QUALITY PIPE SUPPORTS (QPS) LTD

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INTRODUCTION

Introduction

About us
In 1991 Quality Pipe Supports (QPS) Ltd first supplied pipe supports into the power generation industry and since then QPS has grown internationally as a major supplier of pipe support systems to a wide range of industries.

Based in Newtown, Mid Wales, QPS has gained a reputation for having a reliable and responsive attitude to clients within the Power Generation, Nuclear, Petrochemical, Oil, Gas, Offshore, Process and Pharmaceutical industries.

Our key strengths include an adaptable and flexible approach which allows us to consistently meet every aspect of our clients' project requirements.

Client Commitment
Our success in the pipe support industry has always been based on providing our clients with high quality products, realistic delivery schedules, flexibility, competitive prices, and the ability to work closely with the customer to offer the best solutions to all your pipe support needs.

Product Range
We manufacture a comprehensive range of pipe supports covering all requirements. We also fabricate supports and ancillary steelwork to clients' specific designs. Our extensive range includes constant and variable spring units, rigid hangers, ancillary equipment (pipe clamps, u-bolts, etc.), cryogenic (cold) supports, sliders, dynamic restraints, and all types of steelwork fabrications. All of these items are available in a wide range of sizes and materials to suit the clients' specification.

Facilities
Our workshop and production facilities are well equipped for modern pipe support fabrication, with all manufacturing taking place under one roof we are able to achieve high quality pipe supports both efficiently and effectively. We have a purpose built stainless steel clean room; this allows elimination of any possible carbon contamination. Our welders are fully qualified to all the relevant standards required for carbon steel, stainless steel and duplex steel materials.

Engineering
QPS has an experienced and knowledgeable engineering team to assist and support clients in their pipe support design requirements. By using this service our clients are able to collaborate with our team to achieve innovative and practical support solutions to a wide range of pipework configurations.

Plant Surveys and Pipe Support Inspections
Extensive knowledge of the industry allows QPS to provide comprehensive "on-site" support to clients for installation and operation of the complete range of products that we supply. This typically covers spring hanger survey, inspection, refurbishment, and reverse engineering to provide "like for like" replacements of competitor supports and hardware.

Examples of our Engineering activities include:

- Full design and detail of pipe support assemblies
- Site surveys, support & inspection
- Pipe stress analysis to British and International design codes
- Preparation of layout and piping isometric drawings
- Product design and development
- Preparation of design and fabrication drawings

Introduction

Client Support

QPS products are manufactured to precise specifications, enabling us to maintain and develop close relationships with all our clients. Concise and effective communication is vital to our success, and allows us to prioritise scheduled support tracker updates for the largest projects, thus keeping the client informed of the current progress of each pipe support assembly.

We pride ourselves on listening to our clients' requirements and keeping everyone informed at all times from order receipt through to despatch of equipment to the jobsite.

Quality Assurance

Our fully documented quality management system is accredited to BS EN ISO 9001-2015. This ensures the stringent quality requirements demanded by our clients are met and adhered to in all sectors of our work each and every time.

We maintain full traceability of materials and consumables, with full certification and records of manufacturing, providing document packages for projects on demand. Key skills are constantly monitored and maintained for our coded welders, NDT inspection along with qualified in-house welding and painting inspectors.

We also hold full CE Marking accreditation in accordance with EN1090-2.

In our efforts to be the best pipe support company for all your needs, both now and in the future, QPS continuously stay up to date with our health & safety and environmental policies. We believe in a safe environment for our workforce and visitors alike and have a strong commitment to help the community and local suppliers as well as lowering our environmental impact as much as possible.

As such we continue to hold the following certification:-

- ISO 14001-2004
- OHSAS 18001
- ISO 9001-2015
- EN1090-2

Contact Information

We are always available to help with any specific requirements and to provide practical advice. Please contact us for additional copies of our catalogue, support selector program or any other company or technical information:

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QUALITY PIPE SUPPORTS (QPS) Ltd.
SUPPORT REFERENCE No.
SERIAL No.
FAT No.
WORKING LOAD
TOTAL TRAVEL
ACTUAL TRAVEL

CONSTANT SPRING SUPPORTS

Description

Design Principle
The constant support as manufactured by QPS Ltd is designed to allow the supported pipework to expand vertically upwards or downwards throughout the total travel of the unit whilst maintaining a constant supporting effort. The use of constant supports therefore ensures that no undue stresses are imposed on critical pipe components and connections.
This is achieved by transferring the operating load to the coiled compression spring through a cranked load arm; as the load arm moves through its travel range the resulting moment of the operating load and spring are perfectly counterbalanced about the main pivot shaft, thus providing a uniform constant load.

Construction
All our constant support units are substantially constructed, with a wide selection of top fixing arrangements available for attachment to supporting steelwork. All materials have been selected to provide a high safety factor, and the helical coil is housed in a casing which prevents the ingress of construction debris, thus reducing the danger of damage or restriction to the function of the unit.
The constant units are principally manufactured from carbon steel as standard, but stainless steel units are available for extreme corrosive conditions.

Model Range
The constant supports are available in a range of six different models, comprising horizontal, vertical and base mounted units. These accommodate a maximum of 66 different sizes, catering for operating loads ranging from 10kg up to 31,500kg, with travels from 40mm up to 610mm. (Longer travels are available on request).

Specials
Our standard range of quality constant supports will cater for most design conditions, but we can provide special units for higher operating loads and movements than are shown in our standard selection tables; multi-coat paint systems are available if required by the project.

Pre-setting
Our constant supports are supplied to site in the pre-set position to suit the specified operating / installed load condition; the removable pre-set pins lock the load arm in the correct position for connecting to the pipework in its cold condition. The pre-set pins must remain in place if the pipework system is subject to hydrostatic testing or chemical cleaning, but must be removed prior to commissioning.

Hydrostatic Test Loads
Every constant support unit is capable of supporting pipework that may be subject to hydrostatic test loads of up to two times the working load of the unit.

Site Load Adjustment
All our constant supports are pre-set to suit the client's specified operating load and travel. Sometimes however, there are minor variations between the specified design load and the "actual" operating load on site. In these situations the constant units incorporate a site adjustment screw that enables the design load to be adjusted up to +/- 20% of the design load. The amount of adjustment is shown on the scale plate, which is calibrated in 2% divisions.

Selection Procedure

To enable a constant support to be selected it is necessary to have details of the actual design load and vertical movement (up / down) that the constant is to accommodate at each support point. It is then good practice to add 'over travel' to the designated vertical movement.

Recommended 'over travel':
a. For vertical movements up to 125mm - add 25mm
b. For vertical movements in excess of 125mm – add 20% of the original actual movement.

In both a and b above, the calculated figure should then be rounded up to the next whole 10mm increment, thus providing the total travel for each specific support point. The constant unit can then be selected from the constant support selection tables to suit the operating load and total travel calculated.

Typically, selection of the correct constant size is determined by referring to the selection tables (Kg or kN). Using the total travel figure along the top of the chart, read down the relevant column until the required operating load is found, or the nearest greater load. The correct size of spring is found by reading horizontally along the row to the left of this load.

When selecting constant support model QC110, only loads from the right hand side of the bold line within the selection tables should be used.

Example
Operating load 27kN
Actual movement 82mm up
Total travel 82+25 = 107mm, rounded up to the next whole 10mm increment = 110mm

Using the kN selection table:

- Locate total travel column of 110mm and follow down load column for next load up from 27kN. This reads 27.31kN.
- Next, move horizontally to the left under column headed "constant spring size". In this example the selected size would be size 31.

Ordering information
The following information is required when ordering a Constant Support:

- Support / Tag No.
- Constant type (e.g. Fig QC100)
- Size (1 to 66)
- Mounting type (e.g. BY)
- Operating load (Kg or kN)
- Hydrostatic test load (if required)
- Actual travel (up / down)
- Total travel (up / down)
- Rod size if non standard
- Quantity required
- Surface finish specification (standard is hot dip galvanised)

Dimensioned constant support assembly drawings are available using our custom design software.

Installation Instructions

Initially the constant support units should be attached to the steelwork by means of welding or bolting.

1. **Connecting and Loading of Constant Support Units**
   1.1 Constant support unit types which utilise sling rods (QC100, QC110, QC120 and QC130) should be connected between the support top attachment and the constant support unit connector (turnbuckle or yoke). The operating load is transferred from the temporary installation condition to the constant support unit by adjustment of the turnbuckle or yoke arrangement until the pre-set pin (painted red) is easily removed.

   1.2 In the case of constant support unit types which support piping from below, (QC140 & QC150) the constant support unit is initially installed between the equipment support bracket and the supporting steelwork. Any differences in height may be accommodated by use of the height adjustment nut. The operating load is transferred from the temporary installation condition to the constant support unit by further adjustment of the height adjusting nut until the pre-set pin (painted red) is easily removed.

   1.3 The red painted pre-set pin should remain in position for any pre-commissioning overload conditions such as hydrostatic testing or chemical cleaning, but must be removed prior to operation, and then stored for possible future use.

2. **Load Adjustment**
   2.1 In the event that the actual operating load is greater or lesser than the design load for which the constant support unit was designed and calibrated, it will be necessary to utilise the load adjustment facility. The load adjuster screw allows load carrying capacity of +/- 20% of the mean load to be achieved. A simple rotation of this load adjuster nut in the appropriate direction will increase or decrease the load accordingly; the load adjustment scale is calibrated in 2% divisions.

3. **Operation**
   3.1 Prior to operation the following checks must be carried out:
   - All pre-set pins are removed and stored
   - The constant support unit travel indicator is set to the correct setting

   3.2 During normal operation the unit travel indicator should be at the correct operating (hot) position.

   3.3 A periodic check should be made during the first few months of operation to ensure that any movement is within the travel range of the constant support unit; minor site adjustments may be necessary during this time.

4. **Disconnecting and Unloading of Constant Support Units**
   4.1 Reverse the above instructions until the red painted pre-set pin can be easily fitted back into its pre-set position.

Constant Spring Supports – Pictorial Index

QC100

QC110

QC120

QC130

QC140

QC150

Constant Spring Supports

Loads in Kg

Constant Spring Support – Selection Table – Sizes 1 to 33 – Travels 40 to 320

Constant Spring Size	Total Travel (mm)																												
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
Min Load	61	49	41	35	31	27	25	22	20	19	18	16	15	14	14	13	12	12	11	11	10	10	10	9	9	9	8		
1	78	63	52	45	39	35	31	28	26	24	22	21	20	18	17	16	16	15	14	13	13	12	12	11	11	11	10		
2	100	80	67	57	50	44	40	36	33	31	29	27	25	23	22	21	20	19	18	17	17	16	15	15	14	14	13		
3	127	101	84	72	63	56	51	46	42	39	36	34	32	30	28	27	25	24	23	22	21	20	20	19	18	17	17		
4	161	129	107	92	81	72	64	59	54	50	46	43	40	38	36	34	32	31	29	28	27	26	25	24	23	22	21		
5	204	164	136	117	102	91	82	74	68	63	58	55	51	48	45	43	41	39	37	36	34	33	32	30	29	28	27		
6	260	208	173	149	130	116	104	95	87	80	74	69	65	61	58	55	52	50	47	45	43	42	40	38	37	36	35		
7	331	265	221	189	166	147	133	121	110	102	95	88	83	78	74	70	66	63	60	58	55	53	51	49	47	46	44	43	42
8	422	337	281	241	211	187	169	153	141	130	120	112	105	99	94	89	84	80	77	74	70	68	65	63	60	58	56	55	53
9	537	430	358	307	269	239	215	195	179	165	153	143	134	126	119	113	107	102	98	93	90	86	83	80	77	74	72	69	67
10	680	544	453	388	340	302	272	247	227	209	194	181	170	160	151	143	136	129	124	118	113	109	105	101	97	94	91	88	85
11	864	691	576	494	432	384	346	314	288	266	247	230	216	203	192	182	173	165	157	150	144	138	133	128	124	119	115	112	108
12	1097	877	731	627	548	487	439	399	366	337	313	292	274	258	244	231	219	209	200	191	183	176	169	163	157	151	146	142	137
13			824	706	618	549	494	449	412	380	353	330	309	291	275	260	247	235	225	215	206	198	190	183	176	170	165	159	154
14			927	795	696	618	556	506	464	428	397	371	348	327	309	293	278	265	253	242	232	223	214	206	199	192	185	179	174
15			1041	892	781	694	624	568	520	480	446	416	390	367	347	329	312	297	284	272	260	250	240	231	223	215	208	201	195
16			1152	988	864	768	691	628	576	532	494	461	432	407	384	364	346	329	314	301	288	277	266	256	247	238	230	223	216
17			1271	1090	953	847	763	693	636	587	545	508	477	449	424	401	381	363	347	332	318	305	293	283	273	263	254	246	238
18			1444	1238	1083	963	866	788	722	666	619	578	542	510	481	456	433	413	394	377	361	347	333	321	309	299	289	279	271
19			1640	1406	1230	1093	984	894	820	757	703	656	615	579	547	518	492	469	447	428	410	394	378	364	351	339	328	317	307
20			1786	1531	1339	1191	1071	974	893	824	765	714	670	630	595	564	536	510	487	466	446	429	412	397	383	369	357	346	335
21			1943	1666	1457	1296	1166	1060	972	897	833	777	729	686	648	614	583	555	530	507	486	466	448	432	416	402	389	376	364
22			2122	1819	1591	1415	1273	1157	1061	979	909	849	796	749	707	670	637	606	579	554	530	509	490	472	455	439	424	411	398
23			2315	1984	1736	1543	1389	1263	1157	1068	992	926	868	817	772	731	694	661	631	604	579	556	534	514	496	479	463	448	434
24			2516	2156	1887	1677	1510	1372	1258	1161	1078	1006	943	888	839	794	755	719	686	656	629	604	581	559	539	521	503	487	472
25			2766	2371	2074	1844	1659	1508	1383	1276	1185	1106	1037	976	922	873	830	790	754	721	691	664	638	615	593	572	553	535	519
26			3054	2617	2290	2036	1832	1666	1527	1409	1309	1221	1145	1078	1018	964	916	872	833	797	763	733	705	679	654	632	611	591	573
27				2979	2607	2317	2085	1896	1738	1604	1490	1390	1303	1227	1159	1098	1043	993	948	907	869	834	802	772	745	719	695	673	652
28				3374	2952	2624	2362	2147	1968	1817	1687	1575	1476	1389	1312	1243	1181	1125	1074	1027	984	945	908	875	844	814	787	762	738
29				3687	3226	2868	2581	2346	2151	1985	1843	1721	1613	1518	1434	1358	1290	1229	1173	1122	1075	1032	993	956	922	890	860	833	807
30				4016	3514	3124	2811	2556	2343	2162	2008	1874	1757	1654	1562	1480	1406	1339	1278	1222	1171	1124	1081	1041	1004	969	937	907	879
31				4378	3831	3405	3065	2786	2554	2357	2189	2043	1915	1803	1703	1613	1532	1459	1393	1332	1277	1226	1179	1135	1095	1057	1022	989	958
32				4773	4177	3712	3341	3037	2784	2570	2387	2227	2088	1965	1856	1759	1671	1591	1519	1453	1392	1336	1285	1237	1193	1152	1114	1078	1044
33				5464	4781	4250	3825	3477	3188	2942	2732	2550	2391	2250	2125	2013	1913	1821	1739	1663	1594	1530	1471	1417	1366	1319	1275	1234	1195

Note: For Fig.QC110 only, select from right hand side of bold line.

Loads in Kg

Constant Spring Support – Selection Table – Sizes 1 to 33 – Travels 330 to 610

Constant Spring Size	Total Travel (mm)																												
	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610
Min Load																													
1																													
2																													
3																													
4																													
5																													
6																													
7	40	39	38	37	36	35	34	33	32	32																			
8	51	50	48	47	46	44	43	42	41	40																			
9	65	63	61	60	58	57	55	54	52	51																			
10	82	80	78	76	74	72	70	68	66	65																			
11	105	102	99	96	94	91	89	87	84	82																			
12	133	129	125	122	119	116	113	110	107	105																			
13	150	145	141	137	134	130	127	124	121	118																			
14	169	163	159	154	150	146	143	139	136	132																			
15	189	184	178	173	169	164	160	156	152	149																			
16	209	203	197	192	187	182	177	173	169	165																			
17	231	224	218	212	206	201	196	191	186	182																			
18	262	255	247	241	234	228	222	217	211	206																			
19	298	289	281	273	266	259	252	246	240	234	229	224	219	214	209	205	201	197											
20	325	315	306	298	289	282	275	268	261	255	249	243	238	233	228	223	219	214											
21	353	343	333	324	315	307	299	292	284	278	271	265	259	253	248	243	238	233											
22	386	374	364	354	344	335	326	318	310	303	296	289	283	277	271	265	260	255											
23	421	408	397	386	375	366	356	347	339	331	323	316	309	302	296	289	283	278											
24	457	444	431	419	408	397	387	378	368	360	351	343	336	328	321	315	308	302											
25	503	488	474	461	448	437	425	415	405	395	386	377	369	361	353	346	339	332											
26	555	539	523	509	495	482	470	458	447	436	426	416	407	398	390	382	374	366											
27	632	613	596	579	564	549	535	521	509	496	485	474	463	453	444	434	426	417											
28	716	695	675	656	638	622	606	591	576	562	549	537	525	514	503	492	482	472											
29	782	759	737	717	698	679	662	645	630	615	600	587	574	561	549	538	527	516											
30	852	827	803	781	760	740	721	703	686	669	654	639	625	611	598	586	574	562											
31	929	901	876	851	828	807	786	766	748	730	713	697	681	666	652	639	626	613											
32	1012	983	955	928	903	879	857	835	815	795	777	759	742	726	711	696	682	668											
33	1159	1125	1093	1063	1034	1007	981	956	933	911	890	869	850	832	814	797	781	765											

Constant Spring Supports

Loads in Kg

Constant Spring Support – Selection Table – Sizes 34 to 66 – Travels 40 to 320

Constant Spring Size	Total Travel (mm)																												
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
34						4698	4228	3844	3524	3253	3020	2819	2643	2487	2349	2225	2114	2013	1922	1838	1762	1691	1626	1566	1510	1458	1409	1364	1321
35						5146	4632	4211	3860	3563	3308	3088	2895	2724	2573	2438	2316	2206	2105	2014	1930	1853	1781	1715	1654	1597	1544	1494	1447
36						5850	5265	4787	4388	4050	3761	3510	3291	3097	2925	2771	2633	2507	2393	2289	2194	2106	2025	1950	1880	1816	1755	1698	1645
37						6657	5991	5446	4993	4608	4279	3994	3744	3524	3328	3153	2996	2853	2723	2605	2496	2396	2304	2219	2140	2066	1997	1933	1872
38						7259	6533	5939	5444	5025	4666	4355	4083	3843	3629	3438	3266	3111	2969	2840	2722	2613	2513	2420	2333	2253	2178	2107	2041
39						7911	7120	6473	5934	5477	5086	4747	4450	4188	3956	3748	3560	3391	3236	3096	2967	2848	2739	2637	2543	2455	2373	2297	2225
40								7060	6471	5973	5547	5177	4853	4568	4314	4087	3883	3698	3530	3376	3236	3106	2987	2876	2773	2678	2588	2505	2427
41								7687	7047	6504	6040	5637	5285	4974	4698	4450	4228	4027	3844	3676	3523	3382	3252	3132	3020	2916	2819	2728	2642
42								8421	7719	7126	6617	6176	5790	5449	5146	4875	4632	4411	4211	4028	3860	3705	3563	3431	3308	3194	3088	2988	2895
43								9573	8776	8100	7522	7020	6582	6194	5850	5542	5265	5015	4787	4578	4388	4212	4050	3900	3761	3631	3510	3397	3291
44								10893	9985	9217	8559	7988	7489	7048	6657	6306	5991	5706	5447	5210	4993	4793	4609	4438	4279	4132	3994	3865	3744
45								11878	10888	10050	9332	8710	8166	7685	7259	6876	6533	6222	5939	5681	5444	5226	5025	4839	4666	4505	4355	4215	4083
46								12946	11867	10954	10171	9494	8900	8377	7911	7495	7120	6781	6473	6192	5934	5696	5477	5274	5086	4911	4747	4594	4450
47								14119	12942	11947	11094	10354	9707	9136	8628	8174	7765	7396	7060	6753	6471	6212	5973	5752	5547	5355	5177	5010	4853
48								15376	14095	13010	12081	11276	10571	9949	9396	8902	8457	8054	7688	7354	7047	6765	6505	6264	6041	5832	5638	5456	5285
49								16601	15218	14047	13044	12174	11413	10742	10145	9611	9131	8696	8301	7940	7609	7305	7024	6764	6522	6297	6087	5891	5707
50								18015	16514	15244	14155	13211	12386	11657	11009	10430	9908	9437	9008	8616	8257	7927	7622	7340	7077	6833	6606	6393	6193
51								19377	17762	16396	15225	14210	13322	12538	11842	11218	10657	10150	9689	9267	8881	8526	8198	7894	7612	7350	7105	6876	6661
52								20948	19202	17725	16459	15362	14402	13555	12802	12128	11521	10973	10474	10019	9601	9217	8863	8534	8230	7946	7681	7433	7201
53								22624	20739	19143	17776	16591	15554	14639	13826	13098	12443	11851	11312	10820	10369	9955	9572	9217	8888	8582	8295	8028	7777
54								24090	22083	20384	18928	17666	16562	15588	14722	13947	13250	12619	12045	11521	11041	10600	10192	9815	9464	9138	8833	8548	8281
55								25838	23685	21863	20301	18948	17764	16719	15790	14959	14211	13534	12919	12357	11843	11369	10932	10527	10151	9801	9474	9168	8882
56								27713	25404	23450	21775	20323	19053	17932	16936	16044	15242	14516	13857	13254	12702	12194	11725	11291	10887	10512	10161	9834	9526
57								29724	27247	25151	23354	21797	20435	19233	18164	17208	16348	15570	14862	14216	13623	13078	12575	12110	11677	11275	10899	10547	10218
58								31881	29224	26976	25049	23379	21918	20629	19483	18457	17534	16699	15940	15247	14612	14027	13488	12988	12524	12092	11689	11312	10959
59												24578	23042	21686	20482	19404	18433	17556	16758	16029	15361	14747	14180	13654	13167	12713	12289	11893	11521
60												25838	24224	22799	21532	20399	19379	18456	17617	16851	16149	15503	14907	14355	13842	13365	12919	12503	12112
61												27164	25466	23968	22637	21445	20373	19403	18521	17716	16977	16298	15671	15091	14552	14050	13582	13144	12733
62												28557	26772	25198	23798	22545	21418	20398	19471	18624	17848	17134	16475	15865	15299	14771	14279	13818	13386
63												29723	27866	26226	24769	23466	22292	21231	20266	19385	18577	17834	17148	16513	15923	15374	14862	14382	13933
64												30937	29003	27297	25781	24424	23203	22098	21093	20176	19336	18562	17848	17187	16573	16002	15468	14969	14502
65												32200	30187	28412	26833	25421	24150	23000	21954	21000	20125	19320	18577	17889	17250	16655	16100	15581	15094
66												33515	31420	29572	27929	26459	25136	23939	22851	21857	20947	20109	19335	18619	17954	17335	16757	16217	15710

Note: For Fig.QC110 only, select from right hand side of bold line.

Loads in Kg

Constant Spring Support – Selection Table – Sizes 34 to 66 – Travels 330 to 610

Constant Spring Size	Total Travel (mm)																											
	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610
34	1281	1244	1208	1175	1143	1113	1084	1057	1031	1007	983	961	940	919	900	881	863	846	829	813	798	783	769	755	742	729	717	705	693
35	1404	1362	1323	1287	1252	1219	1188	1158	1130	1103	1077	1053	1029	1007	986	965	945	926	908	891	874	858	842	827	813	799	785	772	759
36	1596	1549	1504	1463	1423	1386	1350	1316	1284	1254	1224	1197	1170	1145	1120	1097	1074	1053	1032	1013	993	975	957	940	924	908	892	876	863
37	1815	1762	1712	1664	1619	1577	1536	1498	1461	1426	1393	1362	1331	1302	1275	1248	1223	1198	1175	1152	1130	1109	1089	1070	1051	1033	1015	999	982
38	1980	1921	1866	1815	1766	1719	1675	1633	1593	1555	1519	1485	1452	1420	1390	1361	1333	1307	1281	1256	1233	1210	1188	1167	1146	1126	1107	1089	1071
39	2158	2094	2034	1978	1924	1874	1826	1780	1737	1695	1656	1618	1582	1548	1515	1483	1453	1424	1396	1369	1343	1319	1295	1271	1249	1228	1207	1187	1167
40	2353	2284	2219	2157	2099	2044	1991	1941	1894	1849	1806	1765	1726	1688	1652	1618	1585	1553	1523	1493	1465	1438	1412	1387	1362	1339	1316	1294	1273
41	2562	2487	2416	2349	2285	2225	2168	2114	2062	2013	1966	1922	1879	1838	1799	1762	1726	1691	1658	1626	1595	1566	1537	1510	1483	1458	1433	1409	1386
42	2807	2724	2647	2573	2504	2438	2375	2316	2259	2206	2154	2105	2059	2014	1971	1930	1890	1853	1816	1781	1748	1715	1684	1654	1625	1597	1570	1544	1519
43	3191	3097	3009	2925	2846	2771	2700	2633	2568	2507	2449	2393	2340	2289	2241	2194	2149	2106	2065	2025	1987	1950	1915	1880	1847	1816	1785	1755	1726
44	3631	3524	3424	3328	3238	3153	3072	2996	2923	2853	2787	2723	2663	2605	2549	2496	2445	2396	2349	2304	2261	2219	2179	2140	2102	2066	2031	1997	1964
45	3959	3843	3733	3629	3531	3438	3350	3266	3187	3111	3038	2969	2903	2840	2780	2722	2666	2613	2562	2513	2465	2420	2376	2333	2292	2253	2214	2178	2142
46	4315	4188	4069	3956	3849	3748	3651	3560	3473	3391	3312	3236	3165	3096	3030	2967	2906	2848	2792	2739	2687	2637	2589	2543	2498	2455	2414	2373	2335
47	4706	4568	4437	4314	4198	4087	3982	3883	3788	3698	3612	3530	3451	3376	3304	3236	3170	3106	3045	2987	2930	2876	2824	2773	2725	2678	2632	2588	2546
48	5125	4975	4832	4698	4571	4451	4337	4228	4125	4027	3933	3844	3759	3677	3599	3524	3452	3383	3316	3253	3191	3132	3075	3020	2967	2916	2867	2819	2773
49	5534	5371	5218	5073	4936	4806	4682	4565	4454	4348	4247	4150	4058	3970	3885	3804	3727	3652	3581	3512	3446	3382	3320	3261	3204	3149	3095	3044	2994
50	6005	5829	5662	5505	5356	5215	5081	4954	4833	4718	4609	4504	4404	4308	4216	4129	4044	3963	3886	3811	3739	3670	3603	3539	3477	3417	3359	3303	3249
51	6459	6269	6090	5921	5761	5609	5465	5329	5199	5075	4957	4844	4737	4634	4535	4441	4350	4263	4179	4099	4022	3947	3875	3806	3739	3675	3613	3552	3494
52	6983	6777	6584	6401	6228	6064	5908	5761	5620	5486	5359	5237	5121	5009	4903	4801	4703	4609	4518	4431	4348	4267	4190	4115	4043	3973	3906	3840	3778
53	7541	7320	7110	6913	6726	6549	6381	6222	6070	5925	5788	5656	5530	5410	5295	5185	5079	4977	4880	4786	4696	4609	4525	4444	4366	4291	4218	4148	4080
54	8030	7794	7571	7361	7162	6974	6795	6625	6463	6309	6163	6023	5889	5761	5638	5521	5408	5300	5196	5096	5000	4907	4818	4732	4649	4569	4491	4417	4344
55	8613	8359	8121	7895	7682	7479	7288	7106	6932	6767	6610	6460	6316	6179	6047	5921	5800	5684	5573	5466	5363	5263	5168	5075	4986	4900	4817	4737	4659
56	9238	8966	8710	8468	8239	8022	7817	7621	7435	7258	7089	6928	6774	6627	6486	6351	6221	6097	5977	5862	5752	5645	5543	5444	5348	5256	5167	5081	4997
57	9908	9616	9342	9082	8837	8604	8384	8174	7975	7785	7604	7431	7266	7108	6957	6812	6673	6539	6411	6288	6169	6055	5945	5839	5736	5637	5542	5449	5360
58	10627	10314	10019	9741	9478	9228	8992	8767	8553	8350	8155	7970	7793	7624	7461	7306	7157	7014	6876	6744	6617	6494	6376	6262	6152	6046	5944	5845	5749
59	11172	10843	10533	10241	9964	9702	9453	9217	8992	8778	8574	8379	8193	8015	7844	7681	7524	7373	7229	7090	6956	6827	6703	6583	6468	6356	6249	6144	6044
60	11745	11399	11074	10766	10475	10199	9938	9689	9453	9228	9013	8809	8613	8426	8246	8075	7910	7752	7600	7453	7313	7177	7047	6921	6800	6682	6569	6460	6354
61	12347	11984	11642	11318	11012	10723	10448	10186	9938	9701	9476	9260	9055	8858	8669	8489	8315	8149	7989	7836	7688	7546	7408	7276	7148	7025	6906	6791	6680
62	12981	12599	12239	11899	11577	11273	10984	10709	10448	10199	9962	9735	9519	9312	9114	8924	8742	8567	8399	8238	8082	7933	7788	7649	7515	7385	7260	7139	7022
63	13511	13113	12739	12385	12050	11733	11432	11146	10874	10615	10369	10133	9908	9692	9486	9289	9099	8917	8742	8574	8412	8256	8106	7962	7822	7687	7557	7431	7309
64	14062	13649	13259	12890	12542	12212	11899	11601	11318	11049	10792	10547	10312	10088	9873	9668	9470	9281	9099	8924	8756	8594	8437	8287	8141	8001	7865	7734	7607
65	14636	14206	13800	13417	13054	12710	12385	12075	11780	11500	11233	10977	10733	10500	10277	10062	9857	9660	9471	9288	9113	8944	8782	8625	8474	8328	8186	8050	7918
66	15234	14786	14363	13964	13587	13229	12890	12568	12261	11969	11691	11425	11172	10929	10696	10473	10260	10054	9857	9668	9485	9310	9140	8977	8820	8668	8521	8379	8241

Constant Spring Supports

Loads in Kn

Constant Spring Support – Selection Table – Sizes 1 to 33 – Travels 40 to 320

Constant Spring Size	Total Travel (mm)																													
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
Min Load	0.598	0.480	0.402	0.343	0.304	0.265	0.245	0.216	0.196	0.186	0.176	0.157	0.146	0.137	0.137	0.127	0.117	0.114	0.111	0.107	0.102	0.098	0.094	0.091	0.087	0.085	0.082		
1	0.765	0.618	0.510	0.441	0.382	0.343	0.304	0.274	0.255	0.235	0.216	0.206	0.196	0.176	0.167	0.157	0.157	0.147	0.137	0.127	0.127	0.118	0.118	0.108	0.108	0.108	0.098		
2	0.981	0.784	0.657	0.559	0.490	0.431	0.392	0.353	0.324	0.304	0.284	0.265	0.245	0.225	0.216	0.206	0.196	0.186	0.176	0.167	0.167	0.157	0.147	0.147	0.137	0.137	0.127		
3	1.245	0.990	0.824	0.706	0.618	0.549	0.500	0.451	0.412	0.382	0.353	0.333	0.314	0.294	0.274	0.265	0.245	0.235	0.225	0.216	0.206	0.196	0.196	0.186	0.176	0.167	0.167		
4	1.579	1.265	1.049	0.902	0.794	0.706	0.628	0.579	0.530	0.490	0.451	0.422	0.392	0.373	0.353	0.333	0.314	0.304	0.284	0.274	0.265	0.255	0.245	0.235	0.225	0.216	0.207		
5	2.001	1.608	1.333	1.147	1.000	0.892	0.804	0.726	0.667	0.618	0.569	0.539	0.500	0.471	0.441	0.422	0.402	0.382	0.363	0.353	0.333	0.326	0.314	0.294	0.284	0.274	0.265		
6	2.550	2.040	1.697	1.461	1.275	1.138	1.020	0.932	0.853	0.785	0.726	0.677	0.637	0.598	0.569	0.539	0.510	0.490	0.461	0.441	0.422	0.412	0.392	0.373	0.363	0.353	0.343		
7	3.246	2.599	2.167	1.853	1.628	1.442	1.304	1.187	1.079	1.000	0.932	0.863	0.814	0.765	0.726	0.686	0.647	0.618	0.588	0.568	0.539	0.520	0.500	0.480	0.461	0.451	0.431	0.422	0.412
8	4.138	3.305	2.756	2.363	2.069	1.834	1.657	1.500	1.383	1.275	1.177	1.098	1.030	0.971	0.922	0.873	0.824	0.785	0.755	0.725	0.686	0.667	0.637	0.618	0.588	0.570	0.549	0.540	0.520
9	5.266	4.217	3.511	3.011	2.638	2.344	2.108	1.912	1.755	1.618	1.500	1.402	1.314	1.236	1.167	1.108	1.049	1.000	0.961	0.912	0.882	0.843	0.814	0.784	0.755	0.725	0.706	0.677	0.657
10	6.669	5.335	4.442	3.805	3.334	2.962	2.667	2.422	2.226	2.050	1.902	1.775	1.667	1.569	1.481	1.402	1.334	1.265	1.216	1.157	1.108	1.069	1.029	0.990	0.951	0.922	0.892	0.863	0.834
11	8.473	6.776	5.649	4.844	4.236	3.766	3.393	3.079	2.824	2.609	2.422	2.256	2.118	1.991	1.883	1.785	1.697	1.618	1.539	1.470	1.412	1.353	1.304	1.255	1.216	1.167	1.127	1.099	1.060
12	10.758	8.600	7.169	6.149	5.374	4.776	4.305	3.913	3.589	3.305	3.069	2.864	2.687	2.530	2.393	2.265	2.148	2.050	1.961	1.872	1.794	1.725	1.657	1.598	1.539	1.480	1.431	1.393	1.344
13			8.081	6.923	6.061	5.384	4.844	4.403	4.040	3.727	3.462	3.236	3.030	2.854	2.697	2.550	2.422	2.305	2.206	2.108	2.020	1.942	1.863	1.794	1.725	1.667	1.618	1.559	1.510
14			9.091	7.796	6.825	6.061	5.452	4.962	4.550	4.197	3.893	3.638	3.413	3.207	3.030	2.873	2.726	2.599	2.481	2.373	2.275	2.187	2.099	2.019	1.951	1.882	1.814	1.755	1.706
15			10.209	8.748	7.659	6.806	6.119	5.570	5.099	4.707	4.374	4.080	3.825	3.599	3.403	3.226	3.060	2.913	2.785	2.667	2.550	2.452	2.354	2.265	2.186	2.108	2.039	1.970	1.912
16			11.297	9.689	8.473	7.532	6.776	6.159	5.649	5.217	4.844	4.521	4.236	3.991	3.766	3.570	3.393	3.226	3.079	2.952	2.824	2.716	2.609	2.510	2.421	2.333	2.255	2.186	2.118
17			12.464	10.689	9.346	8.306	7.482	6.796	6.237	5.757	5.345	4.982	4.678	4.403	4.158	3.932	3.736	3.560	3.403	3.256	3.119	2.991	2.873	2.774	2.676	2.578	2.490	2.412	2.333
18			14.161	12.141	10.621	9.444	8.493	7.728	7.080	6.531	6.070	5.668	5.315	5.001	4.717	4.472	4.246	4.050	3.864	3.697	3.540	3.403	3.266	3.147	3.029	2.931	2.833	2.735	2.657
19			16.083	13.788	12.062	10.719	9.650	8.767	8.041	7.424	6.894	6.433	6.031	5.678	5.364	5.080	4.825	4.599	4.384	4.197	4.021	3.864	3.707	3.570	3.442	3.324	3.217	3.109	3.011
20			17.515	15.014	13.131	11.680	10.503	9.552	8.757	8.081	7.502	7.002	6.570	6.178	5.835	5.531	5.256	5.001	4.776	4.570	4.374	4.207	4.040	3.893	3.756	3.619	3.501	3.393	3.285
21			19.054	16.338	14.288	12.709	11.435	10.395	9.532	8.797	8.169	7.620	7.149	6.727	6.355	6.021	5.717	5.443	5.198	4.972	4.766	4.570	4.393	4.236	4.080	3.942	3.815	3.687	3.570
22			20.810	17.838	15.602	13.876	12.484	11.346	10.405	9.601	8.914	8.326	7.806	7.345	6.933	6.570	6.247	5.943	5.678	5.433	5.198	4.992	4.805	4.629	4.462	4.305	4.158	4.031	3.903
23			22.702	19.456	17.024	15.132	13.621	12.386	11.346	10.474	9.728	9.081	8.512	8.012	7.571	7.169	6.806	6.482	6.188	5.923	5.678	5.452	5.237	5.041	4.864	4.697	4.540	4.393	4.256
24			24.674	21.143	18.505	16.446	14.808	13.445	12.337	11.386	10.572	9.865	9.248	8.708	8.228	7.786	7.404	7.051	6.727	6.433	6.168	5.923	5.698	5.482	5.286	5.109	4.933	4.776	4.629
25			27.125	23.252	20.340	18.083	16.269	14.788	13.563	12.513	11.621	10.846	10.169	9.571	9.042	8.561	8.140	7.747	7.394	7.071	6.776	6.512	6.257	6.031	5.815	5.609	5.432	5.247	5.090
26			29.950	25.664	22.457	19.966	17.966	16.338	14.975	13.818	12.837	11.974	11.229	10.572	9.983	9.454	8.983	8.551	8.169	7.816	7.482	7.188	6.914	6.659	6.414	6.198	5.992	5.796	5.619
27				29.214	25.566	22.722	20.447	18.593	17.044	15.730	14.612	13.631	12.778	12.033	11.366	10.768	10.228	9.738	9.297	8.895	8.522	8.179	7.865	7.571	7.306	7.051	6.816	6.600	6.394
28				33.088	28.949	25.733	23.163	21.055	19.299	17.819	16.544	15.445	14.475	13.621	12.866	12.190	11.582	11.032	10.532	10.071	9.650	9.267	8.904	8.581	8.277	7.983	7.718	7.473	7.237
29				36.157	31.636	28.125	25.311	23.006	21.094	19.466	18.074	16.877	15.818	14.886	14.063	13.317	12.651	12.052	11.503	11.003	10.542	10.120	9.738	9.375	9.042	8.728	8.434	8.169	7.914
30				39.384	34.461	30.636	27.566	25.066	22.977	21.202	19.692	18.378	17.230	16.220	15.318	14.514	13.788	13.131	12.533	11.984	11.484	11.023	10.601	10.209	9.846	9.503	9.189	8.895	8.620
31				42.934	37.569	33.392	30.057	27.321	25.046	23.114	21.467	20.035	18.780	17.681	16.701	15.818	15.024	14.308	13.661	13.062	12.523	12.023	11.562	11.131	10.738	10.366	10.022	9.699	9.395
32				46.807	40.962	36.402	32.764	29.783	27.302	25.203	23.408	21.839	20.476	19.270	18.201	17.250	16.387	15.602	14.896	14.249	13.651	13.102	12.602	12.131	11.699	11.297	10.925	10.572	10.238
33				53.584	46.886	41.678	37.510	34.098	31.264	28.851	26.792	25.007	23.448	22.065	20.839	19.741	18.760	17.858	17.054	16.308	15.632	15.004	14.426	13.896	13.396	12.935	12.503	12.101	11.719

Note: For Fig.QC110 only, select from right hand side of bold line.

Loads in Kn

Constant Spring Support – Selection Table – Sizes 1 to 33 – Travels 330 to 610																													
Constant Spring Size	Total Travel (mm)																												
	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610
Min Load																													
1																													
2																													
3																													
4																													
5																													
6																													
7	0.392	0.383	0.373	0.363	0.353	0.343	0.333	0.324	0.314	0.314																			
8	0.500	0.491	0.471	0.461	0.451	0.431	0.422	0.412	0.402	0.392																			
9	0.638	0.618	0.598	0.589	0.569	0.559	0.540	0.530	0.510	0.500																			
10	0.804	0.785	0.765	0.746	0.726	0.706	0.686	0.667	0.647	0.637																			
11	1.030	1.006	0.971	0.942	0.922	0.892	0.873	0.854	0.824	0.804																			
12	1.305	1.265	1.226	1.197	1.167	1.138	1.108	1.079	1.049	1.030																			
13	1.470	1.421	1.382	1.343	1.315	1.275	1.246	1.216	1.187	1.158																			
14	1.657	1.598	1.559	1.510	1.471	1.432	1.403	1.364	1.334	1.295																			
15	1.853	1.804	1.745	1.696	1.658	1.609	1.570	1.530	1.491	1.462																			
16	2.049	1.990	1.931	1.882	1.834	1.785	1.736	1.697	1.658	1.619																			
17	2.265	2.196	2.137	2.078	2.021	1.972	1.923	1.874	1.825	1.785																			
18	2.568	2.450	2.421	2.363	2.296	2.237	2.178	2.129	2.070	2.021																			
19	2.922	2.834	2.756	2.677	2.608	2.540	2.471	2.412	2.353	2.295	2.246	2.197	2.147	2.098	2.049	2.010	1.971	1.932											
20	3.187	3.089	3.001	2.922	2.834	2.765	2.697	2.628	2.560	2.500	2.442	2.383	2.334	2.285	2.236	2.187	2.147	2.098											
21	3.462	3.364	3.266	3.177	3.089	3.010	2.932	2.863	2.785	2.726	2.657	2.599	2.540	2.481	2.432	2.383	2.334	2.285											
22	3.785	3.668	3.570	3.472	3.373	3.285	3.197	3.119	3.040	2.971	2.903	2.834	2.775	2.716	2.657	2.598	2.550	2.500											
23	4.129	4.001	3.893	3.785	3.677	3.589	3.491	3.403	3.324	3.246	3.167	3.099	3.030	2.961	2.903	2.834	2.775	2.726											
24	4.482	4.354	4.227	4.109	4.001	3.893	3.795	3.707	3.609	3.530	3.442	3.363	3.295	3.216	3.148	3.089	3.020	2.961											
25	4.933	4.786	4.648	4.521	4.393	4.285	4.167	4.069	3.971	3.873	3.785	3.697	3.618	3.540	3.461	3.393	3.324	3.256											
26	5.443	5.286	5.129	4.992	4.854	4.726	4.609	4.491	4.383	4.276	4.177	4.079	3.991	3.903	3.824	3.746	3.667	3.589											
27	6.198	6.011	5.845	5.678	5.531	5.383	5.246	5.109	4.991	4.864	4.756	4.648	4.540	4.442	4.354	4.256	4.177	4.089											
28	7.022	6.816	6.619	6.433	6.256	6.099	5.942	5.795	5.648	5.511	5.383	5.266	5.148	5.040	4.932	4.825	4.726	4.628											
29	7.669	7.443	7.228	7.031	6.844	6.658	6.491	6.325	6.178	6.031	5.884	5.756	5.629	5.501	5.383	5.276	5.168	5.060											
30	8.355	8.110	7.875	7.659	7.452	7.256	7.070	6.894	6.727	6.560	6.413	6.266	6.129	5.991	5.864	5.746	5.629	5.511											
31	9.110	8.836	8.591	8.345	8.119	7.913	7.707	7.511	7.335	7.158	6.992	6.835	6.678	6.531	6.393	6.266	6.138	6.011											
32	9.924	9.640	9.365	9.101	8.855	8.619	8.404	8.188	7.992	7.796	7.619	7.443	7.276	7.119	6.972	6.825	6.688	6.550											
33	11.366	11.032	10.719	10.424	10.140	9.875	9.620	9.374	9.149	8.933	8.727	8.521	8.335	8.158	7.982	7.815	7.658	7.501											

Constant Spring Supports

Loads in Kn

Constant Spring Support – Selection Table – Sizes 34 to 66 – Travels 40 to 320

Constant Spring Size	Total Travel (mm)																													
	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
34						46.072	41.463	37.697	34.559	31.901	29.616	27.645	25.919	24.389	23.036	21.820	20.731	19.741	18.848	18.025	17.279	16.583	15.946	15.357	14.808	14.298	13.818	13.376	12.955
35						50.465	45.424	41.296	37.854	34.941	32.440	30.283	28.390	26.713	25.233	23.909	22.712	21.633	20.643	19.751	18.927	18.172	17.466	16.818	16.220	15.661	15.141	14.651	14.190
36						57.369	51.632	46.944	43.032	39.717	36.883	34.421	32.274	30.371	28.684	27.174	25.821	24.585	23.467	22.447	21.516	20.653	19.858	19.123	18.437	17.809	17.211	16.652	16.132
37						65.283	58.752	53.407	48.965	45.189	41.963	39.168	36.716	34.559	32.637	30.920	29.381	27.978	26.704	25.546	24.477	23.497	22.595	21.761	20.986	20.261	19.584	18.956	18.358
38						71.186	64.067	58.242	53.387	49.278	45.758	42.708	40.041	37.687	35.588	33.715	32.029	30.508	29.116	27.851	26.694	25.625	24.644	23.732	22.879	22.094	21.359	20.663	20.015
39						77.580	69.823	63.478	58.193	53.711	49.877	46.552	43.640	41.070	38.795	36.755	34.913	33.254	31.734	30.361	29.096	27.929	26.800	25.860	24.938	24.075	23.271	22.526	21.820
40								69.235	63.459	58.575	54.397	50.769	47.592	44.797	42.306	40.080	38.079	36.265	34.617	33.107	31.734	30.459	29.292	28.204	27.194	26.262	25.380	24.566	23.801
41								75.384	69.107	63.782	59.232	55.280	51.828	48.778	46.072	43.640	41.463	39.491	37.697	36.049	34.549	33.166	31.891	30.714	29.616	28.596	27.645	26.753	25.909
42								82.582	75.698	69.882	64.891	60.566	56.781	53.436	50.465	47.807	45.424	43.257	41.296	39.501	37.854	36.334	34.941	33.647	32.440	31.322	30.283	29.302	28.390
43								93.879	86.063	79.434	73.766	68.843	64.547	60.742	57.369	54.348	51.632	49.180	46.944	44.895	43.032	41.306	39.717	38.246	36.883	35.608	34.421	33.313	32.274
44								106.824	97.919	90.388	83.935	78.336	73.442	69.117	65.283	61.841	58.752	55.957	53.417	51.093	48.965	47.003	45.199	43.522	41.963	40.521	39.168	37.903	36.716
45								116.483	106.775	98.557	91.516	85.416	80.081	75.364	71.186	67.431	64.067	61.017	58.242	55.712	53.387	51.250	49.278	47.454	45.758	44.179	42.708	41.335	40.041
46								126.957	116.376	107.422	99.743	93.104	87.279	82.150	77.580	73.501	69.823	66.499	63.478	60.723	58.193	55.859	53.711	51.720	49.877	48.160	46.552	45.052	43.640
47								138.460	126.918	117.160	108.795	101.538	95.193	89.594	84.612	80.160	76.149	72.530	69.235	66.224	63.459	60.919	58.575	56.408	54.397	52.515	50.769	49.131	47.592
48								150.787	138.225	127.585	118.474	110.580	103.666	97.566	92.143	87.299	82.935	78.983	75.394	72.118	69.107	66.342	63.792	61.429	59.242	57.192	55.290	53.505	51.828
49								162.800	149.238	137.754	127.918	119.386	111.923	105.343	99.488	94.252	89.545	85.279	81.405	77.865	74.619	71.638	68.882	66.332	63.959	61.752	59.693	57.771	55.967
50								176.667	161.947	149.493	138.813	129.556	121.465	114.316	107.961	102.283	97.164	92.545	88.338	84.494	80.974	77.737	74.746	71.981	69.402	67.009	64.783	62.694	60.733
51								190.023	174.186	160.790	149.306	139.352	130.644	122.956	116.130	110.011	104.509	99.537	95.017	90.878	87.093	83.611	80.395	77.414	74.648	72.079	69.676	67.431	65.322
52								205.430	188.307	173.823	161.408	150.650	141.235	132.929	125.545	118.935	112.982	107.608	102.715	98.253	94.154	90.388	86.916	83.690	80.709	77.924	75.325	72.893	70.618
53								221.866	203.380	187.729	174.323	162.702	152.533	143.560	135.587	128.448	122.024	116.219	110.933	106.108	101.685	97.625	93.869	90.388	87.162	84.161	81.346	78.728	76.266
54								236.242	216.560	199.899	185.620	173.244	162.418	152.866	144.374	136.773	129.938	123.750	118.121	112.982	108.275	103.950	99.946	96.252	92.810	89.613	86.622	83.827	81.209
55								253.384	232.271	214.403	199.085	185.816	174.205	163.957	154.847	146.698	139.362	132.723	126.692	121.181	116.140	111.492	107.206	103.235	99.547	96.115	92.908	89.907	87.103
56								271.772	249.128	229.966	213.540	199.301	186.846	175.853	166.085	157.338	149.473	142.353	135.891	129.977	124.564	119.582	114.983	110.727	106.765	103.088	99.645	96.439	93.418
57								291.493	267.202	246.647	229.024	213.756	200.399	188.611	178.128	168.753	160.319	152.690	145.746	139.411	133.596	128.251	123.319	118.759	114.512	110.570	106.883	103.431	100.204
58								312.646	286.590	264.544	245.647	229.270	214.942	202.301	191.063	181.001	171.950	163.761	156.318	149.522	143.295	137.558	132.272	127.369	122.818	118.582	114.630	110.933	107.471
59												241.028	225.965	212.667	200.860	190.288	180.766	172.166	164.340	157.191	150.640	144.619	139.058	133.900	129.124	124.672	120.514	116.630	112.982
60												253.384	237.556	223.582	211.157	200.046	190.043	180.992	172.764	165.252	158.368	152.032	146.188	140.774	135.744	131.066	126.692	122.613	118.778
61												266.388	249.736	235.046	221.993	210.304	199.791	190.278	181.629	173.735	166.487	159.829	153.680	147.992	142.706	137.783	133.194	128.899	124.868
62												280.049	262.544	247.108	233.379	221.091	210.038	200.036	190.945	182.639	175.029	168.027	161.565	155.583	150.032	144.854	140.029	135.508	131.272
63												291.483	273.272	257.189	242.901	230.123	218.610	208.205	198.742	190.102	182.178	174.892	168.164	161.937	156.151	150.767	145.746	141.039	136.636
64												303.388	284.422	267.692	252.825	239.518	227.544	216.707	206.852	197.859	189.621	182.031	175.029	168.547	162.526	156.926	151.689	146.796	142.216
65												315.774	296.033	278.627	263.142	249.295	236.831	225.553	215.295	205.940	197.359	189.464	182.178	175.431	169.165	163.330	157.887	152.797	148.022
66												328.670	308.125	290.002	273.890	259.474	246.500	234.761	224.092	214.344	205.420	197.202	189.612	182.590	176.069	169.998	164.330	159.034	154.062

Note: For Fig.QC110 only, select from right hand side of bold line.

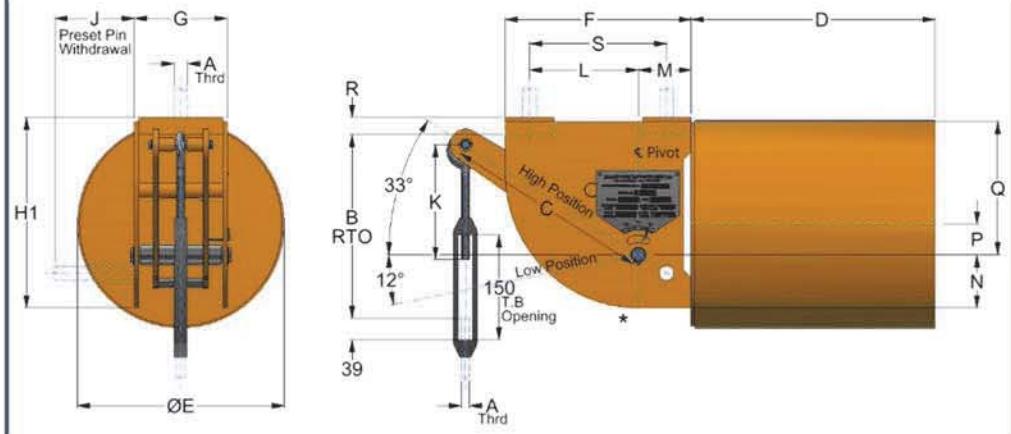
Loads in Kn

Constant Spring Support – Selection Table – Sizes 34 to 66 – Travels 330 to 610																														
Constant Spring Size	Total Travel (mm)																													
	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610
34	12.562	12.199	11.846	11.523	11.209	10.915	10.630	10.366	10.111	9.875	9.639	9.423	9.218	9.012	8.825	8.639	8.462	8.296	8.129	7.972	7.825	7.678	7.541	7.403	7.276	7.148	7.031	6.913	6.795
35	13.769	13.357	12.974	12.621	12.278	11.954	11.650	11.356	11.082	10.816	10.561	10.326	10.090	9.875	9.669	9.463	9.267	9.080	8.904	8.737	8.570	8.413	8.257	8.109	7.972	7.835	7.698	7.570	7.443
36	15.651	15.191	14.749	14.347	13.955	13.592	13.239	12.906	12.592	12.297	12.002	11.738	11.473	11.228	10.983	10.757	10.531	10.326	10.120	9.933	9.737	9.561	9.384	9.218	9.061	8.904	8.747	8.590	8.462
37	17.799	17.279	16.789	16.318	15.877	15.465	15.063	14.690	14.328	13.983	13.660	13.356	13.052	12.767	12.502	12.238	11.993	11.747	11.522	11.296	11.081	10.875	10.679	10.492	10.306	10.129	9.953	9.796	9.629
38	19.417	18.839	18.299	17.799	17.319	16.858	16.426	16.014	15.622	15.248	14.895	14.562	14.238	13.924	13.630	13.346	13.071	12.816	12.561	12.316	12.091	11.865	11.649	11.443	11.238	11.041	10.855	10.679	10.502
39	21.163	20.535	19.947	19.398	18.868	18.378	17.907	17.456	17.034	16.621	16.239	15.866	15.513	15.179	14.856	14.542	14.248	13.964	13.689	13.424	13.169	12.934	12.699	12.463	12.248	12.042	11.836	11.640	11.443
40	23.075	22.398	21.761	21.153	20.584	20.045	19.525	19.035	18.574	18.132	17.711	17.309	16.926	16.554	16.201	15.867	15.544	15.230	14.936	14.641	14.367	14.102	13.847	13.602	13.357	13.131	12.906	12.690	12.484
41	25.125	24.389	23.693	23.036	22.408	21.820	21.261	20.731	20.221	19.741	19.279	18.848	18.427	18.025	17.642	17.279	16.926	16.583	16.259	15.946	15.642	15.357	15.073	14.808	14.543	14.298	14.053	13.818	13.592
42	27.527	26.713	25.958	25.233	24.556	23.909	23.291	22.712	22.153	21.633	21.124	20.643	20.192	19.751	19.329	18.927	18.535	18.172	17.809	17.466	17.142	16.818	16.514	16.220	15.936	15.661	15.396	15.141	14.896
43	31.293	30.371	29.508	28.684	27.910	27.174	26.478	25.821	25.183	24.585	24.016	23.467	22.948	22.447	21.977	21.516	21.074	20.653	20.251	19.858	19.486	19.123	18.780	18.437	18.113	17.809	17.505	17.211	16.926
44	35.608	34.559	33.578	32.637	31.754	30.920	30.126	29.381	28.665	27.978	27.331	26.704	26.115	25.546	24.997	24.477	23.977	23.497	23.036	22.595	22.173	21.761	21.369	20.986	20.614	20.261	19.917	19.584	19.260
45	38.825	37.687	36.608	35.588	34.627	33.715	32.852	32.029	31.254	30.508	29.793	29.116	28.469	27.851	27.262	26.694	26.145	25.625	25.125	24.644	24.173	23.732	23.301	22.879	22.477	22.094	21.712	21.359	21.006
46	42.316	41.070	39.903	38.795	37.746	36.755	35.804	34.912	34.058	33.254	32.480	31.734	31.038	30.361	29.714	29.096	28.498	27.929	27.380	26.860	26.350	25.860	25.389	24.938	24.497	24.075	23.673	23.271	22.899
47	46.150	44.797	43.512	42.306	41.168	40.080	39.050	38.079	37.148	36.265	35.422	34.617	33.843	33.107	32.401	31.734	31.087	30.459	29.861	29.292	28.733	28.204	27.694	27.194	26.723	26.262	25.811	25.380	24.968
48	50.259	48.788	47.386	46.072	44.826	43.649	42.531	41.463	40.452	39.491	38.570	37.697	36.863	36.059	35.294	34.559	33.853	33.176	32.519	31.901	31.293	30.714	30.155	29.616	29.096	28.596	28.116	27.645	27.194
49	54.270	52.672	51.171	49.749	48.406	47.131	45.915	44.767	43.679	42.639	41.649	40.698	39.795	38.932	38.099	37.304	36.549	35.814	35.118	34.441	33.794	33.166	32.558	31.979	31.421	30.881	30.352	29.851	29.361
50	58.889	57.163	55.525	53.986	52.524	51.142	49.828	48.582	47.396	46.268	45.199	44.169	43.188	42.247	41.345	40.492	39.658	38.864	38.109	37.373	36.667	35.990	35.333	34.706	34.098	33.509	32.941	32.391	31.862
51	63.341	61.478	59.722	58.065	56.496	55.005	53.593	52.260	50.985	49.769	48.612	47.503	46.454	45.444	44.473	43.551	42.659	41.806	40.982	40.197	39.442	38.707	38.001	37.324	36.667	36.039	35.431	34.833	34.264
52	68.480	66.460	64.567	62.772	61.076	59.468	57.938	56.496	55.113	53.799	52.554	51.357	50.220	49.122	48.082	47.082	46.121	45.199	44.306	43.453	42.639	41.845	41.090	40.354	39.648	38.962	38.305	37.658	37.050
53	73.952	71.785	69.725	67.793	65.960	64.224	62.576	61.017	59.526	58.104	56.761	55.466	54.231	53.054	51.926	50.847	49.808	48.808	47.856	46.935	46.052	45.199	44.375	43.581	42.816	42.080	41.364	40.678	40.011
54	78.747	76.433	74.246	72.187	70.235	68.392	66.636	64.969	63.380	61.870	60.438	59.065	57.751	56.496	55.290	54.143	53.034	51.975	50.955	49.975	49.033	48.121	47.248	46.405	45.591	44.807	44.042	43.316	42.600
55	84.465	81.974	79.640	77.424	75.335	73.344	71.471	69.686	67.980	66.362	64.822	63.351	61.939	60.595	59.301	58.065	56.879	55.741	54.652	53.603	52.593	51.612	50.681	49.769	48.896	48.053	47.239	46.454	45.689
56	90.594	87.926	85.416	83.043	80.797	78.669	76.659	74.736	72.912	71.177	69.519	67.940	66.430	64.989	63.606	62.282	61.007	59.791	58.614	57.487	56.408	55.359	54.358	53.387	52.446	51.544	50.671	49.828	49.004
57	97.164	94.301	91.614	89.064	86.661	84.376	82.219	80.160	78.208	76.345	74.570	72.873	71.255	69.706	68.225	66.803	65.440	64.126	62.870	61.664	60.497	59.379	58.301	57.261	56.251	55.280	54.348	53.436	52.564
58	104.215	101.146	98.253	95.527	92.947	90.496	88.181	85.975	83.876	81.886	79.973	78.159	76.423	74.766	73.167	71.647	70.186	68.784	67.431	66.136	64.891	63.684	62.527	61.409	60.331	59.291	58.291	57.320	56.378
59	109.560	106.334	103.293	100.430	97.713	95.144	92.702	90.388	88.181	86.083	84.082	82.170	80.346	78.600	76.923	75.325	73.785	72.304	70.892	69.529	68.215	66.950	65.734	64.557	63.429	62.331	61.282	60.252	59.271
60	115.179	111.786	108.599	105.578	102.725	100.018	97.458	95.017	92.702	90.496	88.387	86.387	84.455	82.631	80.866	79.189	77.571	76.021	74.531	73.089	71.716	70.382	69.107	67.872	66.685	65.528	64.420	63.351	62.311
61	121.083	117.523	114.169	110.992	107.991	105.157	102.460	99.891	97.458	95.134	92.928	90.810	88.799	86.867	85.014	83.249	81.542	79.914	78.345	76.845	75.394	74.001	72.648	71.353	70.098	68.892	67.725	66.597	65.508
62	127.300	123.554	120.024	116.689	113.532	110.550	107.716	105.019	102.460	100.018	97.694	95.468	93.350	91.319	89.378	87.515	85.730	84.014	82.366	80.787	79.257	77.796	76.374	75.011	73.697	72.422	71.196	70.010	68.862
63	132.498	128.595	124.927	121.455	118.170	115.061	112.110	109.305	106.638	104.098	101.685	99.371	97.164	95.046	93.026	91.094	89.231	87.446	85.730	84.082	82.494	80.964	79.493	78.081	76.708	75.384	74.109	72.873	71.677
64	137.901	133.851	130.026	126.408	122.995	119.759	116.689	113.767	110.992	108.354	105.833	103.431	101.126	98.929	96.821	94.811	92.869	91.016	89.231	87.515	85.867	84.278	82.739	81.268	79.836	78.463	77.129	75.845	74.599
65	143.530	139.313	135.332	131.576	128.016	124.643	121.455	118.415	115.522	112.776	110.158	107.648	105.255	102.970	100.783	98.675	96.664	94.732	92.879	91.084	89.368	87.711	86.122	84.582	83.102	81.670	80.277	78.944	77.649
66	149.395	145.001	140.853	136.940	133.243	129.732	126.408	123.250	120.239	117.376	114.650	112.041	109.560	107.177	104.892	102.705	100.616	98.596	96.664	94.811	93.016	91.300	89.633	88.034	86.495	85.004	83.562	82.170	80.817

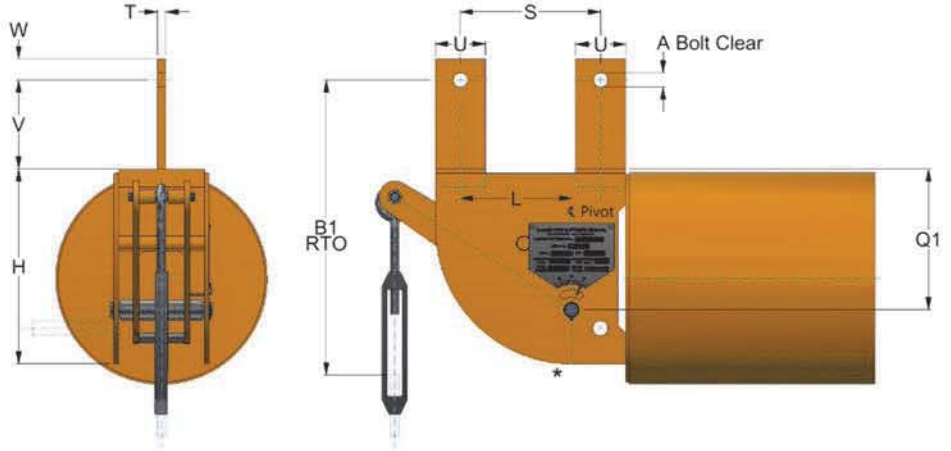
Constant Spring Supports

Constant Spring Support – QC100A, QC100BX, QC100BY & QC100C

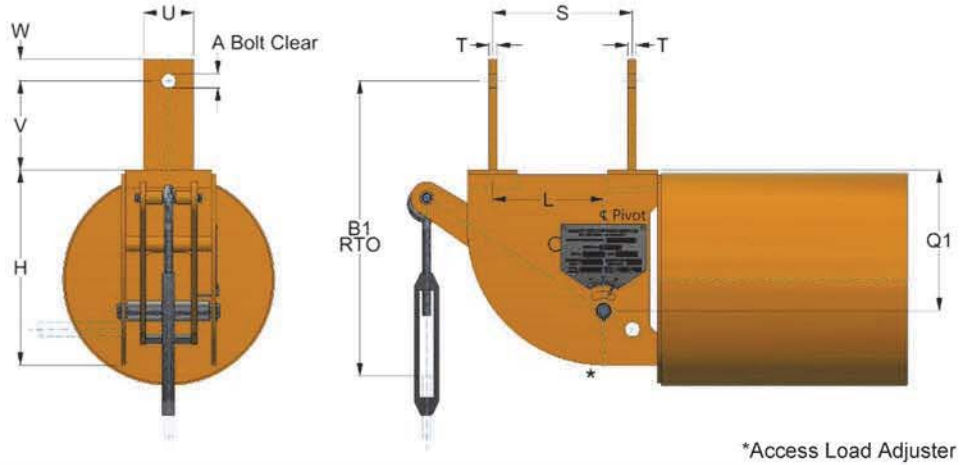
QC100A



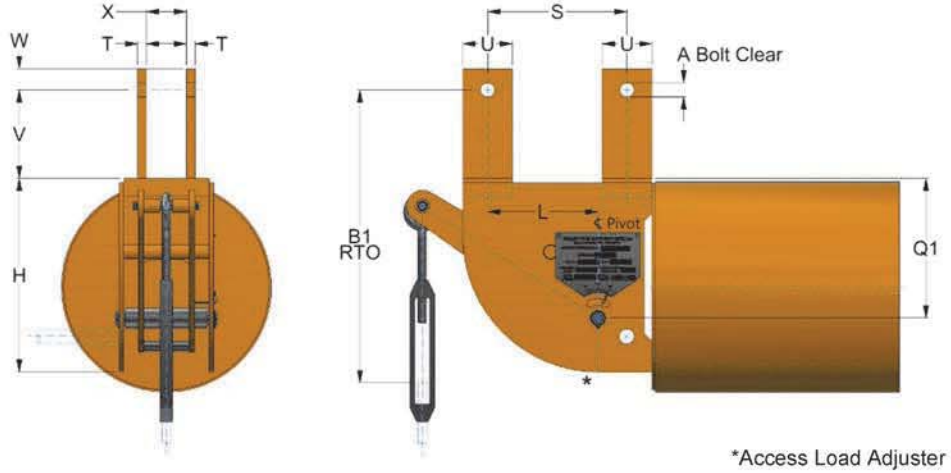
QC100BX



QC100BY

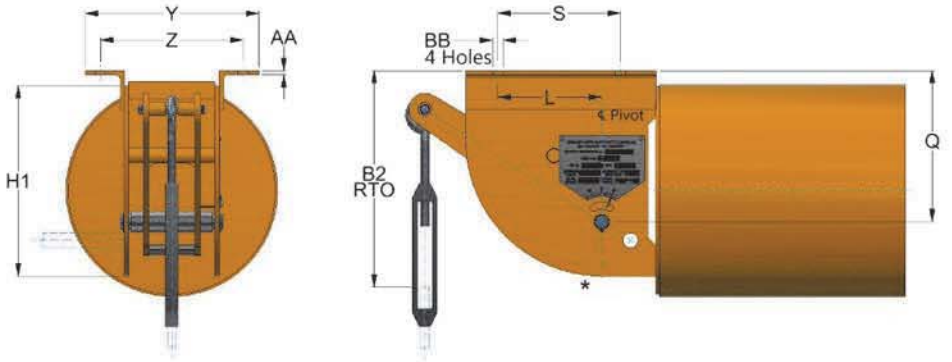


QC100C



Constant Spring Support – QC100E

QC100E



*Access Load Adjuster

The rod take out (RTO) dimensions B, B1 or B2 are given for the load arm in the high position.

When the load arm is in the low position, the total up travel must be added to dimension B, B1 or B2.

This applies to all QC100 types

Constant Spring Tables – Fig. QC100 – Sizes 1 to 18

Sizes 1 to 6											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
40	54	311	405	326	M12	105	140	130		185	
50	67	304	400	319	M12	105	140	130		185	
60	80	296	395	311	M12	105	140	130		185	
70	94	289	385	304	M12	105	140	130		185	
80	107	282	380	297	M12	105	140	130		185	
90	120	275	370	290	M12	105	140	130		185	
100	134	267	360	282	M12	105	140	130		185	
110	147	260	355	275	M12	105	140	130		185	
120	160	253	350	268	M12	105	140	130		185	
130	174	245	340	260	M12	105	140	130		185	
140	187	238	335	253	M12	105	140	130		185	
150	200	271	330	286	M12	105	140	170	130	185	225
160	214	263	320	278	M12	105	140	170	130	185	225
170	227	256	310	271	M12	105	140	170	130	185	225
180	240	249	305	264	M12	105	140	170	130	185	225
190	254	242	300	257	M12	105	140	170	130	185	225
200	267	235	290	250	M12	105	140	170	130	185	225
210	280	228	285	243	M12	105	140	170	130	185	255
220	294	250	275	265	M12	105	140	200	130	185	255
230	307	245	265	260	M12	105	140	200	130	185	255
240	320	235	260	250	M12	105	140	200	130	185	255
250	334	250	255	265	M12	105	140	220	130	185	275
260	347	240	245	255	M12	105	140	220	130	185	275
270	360	255	240	270	M12	105	140	240	130	185	295
280	374	245	230	260	M12	105	140	240	130	185	295
290	387	240	235	255	M12	105	140	240	140	195	295
300	400	230	225	245	M12	105	140	240	140	195	295

Sizes 1 to 66											
Size	1~6	7~12	13~18	19~26	27~33	34~39	40~47	48~50	51~54	55~58	59~66
D	250	300	350	400	600	750	1100	1265	1265	1265	1620
E	150	220	295	330	390	440	525	525	525	525	640
F	180	215	270	325	405	495	610	685	685	685	760
G	115	120	135	150	180	225	280	345	345	345	455
J	135	140	160	175	215	270	330	405	405	405	560
M	55	65	75	95	115	145	198	250	250	250	280
N	55	65	75	95	115	145	180	190	190	190	215
T	10	12	12	20	25	25	30	40	40	40	40
R	15	20	30	30	35	40	50	60	70	80	80
U	40	50	70	80	100	130	150	200	200	200	200
V	80	60	65	115	75	85	100	140	140	140	150
Y	215	220	255	270	320	425	480	745	745	745	855
Z	165	180	205	220	265	335	395	520	520	520	685
BB	14	18	22	22	22	27	33	45	45	45	51
AA	6	6	8	8	10	10	15	20	20	20	25
X	35	35	50	50	65	75	90	110	110	110	120
K	150	150	150	200	200	200	250	300	300	300	300
P	33	38	65	66	83	100	Table	182	182	182	Table

Sizes 7 to 12											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
40	54	336	415	356	M20	120	155	160		225	
50	67	329	410	349	M16	120	155	160		225	
60	80	321	400	341	M16	120	155	160		225	
70	94	314	395	334	M16	120	155	160		225	
80	107	307	385	327	M12	120	155	160		225	
90	120	300	380	320	M12	120	155	160		225	
100	134	292	370	312	M12	120	155	160		225	
110	147	285	365	305	M12	120	155	160		225	
120	160	278	360	298	M12	120	155	160		225	
130	174	270	350	290	M12	120	155	160		225	
140	187	263	345	283	M12	120	155	160		225	
150	200	256	335	276	M12	120	155	160		225	
160	214	248	330	268	M12	120	155	160		225	
170	227	241	320	261	M12	120	155	160		225	
180	240	254	315	274	M12	120	155	180	160	225	245
190	254	247	305	267	M12	120	155	180	160	225	245
200	267	240	300	260	M12	120	155	180	160	225	245
210	280	233	295	253	M12	120	155	180	160	225	245
220	294	255	285	275	M12	120	155	210	160	225	275
230	307	250	280	270	M12	120	155	210	160	225	275
240	320	240	270	260	M12	120	155	210	160	225	275
250	334	255	265	275	M12	120	155	230	160	225	295
260	347	245	255	265	M12	120	155	230	160	225	295
270	360	260	250	280	M12	120	155	250	160	225	315
280	374	250	240	270	M12	120	155	250	160	225	315
290	387	245	235	265	M12	120	155	250	160	225	315
300	400	235	225	255	M12	120	155	250	160	225	315
310	414	270	250	290	M12	120	155	290	190	255	355
320	427	260	240	280	M12	120	155	290	190	255	355
330	440	255	235	275	M12	120	155	290	190	255	355
340	454	250	230	270	M12	120	155	290	190	255	355
350	467	240	220	260	M12	120	155	290	190	255	355
360	480	275	255	295	M12	120	155	330	230	295	395
370	494	265	245	285	M12	120	155	330	230	295	395
380	507	260	240	280	M12	120	155	330	230	295	395
390	520	250	230	270	M12	120	155	330	230	295	395
400	534	245	225	265	M12	120	155	330	230	295	395
410	547	235	215	255	M12	120	155	330	230	295	395
420	560	230	210	250	M12	120	155	330	230	295	395

Sizes 13 to 18											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
60	80	366	450	396	M20	155	190	215	205	280	295
70	94	359	445	389	M20	155	190	215	205	280	295
80	107	352	435	382	M20	155	190	215	205	280	295
90	120	345	430	375	M16	155	190	215	205	280	295
100	134	337	425	367	M16	155	190	215	205	280	295
110	147	330	415	360	M16	155	190	215	205	280	295
120	160	323	410	353	M16	155	190	215	205	280	295
130	174	315	400	345	M16	155	190	215	205	280	295
140	187	308	395	338	M16	155	190	215	205	280	295
150	200	301	385	331	M16	155	190	215	205	280	295
160	214	293	380	323	M12	155	190	215	205	280	295
170	227	286	370	316	M12	155	190	215	205	280	295
180	240	279	365	309	M12	155	190	215	205	280	295
190	254	272	355	302	M12	155	190	215	205	280	295
200	267	265	350	295	M12	155	190	215	205	280	295
210	280	258	345	288	M12	155	190	215	205	280	295
220	294	250	335	280	M12	155	190	215	205	280	295
230	307	243	330	273	M12	155	190	215	205	280	295
240	320	236	320	266	M12	155	190	215	205	280	295
250	334	228	315	258	M12	155	190	215	205	280	295
260	347	221	305	251	M12	155	190	215	205	280	295
270	360	250	300	280	M12	155	190	250	205	280	325
280	374	240	290	270	M12	155	190	250	205	280	325
290	387	235	285	265	M12	155	190	250	205	280	325
300	400	245	275	275	M12	155	190	270	205	280	345
310	414	240	270	270	M12	155	190	270	205	280	345
320	427	230	260	260	M12	155	190	270	205	280	345
330	440	245	255	275	M12	155	190	290	205	280	365
340	454	240	250	270	M12	155	190	290	205	280	365
350	467	230	240	260	M12	155	190	290	205	280	365
360	480	225	235	255	M12	155	190	290	205	280	365
370	494	260	250	290	M12	155	190	335	230	300	410
380	507	255	245	285	M12	155	190	335	230	300	410
390	520	245	235	275	M12	155	190	335	230	300	410
400	534	240	230	270	M12	155	190	335	230	300	410
410	547	230	220	260	M12	155	190	335	230	300	410
420	560	225	215	255	M12	155	190	335	230	300	410

P Dimension										
Size	40~44	45~47	59	60	61	62	63	64	65	66
P	121	165	188	193	197	203	207	211	216	220

W Dimension for 'A' Bolt												
SIZE	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
W	25	25	30	35	40	50	60	65	80	85	100	110	120

Constant Spring Tables – Fig. QC100 – Sizes 19 to 39

Sizes 19 to 26

Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
60	80	446	590	476	M30	190	240	245		340	
70	94	441	585	471	M30	190	240	245		340	
80	107	432	575	462	M24	190	240	245		340	
90	120	425	570	455	M24	190	240	245		340	
100	134	417	560	447	M24	190	240	245		340	
110	147	410	555	440	M24	190	240	245		340	
120	160	403	550	433	M20	190	240	245		340	
130	174	395	540	425	M20	190	240	245		340	
140	187	388	535	418	M20	190	240	245		340	
150	200	381	525	411	M20	190	240	245		340	
160	214	373	520	403	M20	190	240	245		340	
170	227	366	510	396	M20	190	240	245		340	
180	240	359	505	389	M16	190	240	245		340	
190	254	352	495	382	M16	190	240	245		340	
200	267	345	490	375	M16	190	240	245		340	
210	280	338	480	368	M16	190	240	245		340	
220	294	330	475	360	M16	190	240	245		340	
230	307	323	470	353	M16	190	240	245		340	
240	320	316	460	346	M16	190	240	245		340	
250	334	308	455	338	M16	190	240	245		340	
260	347	301	445	331	M16	190	240	245		340	
270	360	294	440	324	M16	190	240	245		340	
280	374	336	430	366	M16	190	240	295	245	340	390
290	387	329	425	359	M16	190	240	295	245	340	390
300	400	322	415	352	M16	190	240	295	245	340	390
310	414	315	410	345	M16	190	240	295	245	340	390
320	427	307	400	337	M16	190	240	295	245	340	390
330	440	300	395	330	M12	190	240	295	245	340	390
340	454	293	390	323	M12	190	240	295	245	340	390
350	467	285	380	315	M12	190	240	295	245	340	390
360	480	279	375	309	M12	190	240	295	245	340	390
370	494	300	365	330	M12	190	240	325	245	340	420
380	507	295	360	325	M12	190	240	325	245	340	420
390	520	285	350	315	M12	190	240	325	245	340	420
400	534	305	345	335	M12	190	240	350	245	340	445
410	547	295	335	325	M12	190	240	350	245	340	445
420	560	290	330	320	M12	190	240	350	245	340	445
430	574	305	320	335	M12	190	240	375	245	340	470
440	587	300	315	330	M12	190	240	375	245	340	470
450	600	295	310	325	M12	190	240	375	245	340	470
460	614	285	300	315	M12	190	240	375	245	340	470
470	627	295	295	325	M12	190	240	390	245	340	485
480	641	285	285	315	M12	190	240	390	245	340	485
490	654	280	290	310	M12	190	240	390	255	350	485
500	667	270	280	300	M12	190	240	390	255	350	485

Sizes 27 to 33

Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
70	94	495	605	530	M36	235	300	305		420	
80	107	485	600	520	M36	235	300	305		420	
90	120	480	590	515	M36	235	300	305		420	
100	134	470	580	505	M36	235	300	305		420	
110	147	465	575	500	M30	235	300	305		420	
120	160	460	570	495	M30	235	300	305		420	
130	174	450	560	485	M30	235	300	305		420	
140	187	445	555	480	M30	235	300	305		420	
150	200	435	545	470	M30	235	300	305		420	
160	214	430	540	465	M30	235	300	305		420	
170	227	420	530	455	M24	235	300	305		420	
180	240	415	525	450	M24	235	300	305		420	
190	254	405	515	440	M24	235	300	305		420	
200	267	400	510	435	M24	235	300	305		420	
210	280	395	505	430	M24	235	300	305		420	
220	294	385	495	420	M24	235	300	305		420	
230	307	380	490	415	M24	235	300	305		420	
240	320	370	480	405	M20	235	300	305		420	
250	334	365	475	400	M20	235	300	305		420	
260	347	355	465	390	M20	235	300	305		420	
270	360	350	460	385	M20	235	300	305		420	
280	374	340	450	375	M20	235	300	305		420	
290	387	335	445	370	M20	235	300	305		420	
300	400	325	435	360	M20	235	300	305		420	
310	414	320	430	355	M20	235	300	305		420	
320	427	315	425	350	M20	235	300	305		420	
330	440	305	415	340	M20	235	300	305		420	
340	454	300	410	335	M20	235	300	305		420	
350	467	290	400	325	M20	235	300	305		420	
360	480	285	395	320	M20	235	300	305		420	
370	494	305	385	340	M20	235	300	335	305	420	450
380	507	300	380	335	M20	235	300	335	305	420	450
390	520	290	370	325	M20	235	300	335	305	420	450
400	534	300	365	335	M20	235	300	350	305	420	465
410	547	290	355	325	M20	235	300	350	305	420	465
420	560	285	350	320	M20	235	300	350	305	420	465
430	574	300	340	330	M20	235	300	370	305	420	485
440	587	290	335	325	M20	235	300	370	305	420	485
450	600	285	330	315	M20	235	300	370	305	420	485
460	614	275	320	310	M20	235	300	370	305	420	485
470	627	290	315	325	M20	235	300	390	305	420	505
480	641	280	305	315	M20	235	300	390	305	420	505
490	654	275	300	310	M20	235	300	390	305	420	505
500	667	265	290	300	M20	235	300	390	305	420	505

Sizes 34 to 39

Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
90	120	540	665	580	M48	290	365	450		630	
100	134	530	655	570	M42	290	365	450		630	
110	147	525	650	565	M42	290	365	450		630	
120	160	520	645	560	M42	290	365	450		630	
130	174	510	635	550	M42	290	365	450		630	
140	187	505	630	545	M36	290	365	450		630	
150	200	495	620	535	M36	290	365	450		630	
160	214	490	615	530	M36	290	365	450		630	
170	227	480	605	520	M36	290	365	450		630	
180	240	475	600	515	M36	290	365	450		630	
190	254	465	590	505	M30	290	365	450		630	
200	267	460	585	500	M30	290	365	450		630	
210	280	455	580	495	M30	290	365	450		630	
220	294	445	570	485	M30	290	365	450		630	
230	307	440	565	480	M30	290	365	450		630	
240	320	430	555	470	M30	290	365	450		630	
250	334	425	550	465	M30	290	365	450		630	
260	347	415	540	455	M30	290	365	450		630	
270	360	410	535	450	M30	290	365	450		630	
280	374	400	525	440	M30	290	365	450		630	
290	387	395	520	435	M30	290	365	450		630	
300	400	385	510	425	M30	290	365	450		630	
310	414	380	505	420	M24	290	365	450		630	
320	427	375	500	415	M24	290	365	450		630	
330	440	365	490	405	M24	290	365	450		630	
340	454	360	485	400	M24	290	365	450		630	
350	467	350	475	390	M24	290	365	450		630	
360	480	345	470	385	M24	290	365	450		630	
370	494	335	460	375	M24	290	365	450		630	
380	507	330	455	370	M24	290	365	450		630	
390	520	320	445	360	M24	290	365	450		630	
400	534	315	440	355	M24	290	365	450		630	
410	547	305	430	345	M24	290	365	450		630	
420	560	330	425	370	M24	290	365	400	370	515	545
430	574	320	415	360	M24	290	365	400	370	515	545
440	587	315	410	355	M24	290	365	400	370	515	545
450	600	310	405	345	M24	290	365	400	370	515	545
460	614	300	395	340	M24	290	365	400	370	515	545
470	627	295	390	335	M24	290	365	400	370	515	545
480	641	335	380	375	M24	290	365	450	370	515	595
490	654	330	375	370	M24	290	365	450	370	515	595
500	667	320	365	360	M24	290	365	450	370	515	595
510	680	315	360	355	M24	290	365	450	370	515	595
520	695	305	350	345	M24	290	365	450	370	515	595
530	708	300	345	340	M24	290	365	450	370	515	595
540	720	325	335	365	M24	290	365	480	370	515	625
550	734	315	330	355	M24	290	365	480	370	515	625
560	747	310	325	350	M24	290	365	480	370	515	625
570	761	300	315	340	M24	290	365	480	370	515	625
580	774	295	310	335	M24	290	365	480	370	515	625
590	787	285	300	325	M24	290	365	480	370	515	625
600	800	280	295	320	M24	290	365	480	370	515	625
610	815	270	285	310	M24	290	365	480	370	515	625

For table of standard dimensions, see page 24

Constant Spring Tables – Fig. QC100 – Sizes 40 to 54

Sizes 40 to 47											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
110	147	645	795	695	M64	355	455	450		630	
120	160	640	790	690	M56	355	455	450		630	
130	174	630	780	680	M56	355	455	450		630	
140	187	625	775	675	M56	355	455	450		630	
150	200	615	765	665	M56	355	455	450		630	
160	214	610	760	660	M48	355	455	450		630	
170	227	600	750	650	M48	355	455	450		630	
180	240	595	745	645	M48	355	455	450		630	
190	254	585	735	635	M48	355	455	450		630	
200	267	580	730	630	M48	355	455	450		630	
210	280	575	725	625	M42	355	455	450		630	
220	294	565	715	615	M42	355	455	450		630	
230	307	560	710	610	M42	355	455	450		630	
240	320	550	700	600	M42	355	455	450		630	
250	334	545	695	595	M42	355	455	450		630	
260	347	535	685	585	M42	355	455	450		630	
270	360	530	680	580	M42	355	455	450		630	
280	374	520	670	570	M42	355	455	450		630	
290	387	515	665	565	M36	355	455	450		630	
300	400	505	655	555	M36	355	455	450		630	
310	414	500	650	550	M36	355	455	450		630	
320	427	495	645	545	M36	355	455	450		630	
330	440	485	635	535	M36	355	455	450		630	
340	454	480	630	530	M36	355	455	450		630	
350	467	470	620	520	M36	355	455	450		630	
360	480	465	615	515	M36	355	455	450		630	
370	494	455	605	505	M36	355	455	450		630	
380	507	450	600	500	M36	355	455	450		630	
390	520	440	590	490	M36	355	455	450		630	
400	534	435	585	485	M36	355	455	450		630	
410	547	425	575	475	M36	355	455	450		630	
420	560	420	570	470	M36	355	455	450		630	
430	574	410	560	460	M36	355	455	450		630	
440	587	405	555	455	M36	355	455	450		630	
450	600	395	545	445	M36	355	455	450		630	
460	614	390	540	440	M36	355	455	450		630	
470	627	385	535	435	M36	355	455	450		630	
480	641	375	525	425	M36	355	455	450		630	
490	654	370	520	420	M36	355	455	450		630	
500	667	450	600	500	M36	355	455	540		720	
510	680	445	595	495	M36	355	455	540		720	
520	695	435	585	485	M36	355	455	540		720	
530	708	430	580	480	M36	355	455	540		720	
540	720	420	570	470	M36	355	455	540		720	
550	734	415	565	465	M36	355	455	540		720	
560	747	405	555	455	M36	355	455	540		720	
570	761	400	550	450	M36	355	455	540		720	
580	774	390	540	440	M36	355	455	540		720	
590	787	385	535	435	M36	355	455	540		720	
600	800	380	530	430	M36	355	455	540		720	
610	815	370	520	420	M36	355	455	540		720	

Sizes 48 to 50											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
110	147	780	980	840	M80	340	480	545		735	
120	160	775	975	835	M72	340	480	545		735	
130	174	765	965	825	M72	340	480	545		735	
140	187	760	960	820	M72	340	480	545		735	
150	200	750	950	810	M64	340	480	545		735	
160	214	745	945	805	M64	340	480	545		735	
170	227	735	935	795	M64	340	480	545		735	
180	240	730	930	790	M64	340	480	545		735	
190	254	720	920	780	M64	340	480	545		735	
200	267	715	915	775	M56	340	480	545		735	
210	280	710	910	770	M56	340	480	545		735	
220	294	700	900	760	M56	340	480	545		735	
230	307	695	895	755	M56	340	480	545		735	
240	320	685	885	745	M56	340	480	545		735	
250	334	680	880	740	M56	340	480	545		735	
260	347	670	870	730	M56	340	480	545		735	
270	360	665	865	725	M48	340	480	545		735	
280	374	655	855	715	M48	340	480	545		735	
290	387	650	850	710	M48	340	480	545		735	
300	400	640	840	700	M48	340	480	545		735	
310	414	635	835	695	M48	340	480	545		735	
320	427	630	830	690	M48	340	480	545		735	
330	440	620	820	680	M48	340	480	545		735	
340	454	615	815	675	M48	340	480	545		735	
350	467	605	805	665	M48	340	480	545		735	
360	480	600	800	660	M42	340	480	545		735	
370	494	590	790	650	M42	340	480	545		735	
380	507	585	785	645	M42	340	480	545		735	
390	520	575	775	635	M42	340	480	545		735	
400	534	570	770	630	M42	340	480	545		735	
410	547	560	760	620	M42	340	480	545		735	
420	560	555	755	615	M42	340	480	545		735	
430	574	545	745	605	M42	340	480	545		735	
440	587	540	740	600	M42	340	480	545		735	
450	600	530	730	590	M42	340	480	545		735	
460	614	525	725	585	M42	340	480	545		735	
470	627	520	720	580	M42	340	480	545		735	
480	641	510	710	570	M42	340	480	545		735	
490	654	505	705	565	M42	340	480	545		735	
500	667	495	695	555	M42	340	480	545		735	
510	680	490	690	550	M42	340	480	545		735	
520	695	480	680	540	M42	340	480	545		735	
530	708	475	675	535	M42	340	480	545		735	
540	720	465	665	525	M42	340	480	545		735	
550	734	460	660	520	M42	340	480	545		735	
560	747	450	650	510	M42	340	480	545		735	
570	761	445	645	505	M42	340	480	545		735	
580	774	435	635	495	M42	340	480	545		735	
590	787	430	630	490	M42	340	480	545		735	
600	800	425	625	485	M42	340	480	545		735	
610	815	415	615	475	M42	340	480	545		735	

Sizes 51 to 54											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
110	147	770	980	840	M80	340	480	545		735	
120	160	765	975	835	M72	340	480	545		735	
130	174	755	965	825	M72	340	480	545		735	
140	187	750	960	820	M72	340	480	545		735	
150	200	740	950	810	M64	340	480	545		735	
160	214	735	945	805	M64	340	480	545		735	
170	227	725	935	795	M64	340	480	545		735	
180	240	720	930	790	M64	340	480	545		735	
190	254	710	920	780	M64	340	480	545		735	
200	267	705	915	775	M56	340	480	545		735	
210	280	700	910	770	M56	340	480	545		735	
220	294	690	900	760	M56	340	480	545		735	
230	307	685	895	755	M56	340	480	545		735	
240	320	675	885	745	M56	340	480	545		735	
250	334	670	880	740	M56	340	480	545		735	
260	347	660	870	730	M56	340	480	545		735	
270	360	655	865	725	M48	340	480	545		735	
280	374	645	855	715	M48	340	480	545		735	
290	387	640	850	710	M48	340	480	545		735	
300	400	630	840	700	M48	340	480	545		735	
310	414	625	835	695	M48	340	480	545		735	
320	427	620	830	690	M48	340	480	545		735	
330	440	610	820	680	M48	340	480	545		735	
340	454	605	815	675	M48	340	480	545		735	
350	467	595	805	665	M48	340	480	545		735	
360	480	590	800	660	M42	340	480	545		735	
370	494	580	790	650	M42	340	480	545		735	
380	507	575	785	645	M42	340	480	545		735	
390	520	565	775	635	M42	340	480	545		735	
400	534	560	770	630	M42	340	480	545		735	
410	547	550	760	620	M42	340	480	545		735	
420	560	545	755	615	M42	340	480	545		735	
430	574	535	745	605	M42	340	480	545		735	
440	587	530	740	600	M42	340	480	545		735	
450	600	520	730	590	M42	340	480	545		735	
460	614	515	725	585	M42	340	480	545		735	
470	627	510	720	580	M42	340	480	545		735	
480	641	500	710	570	M42	340	480	545		735	
490	654	495	705	565	M42	340	480	545		735	
500	667	485	695	555	M42	340	480	545		735	
510	680	480	690	550	M42	340	480	545		735	
520	695	470	680	540	M42	340	480	545		735	
530	708	465	675	535	M42	340	480	545		735	
540	720	455	665	525	M42	340	480	545		735	
550	734	450	660	520	M42	340	480	545		735	
560	747	440	650	510	M42	340	480	545		735	
570	761	435	645	505	M42	340	480	545		735	
580	774	425	635	495	M42	340	480	545		735	
590	787	420	630	490	M42	340	480	545		735	
600	800	415	625	485	M42	340	480	545		735	
610	815	405	615	475	M42	340	480	545		735	

For table of standard dimensions, see page 24

Constant Spring Tables – Fig. QC100 – Sizes 55 to 66

Sizes 55 to 58											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
110	147	760	980	840	M90	340	480	545		735	
120	160	755	975	835	M90	340	480	545		735	
130	174	745	965	825	M80	340	480	545		735	
140	187	740	960	820	M80	340	480	545		735	
150	200	730	950	810	M80	340	480	545		735	
160	214	725	945	805	M72	340	480	545		735	
170	227	715	935	795	M72	340	480	545		735	
180	240	710	930	790	M72	340	480	545		735	
190	254	700	920	780	M72	340	480	545		735	
200	267	695	915	775	M64	340	480	545		735	
210	280	690	910	770	M64	340	480	545		735	
220	294	680	900	760	M64	340	480	545		735	
230	307	675	895	755	M64	340	480	545		735	
240	320	665	885	745	M64	340	480	545		735	
250	334	660	880	740	M64	340	480	545		735	
260	347	650	870	730	M56	340	480	545		735	
270	360	645	865	725	M56	340	480	545		735	
280	374	635	855	715	M56	340	480	545		735	
290	387	630	850	710	M56	340	480	545		735	
300	400	620	840	700	M56	340	480	545		735	
310	414	615	835	695	M56	340	480	545		735	
320	427	610	830	690	M56	340	480	545		735	
330	440	600	820	680	M56	340	480	545		735	
340	454	595	815	675	M56	340	480	545		735	
350	467	585	805	665	M56	340	480	545		735	
360	480	580	800	660	M48	340	480	545		735	
370	494	570	790	650	M48	340	480	545		735	
380	507	565	785	645	M48	340	480	545		735	
390	520	555	775	635	M48	340	480	545		735	
400	534	550	770	630	M48	340	480	545		735	
410	547	540	760	620	M48	340	480	545		735	
420	560	535	755	615	M48	340	480	545		735	
430	574	525	745	605	M48	340	480	545		735	
440	587	520	740	600	M48	340	480	545		735	
450	600	510	730	590	M48	340	480	545		735	
460	614	505	725	585	M48	340	480	545		735	
470	627	500	720	580	M48	340	480	545		735	
480	641	490	710	570	M48	340	480	545		735	
490	654	485	705	565	M48	340	480	545		735	
500	667	475	695	555	M48	340	480	545		735	
510	680	470	690	550	M48	340	480	545		735	
520	695	460	680	540	M48	340	480	545		735	
530	708	455	675	535	M48	340	480	545		735	
540	720	445	665	525	M48	340	480	545		735	
550	734	440	660	520	M48	340	480	545		735	
560	747	430	650	510	M48	340	480	545		735	
570	761	425	645	505	M48	340	480	545		735	
580	774	415	635	495	M48	340	480	545		735	
590	787	410	630	490	M48	340	480	545		735	
600	800	405	625	485	M48	340	480	545		735	
610	815	395	615	475	M48	340	480	545		735	

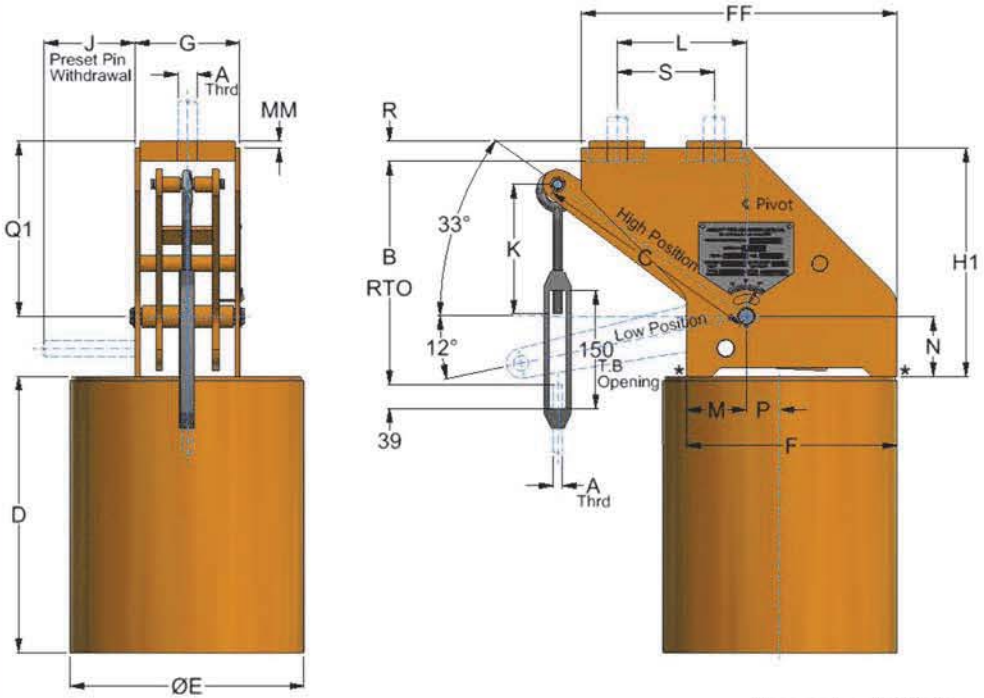
Sizes 59 to 62											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
150	200	785	1015	865	M80	380	560	600		815	
160	214	780	1010	860	M80	380	560	600		815	
170	227	770	1000	850	M80	380	560	600		815	
180	240	765	995	845	M80	380	560	600		815	
190	254	760	990	840	M72	380	560	600		815	
200	267	750	980	830	M72	380	560	600		815	
210	280	745	975	825	M72	380	560	600		815	
220	294	735	965	815	M72	380	560	600		815	
230	307	730	960	810	M72	380	560	600		815	
240	320	720	950	800	M64	380	560	600		815	
250	334	715	945	795	M64	380	560	600		815	
260	347	705	935	785	M64	380	560	600		815	
270	360	700	930	780	M64	380	560	600		815	
280	374	690	920	770	M64	380	560	600		815	
290	387	685	915	765	M64	380	560	600		815	
300	400	680	910	760	M64	380	560	600		815	
310	414	670	900	750	M64	380	560	600		815	
320	427	665	890	745	M56	380	560	600		815	
330	440	655	885	735	M56	380	560	600		815	
340	454	650	880	730	M56	380	560	600		815	
350	467	640	870	720	M56	380	560	600		815	
360	480	635	865	715	M56	380	560	600		815	
370	494	625	855	705	M56	380	560	600		815	
380	507	620	850	700	M56	380	560	600		815	
390	520	610	840	690	M56	380	560	600		815	
400	534	605	835	685	M56	380	560	600		815	
410	547	600	830	680	M56	380	560	600		815	
420	560	590	820	670	M56	380	560	600		815	
430	574	580	810	660	M56	380	560	600		815	
440	587	575	805	655	M56	380	560	600		815	
450	600	565	795	645	M56	380	560	600		815	
460	614	560	790	640	M56	380	560	600		815	
470	627	555	785	635	M56	380	560	600		815	
480	641	545	775	625	M56	380	560	600		815	
490	654	540	770	620	M56	380	560	600		815	
500	667	530	760	610	M56	380	560	600		815	
510	680	525	755	605	M56	380	560	600		815	
520	695	515	745	595	M56	380	560	600		815	
530	708	510	740	590	M56	380	560	600		815	
540	720	500	730	580	M56	380	560	600		815	
550	734	495	725	575	M56	380	560	600		815	
560	747	485	715	570	M56	380	560	600		815	
570	761	480	710	560	M56	380	560	600		815	
580	774	470	700	550	M56	380	560	600		815	
590	787	465	695	545	M56	380	560	600		815	
600	800	460	690	540	M56	380	560	600		815	
610	815	450	680	530	M56	380	560	600		815	

Sizes 63 to 66											
Travel	C	B	B1	B2	A	L	S	Q	Q1	H	H1
150	200	785	1015	865	M90	380	560	600		815	
160	214	780	1010	860	M90	380	560	600		815	
170	227	770	1000	850	M90	380	560	600		815	
180	240	765	995	845	M80	380	560	600		815	
190	254	760	990	840	M80	380	560	600		815	
200	267	750	980	830	M80	380	560	600		815	
210	280	745	975	825	M80	380	560	600		815	
220	294	735	965	815	M80	380	560	600		815	
230	307	730	960	810	M72	380	560	600		815	
240	320	720	950	800	M72	380	560	600		815	
250	334	715	945	795	M72	380	560	600		815	
260	347	705	935	785	M72	380	560	600		815	
270	360	700	930	780	M72	380	560	600		815	
280	374	690	920	770	M72	380	560	600		815	
290	387	685	915	765	M64	380	560	600		815	
300	400	680	910	760	M64	380	560	600		815	
310	414	670	900	750	M64	380	560	600		815	
320	427	665	890	745	M64	380	560	600		815	
330	440	655	885	735	M64	380	560	600		815	
340	454	650	880	730	M64	380	560	600		815	
350	467	640	870	720	M64	380	560	600		815	
360	480	635	865	715	M64	380	560	600		815	
370	494	625	855	705	M64	380	560	600		815	
380	507	620	850	700	M56	380	560	600		815	
390	520	610	840	690	M56	380	560	600		815	
400	534	605	835	685	M56	380	560	600		815	
410	547	600	830	680	M56	380	560	600		815	
420	560	590	820	670	M56	380	560	600		815	
430	574	580	810	660	M56	380	560	600		815	
440	587	575	805	655	M56	380	560	600		815	
450	600	565	795	645	M56	380	560	600		815	
460	614	560	790	640	M56	380	560	600		815	
470	627	555	785	635	M56	380	560	600		815	
480	641	545	775	625	M56	380	560	600		815	
490	654	540	770	620	M56	380	560	600		815	
500	667	530	760	610	M56	380	560	600		815	
510	680	525	755	605	M56	380	560	600		815	
520	695	515	745	595	M56	380	560	600		815	
530	708	510	740	590	M56	380	560	600		815	
540	720	500	730	580	M56	380	560	600		815	
550	734	495	725	575	M56	380	560	600		815	
560	747	485	715	570	M56	380	560	600		815	
570	761	480	710	560	M56	380	560	600		815	
580	774	470	700	550	M56	380	560	600		815	
590	787	465	695	545	M56	380	560	600		815	
600	800	460	690	540	M56	380	560	600		815	
610	815	450	680	530	M56	380	560	600		815	

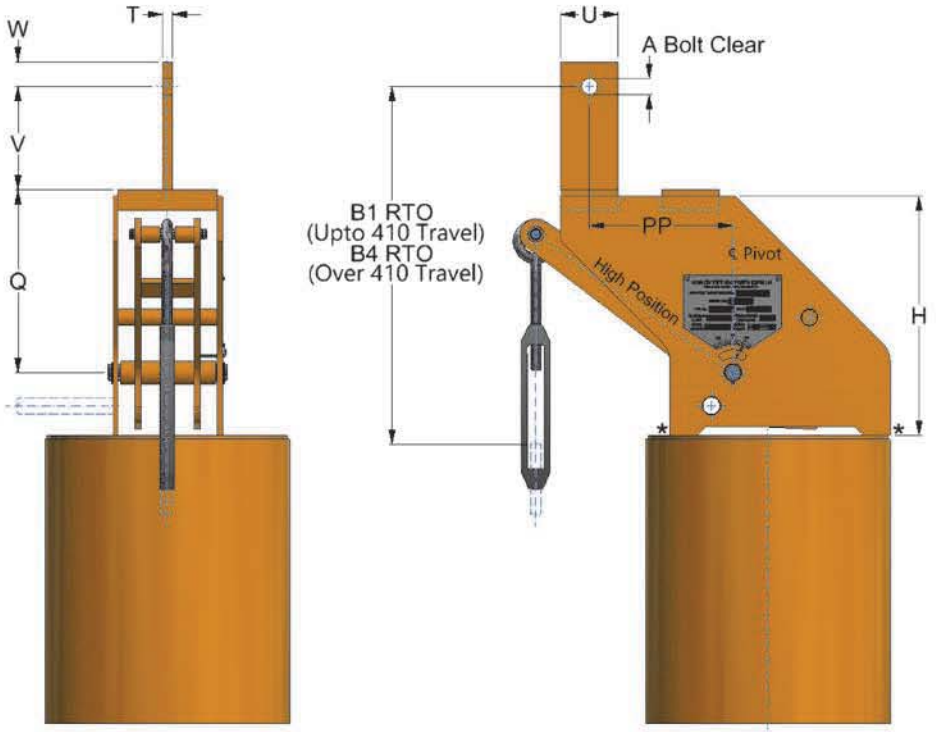
For table of standard dimensions, see page 24

Constant Spring Support – QC110A & B

QC110A



QC110B



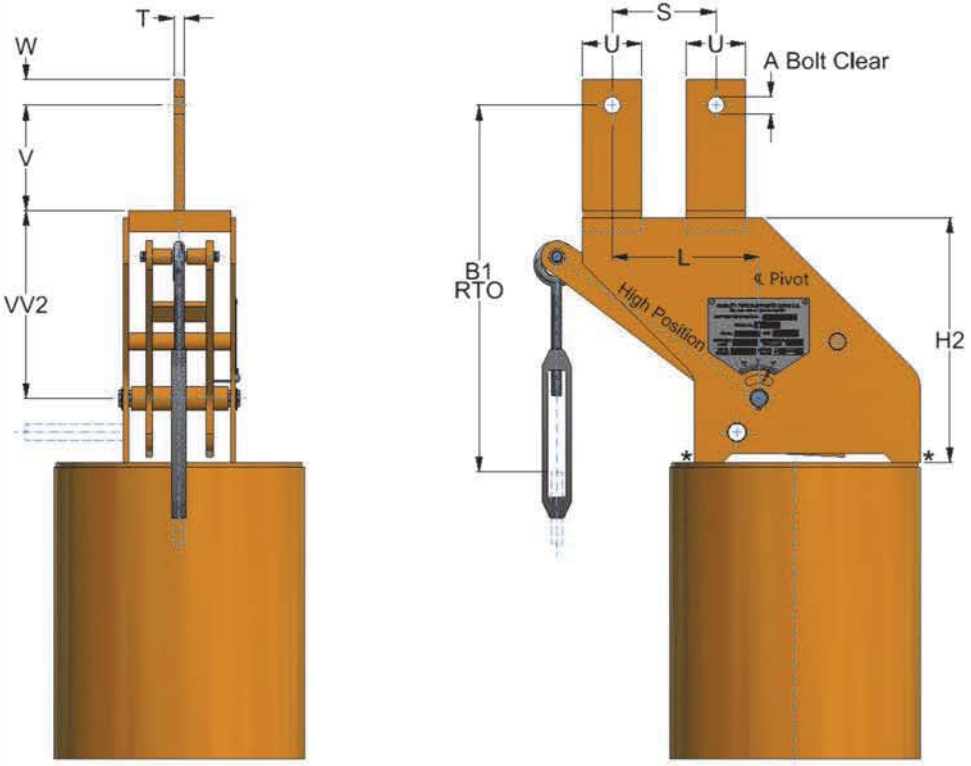
The rod take out (RTO) dimension B, B1 or B3 are given for the load arm in the high position.
When the load is set in the low position the total up travel must be added to dimensions B, B1 or B3.

Typical yoke arrangement applicable to all types.
See page 32 for diagram and yoke table for unit and travel range applicable.

Note: Type 'B' & 'C'
Not recommended over:
190 Travel Sizes 1 to 12
210 Travel Sizes 13 to 18
290 Travel Sizes 19 to 26
300 Travel Sizes 27 to 33
500 Travel Sizes 34 to 39
All Travels Sizes 40 to 66

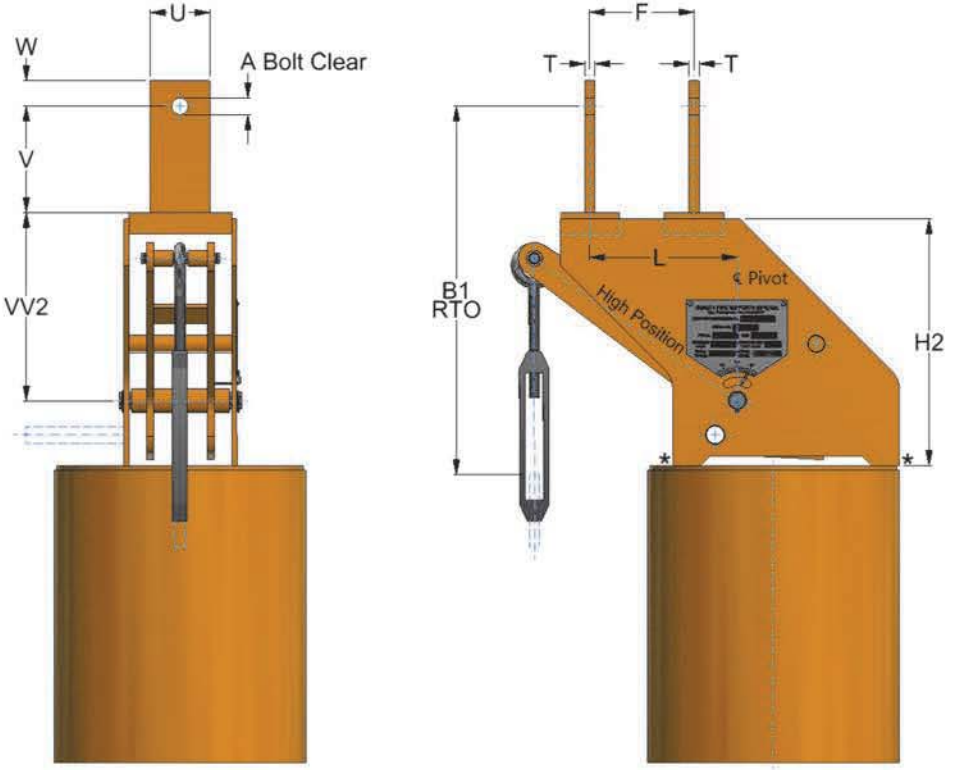
Constant Spring Support – QC110BX & BY

QC110BX



*Access Load Adjuster

QC110BY



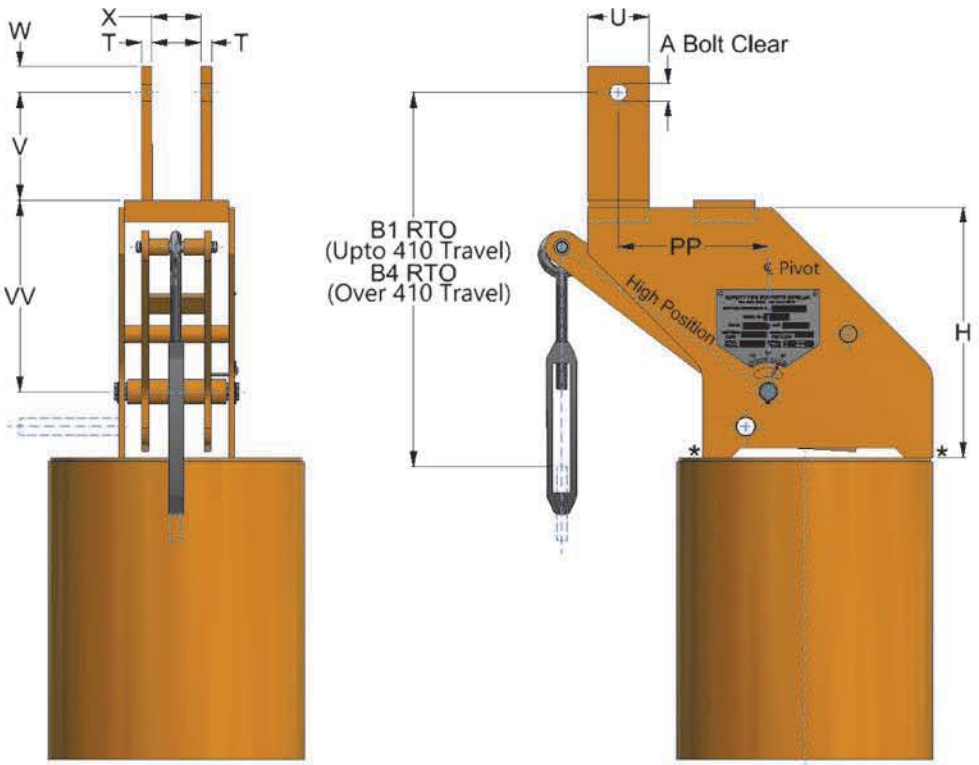
*Access Load Adjuster

The rod take out (RTO) dimension B, B1 or B3 are given for the load arm in the high position.
When the load is set in the low position the total up travel must be added to dimensions B, B1 or B3.

Typical yoke arrangement applicable to all types.
See page 32 for diagram and yoke table for unit and travel range applicable.

Constant Spring Support – QC110C & CX

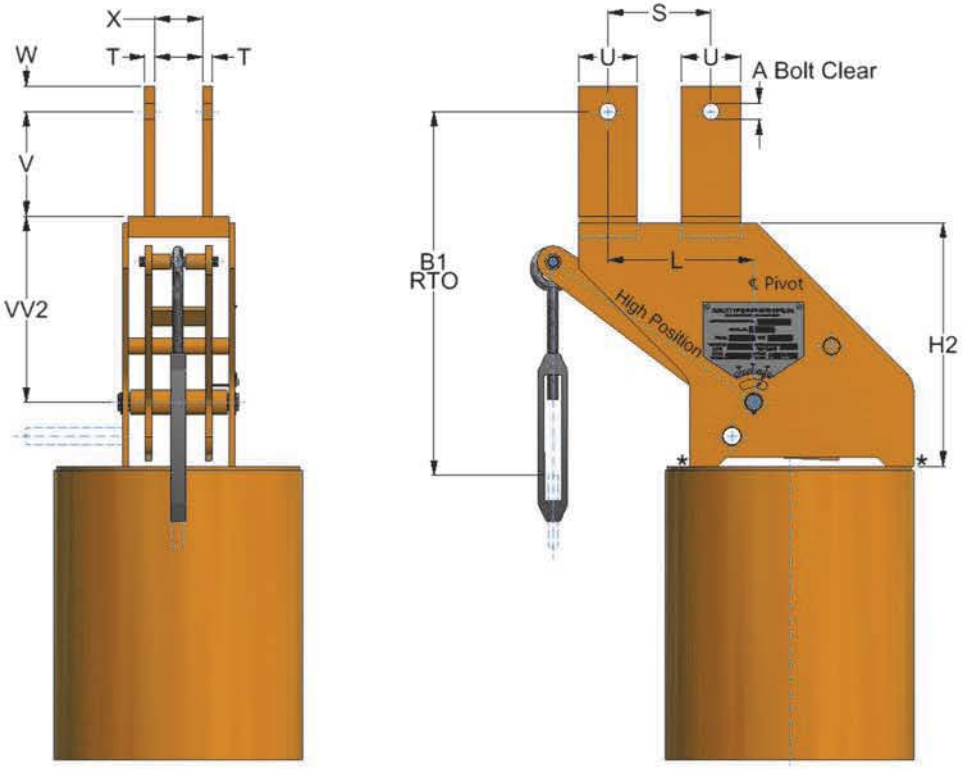
QC110C



*Access Load Adjuster

Note: Type 'B' & 'C'
Not recommended over:
190 Travel Sizes 1 to 12
210 Travel Sizes 13 to 18
290 Travel Sizes 19 to 26
300 Travel Sizes 27 to 33
500 Travel Sizes 34 to 39
All Travels Sizes 40 to 66

QC110CX



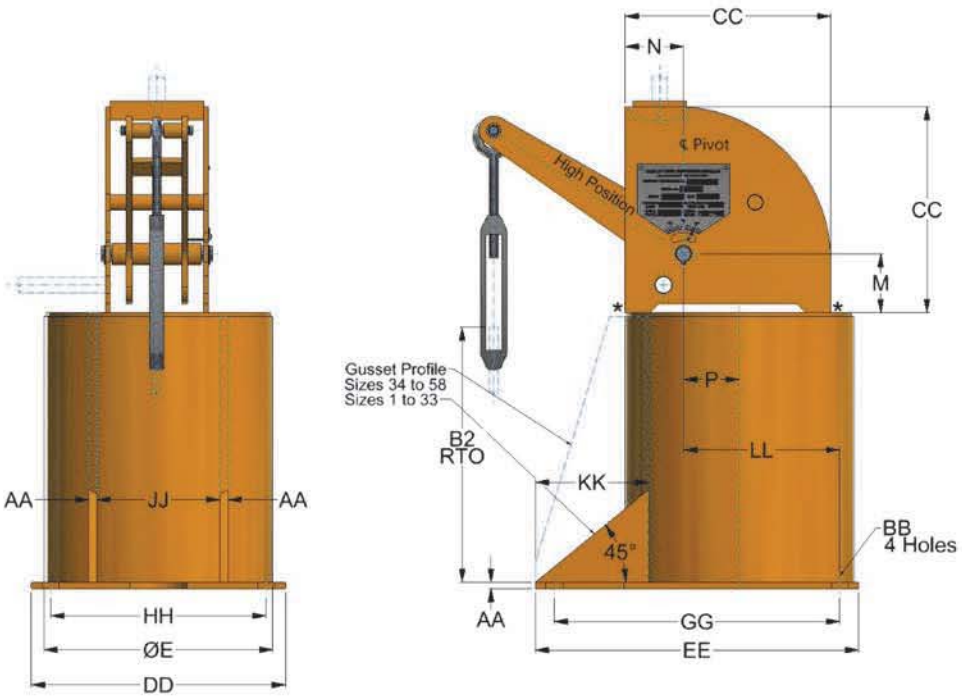
*Access Load Adjuster

The rod take out (RTO) dimension B, B1 or B3 are given for the load arm in the high position.
When the load is set in the low position the total up travel must be added to dimensions B, B1 or B3.

Typical yoke arrangement applicable to all types.
See page 32 for diagram and yoke table for unit and travel range applicable.

Constant Spring Support – QC110D & E

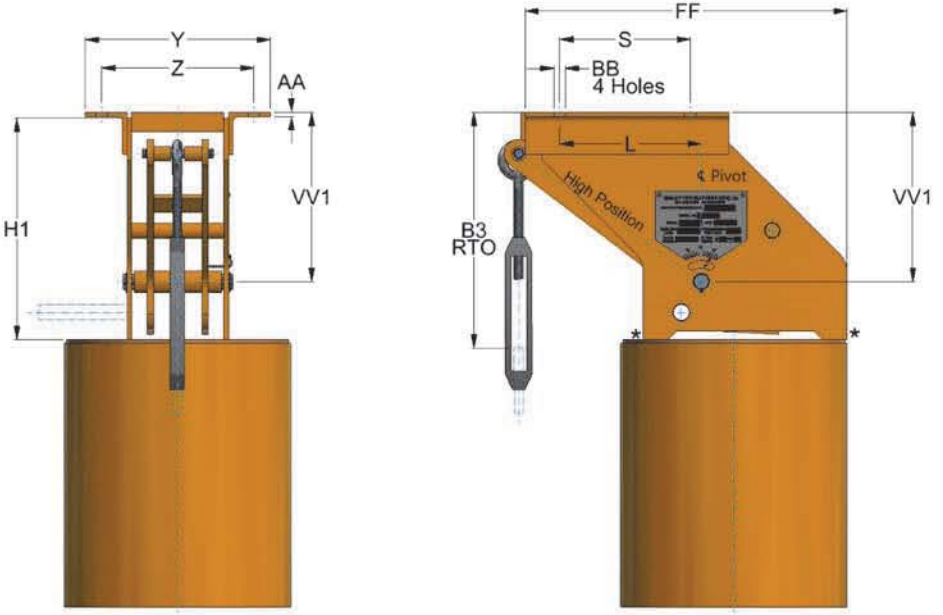
QC110D



Type D only. The rod take out (RTO) dimension B2 is given for the load arm in the high position.
When the load is set in the low position the total up travel must be subtracted from dimensions B2.

*Access Load Adjuster

QC110E



*Access Load Adjuster

The rod take out (RTO) dimension B, B1 or B3 are given for the load arm in the high position.
When the load is set in the low position the total up travel must be added to dimensions B, B1 or B3.

Typical yoke arrangement applicable to all types.
See page 32 for diagram and yoke table for unit and travel range applicable.

Constant Spring Supports

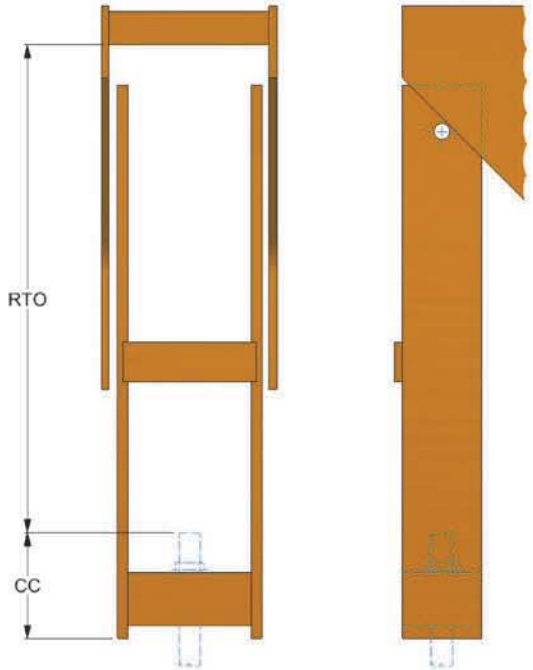
Constant Spring Tables – Fig. QC110 – Sizes 1 to 66

Constant Support Dimension Sizes 1 to 66											
Size	1~6	7~12	13~18	19~26	27~33	34~39	40~47	48~50	51~54	55~58	59~66
D	250	300	350	400	600	750	1100	1265	1265	1265	1620
E	150	220	295	330	390	440	525	525	525	525	640
F	180	215	270	325	405	495	610	685	685	685	760
G	115	120	135	150	180	225	280	345	345	345	455
J	135	140	160	175	215	270	330	405	405	405	560
M	55	65	75	95	115	145	198	250	250	250	280
N	55	65	75	95	115	145	180	190	190	190	215
T	10	12	12	20	25	25	30	40	40	40	40
R	15	20	30	30	35	40	50	60	70	80	80
U	40	50	70	80	100	130	150	200	200	200	200
V	40	40	50	65	75	75	90	140	140	140	150
Y	215	220	255	280	320	425	480	745	745	745	855
Z	165	180	205	220	265	335	395	520	520	520	685
BB	14	18	22	22	22	27	33	45	45	45	51
AA	6	6	8	8	10	10	15	20	20	20	25
TT	5	5	10	15	10	30	15	15	15	15	40
FF	295	330	455	550	615	815	945	1080	1080	1080	1100
X	35	35	50	50	65	75	90	110	110	110	120
K	150	150	150	200	200	200	250	300	300	300	300
P	33	38	65	66	83	100	Table	182	182	182	Table
LL	100	130	195	215	255	285	Table	460	460	460	~
GG	180	255	370	395	510	510	740	830	830	830	~
EE	220	305	420	460	585	610	840	930	930	930	~
KK	80	100	170	180	230	170	300	350	350	350	~
JJ	102	127	203	254	305	206	257	305	305	405	~
HH	170	230	280	355	410	460	560	560	560	560	~
DD	210	280	330	420	485	560	660	660	660	660	~
CC	-	-	-	-	-	-	-	275	275	290	340

All units are supplied with drop rods and turnbuckles, except for sizes/travels shown in the yoke table below, which will be supplied with a yoke arrangement.

Yoke Table	
Sizes	Travels
48 - 58	170 - 350
59 - 66	180 - 350

LL Dimension		
Size	40 - 44	45 - 47
LL	360	405



W Dimensions for 'A' Bolt													
Size	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
W	25	25	30	35	40	50	60	65	80	85	100	110	120

P Dimension										
Size	40 - 44	45 - 47	59	60	61	62	63	64	65	66
P	121	165	188	193	197	203	207	211	216	220

Constant Spring Tables – Fig. QC110 – Sizes 1 to 12

Sizes 1 to 6															
Travel	C	B	B1	B2	B3	A	PP	L	S	VV	VV1	VV2	H	H1	H2
60	80	340	395	130	355	M12	64	150	130		175			225	
70	94	335	390	135	350	M12	64	150	130		175			225	
80	107	325	380	145	340	M12	86	150	130		175			225	
90	120	320	375	150	335	M12	97	150	130		175			225	
100	134	315	365	160	330	M12	107	150	130		175			225	
110	147	305	360	165	320	M12	118	150	130		175			225	
120	160	300	355	175	315	M12	128	150	130		175			225	
130	174	290	345	180	305	M12	140	150	130		175			225	
140	187	285	340	185	300	M12	150	150	130		175			225	
150	200	275	330	195	290	M12	161	150	130		175			225	
160	214	270	325	200	285	M12	172	150	130		175			225	
170	227	260	315	210	275	M12	182	150	130		175			225	
180	240	255	310	215	270	M12	193	150	130		175			225	
190	254	245	300	225	260	M12	203	150	130		175			225	
200	267	240	295	230	255	M12		150	130		175	175		225	225
210	280	235	290	240	250	M12		150	130		175	175		225	225
220	294	250	280	245	265	M12		150	130		200	175		250	225
230	307	245	275	255	260	M12		150	130		200	175		250	225
240	320	235	265	260	250	M12		150	130		200	175		250	225
250	334	250	260	270	265	M12		150	130		220	175		270	225
260	347	240	250	275	255	M12		150	130		220	175		270	225
270	360	235	245	280	250	M12		150	130		220	175		270	225
280	374	245	235	290	260	M12		150	130		240	175		290	225
290	387	240	230	295	255	M12		150	130		240	175		290	225
300	400	230	220	305	245	M12		150	130		240	175		290	225

For table of standard dimensions, see page 32

Sizes 7 to 12															
Travel	C	B	B1	B2	B3	A	PP	L	S	VV	VV1	VV2	H	H1	H2
90	120	320	380	215	340	M12	96	155	125		180			240	
100	134	310	370	220	330	M12	107	155	125		180			240	
110	147	305	365	230	325	M12	117	155	125		180			240	
120	160	300	360	235	320	M12	128	155	125		180			240	
130	174	290	350	245	310	M12	139	155	125		180			240	
140	187	285	345	250	305	M12	150	155	125		180			240	
150	200	275	335	260	295	M12	160	155	125		180			240	
160	214	270	330	265	290	M12	171	155	125		180			240	
170	227	260	320	270	280	M12	181	155	125		180			240	
180	240	255	315	280	275	M12	192	155	125		180			240	
190	254	250	310	285	270	M12	204	155	125		180			240	
200	267	240	300	295	260	M12		155	125		180	180		240	240
210	280	235	295	300	255	M12		155	125		180	180		240	240
220	294	255	285	305	275	M12		155	125		210	180		270	240
230	307	250	280	315	270	M12		155	125		210	180		270	240
240	320	240	270	320	260	M12		155	125		210	180		270	240
250	334	255	265	330	275	M12		155	125		230	180		290	240
260	347	245	255	335	265	M12		155	125		230	180		290	240
270	360	240	250	340	260	M12		155	125		230	180		290	240
280	374	245	240	350	265	M12		155	125		245	180		305	240
290	387	240	235	355	260	M12		155	125		245	180		305	240
300	400	230	225	365	250	M12		155	125		245	180		305	240
310	414	270	250	370	290	M12		155	125		290	210		350	270
320	427	260	240	380	280	M12		155	125		290	210		350	270
330	440	255	235	385	275	M12		155	125		290	210		350	270
340	454	250	230	395	270	M12		155	125		290	210		350	270
350	467	240	220	400	260	M12		155	125		290	210		350	270
360	480	275	255	405	295	M12		155	125		330	250		390	310
370	494	265	245	415	285	M12		155	125		330	250		390	310
380	507	260	240	420	280	M12		155	125		330	250		390	310
390	520	250	230	430	270	M12		155	125		330	250		390	310
400	534	245	225	435	265	M12		155	125		330	250		390	310
410	547	235	215	445	255	M12		155	125		330	250		390	310
420	560	230	210	450	250	M12		155	125		330	250		390	310

Constant Spring Tables – Fig. QC110 – Sizes 13 to 26

Sizes 13 to 18															
Travel	C	B	B1	B2	B3	A	PP	L	S	VV	VV1	VV2	H	H1	H2
100	134	345	425	280	375	M16	105	225	195		225			290	
110	147	340	420	290	370	M16	116	225	195		225			290	
120	160	335	415	295	365	M16	126	225	195		225			290	
130	174	325	405	305	355	M16	138	225	195		225			290	
140	187	320	400	310	350	M16	148	225	195		225			290	
150	200	310	390	315	340	M16	158	225	195		225			290	
160	214	305	385	325	335	M12	169	225	195		225			290	
170	227	295	375	330	325	M12	179	225	195		225			290	
180	240	290	370	340	320	M12	189	225	195		225			290	
190	254	280	360	345	310	M12	200	225	195		225			290	
200	267	275	355	355	305	M12	211	225	195		225			290	
210	280	270	350	360	300	M12	221	225	195		225			290	
220	294	260	340	370	290	M12		225	195		225	225		290	290
230	307	255	335	375	285	M12		225	195		225	225		290	290
240	320	245	325	380	275	M12		225	195		225	225		290	290
250	334	240	320	390	270	M12		225	195		225	225		290	290
260	347	230	310	395	260	M12		225	195		225	225		290	290
270	360	255	305	405	285	M12		225	195		255	225		320	290
280	374	245	295	410	275	M12		225	195		255	225		320	290
290	387	240	290	420	270	M12		225	195		255	225		320	290
300	400	255	280	425	285	M12		225	195		280	225		345	290
310	414	250	275	435	280	M12		225	195		280	225		345	290
320	427	240	265	440	270	M12		225	195		280	225		345	290
330	440	255	260	450	285	M12		225	195		300	225		365	290
340	454	250	255	455	280	M12		225	195		300	225		365	290
350	467	240	245	460	270	M12		225	195		300	225		365	290
360	480	235	240	470	265	M12		225	195		300	225		365	290
370	494	260	230	475	290	M12		225	195		335	225		400	290
380	507	255	245	485	285	M12		225	195		335	245		400	310
390	520	245	235	490	275	M12		225	195		335	245		400	310
400	534	240	230	500	270	M12		225	195		335	245		400	310
410	547	230	220	505	260	M12		225	195		335	245		400	310
420	560	225	215	515	255	M12		225	195		335	245		400	310

For table of standard dimensions, see page 32

Sizes 19 to 26															
Travel	C	B	B1	B2	B3	A	PP	L	S	VV	VV1	VV2	H	H1	H2
120	160	470	565	315	500	M20	129	260	220		310			390	
130	174	460	555	325	490	M20	141	260	220		310			390	
140	187	455	550	330	485	M20	152	260	220		310			390	
150	200	445	540	335	475	M20	162	260	220		310			390	
160	214	440	535	345	470	M20	173	260	220		310			390	
170	227	430	525	350	460	M20	184	260	220		310			390	
180	240	425	520	360	455	M16	195	260	220		310			390	
190	254	415	510	365	445	M16	206	260	220		310			390	
200	267	410	505	375	440	M16	217	260	220		310			390	
210	280	405	500	380	435	M16	227	260	220		310			390	
220	294	395	490	390	425	M16	239	260	220		310			390	
230	307	390	480	395	420	M16	249	260	220		310			390	
240	320	380	475	400	410	M16	259	260	220		310			390	
250	334	375	470	410	405	M16	271	260	220		310			390	
260	347	365	460	415	395	M16	282	260	220		310			390	
270	360	360	455	425	390	M16	292	260	220		310			390	
280	374	350	445	430	380	M16	304	260	220		310			390	
290	387	345	440	440	375	M16	315	260	220		310			390	
300	400	335	430	445	365	M16		260	220		310	310		390	390
310	414	330	425	455	360	M16		260	220		310	310		390	390
320	427	325	420	460	355	M16		260	220		310	310		390	390
330	440	315	410	470	345	M12		260	220		310	310		390	390
340	454	310	405	475	340	M12		260	220		310	310		390	390
350	467	300	395	480	330	M12		260	220		310	310		390	390
360	480	295	390	490	325	M12		260	220		310	310		390	390
370	494	315	380	495	345	M12		260	220		340	310		420	390
380	507	310	375	505	340	M12		260	220		340	310		420	390
390	520	300	365	510	330	M12		260	220		340	310		420	390
400	534	295	360	520	325	M12		260	220		340	310		420	390
410	547	315	350	525	345	M12		260	220		370	310		450	390
420	560	310	345	535	340	M12		260	220		370	310		450	390
430	574	300	335	540	330	M12		260	220		370	310		450	390
440	587	295	330	550	325	M12		260	220		370	310		450	390
450	600	290	325	555	320	M12		260	220		370	310		450	390
460	614	310	315	560	340	M12		260	220		400	310		480	390
470	627	305	310	570	335	M12		260	220		400	310		480	390
480	641	295	300	575	325	M12		260	220		400	310		480	390
490	654	290	295	585	320	M12		260	220		400	310		480	390
500	667	280	285	590	310	M12		260	220		400	310		480	390

Constant Spring Tables – Fig. QC110 – Sizes 27 to 39

Sizes 27 to 33															
Travel	C	B	B1	B2	B3	A	PP	L	S	VV	VV1	VV2	H	H1	H2
130	174	440	550	545	475	M30	142	285	240		295			405	
140	187	435	545	550	470	M30	153	285	240		295			405	
150	200	425	535	560	460	M30	164	285	240		295			405	
160	214	420	530	570	455	M30	175	285	240		295			405	
170	227	410	520	575	445	M24	185	285	240		295			405	
180	240	405	515	580	440	M24	196	285	240		295			405	
190	254	395	505	590	430	M24	208	285	240		295			405	
200	267	390	500	595	425	M24	219	285	240		295			405	
210	280	385	495	605	420	M24	230	285	240		295			405	
220	294	375	485	610	410	M24	241	285	240		295			405	
230	307	370	480	620	405	M24	251	285	240		295			405	
240	320	360	470	625	395	M20	262	285	240		295			405	
250	334	355	465	635	390	M20	273	285	240		295			405	
260	347	345	455	640	380	M20	284	285	240		295			405	
270	360	340	450	645	375	M20	295	285	240		295			405	
280	374	330	440	655	365	M20	306	285	240		295			405	
290	387	325	435	660	360	M20	317	285	240		295			405	
300	400	315	425	670	350	M20	327	285	240		295			405	
310	414	310	420	675	345	M20		285	240		295	295		405	405
320	427	305	415	685	340	M20		285	240		295	295		405	405
330	440	295	405	690	330	M20		285	240		295	295		405	405
340	454	290	400	700	325	M20		285	240		295	295		405	405
350	467	280	390	705	315	M20		285	240		295	295		405	405
360	480	275	385	710	310	M20		285	240		295	295		405	405
370	494	310	375	720	345	M20		285	240		340	295		450	405
380	507	305	370	725	340	M20		285	240		340	295		450	405
390	520	295	360	735	330	M20		285	240		340	295		450	405
400	534	290	355	740	325	M20		285	240		340	295		450	405
410	547	310	345	750	345	M20		285	240		370	295		480	405
420	560	305	340	755	340	M20		285	240		370	295		480	405
430	574	295	330	765	330	M20		285	240		370	295		480	405
440	587	290	325	770	325	M20		285	240		370	295		480	405
450	600	315	320	775	350	M20		285	240		400	295		510	405
460	614	305	310	785	340	M20		285	240		400	295		510	405
470	627	300	305	790	335	M20		285	240		400	295		510	405
480	641	290	295	800	325	M20		285	240		400	295		510	405
490	654	285	290	805	320	M20		285	240		400	295		510	405
500	667	275	280	815	310	M20		285	240		400	295		510	405

For table of standard dimensions, see page 32

Sizes 34 to 39																	
Travel	C	B	B1	B2	B3	B4	A	PP	L	S	VV	VV1	VV2	H	H1	H2
170	227	530	645	750	570		M36	187	400	355		420			535	
180	240	525	640	760	565		M36	197	400	355		420			535	
190	254	515	630	765	555		M30	209	400	355		420			535	
200	267	510	625	770	550		M30	220	400	355		420			535	
210	280	505	620	780	545		M30	230	400	355		420			535	
220	294	495	610	785	535		M30	242	400	355		420			535	
230	307	490	605	790	530		M30	252	400	355		420			535	
240	320	480	595	800	520		M30	262	400	355		420			535	
250	334	475	590	810	515		M30	274	400	355		420			535	
260	347	465	580	815	505		M30	285	400	355		420			535	
270	360	460	575	825	500		M30	296	400	355		420			535	
280	374	450	565	830	490		M30	307	400	355		420			535	
290	387	445	560	840	485		M30	318	400	355		420			535	
300	400	435	550	845	475		M30	328	400	355		420			535	
310	414	430	545	850	470		M24	340	400	355		420			535	
320	427	425	540	860	465		M24	351	400	355		420			535	
330	440	415	530	870	455		M24	361	400	355		420			535	
340	454	410	525	875	450		M24	373	400	355		420			535	
350	467	400	515	880	440		M24	384	400	355		420			535	
360	480	395	510	890	435		M24	394	400	355		420			535	
370	494	385	500	895	425		M24	405	400	355		420			535	
380	507	380	495	905	420		M24	416	400	355		420			535	
390	520	370	485	910	410		M24	427	400	355		420			535	
400	534	365	480	920	405		M24	439	400	355		420			535	
410	547	355	470	925	395		M24	449	400	355		420			535	
420	560	350	465	935	390	515	M24	460	400	355	470	420	420	585	535	535
430	574	340	455	945	380	505	M24	470	400	355	470	420	420	585	535	535
440	587	335	450	950	375	500	M24	480	400	355	470	420	420	585	535	535
450	600	330	445	955	370	495	M24	495	400	355	470	420	420	585	535	535
460	614	320	435	965	360	485	M24	505	400	355	470	420	420	585	535	535
470	627	315	430	970	355	480	M24	515	400	355	470	420	420	585	535	535
480	641	305	420	980	345	470	M24	530	400	355	470	420	420	585	535	535
490	654	340	415	985	380	465	M24	540	400	355	470	460	420	585	575	535
500	667	330	405	995	370	455	M24	550	400	355	470	460	420	585	575	535
510	680	325	400	1000	365		M24		400	355		460	420		575	535
520	695	315	390	1010	355		M24		400	355		460	420		575	535
530	708	310	385	1015	350		M24		400	355		460	420		575	535
540	720	305	380	1020	345		M24		400	355		460	420		575	535
550	734	335	370	1030	375		M24		400	355		500	420		615	535
560	747	330	365	1035	370		M24		400	355		500	420		615	535
570	761	320	355	1045	360		M24		400	355		500	420		615	535
580	774	315	350	1050	355		M24		400	355		500	420		615	535
590	787	305	340	1060	345		M24		400	355		500	420		615	535
600	800	300	335	1065	340		M24		400	355		500	420		615	535
610	815	290	325	1075	330		M24		400	355		500	420		615	535

Constant Spring Tables – Fig. QC110 – Sizes 40 to 50

Sizes 40 to 47												
Travel	C	B	B1	B2	B3	A	L	S	VV1	VV2	H1	H2
170	227	575	715	1115	625	M48	430	370	425		610	
180	240	570	710	1120	620	M48	430	370	425		610	
190	254	560	700	1130	610	M48	430	370	425		610	
200	267	555	695	1135	605	M48	430	370	425		610	
210	280	545	690	1145	595	M42	430	370	425		610	
220	294	540	680	1150	590	M42	430	370	425		610	
230	307	535	675	1160	585	M42	430	370	425		610	
240	320	525	665	1165	575	M42	430	370	425		610	
250	334	520	660	1175	570	M42	430	370	425		610	
260	347	510	650	1180	560	M42	430	370	425		610	
270	360	505	645	1185	555	M42	430	370	425		610	
280	374	495	635	1195	545	M42	430	370	425		610	
290	387	490	630	1200	540	M36	430	370	425		610	
300	400	480	620	1210	530	M36	430	370	425		610	
310	414	475	615	1215	525	M36	430	370	425		610	
320	427	470	610	1225	520	M36	430	370	425		610	
330	440	460	600	1230	510	M36	430	370	425		610	
340	454	455	595	1240	505	M36	430	370	425		610	
350	467	445	585	1245	495	M36	430	370	425		610	
360	480	440	580	1250	490	M36	430	370	425		610	
370	494	430	570	1260	480	M36	430	370	425		610	
380	507	425	565	1270	475	M36	430	370	425		610	
390	520	415	555	1275	465	M36	430	370	425		610	
400	534	410	550	1280	460	M36	430	370	425		610	
410	547	400	540	1290	450	M36	430	370	425		610	
420	560	470	610	1290	520	M36	430	370	500	500	685	685
430	574	460	600	1300	510	M36	430	370	500	500	685	685
440	587	455	595	1305	505	M36	430	370	500	500	685	685
450	600	445	585	1315	495	M36	430	370	500	500	685	685
460	614	440	580	1320	490	M36	430	370	500	500	685	685
470	627	435	575	1330	485	M36	430	370	500	500	685	685
480	641	425	565	1335	475	M36	430	370	500	500	685	685
490	654	420	560	1345	470	M36	430	370	500	500	685	685
500	667	410	550	1350	460	M36	430	370	500	500	685	685
510	680	405	545	1355	455	M36	430	370	500	500	685	685
520	695	395	535	1365	445	M36	430	370	500	500	685	685
530	708	390	530	1375	440	M36	430	370	500	500	685	685
540	720	380	520	1380	430	M36	430	370	500	500	685	685
550	734	375	515	1385	425	M36	430	370	500	500	685	685
560	747	365	505	1395	415	M36	430	370	500	500	685	685
570	761	360	500	1400	410	M36	430	370	500	500	685	685
580	774	350	490	1410	400	M36	430	370	500	500	685	685
590	787	345	485	1415	395	M36	430	370	500	500	685	685
600	800	340	480	1425	390	M36	430	370	500	500	685	685
610	815	330	470	1430	380	M36	430	370	500	500	685	685

For table of standard dimensions, see page 32

Sizes 48 to 50												
Travel	C	B	B1	B2	B3	A	L	S	VV1	VV2	H1	H2
170	227	635	835	1285	695	M64	460	365	445		680	
180	240	630	830	1290	690	M64	460	365	445		680	
190	254	620	820	1300	680	M64	460	365	445		680	
200	267	615	815	1305	675	M56	460	365	445		680	
210	280	610	810	1310	670	M56	460	365	445		680	
220	294	600	800	1320	660	M56	460	365	445		680	
230	307	595	795	1330	655	M56	460	365	445		680	
240	320	585	785	1335	645	M56	460	365	445		680	
250	334	580	780	1340	640	M56	460	365	445		680	
260	347	570	770	1350	630	M56	460	365	445		680	
270	360	565	765	1355	625	M48	460	365	445		680	
280	374	555	755	1365	615	M48	460	365	445		680	
290	387	550	750	1370	610	M48	460	365	445		680	
300	400	540	740	1380	600	M48	460	365	445		680	
310	414	535	735	1385	595	M48	460	365	445		680	
320	427	530	730	1395	590	M48	460	365	445		680	
330	440	520	720	1400	580	M48	460	365	445		680	
340	454	515	715	1410	575	M48	460	365	445		680	
350	467	505	705	1415	565	M48	460	365	445		680	
360	480	500	700	1420	560	M42	460	365	445		680	
370	494	490	690	1430	550	M42	460	365	445		680	
380	507	485	685	1435	545	M42	460	365	445		680	
390	520	475	675	1445	535	M42	460	365	445		680	
400	534	470	670	1450	530	M42	460	365	445		680	
410	547	460	660	1460	520	M42	460	365	445		680	
420	560	540	740	1465	600	M42	460	365	530		765	
430	574	530	730	1475	590	M42	460	365	530		765	
440	587	525	725	1480	585	M42	460	365	530		765	
450	600	515	715	1485	575	M42	460	365	530		765	
460	614	510	710	1495	570	M42	460	365	530		765	
470	627	505	705	1500	565	M42	460	365	530		765	
480	641	495	695	1510	555	M42	460	365	530		765	
490	654	490	690	1515	550	M42	460	365	530		765	
500	667	480	680	1525	540	M42	460	365	530		765	
510	680	475	675	1530	535	M42	460	365	530		765	
520	695	465	665	1540	525	M42	460	365	530		765	
530	708	460	660	1545	520	M42	460	365	530		765	
540	720	450	650	1550	510	M42	460	365	530		765	
550	734	445	645	1560	505	M42	460	365	530		765	
560	747	435	635	1565	495	M42	460	365	530		765	
570	761	430	630	1575	490	M42	460	365	530		765	
580	774	420	620	1580	480	M42	460	365	530		765	
590	787	415	615	1590	475	M42	460	365	530		765	
600	800	410	610	1595	470	M42	460	365	530		765	
610	815	400	600	1605	460	M42	460	365	530		765	

Constant Spring Tables – Fig. QC110 – Sizes 51 to 58

Sizes 51 to 54												
Travel	A	B	B1	B2	B3	C	E	F	VV1	VV2	H1	H2
170	227	625	835	1285	695	M64	460	365	445		680	
180	240	620	830	1290	690	M64	460	365	445		680	
190	254	610	820	1300	680	M64	460	365	445		680	
200	267	605	815	1305	675	M56	460	365	445		680	
210	280	600	810	1310	670	M56	460	365	445		680	
220	294	590	800	1320	660	M56	460	365	445		680	
230	307	585	795	1330	655	M56	460	365	445		680	
240	320	575	785	1335	645	M56	460	365	445		680	
250	334	570	780	1340	640	M56	460	365	445		680	
260	347	560	770	1350	630	M56	460	365	445		680	
270	360	555	765	1355	625	M48	460	365	445		680	
280	374	545	755	1365	615	M48	460	365	445		680	
290	387	540	750	1370	610	M48	460	365	445		680	
300	400	530	740	1380	600	M48	460	365	445		680	
310	414	525	735	1385	595	M48	460	365	445		680	
320	427	520	730	1395	590	M48	460	365	445		680	
330	440	510	720	1400	580	M48	460	365	445		680	
340	454	505	715	1410	575	M48	460	365	445		680	
350	467	495	705	1415	565	M48	460	365	445		680	
360	480	490	700	1420	560	M42	460	365	445		680	
370	494	480	690	1430	550	M42	460	365	445		680	
380	507	475	685	1435	545	M42	460	365	445		680	
390	520	465	675	1445	535	M42	460	365	445		680	
400	534	460	670	1450	530	M42	460	365	445		680	
410	547	450	660	1460	520	M42	460	365	445		680	
420	560	530	740	1465	600	M42	460	365	530		765	
430	574	520	730	1475	590	M42	460	365	530		765	
440	587	515	725	1480	585	M42	460	365	530		765	
450	600	505	715	1485	575	M42	460	365	530		765	
460	614	500	710	1495	570	M42	460	365	530		765	
470	627	495	705	1500	565	M42	460	365	530		765	
480	641	485	695	1510	555	M42	460	365	530		765	
490	654	480	690	1515	550	M42	460	365	530		765	
500	667	470	680	1525	540	M42	460	365	530		765	
510	680	465	675	1530	535	M42	460	365	530		765	
520	695	455	665	1540	525	M42	460	365	530		765	
530	708	450	660	1545	520	M42	460	365	530		765	
540	720	440	650	1550	510	M42	460	365	530		765	
550	734	435	645	1560	505	M42	460	365	530		765	
560	747	425	635	1565	495	M42	460	365	530		765	
570	761	420	630	1575	490	M42	460	365	530		765	
580	774	410	620	1580	480	M42	460	365	530		765	
590	787	405	615	1590	475	M42	460	365	530		765	
600	800	400	610	1595	470	M42	460	365	530		765	
610	815	390	600	1605	460	M42	460	365	530		765	

For table of standard dimensions, see page 32

Sizes 55 to 58												
Travel	A	B	B1	B2	B3	C	E	F	VV1	VV2	H1	H2
180	240	610	830	1290	690	M72	460	365	445		680	
190	254	600	820	1300	680	M72	460	365	445		680	
200	267	595	815	1305	675	M64	460	365	445		680	
210	280	590	810	1310	670	M64	460	365	445		680	
220	294	580	800	1320	660	M64	460	365	445		680	
230	307	575	795	1330	655	M64	460	365	445		680	
240	320	565	785	1335	645	M64	460	365	445		680	
250	334	560	780	1340	640	M64	460	365	445		680	
260	347	550	770	1350	630	M56	460	365	445		680	
270	360	545	765	1355	625	M56	460	365	445		680	
280	374	535	755	1365	615	M56	460	365	445		680	
290	387	530	750	1370	610	M56	460	365	445		680	
300	400	520	740	1380	600	M56	460	365	445		680	
310	414	515	735	1358	595	M56	460	365	445		680	
320	427	510	730	1395	590	M56	460	365	445		680	
330	440	500	720	1400	580	M56	460	365	445		680	
340	454	495	715	1410	575	M56	460	365	445		680	
350	467	485	705	1415	565	M56	460	365	445		680	
360	480	480	700	1420	560	M48	460	365	445		680	
370	494	470	690	1430	550	M48	460	365	445		680	
380	507	465	685	1435	545	M48	460	365	445		680	
390	520	455	675	1445	535	M48	460	365	445		680	
400	534	450	670	1450	530	M48	460	365	445		680	
410	547	440	660	1460	520	M48	460	365	445		680	
420	560	520	740	1465	600	M48	460	365	530		765	
430	574	510	730	1475	590	M48	460	365	530		765	
440	587	505	725	1480	585	M48	460	365	530		765	
450	600	495	715	1485	575	M48	460	365	530		765	
460	614	490	710	1495	570	M48	460	365	530		765	
470	627	485	705	1500	565	M48	460	365	530		765	
480	641	475	695	1510	555	M48	460	365	530		765	
490	654	470	690	1515	550	M48	460	365	530		765	
500	667	460	680	1525	540	M48	460	365	530		765	
510	680	455	675	1530	535	M48	460	365	530		765	
520	695	445	665	1540	525	M48	460	365	530		765	
530	708	440	660	1545	520	M48	460	365	530		765	
540	720	430	650	1550	510	M48	460	365	530		765	
550	734	425	645	1560	505	M48	460	365	530		765	
560	747	415	635	1565	495	M48	460	365	530		765	
570	761	410	630	1575	490	M48	460	365	530		765	
580	774	400	620	1580	480	M48	460	365	530		765	
590	787	395	615	1590	475	M48	460	365	530		765	
600	800	390	610	1595	470	M48	460	365	530		765	
610	815	380	600	1605	460	M48	460	365	530		765	

Constant Spring Tables – Fig. QC110 – Sizes 59 to 66

Sizes 59 to 62											
Travel	C	B	B1	B3	A	L	S	VV1	VV2	H1	H2
180	240	745	975	825	M80	430	500	580		820	
190	254	740	970	820	M72	430	500	580		820	
200	267	730	960	810	M72	430	500	580		820	
210	280	725	955	805	M72	430	500	580		820	
220	294	715	945	795	M72	430	500	580		820	
230	307	710	940	790	M72	430	500	580		820	
240	320	700	930	780	M64	430	500	580		820	
250	334	695	925	775	M64	430	500	580		820	
260	347	685	915	765	M64	430	500	580		820	
270	360	680	910	760	M64	430	500	580		820	
280	374	670	900	750	M64	430	500	580		820	
290	387	665	895	745	M64	430	500	580		820	
300	400	660	890	740	M64	430	500	580		820	
310	414	650	880	730	M64	430	500	580		820	
320	427	645	875	725	M56	430	500	580		820	
330	440	635	865	715	M56	430	500	580		820	
340	454	630	860	710	M56	430	500	580		820	
350	467	620	850	700	M56	430	500	580		820	
360	480	615	845	695	M56	430	500	580		820	
370	494	605	835	685	M56	430	500	580		820	
380	507	600	830	680	M56	430	500	580		820	
390	520	595	825	675	M56	430	500	580		820	
400	534	585	815	665	M56	430	500	580		820	
410	547	580	810	660	M56	430	500	580		820	
420	560	570	800	650	M56	430	500	580		820	
430	574	560	790	640	M56	430	500	580		820	
440	587	555	785	635	M56	430	500	580		820	
450	600	550	775	625	M56	430	500	580		820	
460	614	540	770	620	M56	430	500	580		820	
470	627	535	765	615	M56	430	500	580		820	
480	641	525	755	605	M56	430	500	580		820	
490	654	520	750	600	M56	430	500	580		820	
500	667	510	740	590	M56	430	500	580		820	
510	680	505	735	585	M56	430	500	580		820	
520	695	495	725	575	M56	430	500	580		820	
530	708	490	720	570	M56	430	500	580		820	
540	720	480	710	560	M56	430	500	580		820	
550	734	475	705	555	M56	430	500	580		820	
560	747	470	700	545	M56	430	500	580		820	
570	761	460	690	540	M56	430	500	580		820	
580	774	450	685	530	M56	430	500	580		820	
590	787	445	675	525	M56	430	500	580		820	
600	800	440	670	520	M56	430	500	580		820	
610	815	430	660	510	M56	430	500	580		820	

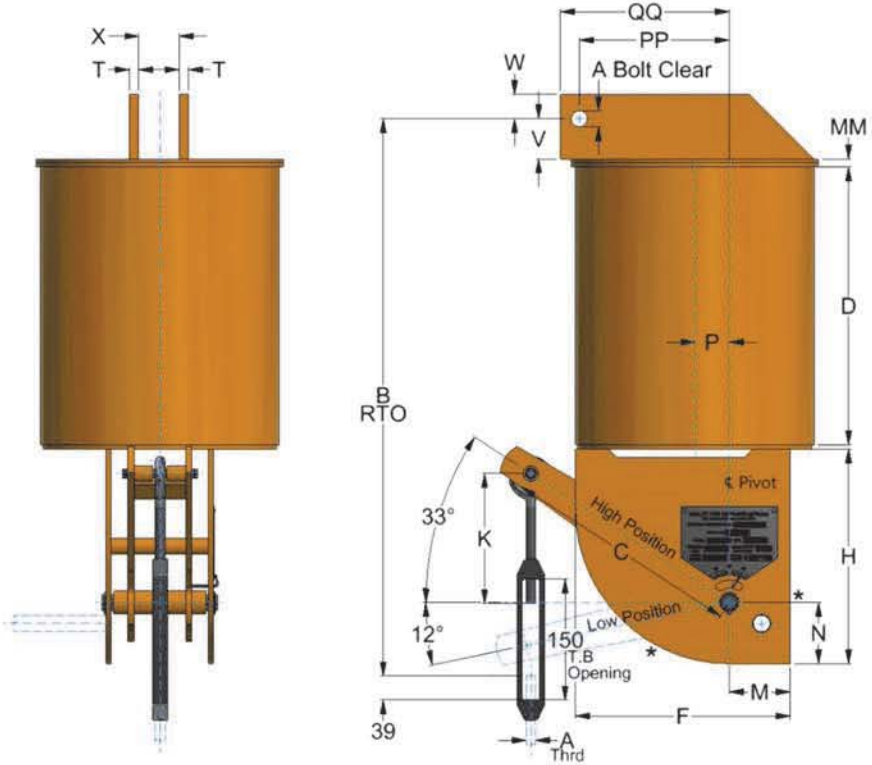
For table of standard dimensions, see page 32

Sizes 63 to 66											
Travel	C	B	B1	B3	A	L	S	VV1	VV2	H1	H2
180	240	745	975	825	M80	430	500	580		820	
190	254	740	970	820	M80	430	500	580		820	
200	267	730	960	810	M80	430	500	580		820	
210	280	725	955	805	M80	430	500	580		820	
220	294	715	945	795	M80	430	500	580		820	
230	307	710	940	790	M72	430	500	580		820	
240	320	700	930	780	M72	430	500	580		820	
250	334	695	925	775	M72	430	500	580		820	
260	347	685	915	765	M72	430	500	580		820	
270	360	680	910	760	M72	430	500	580		820	
280	374	670	900	750	M72	430	500	580		820	
290	387	665	895	745	M64	430	500	580		820	
300	400	660	890	740	M64	430	500	580		820	
310	414	650	880	730	M64	430	500	580		820	
320	427	645	875	725	M64	430	500	580		820	
330	440	635	865	715	M64	430	500	580		820	
340	454	630	860	710	M64	430	500	580		820	
350	467	620	850	700	M64	430	500	580		820	
360	480	615	845	695	M64	430	500	580		820	
370	494	605	835	685	M64	430	500	580		820	
380	507	600	830	680	M56	430	500	580		820	
390	520	595	825	675	M56	430	500	580		820	
400	534	585	815	665	M56	430	500	580		820	
410	547	580	810	660	M56	430	500	580		820	
420	560	570	800	650	M56	430	500	580		820	
430	574	560	790	640	M56	430	500	580		820	
440	587	555	785	635	M56	430	500	580		820	
450	600	550	775	625	M56	430	500	580		820	
460	614	540	770	620	M56	430	500	580		820	
470	627	535	765	615	M56	430	500	580		820	
480	641	525	755	605	M56	430	500	580		820	
490	654	520	750	600	M56	430	500	580		820	
500	667	510	740	590	M56	430	500	580		820	
510	680	505	735	585	M56	430	500	580		820	
520	695	495	725	575	M56	430	500	580		820	
530	708	490	720	570	M56	430	500	580		820	
540	720	480	710	560	M56	430	500	580		820	
550	734	475	705	555	M56	430	500	580		820	
560	747	470	700	545	M56	430	500	580		820	
570	761	460	690	540	M56	430	500	580		820	
580	774	450	685	530	M56	430	500	580		820	
590	787	445	675	525	M56	430	500	580		820	
600	800	440	670	520	M56	430	500	580		820	
610	815	430	660	510	M56	430	500	580		820	

Constant Spring Support – QC120B, QC120C & QC120D

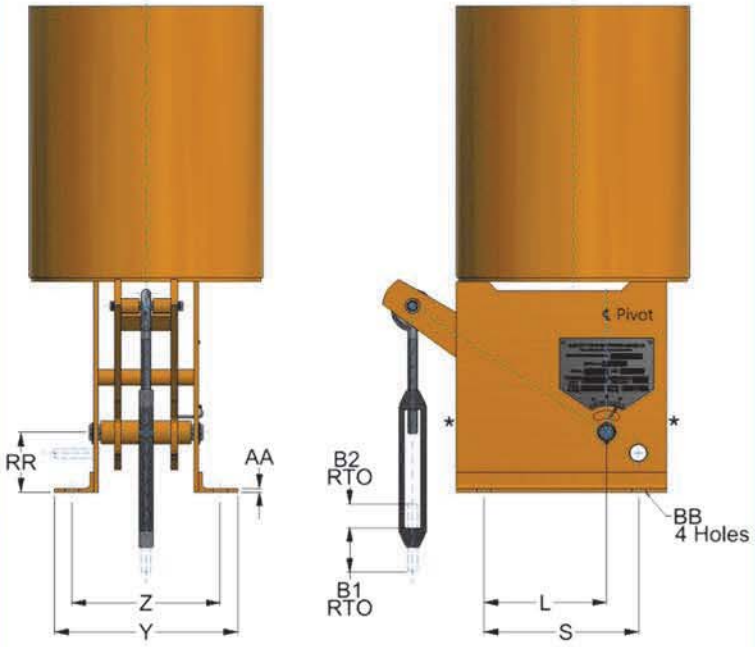
QC120B

QC120C



*Access Load Adjuster

QC120D



*Access Load Adjuster

RTO is B for Types B & C.
RTO is B1 or B2 for Type D.

RTO is calculated when the load arm is in the high position.

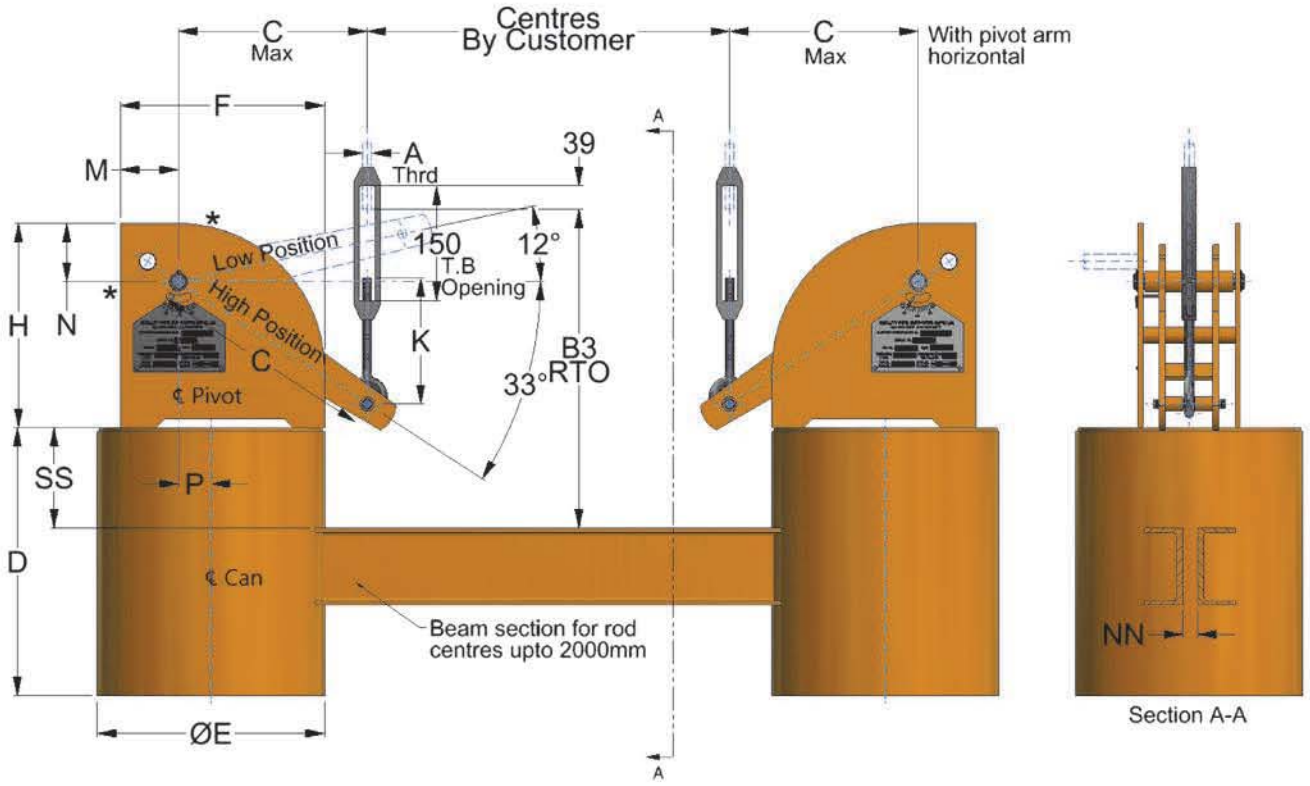
For up travel:
RTO equals total up plus B or B1 or total up travel minus B2.

Types B, D & G are not recommended over:-
250 Travel for sizes 1 - 6
300 Travel for sizes 7 - 12
360 Travel for sizes 13 - 18
420 Travel for sizes 19 - 26 & 27 - 33
500 Travel for sizes 34 – 39

Typical yoke arrangement applicable to types B, C & D. See page 41 for diagram and yoke table for unit and travel range applicable.

Constant Spring Support – QC120G

QC120G



NOTE:
When using type 'G' the working load must be halved to select hanger size.
Arms in 'High Position' allow downward pipe movement.

*Access Load Adjuster

RTO is B for Types B & C.
RTO is B1 or B2 for Type D.

RTO is calculated when the load arm is in the high position.

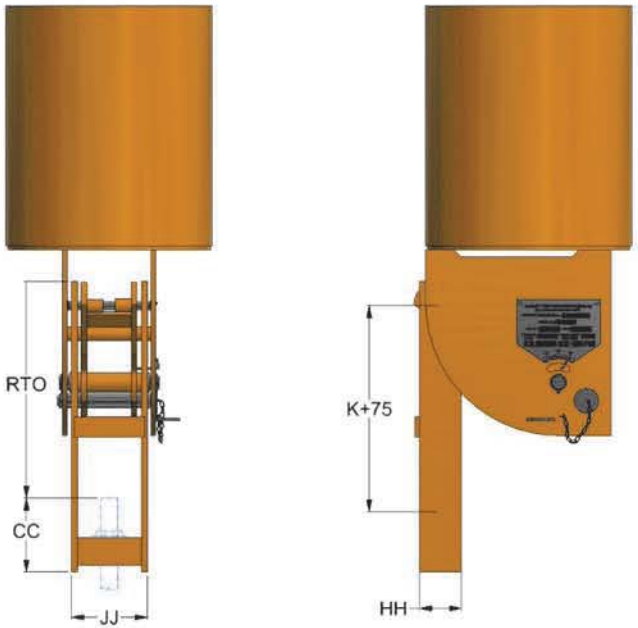
For up travel:
RTO equals total up plus B or B1 or total up travel minus B2.

Types B, D & G are not recommended over:-
250 Travel for sizes 1 - 6
300 Travel for sizes 7 - 12
360 Travel for sizes 13 - 18
420 Travel for sizes 19 - 26 & 27 - 33
500 Travel for sizes 34 – 39

Constant Spring Tables – Fig. QC120 – Sizes 1 to 66

Constant Support Dimension Sizes 1 to 66												
Size		1~6	7~12	13~18	19~26	27~33	34~39	40~47	48~50	51~54	55~58	59~66
D		250	300	350	400	600	750	1100	1265	1265	Table	Table
E		150	220	295	330	390	440	525	525	525	525	640
F		180	215	270	325	405	495	610	710	710	710	760
G		115	120	135	150	180	225	280	345	345	345	455
J		135	140	160	175	215	270	330	405	405	405	560
M		55	65	75	95	115	145	180	250	250	250	280
N		55	65	75	95	115	145	180	190	190	190	215
T		10	12	12	20	25	25	30	40	40	40	40
V		40	40	50	65	75	75	90	140	140	140	150
Y		215	220	255	270	320	425	480	745	745	745	855
Z		165	180	205	220	265	335	395	520	520	520	685
BB		14	18	22	22	22	27	33	45	45	45	51
AA		6	6	8	8	10	10	15	20	20	20	25
MM		10	15	20	25	30	40	40	60	60	60	80
X		35	35	50	50	65	75	90	110	110	110	120
XX		220	300	380	425	480	540	625	650	650	650	780
K		150	150	150	200	200	200	250	Table	Table	300	300
P		33	38	65	66	83	100	Table	182	182	182	Table
H		180	215	270	325	405	495	610	685	685	685	760
CC		125	155	170	190	205	225	245	275	290	290	340
JJ		95	102	112	123	153	190	231	288	288	288	390
HH		40	50	65	80	90	110	130	150	160	160	220
NN		18	30	30	42	50	55	65	65	65	65	70
Beam Section Size	Travel up to 190	100x50	125x65	125x65	200x75	200x90	260x90	300x90	380x100	380x100	380x100	430x100
	Travel over 190	100x50	100x50	100x50	125x65	150x75	180x75	230x90	300x90	300x90	380x100	430x100

All units are supplied with drop rods and turnbuckles, except for sizes/travels shown in the table below, which will be supplied with a yoke arrangement.



Typical yoke arrangement applicable to types QC120B, C & D.

W Dimensions for 'A' Bolt												
Size	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
W	25	25	30	35	40	50	60	65	80	85	100	110	120

P Dimension										
Size	40 - 44	45 - 47	59	60	61	62	63	64	65	66
P	121	165	188	193	197	203	207	211	216	220

D Dimension					
Size	55 ~ 58		59 ~ 66		Travel Range
	Type G & D	Type B & C	Type G & D	Type B & C	
D	1265	1650	1620	1845	170-410
	1265	1265	1620	1620	420-610

K Dimension (Sizes 48-54)		
Travel Range	150-410	420-610
K	135	300

Yoke Table	
Size	Travels
1~6	40 to 100
7~12	40 to 120
13~18	60 to 150
19~26	70 to 180
27~33	80 to 200
34~39	100 to 250
40~47	120 to 320
48~54	150 to 410
55~58	170 to 410
59~66	180 to 410

Constant Spring Tables – Fig. QC120 – Sizes 1 to 12

Sizes 1 to 6												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
40	54	620	130		375	M12	42	105	140	105	65	55
50	67	610	125		370	M12	53	105	140	105	65	55
60	80	605	115		360	M12	64	105	140	105	65	55
70	94	600	110		355	M12	76	105	140	110	65	55
80	107	590	105		345	M12	86	105	140	115	65	55
90	120	585	95		340	M12	97	105	140	130	65	55
100	134	575	90		330	M12	107	105	140	130	65	55
110	147	570	80		325	M12	118	105	140	140	65	55
120	160	560	75		320	M12	128	105	140	155	65	55
130	174	555	65		310	M12	140	105	140	160	65	55
140	187	550	60		305	M12	150	105	140	175	65	55
150	200	540	50		295	M12	161	105	140	180	65	55
160	214	530	45		290	M12	172	105	140	195	65	55
170	227	525	35		280	M12	182	105	140	210	65	55
180	240	520	30		275	M12	193	105	140	215	65	55
190	254	510	25		265	M12	203	105	140	230	65	55
200	267	505	15		260	M12	214	105	140	235	65	55
210	280	500	10		255	M12	225	105	140	250	65	55
220	294	490		25	275	M12	240	105	140	260	90	85
230	307	485		30	270	M12	250	105	140	270	90	85
240	320	475		40	260	M12	260	105	140	280	90	85
250	334	470		60	255	M12	270	105	140	290	105	85
260	347	N/A		70	N/A	M12	N/A	105	140	N/A	105	N/A
270	360	N/A		75	N/A	M12	N/A	105	140	N/A	105	N/A
280	374	N/A		85	N/A	M12	N/A	105	140	N/A	105	N/A
290	387	N/A		90	N/A	M12	N/A	105	140	N/A	105	N/A
300	400	N/A		100	N/A	M12	N/A	105	140	N/A	105	N/A

For table of standard dimensions, see page 41

Sizes 7 to 12												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
40	54	700	115		385	M20	41	120	155	150	80	40
50	67	695	110		380	M16	52	120	155	150	80	40
60	80	685	100		370	M16	63	120	155	150	80	40
70	94	680	95		365	M16	75	120	155	150	80	40
80	107	670	90		355	M12	85	120	155	150	80	40
90	120	665	80		350	M12	96	120	155	150	80	40
100	134	655	70		340	M12	107	120	155	150	80	40
110	147	650	65		335	M12	117	120	155	150	80	40
120	160	645	60		330	M12	128	120	155	160	80	40
130	174	635	50		320	M12	139	120	155	170	80	40
140	187	625	45		315	M12	150	120	155	180	80	40
150	200	620	35		305	M12	160	120	155	190	80	40
160	214	610	30		300	M12	171	120	155	200	80	40
170	227	605	20		290	M12	181	120	155	215	80	40
180	240	600	15		285	M12	192	120	155	220	80	40
190	254	590	10		280	M12	204	120	155	235	80	40
200	267	585	~	~	270	M12	214	120	155	245	80	40
210	280	575		10	265	M12	225	120	155	255	80	40
220	294	570		40	285	M12	240	120	155	260	105	70
230	307	565		45	280	M12	250	120	155	270	105	70
240	320	555		55	270	M12	260	120	155	280	105	70
250	334	550		60	295	M12	270	120	155	290	105	100
260	347	540		70	285	M12	280	120	155	300	105	100
270	360	535		75	280	M12	290	120	155	310	105	100
280	374	525		85	270	M12	305	120	155	325	105	100
290	387	520		90	265	M12	315	120	155	335	105	100
300	400	510		100	255	M12	325	120	155	345	105	100
310	414	N/A		125	N/A	M12	N/A	120	155	N/A	125	N/A
320	427	N/A		135	N/A	M12	N/A	120	155	N/A	125	N/A
330	440	N/A		140	N/A	M12	N/A	120	155	N/A	125	N/A
340	454	N/A		145	N/A	M12	N/A	120	155	N/A	125	N/A
350	467	N/A		155	N/A	M12	N/A	120	155	N/A	125	N/A
360	480	N/A		180	N/A	M12	N/A	120	155	N/A	145	N/A
370	494	N/A		190	N/A	M12	N/A	120	155	N/A	145	N/A
380	507	N/A		195	N/A	M12	N/A	120	155	N/A	145	N/A
390	520	N/A		205	N/A	M12	N/A	120	155	N/A	145	N/A
400	534	N/A		210	N/A	M12	N/A	120	155	N/A	145	N/A
410	547	N/A		220	N/A	M12	N/A	120	155	N/A	145	N/A
420	560	N/A		225	N/A	M12	N/A	120	155	N/A	145	N/A

Constant Spring Tables – Fig. QC120 – Sizes 13 to 26

Sizes 13 to 18												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
60	80	790	90		415	M20	63	155	190	200	90	40
70	94	785	85		410	M20	75	155	190	200	90	40
80	107	780	75		400	M20	85	155	190	200	90	40
90	120	770	70		395	M16	95	155	190	200	90	40
100	134	765	60		385	M16	105	155	190	200	90	40
110	147	755	55		380	M16	116	155	190	200	90	40
120	160	750	50		375	M16	126	155	190	200	90	40
130	174	740	40		365	M16	138	155	190	200	90	40
140	187	735	35		360	M16	148	155	190	200	90	40
150	200	725	25		350	M16	158	155	190	200	90	40
160	214	720	20		345	M12	169	155	190	200	90	40
170	227	710	10		335	M12	179	155	190	215	90	40
180	240	705	5		330	M12	189	155	190	220	90	40
190	254	700		5	320	M12	200	155	190	230	90	40
200	267	690		10	315	M12	211	155	190	240	90	40
210	280	685		20	310	M12	221	155	190	255	90	40
220	294	675		25	300	M12	232	155	190	265	90	40
230	307	670		30	295	M12	242	155	190	275	90	40
240	320	660		40	285	M12	253	155	190	285	90	40
250	334	655		45	280	M12	264	155	190	295	90	40
260	347	650		55	270	M12	274	155	190	305	90	40
270	360	645		85	305	M12	290	155	190	310	115	80
280	374	635		95	295	M12	305	155	190	325	115	80
290	387	630		100	290	M12	315	155	190	335	115	80
300	400	620		110	280	M12	325	155	190	345	115	80
310	414	615		135	305	M12	340	155	190	360	135	110
320	427	605		145	295	M12	350	155	190	370	135	110
330	440	600		150	290	M12	360	155	190	380	135	110
340	454	595		155	285	M12	375	155	190	395	135	110
350	467	685		165	275	M12	385	155	190	405	135	110
360	480	580		170	270	M12	395	155	190	415	135	110
370	494	N/A		180	N/A	M12	N/A	155	190	N/A	135	N/A
380	507	N/A		200	N/A	M12	N/A	155	190	N/A	150	N/A
390	520	N/A		210	N/A	M12	N/A	155	190	N/A	150	N/A
400	534	N/A		215	N/A	M12	N/A	155	190	N/A	150	N/A
410	547	N/A		225	N/A	M12	N/A	155	190	N/A	150	N/A
420	560	N/A		230	N/A	M12	N/A	155	190	N/A	150	N/A

For table of standard dimensions, see page 41

Sizes 19 to 26												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
70	94	945	115		535	M30	76	190	240	230	110	80
80	107	935	105		530	M24	87	190	240	230	110	80
90	120	930	100		520	M24	97	190	240	230	110	80
100	134	920	90		510	M24	108	190	240	230	110	80
110	147	915	85		505	M24	119	190	240	230	110	80
120	160	910	78		500	M20	129	190	240	230	110	80
130	174	900	70		490	M20	141	190	240	230	110	80
140	187	895	65		485	M20	152	190	240	230	110	80
150	200	885	55		475	M20	162	190	240	230	110	80
160	214	880	50		470	M20	173	190	240	230	110	80
170	227	870	40		460	M20	184	190	240	230	110	80
180	240	865	35		455	M16	195	190	240	230	110	80
190	254	855	30		450	M16	206	190	240	235	110	80
200	267	850	20		440	M16	217	190	240	245	110	80
210	280	845	15		435	M16	227	190	240	255	110	80
220	294	835	5		425	M16	239	190	240	270	110	80
230	307	830	~	~	420	M16	249	190	240	280	110	80
240	320	820		10	410	M16	259	190	240	290	110	80
250	334	815		15	405	M16	271	190	240	300	110	80
260	347	805		25	395	M16	282	190	240	310	110	80
270	360	800		30	390	M16	292	190	240	320	110	80
280	374	790		40	380	M16	304	190	240	335	110	80
290	387	785		45	375	M16	315	190	240	345	110	80
300	400	775		55	370	M16	324	190	240	355	110	80
310	414	770		60	360	M16	336	190	240	365	110	80
320	427	765		70	350	M16	347	190	240	375	110	80
330	440	755		75	345	M12	357	190	240	385	110	80
340	454	750		80	340	M12	369	190	240	400	110	80
350	467	740		90	330	M12	380	190	240	410	110	80
360	480	735		95	325	M12	390	190	240	420	110	80
370	494	725		150	355	M12	405	190	240	425	155	120
380	507	720		155	350	M12	415	190	240	435	155	120
390	520	710		165	340	M12	425	190	240	445	155	120
400	534	705		170	335	M12	440	190	240	460	155	120
410	547	695		180	325	M12	450	190	240	470	155	120
420	560	680		210	320	M12	460	190	240	480	180	120
430	574	N/A		220	N/A	M12	N/A	190	240	N/A	180	N/A
440	587	N/A		225	N/A	M12	N/A	190	240	N/A	180	N/A
450	600	N/A		230	N/A	M12	N/A	190	240	N/A	180	N/A
460	614	N/A		240	N/A	M12	N/A	190	240	N/A	180	N/A
470	627	N/A		245	N/A	M12	N/A	190	240	N/A	180	N/A
480	641	N/A		255	N/A	M12	N/A	190	240	N/A	180	N/A
490	654	N/A		260	N/A	M12	N/A	190	240	N/A	180	N/A
500	667	N/A		270	N/A	M12	N/A	190	240	N/A	180	N/A

Constant Spring Tables – Fig. QC120 – Sizes 27 to 39

Sizes 27 to 33												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
80	107	1210	85		550	M36	88	235	300	275	130	40
90	120	1205	80		540	M36	99	235	300	275	130	40
100	134	1195	70		530	M36	109	235	300	275	130	40
110	147	1190	65		525	M30	120	235	300	275	130	40
120	160	1185	60		520	M30	131	235	300	275	130	40
130	174	1175	50		510	M30	142	235	300	275	130	40
140	187	1170	45		505	M30	153	235	300	275	130	40
150	200	1160	35		495	M30	164	235	300	275	130	40
160	214	1155	30		490	M30	175	235	300	275	130	40
170	227	1145	20		480	M24	185	235	300	275	130	40
180	240	1140	15		475	M24	196	235	300	275	130	40
190	254	1130	10		470	M24	208	235	300	275	130	40
200	267	1125	~	~	460	M24	219	235	300	275	130	40
210	280	1120		10	455	M24	230	235	300	275	130	40
220	294	1110		15	445	M24	241	235	300	275	130	40
230	307	1105		20	440	M24	251	235	300	285	130	40
240	320	1095		30	430	M20	262	235	300	295	130	40
250	334	1090		35	425	M20	273	235	300	310	130	40
260	347	1080		45	415	M20	284	235	300	315	130	40
270	360	1075		50	410	M20	295	235	300	330	130	40
280	374	1065		60	400	M20	306	235	300	335	130	40
290	387	1060		65	395	M20	317	235	300	345	130	40
300	400	1050		70	390	M20	327	235	300	355	130	40
310	414	1045		80	380	M20	339	235	300	370	130	40
320	427	1040		90	370	M20	350	235	300	380	130	40
330	440	1030		95	365	M20	361	235	300	390	130	40
340	454	1025		100	360	M20	372	235	300	395	130	40
350	467	1015		110	350	M20	383	235	300	415	130	40
360	480	1010		115	345	M20	394	235	300	420	130	40
370	494	1000		175	405	M20	405	235	300	435	180	110
380	507	995		180	400	M20	415	235	300	445	180	110
390	520	985		190	390	M20	425	235	300	455	180	110
400	534	980		195	385	M20	440	235	300	470	180	110
410	547	970		205	375	M20	450	235	300	480	180	110
420	560	965		210	370	M20	460	235	300	490	180	110
430	574	955		220	360	M20	N/A	235	300	500	180	110
440	587	950		225	355	M20	N/A	235	300	510	180	110
450	600	945		230	350	M20	N/A	235	300	525	180	110
460	614	935		240	340	M20	N/A	235	300	535	180	110
470	627	930		245	335	M20	N/A	235	300	545	180	110
480	641	920		255	325	M20	N/A	235	300	560	180	110
490	654	915		260	320	M20	N/A	235	300	570	180	110
500	667	905		270	310	M20	N/A	235	300	580	180	110

For table of standard dimensions, see page 41

Sizes 34 to 39												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
100	134	1420	45		590	M42	110	290	365	345	155	40
110	147	1410	40		585	M42	121	290	365	345	155	40
120	160	1405	35		580	M42	131	290	365	345	155	40
130	174	1395	25		570	M42	143	290	365	345	155	40
140	187	1390	20		565	M36	154	290	365	345	155	40
150	200	1385	10		555	M36	165	290	365	345	155	40
160	214	1375	5		550	M36	176	290	365	345	155	40
170	227	1370		5	540	M36	187	290	365	345	155	40
180	240	1360		10	535	M36	197	290	365	345	155	40
190	254	1355		20	530	M30	209	290	365	345	155	40
200	267	1345		25	520	M30	220	290	365	345	155	40
210	280	1340		35	515	M30	230	290	365	345	155	40
220	294	1330		40	505	M30	242	290	365	345	155	40
230	307	1325		45	500	M30	252	290	365	345	155	40
240	320	1320		55	490	M30	262	290	365	345	155	40
250	334	1310		60	485	M30	274	290	365	345	155	40
260	347	1305		70	475	M30	285	290	365	355	155	40
270	360	1295		75	470	M30	296	290	365	360	155	40
280	374	1290		85	460	M30	307	290	365	370	155	40
290	387	1280		90	455	M30	318	290	365	380	155	40
300	400	1275		100	450	M30	328	290	365	390	155	40
310	414	1265		105	440	M24	340	290	365	405	155	40
320	427	1260		115	430	M24	351	290	365	415	155	40
330	440	1250		120	425	M24	361	290	365	420	155	40
340	454	1245		125	420	M24	373	290	365	430	155	40
350	467	1240		135	410	M24	384	290	365	445	155	40
360	480	1230		140	405	M24	394	290	365	455	155	40
370	494	1225		150	395	M24	405	290	365	465	155	40
380	507	1215		155	390	M24	416	290	365	485	155	40
390	520	1210		165	385	M24	427	290	365	495	155	40
400	534	1200		170	375	M24	439	290	365	500	155	40
410	547	1195		180	370	M24	449	290	365	515	155	40
420	560	1185		215	450	M24	460	290	365	500	185	70
430	574	1175		225	440	M24	470	290	365	510	185	70
440	587	1170		230	435	M24	480	290	365	515	185	70
450	600	1165		235	430	M24	495	290	365	530	185	70
460	614	1155		245	420	M24	505	290	365	540	185	70
470	627	1150		250	415	M24	515	290	365	550	185	70
480	641	1140		260	405	M24	530	290	365	565	185	70
490	654	1135		290	400	M24	540	290	365	575	210	70
500	667	1125		300	390	M24	550	290	365	585	210	70
510	680	N/A		305	N/A	M24	N/A	290	365	N/A	210	N/A
520	695	N/A		315	N/A	M24	N/A	290	365	N/A	210	N/A
530	708	N/A		320	N/A	M24	N/A	290	365	N/A	210	N/A
540	720	N/A		325	N/A	M24	N/A	290	365	N/A	210	N/A
550	734	N/A		335	N/A	M24	N/A	290	365	N/A	210	N/A
560	747	N/A		340	N/A	M24	N/A	290	365	N/A	210	N/A
570	761	N/A		350	N/A	M24	N/A	290	365	N/A	210	N/A
580	774	N/A		355	N/A	M24	N/A	290	365	N/A	210	N/A
590	787	N/A		365	N/A	M24	N/A	290	365	N/A	210	N/A
600	800	N/A		370	N/A	M24	N/A	290	365	N/A	210	N/A
610	815	N/A		380	N/A	M24	N/A	290	365	N/A	210	N/A

Constant Spring Tables – Fig. QC120 – Sizes 40 to 50

Sizes 40 to 47												
Travel	C	B	B1	B2	B3	A	PP	L	S	QQ	RR	SS
120	160	1895	50		740	M56	132	355	455	395	190	70
130	174	1890	40		730	M56	144	355	455	395	190	70
140	187	1880	35		725	M56	154	355	455	395	190	70
150	200	1875	25		715	M56	165	355	455	395	190	70
160	214	1865	20		710	M48	176	355	455	395	190	70
170	227	1860	10		700	M48	187	355	455	395	190	70
180	240	1850	5		695	M48	198	355	455	395	190	70
190	254	1845		5	690	M48	210	355	455	395	190	70
200	267	1835		10	680	M48	220	355	455	395	190	70
210	280	1830		20	675	M42	231	355	455	395	190	70
220	294	1820		25	665	M42	243	355	455	395	190	70
230	307	1815		35	660	M42	253	355	455	395	190	70
240	320	1810		40	650	M42	264	355	455	395	190	70
250	334	1800		50	645	M42	275	355	455	395	190	70
260	347	1795		55	635	M42	286	355	455	395	190	70
270	360	1785		60	630	M42	297	355	455	395	190	70
280	374	1780		70	620	M42	308	355	455	395	190	70
290	387	1770		75	615	M36	319	355	455	395	190	70
300	400	1765		85	610	M36	329	355	455	395	190	70
310	414	1755		90	600	M36	341	355	455	405	190	70
320	427	1750		100	595	M36	352	355	455	415	190	70
330	440	1740		105	585	M36	363	355	455	425	190	70
340	454	1735		110	580	M36	375	355	455	435	190	70
350	467	1730		120	570	M36	386	355	455	450	190	70
360	480	1720		125	565	M36	396	355	455	455	190	70
370	494	1715		135	555	M36	407	355	455	465	190	70
380	507	1705		140	550	M36	416	355	455	485	190	70
390	520	1700		150	545	M36	429	355	455	495	190	70
400	534	1690		155	535	M36	441	355	455	500	190	70
410	547	1685		165	525	M36	451	355	455	515	190	70
420	560	1680		230	550	M36	461	355	455	515	250	100
430	574	1670		235	540	M36	471	355	455	525	250	100
440	587	1665		245	535	M36	482	355	455	535	250	100
450	600	1655		250	525	M36	493	355	455	550	250	100
460	614	1650		260	520	M36	505	355	455	560	250	100
470	627	1645		265	515	M36	515	355	455	570	250	100
480	641	1635		275	505	M36	527	355	455	580	250	100
490	654	1630		280	500	M36	537	355	455	590	250	100
500	667	1620		285	490	M36	548	355	455	600	250	100
510	680	1615		295	485	M36	559	355	455	615	250	100
520	695	1605		305	475	M36	571	355	455	625	250	100
530	708	1600		310	470	M36	582	355	455	635	250	100
540	720	1590		315	460	M36	592	355	455	645	250	100
550	734	1585		325	455	M36	604	355	455	660	250	100
560	747	1575		330	445	M36	613	355	455	665	250	100
570	761	1570		340	440	M36	625	355	455	680	250	100
580	774	1560		345	430	M36	636	355	455	690	250	100
590	787	1555		355	425	M36	647	355	455	700	250	100
600	800	1550		360	420	M36	658	355	455	715	250	100
610	815	1540		370	410	M36	670	355	455	725	250	100

Sizes 48 to 50											
Travel	C	B	B2	B3	A	PP	L	S	QQ	RR	SS
150	200	2060	220	665	M64	164	340	480	465	320	70
160	214	2055	225	660	M64	175	340	480	465	320	70
170	227	2045	235	650	M64	186	340	480	465	320	70
180	240	2040	240	645	M64	197	340	480	465	320	70
190	254	2030	250	635	M64	209	340	480	465	320	70
200	267	2025	255	630	M56	220	340	480	465	320	70
210	280	2020	260	625	M56	231	340	480	465	320	70
220	294	2010	270	615	M56	242	340	480	465	320	70
230	307	2005	275	610	M56	252	340	480	465	320	70
240	320	1995	285	600	M56	263	340	480	465	320	70
250	334	1990	290	595	M56	275	340	480	465	320	70
260	347	1980	300	585	M56	285	340	480	465	320	70
270	360	1975	305	580	M48	296	340	480	465	320	70
280	374	1965	315	570	M48	308	340	480	465	320	70
290	387	1960	320	565	M48	318	340	480	465	320	70
300	400	1950	330	555	M48	328	340	480	465	320	70
310	414	1945	335	550	M48	340	340	480	465	320	70
320	427	1935	345	545	M48	351	340	480	465	320	70
330	440	1930	350	535	M48	362	340	480	465	320	70
340	454	1925	355	530	M48	373	340	480	465	320	70
350	467	1915	365	520	M48	384	340	480	475	320	70
360	480	1910	370	515	M42	395	340	480	485	320	70
370	494	1900	380	505	M42	406	340	480	495	320	70
380	507	1895	385	500	M42	416	340	480	520	320	70
390	520	1885	395	495	M42	427	340	480	525	320	70
400	534	1880	400	485	M42	439	340	480	535	320	70
410	547	1870	410	480	M42	450	340	480	545	320	70
420	560	2030	250	635	M42	461	340	480	525	320	70
430	574	2020	255	625	M42	471	340	480	535	320	70
440	587	2015	265	620	M42	482	340	480	545	320	70
450	600	2005	275	610	M42	493	340	480	555	320	70
460	614	2000	280	605	M42	505	340	480	570	320	70
470	627	1995	285	600	M42	515	340	480	580	320	70
480	641	1985	295	590	M42	527	340	480	590	320	70
490	654	1980	300	585	M42	537	340	480	600	320	70
500	667	1970	305	575	M42	548	340	480	610	320	70
510	680	1965	315	570	M42	559	340	480	625	320	70
520	695	1955	325	560	M42	571	340	480	635	320	70
530	708	1950	330	555	M42	582	340	480	645	320	70
540	720	1940	335	545	M42	592	340	480	655	320	70
550	734	1935	345	540	M42	604	340	480	665	320	70
560	747	1925	350	530	M42	613	340	480	675	320	70
570	761	1920	360	525	M42	625	340	480	690	320	70
580	774	1910	365	515	M42	636	340	480	700	320	70
590	787	1905	375	510	M42	647	340	480	710	320	70
600	800	1900	380	505	M42	658	340	480	720	320	70
610	815	1890	390	495	M42	670	340	480	735	320	70

For table of standard dimensions, see page 41

Constant Spring Tables – Fig. QC120 – Sizes 51 to 58

Sizes 51 to 54											
Travel	C	B	B2	B3	A	PP	L	S	QQ	RR	SS
150	200	2060	220	665	M64	164	340	480	465	320	70
160	214	2055	225	660	M64	175	340	480	465	320	70
170	227	2045	235	650	M64	186	340	480	465	320	70
180	240	2040	240	645	M64	197	340	480	465	320	70
190	254	2030	250	635	M64	209	340	480	465	320	70
200	267	2025	255	630	M56	220	340	480	465	320	70
210	280	2020	260	625	M56	231	340	480	465	320	70
220	294	2010	270	615	M56	242	340	480	465	320	70
230	307	2005	275	610	M56	252	340	480	465	320	70
240	320	1995	285	600	M56	263	340	480	465	320	70
250	334	1990	290	595	M56	275	340	480	465	320	70
260	347	1980	300	585	M56	285	340	480	465	320	70
270	360	1975	305	580	M48	296	340	480	465	320	70
280	374	1965	315	570	M48	308	340	480	465	320	70
290	387	1960	320	565	M48	318	340	480	465	320	70
300	400	1950	330	555	M48	328	340	480	465	320	70
310	414	1945	335	550	M48	340	340	480	465	320	70
320	427	1935	345	545	M48	351	340	480	465	320	70
330	440	1930	350	535	M48	362	340	480	465	320	70
340	454	1925	355	530	M48	373	340	480	465	320	70
350	467	1915	365	520	M48	384	340	480	475	320	70
360	480	1910	370	515	M42	395	340	480	485	320	70
370	494	1900	380	505	M42	406	340	480	495	320	70
380	507	1895	385	500	M42	416	340	480	520	320	70
390	520	1885	395	495	M42	427	340	480	525	320	70
400	534	1880	400	485	M42	439	340	480	535	320	70
410	547	1870	410	480	M42	450	340	480	545	320	70
420	560	2030	250	635	M42	461	340	480	525	320	70
430	574	2020	255	625	M42	471	340	480	535	320	70
440	587	2015	265	620	M42	482	340	480	545	320	70
450	600	2005	275	610	M42	493	340	480	560	320	70
460	614	2000	280	605	M42	505	340	480	570	320	70
470	627	1995	285	600	M42	515	340	480	580	320	70
480	641	1985	295	590	M42	527	340	480	590	320	70
490	654	1980	300	585	M42	537	340	480	600	320	70
500	667	1970	305	575	M42	548	340	480	610	320	70
510	680	1965	315	570	M42	559	340	480	625	320	70
520	695	1955	325	560	M42	571	340	480	635	320	70
530	708	1950	330	555	M42	582	340	480	645	320	70
540	720	1940	335	545	M42	592	340	480	655	320	70
550	734	1935	345	540	M42	604	340	480	665	320	70
560	747	1925	350	530	M42	613	340	480	675	320	70
570	761	1920	360	525	M42	625	340	480	690	320	70
580	774	1910	365	515	M42	636	340	480	700	320	70
590	787	1905	375	510	M42	647	340	480	710	320	70
600	800	1900	380	505	M42	658	340	480	720	320	70
610	815	1890	390	495	M42	670	340	480	735	320	70

Sizes 55 to 58											
Travel	C	B	B2	B3	A	PP	L	S	QQ	RR	SS
170	227	2595	70	815	M72	186	340	480	465	320	70
180	240	2590	75	810	M72	197	340	480	465	320	70
190	254	2580	85	800	M72	209	340	480	465	320	70
200	267	2575	90	795	M64	220	340	480	465	320	70
210	280	2570	100	790	M64	231	340	480	465	320	70
220	294	2560	105	780	M64	242	340	480	465	320	70
230	307	2555	110	775	M64	252	340	480	465	320	70
240	320	2545	120	765	M64	263	340	480	465	320	70
250	334	2540	125	760	M64	275	340	480	465	320	70
260	347	2530	135	750	M56	285	340	480	465	320	70
270	360	2525	140	745	M56	296	340	480	465	320	70
280	374	2515	150	735	M56	308	340	480	465	320	70
290	387	2510	155	730	M56	318	340	480	465	320	70
300	400	2500	165	720	M56	328	340	480	465	320	70
310	414	2495	170	715	M56	340	340	480	465	320	70
320	427	2485	180	710	M56	351	340	480	465	320	70
330	440	2480	185	700	M56	362	340	480	465	320	70
340	454	2475	190	695	M56	373	340	480	465	320	70
350	467	2465	200	685	M56	384	340	480	475	320	70
360	480	2460	205	680	M48	395	340	480	485	320	70
370	494	2450	215	670	M48	406	340	480	495	320	70
380	507	2445	220	665	M48	416	340	480	520	320	70
390	520	2435	230	660	M48	427	340	480	525	320	70
400	534	2430	235	650	M48	439	340	480	535	320	70
410	547	2420	245	640	M48	450	340	480	545	320	70
420	560	2030	250	635	M48	461	340	480	535	320	70
430	574	2020	255	625	M48	471	340	480	545	320	70
440	587	2015	265	620	M48	482	340	480	555	320	70
450	600	2005	270	610	M48	493	340	480	565	320	70
460	614	2000	280	605	M48	505	340	480	580	320	70
470	627	1995	285	600	M48	515	340	480	590	320	70
480	641	1985	295	590	M48	527	340	480	600	320	70
490	654	1980	300	585	M48	537	340	480	610	320	70
500	667	1970	305	575	M48	548	340	480	620	320	70
510	680	1965	315	570	M48	559	340	480	630	320	70
520	695	1955	325	560	M48	571	340	480	645	320	70
530	708	1950	330	555	M48	582	340	480	655	320	70
540	720	1940	335	545	M48	592	340	480	665	320	70
550	734	1935	345	540	M48	604	340	480	675	320	70
560	747	1925	350	530	M48	613	340	480	685	320	70
570	761	1920	360	525	M48	625	340	480	700	320	70
580	774	1910	365	515	M48	636	340	480	710	320	70
590	787	1905	375	510	M48	647	340	480	720	320	70
600	800	1900	380	505	M48	658	340	480	730	320	70
610	815	1890	390	495	M48	670	340	480	740	320	70

For table of standard dimensions, see page 41

Constant Spring Tables – Fig. QC120 – Sizes 59 to 66

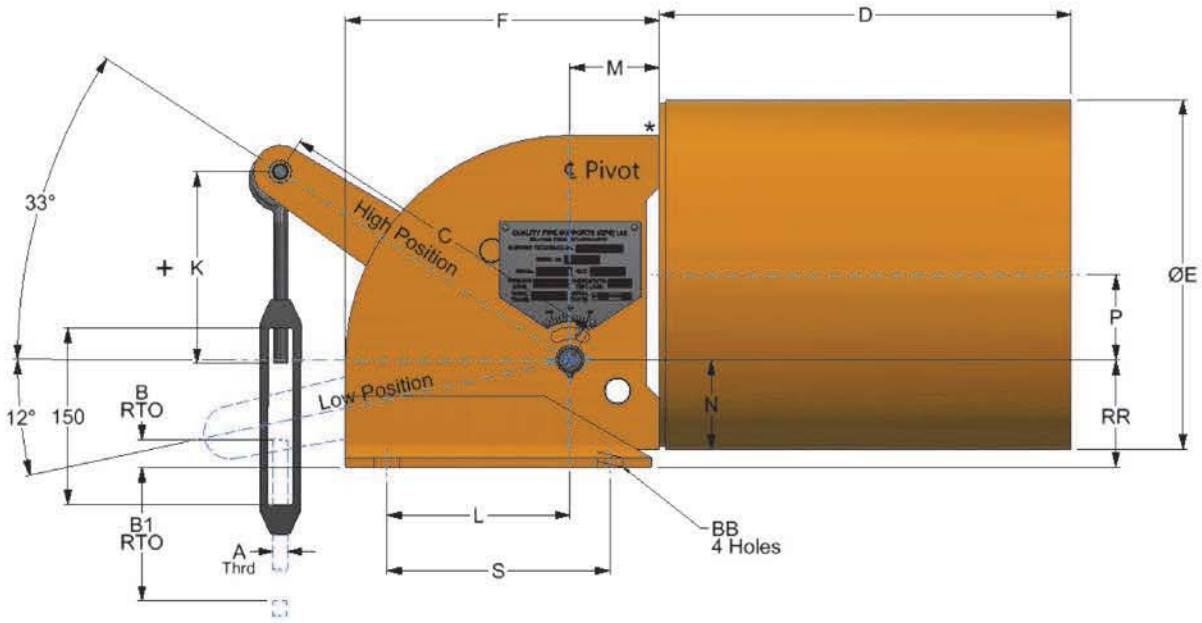
Sizes 59 to 62											
Travel	C	B	B2	B3	A	PP	L	S	QQ	RR	SS
180	240	2870	75	910	M80	197	380	560	530	320	120
190	254	2865	80	900	M72	209	380	560	530	320	120
200	267	2855	90	895	M72	220	380	560	530	320	120
210	280	2850	95	890	M72	231	380	560	530	320	120
220	294	2840	105	880	M72	242	380	560	530	320	120
230	307	2835	110	875	M72	252	380	560	530	320	120
240	320	2825	120	865	M64	263	380	560	530	320	120
250	334	2820	125	860	M64	275	380	560	530	320	120
260	347	2810	135	850	M64	285	380	560	530	320	120
270	360	2805	140	845	M64	296	380	560	530	320	120
280	374	2795	150	835	M64	308	380	560	530	320	120
290	387	2790	155	830	M64	318	380	560	530	320	120
300	400	2785	160	820	M64	328	380	560	530	320	120
310	414	2775	170	815	M64	340	380	560	530	320	120
320	427	2770	175	810	M56	351	380	560	530	320	120
330	440	2760	185	800	M56	362	380	560	530	320	120
340	454	2755	190	795	M56	373	380	560	530	320	120
350	467	2745	200	785	M56	384	380	560	530	320	120
360	480	2740	205	780	M56	395	380	560	530	320	120
370	494	2730	215	770	M56	406	380	560	530	320	120
380	507	2725	220	765	M56	416	380	560	530	320	120
390	520	2720	225	760	M56	427	380	560	530	320	120
400	534	2710	235	750	M56	439	380	560	530	320	120
410	547	2705	240	745	M56	450	380	560	530	320	120
420	560	2465	250	735	M56	461	380	560	545	320	120
430	574	2455	255	725	M56	471	380	560	555	320	120
440	587	2450	265	720	M56	482	380	560	570	320	120
450	600	2440	270	710	M56	493	380	560	575	320	120
460	614	2435	280	705	M56	505	380	560	590	320	120
470	627	2430	285	700	M56	515	380	560	600	320	120
480	641	2420	295	690	M56	527	380	560	610	320	120
490	654	2415	300	685	M56	537	380	560	620	320	120
500	667	2405	305	675	M56	548	380	560	630	320	120
510	680	2400	315	670	M56	559	380	560	645	320	120
520	695	2390	325	660	M56	571	380	560	655	320	120
530	708	2385	330	655	M56	582	380	560	665	320	120
540	720	2380	335	645	M56	592	380	560	675	320	120
550	734	2370	345	640	M56	604	380	560	690	320	120
560	747	2360	350	630	M56	613	380	560	700	320	120
570	761	2355	360	625	M56	625	380	560	710	320	120
580	774	2345	365	615	M56	636	380	560	720	320	120
590	787	2340	375	610	M56	647	380	560	730	320	120
600	800	2335	380	605	M56	658	380	560	740	320	120
610	815	2325	390	595	M56	670	380	560	755	320	120

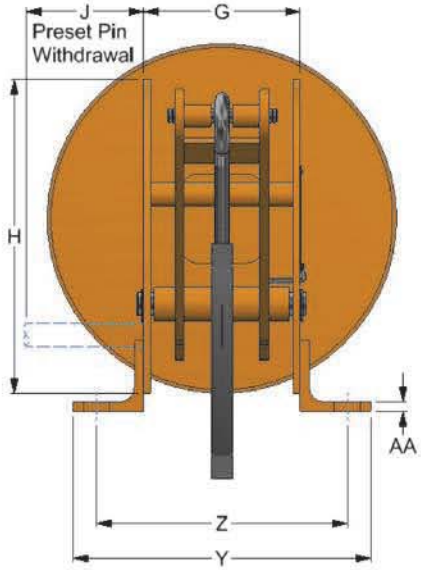
Sizes 63 to 66											
Travel	C	B	B2	B3	A	PP	L	S	QQ	RR	SS
180	240	2870	75	910	M80	197	380	560	530	320	120
190	254	2865	80	900	M80	209	380	560	530	320	120
200	267	2855	90	895	M80	220	380	560	530	320	120
210	280	2850	95	890	M80	231	380	560	530	320	120
220	294	2840	105	880	M80	242	380	560	530	320	120
230	307	2835	110	875	M72	252	380	560	530	320	120
240	320	2825	120	865	M72	263	380	560	530	320	120
250	334	2820	125	860	M72	275	380	560	530	320	120
260	347	2810	135	850	M72	285	380	560	530	320	120
270	360	2805	140	845	M72	296	380	560	530	320	120
280	374	2795	150	835	M72	308	380	560	530	320	120
290	387	2790	155	830	M64	318	380	560	530	320	120
300	400	2785	160	820	M64	328	380	560	530	320	120
310	414	2775	170	815	M64	340	380	560	530	320	120
320	427	2770	175	810	M64	351	380	560	530	320	120
330	440	2760	185	800	M64	362	380	560	530	320	120
340	454	2755	190	795	M64	373	380	560	530	320	120
350	467	2745	200	785	M64	384	380	560	530	320	120
360	480	2740	205	780	M64	395	380	560	530	320	120
370	494	2730	215	770	M64	406	380	560	530	320	120
380	507	2725	220	765	M56	416	380	560	530	320	120
390	520	2720	225	760	M56	427	380	560	530	320	120
400	534	2710	235	750	M56	439	380	560	530	320	120
410	547	2705	240	745	M56	450	380	560	530	320	120
420	560	2465	250	735	M56	461	380	560	545	320	120
430	574	2455	255	725	M56	471	380	560	555	320	120
440	587	2450	265	720	M56	482	380	560	570	320	120
450	600	2440	270	710	M56	493	380	560	580	320	120
460	614	2435	280	705	M56	505	380	560	590	320	120
470	627	2430	285	700	M56	515	380	560	600	320	120
480	641	2420	295	690	M56	527	380	560	615	320	120
490	654	2415	300	685	M56	537	380	560	625	320	120
500	667	2405	305	675	M56	548	380	560	635	320	120
510	680	2400	315	670	M56	559	380	560	645	320	120
520	695	2390	325	660	M56	571	380	560	655	320	120
530	708	2385	330	655	M56	582	380	560	665	320	120
540	720	2380	335	645	M56	592	380	560	675	320	120
550	734	2370	345	640	M56	604	380	560	690	320	120
560	747	2360	350	630	M56	613	380	560	700	320	120
570	761	2355	360	625	M56	625	380	560	710	320	120
580	774	2345	365	615	M56	636	380	560	720	320	120
590	787	2340	375	610	M56	647	380	560	730	320	120
600	800	2335	380	605	M56	658	380	560	740	320	120
610	815	2325	390	595	M56	670	380	560	755	320	120

For table of standard dimensions, see page 41

Constant Spring Support – QC130D

QC130D





+ Longer top rods can be supplied on request

*Access Load Adjuster

The rod take out (RTO) dimension B & B1 are given for the load arm in the high position.
When using B for up travel, RTO equals total up travel minus B.
When using B1 for up travel, RTO equals total up travel plus B1.

Constant Spring Tables – Fig. QC130 – Sizes 1 to 18

Sizes 1 to 6							
Travel	C	B	B1	A	L	S	RR
40	54		130	M12	105	140	65
50	67		125	M12	105	140	65
60	80		115	M12	105	140	65
70	94		110	M12	105	140	65
80	107		105	M12	105	140	65
90	120		95	M12	105	140	65
100	134		90	M12	105	140	65
110	147		80	M12	105	140	65
120	160		75	M12	105	140	65
130	174		65	M12	105	140	65
140	187		60	M12	105	140	65
150	200		50	M12	105	140	65
160	214		45	M12	105	140	65
170	227		35	M12	105	140	65
180	240		30	M12	105	140	65
190	254		25	M12	105	140	65
200	267		15	M12	105	140	65
210	280		10	M12	105	140	65
220	294	40		M12	105	140	105
230	307	45		M12	105	140	105
240	320	55		M12	105	140	105
250	334	60		M12	105	140	105
260	347	70		M12	105	140	105
270	360	75		M12	105	140	105
280	374	85		M12	105	140	105
290	387	90		M12	105	140	105
300	400	100		M12	105	140	105

Sizes 7 to 12							
Travel	C	B	B1	A	L	S	RR
40	54		115	M20	120	155	80
50	67		110	M16	120	155	80
60	80		100	M16	120	155	80
70	94		95	M16	120	155	80
80	107		90	M12	120	155	80
90	120		80	M12	120	155	80
100	134		70	M12	120	155	80
110	147		65	M12	120	155	80
120	160		60	M12	120	155	80
130	174		50	M12	120	155	80
140	187		45	M12	120	155	80
150	200		35	M12	120	155	80
160	214		30	M12	120	155	80
170	227		20	M12	120	155	80
180	240		15	M12	120	155	80
190	254		10	M12	120	155	80
200	267	~	~	M12	120	155	80
210	280	10		M12	120	155	80
220	294	40		M12	120	155	105
230	307	45		M12	120	155	105
240	320	55		M12	120	155	105
250	334	60		M12	120	155	105
260	347	70		M12	120	155	105
270	360	75		M12	120	155	105
280	374	85		M12	120	155	105
290	387	90		M12	120	155	105
300	400	100		M12	120	155	105
310	414	125		M12	120	155	125
320	427	135		M12	120	155	125
330	440	140		M12	120	155	125
340	454	145		M12	120	155	125
350	467	155		M12	120	155	125
360	480	180		M12	120	155	145
370	494	190		M12	120	155	145
380	507	195		M12	120	155	145
390	520	205		M12	120	155	145
400	534	210		M12	120	155	145
410	547	220		M12	120	155	145
420	560	225		M12	120	155	145

Sizes 13 to 18							
Travel	C	B	B1	A	L	S	RR
60	80		80	M20	155	190	100
70	94		75	M20	155	190	100
80	107		65	M20	155	190	100
90	120		60	M16	155	190	100
100	134		50	M16	155	190	100
110	147		45	M16	155	190	100
120	160		40	M16	155	190	100
130	174		30	M16	155	190	100
140	187		25	M16	155	190	100
150	200		15	M16	155	190	100
160	214		10	M12	155	190	100
170	227	~	~	M12	155	190	100
180	240	5		M12	155	190	100
190	254	15		M12	155	190	100
200	267	20		M12	155	190	100
210	280	30		M12	155	190	100
220	294	35		M12	155	190	100
230	307	40		M12	155	190	100
240	320	50		M12	155	190	100
250	334	55		M12	155	190	100
260	347	65		M12	155	190	100
270	360	100		M12	155	190	130
280	374	110		M12	155	190	130
290	387	115		M12	155	190	130
300	400	125		M12	155	190	130
310	414	130		M12	155	190	130
320	427	140		M12	155	190	130
330	440	145		M12	155	190	130
340	454	150		M12	155	190	130
350	467	160		M12	155	190	130
360	480	165		M12	155	190	130
370	494	195		M12	155	190	150
380	507	200		M12	155	190	150
390	520	210		M12	155	190	150
400	534	215		M12	155	190	150
410	547	225		M12	155	190	150
420	560	230		M12	155	190	150

Constant Support Dimension Sizes 1 to 66											
Size	1~6	7~12	13~18	19~26	27~33	34~39	40~47	48~50	51~54	55~58	59~66
D	250	300	350	400	600	750	1100	1265	1265	1265	1620
E	150	220	295	330	390	440	525	525	525	525	640
F	180	215	270	325	405	495	610	685	685	685	760
G	115	120	135	150	180	225	280	345	345	345	455
J	135	140	160	175	215	270	330	405	405	405	560
M	55	65	75	95	115	145	198	250	250	250	280
N	55	65	75	95	115	145	180	190	190	190	215
Y	215	220	255	270	320	425	480	745	745	745	855
Z	165	180	205	220	265	335	395	520	520	520	685
BB	14	18	22	22	22	27	33	45	45	45	51
AA	6	6	8	8	10	10	15	20	20	20	25
K	150	150	150	200	200	200	250	300	300	300	300
P	33	38	65	66	83	100	TABLE	182	182	182	TABLE
H	180	215	270	325	405	495	610	710	710	710	760

P Dimension										
Size	40 - 44	45 - 47	59	60	61	62	63	64	65	66
P	121	165	188	193	197	203	207	211	216	220

Constant Spring Tables – Fig. QC130 – Sizes 19 to 39

Sizes 19 to 26							
Travel	C	B	B1	A	L	S	RR
60	80		120	M30	190	240	110
70	94		115	M30	190	240	110
80	107		105	M24	190	240	110
90	120		100	M24	190	240	110
100	134		90	M24	190	240	110
110	147		85	M24	190	240	110
120	160		80	M20	190	240	110
130	174		70	M20	190	240	110
140	187		65	M20	190	240	110
150	200		55	M20	190	240	110
160	214		50	M20	190	240	110
170	227		40	M20	190	240	110
180	240		35	M16	190	240	110
190	254		30	M16	190	240	110
200	267		20	M16	190	240	110
210	280		15	M16	190	240	110
220	294		5	M16	190	240	110
230	307	~	~	M16	190	240	110
240	320	10		M16	190	240	110
250	334	15		M16	190	240	110
260	347	25		M16	190	240	110
270	360	30		M16	190	240	110
280	374	40		M16	190	240	110
290	387	45		M16	190	240	110
300	400	55		M16	190	240	110
310	414	60		M16	190	240	110
320	427	70		M16	190	240	110
330	440	75		M12	190	240	110
340	454	80		M12	190	240	110
350	467	90		M12	190	240	110
360	480	95		M12	190	240	110
370	494	145		M12	190	240	150
380	507	150		M12	190	240	150
390	520	160		M12	190	240	150
400	534	165		M12	190	240	150
410	547	175		M12	190	240	150
420	560	210		M12	190	240	180
430	574	220		M12	190	240	180
440	587	225		M12	190	240	180
450	600	230		M12	190	240	180
460	614	240		M12	190	240	180
470	627	245		M12	190	240	180
480	641	255		M12	190	240	180
490	654	260		M12	190	240	180
500	667	270		M12	190	240	180

Sizes 27 to 33							
Travel	C	B	B1	A	L	S	RR
70	94		95	M36	235	300	130
80	107		85	M36	235	300	130
90	120		80	M36	235	300	130
100	134		70	M36	235	300	130
110	147		65	M30	235	300	130
120	160		60	M30	235	300	130
130	174		50	M30	235	300	130
140	187		45	M30	235	300	130
150	200		35	M30	235	300	130
160	214		30	M30	235	300	130
170	227		20	M24	235	300	130
180	240		15	M24	235	300	130
190	254		10	M24	235	300	130
200	267	~	~	M24	235	300	130
210	280	10		M24	235	300	130
220	294	15		M24	235	300	130
230	307	20		M24	235	300	130
240	320	30		M20	235	300	130
250	334	35		M20	235	300	130
260	347	45		M20	235	300	130
270	360	50		M20	235	300	130
280	374	60		M20	235	300	130
290	387	65		M20	235	300	130
300	400	70		M20	235	300	130
310	414	80		M20	235	300	130
320	427	90		M20	235	300	130
330	440	95		M20	235	300	130
340	454	100		M20	235	300	130
350	467	110		M20	235	300	130
360	480	115		M20	235	300	130
370	494	165		M20	235	300	170
380	507	170		M20	235	300	170
390	520	180		M20	235	300	170
400	534	185		M20	235	300	170
410	547	195		M20	235	300	170
420	560	200		M20	235	300	170
430	574	210		M20	235	300	170
440	587	215		M20	235	300	170
450	600	220		M20	235	300	170
460	614	230		M20	235	300	170
470	627	235		M20	235	300	170
480	641	245		M20	235	300	170
490	654	250		M20	235	300	170
500	667	260		M20	235	300	170

Sizes 34 to 39							
Travel	C	B	B1	A	L	S	RR
90	120		55	M48	290	365	155
100	134		45	M42	290	365	155
110	147		40	M42	290	365	155
120	160		35	M42	290	365	155
130	174		25	M42	290	365	155
140	187		20	M36	290	365	155
150	200		10	M36	290	365	155
160	214		5	M36	290	365	155
170	227	5		M36	290	365	155
180	240	10		M36	290	365	155
190	254	20		M30	290	365	155
200	267	25		M30	290	365	155
210	280	35		M30	290	365	155
220	294	40		M30	290	365	155
230	307	45		M30	290	365	155
240	320	55		M30	290	365	155
250	334	60		M30	290	365	155
260	347	70		M30	290	365	155
270	360	75		M30	290	365	155
280	374	85		M30	290	365	155
290	387	90		M30	290	365	155
300	400	100		M30	290	365	155
310	414	105		M24	290	365	155
320	427	115		M24	290	365	155
330	440	120		M24	290	365	155
340	454	125		M24	290	365	155
350	467	135		M24	290	365	155
360	480	140		M24	290	365	155
370	494	150		M24	290	365	155
380	507	155		M24	290	365	155
390	520	165		M24	290	365	155
400	534	170		M24	290	365	155
410	547	180		M24	290	365	155
420	560	220		M24	290	365	190
430	574	230		M24	290	365	190
440	587	235		M24	290	365	190
450	600	240		M24	290	365	190
460	614	250		M24	290	365	190
470	627	255		M24	290	365	190
480	641	295		M24	290	365	220
490	654	300		M24	290	365	220
500	667	310		M24	290	365	220
510	680	315		M24	290	365	220
520	695	325		M24	290	365	220
530	708	330		M24	290	365	220
540	720	335		M24	290	365	220
550	734	345		M24	290	365	220
560	747	350		M24	290	365	220
570	761	360		M24	290	365	220
580	774	365		M24	290	365	220
590	787	375		M24	290	365	220
600	800	380		M24	290	365	220
610	815	390		M24	290	365	220

For table of standard dimensions, see page 49

Constant Spring Tables – Fig. QC130 – Sizes 40 to 58

Sizes 40 to 47							
Travel	C	B	B1	A	L	S	RR
110	147		55	M64	355	455	190
120	160		50	M56	355	455	190
130	174		40	M56	355	455	190
140	187		35	M56	355	455	190
150	200		25	M56	355	455	190
160	214		20	M48	355	455	190
170	227		10	M48	355	455	190
180	240		5	M48	355	455	190
190	254	5		M48	355	455	190
200	267	10		M48	355	455	190
210	280	20		M42	355	455	190
220	294	25		M42	355	455	190
230	307	35		M42	355	455	190
240	320	40		M42	355	455	190
250	334	50		M42	355	455	190
260	347	55		M42	355	455	190
270	360	60		M42	355	455	190
280	374	70		M42	355	455	190
290	387	75		M36	355	455	190
300	400	85		M36	355	455	190
310	414	90		M36	355	455	190
320	427	100		M36	355	455	190
330	440	105		M36	355	455	190
340	454	110		M36	355	455	190
350	467	120		M36	355	455	190
360	480	125		M36	355	455	190
370	494	135		M36	355	455	190
380	507	140		M36	355	455	190
390	520	150		M36	355	455	190
400	534	155		M36	355	455	190
410	547	165		M36	355	455	190
420	560	220		M36	355	455	240
430	574	225		M36	355	455	240
440	587	235		M36	355	455	240
450	600	240		M36	355	455	240
460	614	250		M36	355	455	240
470	627	255		M36	355	455	240
480	641	265		M36	355	455	240
490	654	270		M36	355	455	240
500	667	275		M36	355	455	240
510	680	285		M36	355	455	240
520	695	295		M36	355	455	240
530	708	300		M36	355	455	240
540	720	305		M36	355	455	240
550	734	315		M36	355	455	240
560	747	320		M36	355	455	240
570	761	330		M36	355	455	240
580	774	335		M36	355	455	240
590	787	345		M36	355	455	240
600	800	350		M36	355	455	240
610	815	360		M36	355	455	240

Sizes 48 to 54						
Travel	C	B	A	L	S	RR
110	147	25	M80	340	480	320
120	160	30	M72	340	480	320
130	174	40	M72	340	480	320
140	187	45	M72	340	480	320
150	200	55	M64	340	480	320
160	214	60	M64	340	480	320
170	227	70	M64	340	480	320
180	240	75	M64	340	480	320
190	254	85	M64	340	480	320
200	267	90	M56	340	480	320
210	280	100	M56	340	480	320
220	294	105	M56	340	480	320
230	307	110	M56	340	480	320
240	320	120	M56	340	480	320
250	334	125	M56	340	480	320
260	347	135	M56	340	480	320
270	360	140	M48	340	480	320
280	374	150	M48	340	480	320
290	387	155	M48	340	480	320
300	400	165	M48	340	480	320
310	414	170	M48	340	480	320
320	427	180	M48	340	480	320
330	440	185	M48	340	480	320
340	454	190	M48	340	480	320
350	467	200	M48	340	480	320
360	480	205	M42	340	480	320
370	494	215	M42	340	480	320
380	507	220	M42	340	480	320
390	520	230	M42	340	480	320
400	534	235	M42	340	480	320
410	547	245	M42	340	480	320
420	560	250	M42	340	480	320
430	574	255	M42	340	480	320
440	587	265	M42	340	480	320
450	600	270	M42	340	480	320
460	614	280	M42	340	480	320
470	627	285	M42	340	480	320
480	641	295	M42	340	480	320
490	654	300	M42	340	480	320
500	667	305	M42	340	480	320
510	680	315	M42	340	480	320
520	695	325	M42	340	480	320
530	708	330	M42	340	480	320
540	720	335	M42	340	480	320
550	734	345	M42	340	480	320
560	747	350	M42	340	480	320
570	761	360	M42	340	480	320
580	774	365	M42	340	480	320
590	787	375	M42	340	480	320
600	800	380	M42	340	480	320
610	815	390	M42	340	480	320

Sizes 55 to 58						
Travel	C	B	A	L	S	RR
110	147	25	M90	340	480	320
120	160	30	M90	340	480	320
130	174	40	M80	340	480	320
140	187	45	M80	340	480	320
150	200	55	M80	340	480	320
160	214	60	M72	340	480	320
170	227	70	M72	340	480	320
180	240	75	M72	340	480	320
190	254	85	M72	340	480	320
200	267	90	M64	340	480	320
210	280	100	M64	340	480	320
220	294	105	M64	340	480	320
230	307	110	M64	340	480	320
240	320	120	M64	340	480	320
250	334	125	M64	340	480	320
260	347	135	M56	340	480	320
270	360	140	M56	340	480	320
280	374	150	M56	340	480	320
290	387	155	M56	340	480	320
300	400	165	M56	340	480	320
310	414	170	M56	340	480	320
320	427	180	M56	340	480	320
330	440	185	M56	340	480	320
340	454	190	M56	340	480	320
350	467	200	M56	340	480	320
360	480	205	M48	340	480	320
370	494	215	M48	340	480	320
380	507	220	M48	340	480	320
390	520	230	M48	340	480	320
400	534	235	M48	340	480	320
410	547	245	M48	340	480	320
420	560	250	M48	340	480	320
430	574	255	M48	340	480	320
440	587	265	M48	340	480	320
450	600	270	M48	340	480	320
460	614	280	M48	340	480	320
470	627	285	M48	340	480	320
480	641	295	M48	340	480	320
490	654	300	M48	340	480	320
500	667	305	M48	340	480	320
510	680	315	M48	340	480	320
520	695	325	M48	340	480	320
530	708	330	M48	340	480	320
540	720	335	M48	340	480	320
550	734	345	M48	340	480	320
560	747	350	M48	340	480	320
570	761	360	M48	340	480	320
580	774	365	M48	340	480	320
590	787	375	M48	340	480	320
600	800	380	M48	340	480	320
610	815	390	M48	340	480	320

For table of standard dimensions, see page 49

Constant Spring Tables – Fig. QC130 – Sizes 59 to 66

Sizes 59 to 62						
Travel	C	B	A	L	S	RR
150	200	55	M80	380	560	320
160	214	60	M80	380	560	320
170	227	70	M80	380	560	320
180	240	75	M80	380	560	320
190	254	80	M72	380	560	320
200	267	90	M72	380	560	320
210	280	95	M72	380	560	320
220	294	105	M72	380	560	320
230	307	110	M72	380	560	320
240	320	120	M64	380	560	320
250	334	125	M64	380	560	320
260	347	135	M64	380	560	320
270	360	140	M64	380	560	320
280	374	150	M64	380	560	320
290	387	155	M64	380	560	320
300	400	160	M64	380	560	320
310	414	170	M64	380	560	320
320	427	175	M56	380	560	320
330	440	185	M56	380	560	320
340	454	190	M56	380	560	320
350	467	200	M56	380	560	320
360	480	205	M56	380	560	320
370	494	215	M56	380	560	320
380	507	220	M56	380	560	320
390	520	230	M56	380	560	320
400	534	235	M56	380	560	320
410	547	240	M56	380	560	320
420	560	250	M56	380	560	320
430	574	255	M56	380	560	320
440	587	265	M56	380	560	320
450	600	270	M56	380	560	320
460	614	280	M56	380	560	320
470	627	285	M56	380	560	320
480	641	295	M56	380	560	320
490	654	300	M56	380	560	320
500	667	305	M56	380	560	320
510	680	315	M56	380	560	320
520	695	325	M56	380	560	320
530	708	330	M56	380	560	320
540	720	335	M56	380	560	320
550	734	345	M56	380	560	320
560	747	350	M56	380	560	320
570	761	360	M56	380	560	320
580	774	365	M56	380	560	320
590	787	375	M56	380	560	320
600	800	380	M56	380	560	320
610	815	390	M56	380	560	320

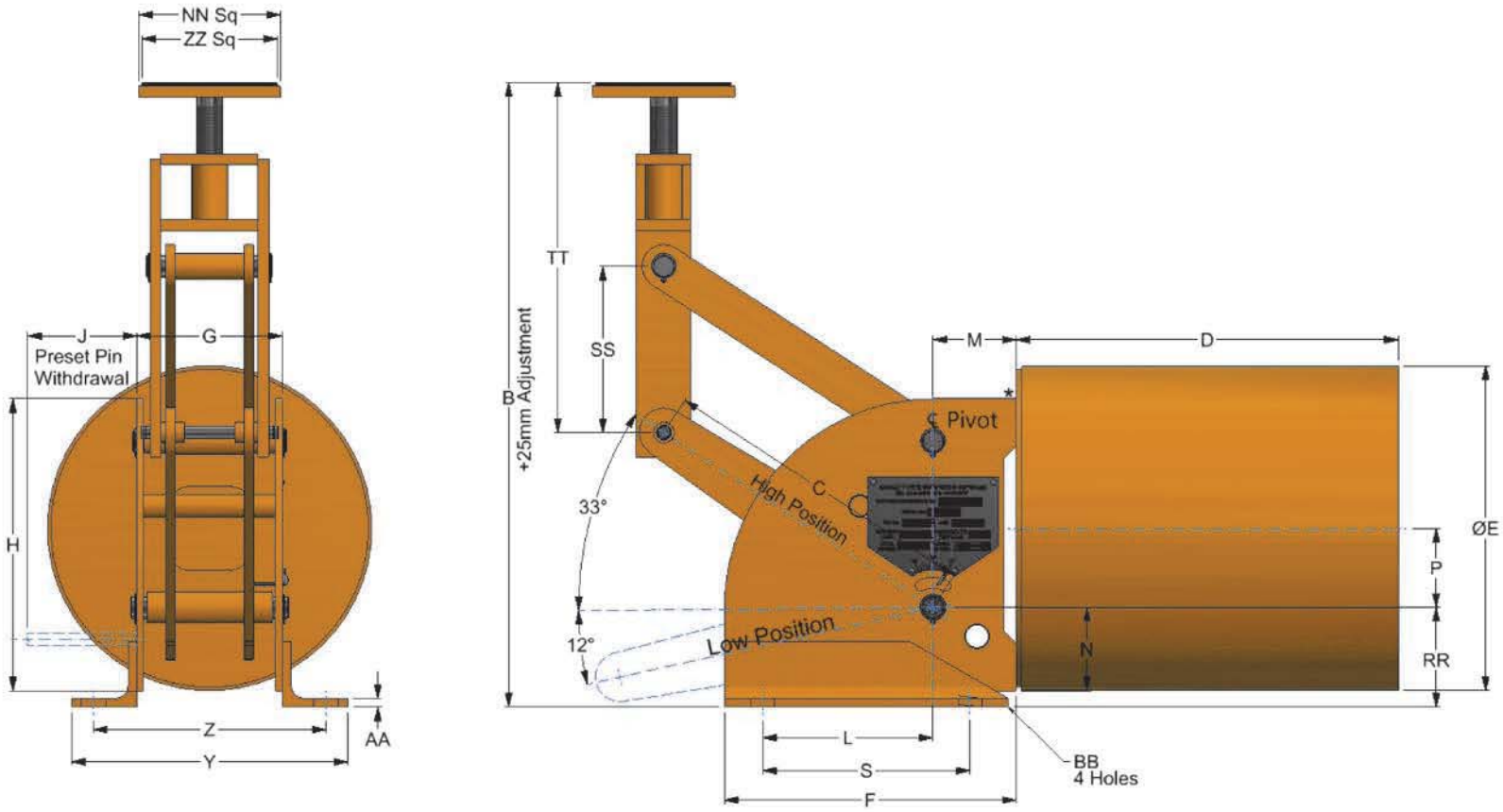
For table of standard dimensions, see page 49

Sizes 63 to 66						
Travel	C	B	A	L	S	RR
150	200	55	M90	380	560	320
160	214	60	M90	380	560	320
170	227	70	M90	380	560	320
180	240	75	M80	380	560	320
190	254	85	M80	380	560	320
200	267	90	M80	380	560	320
210	280	95	M80	380	560	320
220	294	105	M80	380	560	320
230	307	110	M72	380	560	320
240	320	120	M72	380	560	320
250	334	125	M72	380	560	320
260	347	135	M72	380	560	320
270	360	140	M72	380	560	320
280	374	150	M72	380	560	320
290	387	155	M64	380	560	320
300	400	160	M64	380	560	320
310	414	170	M64	380	560	320
320	427	175	M64	380	560	320
330	440	185	M64	380	560	320
340	454	190	M64	380	560	320
350	467	200	M64	380	560	320
360	480	205	M64	380	560	320
370	494	215	M64	380	560	320
380	507	220	M56	380	560	320
390	520	230	M56	380	560	320
400	534	235	M56	380	560	320
410	547	240	M56	380	560	320
420	560	250	M56	380	560	320
430	574	255	M56	380	560	320
440	587	265	M56	380	560	320
450	600	270	M56	380	560	320
460	614	280	M56	380	560	320
470	627	285	M56	380	560	320
480	641	295	M56	380	560	320
490	654	300	M56	380	560	320
500	667	305	M56	380	560	320
510	680	315	M56	380	560	320
520	695	325	M56	380	560	320
530	708	330	M56	380	560	320
540	720	335	M56	380	560	320
550	734	345	M56	380	560	320
560	747	350	M56	380	560	320
570	761	360	M56	380	560	320
580	774	365	M56	380	560	320
590	787	375	M56	380	560	320
600	800	380	M56	380	560	320
610	815	390	M56	380	560	320

Constant Spring Support – QC140F

QC140F

Height is calculated when the load arm is in the high position.
For up travel, installed height equals 'B' minus up travel.



*Access Load Adjuster

Constant Spring Tables – Fig. QC140 – Sizes 1 to 26

Sizes 1 to 6					
Travel	C	B	L	S	RR
40	54	325	105	140	65
50	67	330	105	140	65
60	80	340	105	140	65
70	94	345	105	140	65
80	107	355	105	140	65
90	120	360	105	140	65
100	134	370	105	140	65
110	147	375	105	140	65
120	160	380	105	140	65
130	174	390	105	140	65
140	187	400	105	140	65
150	200	405	105	140	65
160	214	410	105	140	65
170	227	420	105	140	65
180	240	425	105	140	65
190	254	435	105	140	65
200	267	440	105	140	65
210	280	450	105	140	65
220	294	495	105	140	105
230	307	500	105	140	105
240	320	510	105	140	105
250	334	515	105	140	105
260	347	525	105	140	105
270	360	530	105	140	105
280	374	540	105	140	105
290	387	545	105	140	105
300	400	555	105	140	105

Sizes 7 to 12					
Travel	C	B	L	S	RR
40	54	370	120	155	80
50	67	375	120	155	80
60	80	385	120	155	80
70	94	390	120	155	80
80	107	400	120	155	80
90	120	405	120	155	80
100	134	415	120	155	80
110	147	420	120	155	80
120	160	425	120	155	80
130	174	435	120	155	80
140	187	440	120	155	80
150	200	450	120	155	80
160	214	455	120	155	80
170	227	465	120	155	80
180	240	470	120	155	80
190	254	480	120	155	80
200	267	485	120	155	80
210	280	495	120	155	80
220	294	525	120	155	105
230	307	530	120	155	105
240	320	540	120	155	105
250	334	545	120	155	105
260	347	555	120	155	105
270	360	560	120	155	105
280	374	570	120	155	105
290	387	575	120	155	105
300	400	580	120	155	105

Sizes 13 to 18					
Travel	C	B	L	S	RR
60	80	460	155	190	100
70	94	465	155	190	100
80	107	475	155	190	100
90	120	480	155	190	100
100	134	490	155	190	100
110	147	495	155	190	100
120	160	500	155	190	100
130	174	510	155	190	100
140	187	515	155	190	100
150	200	525	155	190	100
160	214	530	155	190	100
170	227	540	155	190	100
180	240	545	155	190	100
190	254	555	155	190	100
200	267	560	155	190	100
210	280	570	155	190	100
220	294	575	155	190	100
230	307	580	155	190	100
240	320	590	155	190	100
250	334	595	155	190	100
260	347	605	155	190	100
270	360	640	155	190	130
280	374	650	155	190	130
290	387	655	155	190	130
300	400	665	155	190	130
310	414	670	155	190	130
320	427	680	155	190	130
330	440	685	155	190	130
340	454	690	155	190	130
350	467	700	155	190	130
360	480	705	155	190	130

Sizes 19 to 26					
Travel	C	B	L	S	RR
60	80	535	190	240	110
70	94	540	190	240	110
80	107	550	190	240	110
90	120	555	190	240	110
100	134	565	190	240	110
110	147	570	190	240	110
120	160	580	190	240	110
130	174	585	190	240	110
140	187	590	190	240	110
150	200	600	190	240	110
160	214	605	190	240	110
170	227	615	190	240	110
180	240	620	190	240	110
190	254	630	190	240	110
200	267	635	190	240	110
210	280	645	190	240	110
220	294	650	190	240	110
230	307	660	190	240	110
240	320	665	190	240	110
250	334	670	190	240	110
260	347	680	190	240	110
270	360	685	190	240	110
280	374	695	190	240	110
290	387	700	190	240	110
300	400	710	190	240	110
310	414	715	190	240	110
320	427	725	190	240	110
330	440	730	190	240	110
340	454	735	190	240	110
350	467	745	190	240	110
360	480	750	190	240	110
370	494	800	190	240	150
380	507	805	190	240	150
390	520	815	190	240	150
400	534	820	190	240	150
410	547	830	190	240	150
420	560	865	190	240	180
430	574	875	190	240	180
440	587	880	190	240	180
450	600	885	190	240	180
460	614	895	190	240	180
470	627	900	190	240	180
480	641	910	190	240	180
490	654	915	190	240	180
500	667	925	190	240	180

Constant Support Dimensions Sizes 1 to 47								
Size	1~6	7~12	13~18	19~26	27~33	34~39	40~44	45~47
D	250	300	350	400	600	750	1100	1100
E	150	220	295	330	390	440	525	525
F	180	215	270	325	405	495	610	610
G	115	120	135	150	180	225	280	280
J	135	140	160	175	215	270	330	330
M	55	65	75	95	115	145	198	198
N	55	65	75	95	115	145	180	180
Y	215	220	255	270	320	425	480	480
Z	165	180	205	220	265	335	395	395
BB	14	18	22	22	22	27	33	33
AA	6	6	8	8	10	10	15	15
TT	230	260	315	380	490	610	685	685
P	33	38	65	66	83	100	121	165
NN	80	100	130	150	180	200	230	230
ZZ	75	95	120	145	175	195	225	225
SS	105	120	160	190	240	295	390	390
H	180	215	270	325	405	495	610	610

Constant Spring Tables – Fig. QC140 – Sizes 27 to 47

Sizes 27 to 33					
Travel	C	B	L	S	RR
70	94	670	235	300	130
80	107	680	235	300	130
90	120	685	235	300	130
100	134	695	235	300	130
110	147	700	235	300	130
120	160	705	235	300	130
130	174	715	235	300	130
140	187	720	235	300	130
150	200	730	235	300	130
160	214	735	235	300	130
170	227	745	235	300	130
180	240	750	235	300	130
190	254	760	235	300	130
200	267	765	235	300	130
210	280	775	235	300	130
220	294	780	235	300	130
230	307	785	235	300	130
240	320	795	235	300	130
250	334	800	235	300	130
260	347	810	235	300	130
270	360	815	235	300	130
280	374	825	235	300	130
290	387	830	235	300	130
300	400	835	235	300	130
310	414	845	235	300	130
320	427	855	235	300	130
330	440	860	235	300	130
340	454	865	235	300	130
350	467	875	235	300	130
360	480	880	235	300	130
370	494	930	235	300	170
380	507	935	235	300	170
390	520	945	235	300	170
400	534	950	235	300	170
410	547	960	235	300	170
420	560	965	235	300	170
430	574	975	235	300	170
440	587	980	235	300	170
450	600	985	235	300	170
460	614	995	235	300	170
470	627	1000	235	300	170
480	641	1010	235	300	170
490	654	1015	235	300	170
500	667	1025	235	300	170

For table of standard dimensions, see page 54

Sizes 34 to 39					
Travel	C	B	L	S	RR
90	120	830	290	365	155
100	134	840	290	365	155
110	147	845	290	365	155
120	160	850	290	365	155
130	174	860	290	365	155
140	187	865	290	365	155
150	200	875	290	365	155
160	214	880	290	365	155
170	227	890	290	365	155
180	240	895	290	365	155
190	254	905	290	365	155
200	267	910	290	365	155
210	280	920	290	365	155
220	294	925	290	365	155
230	307	930	290	365	155
240	320	940	290	365	155
250	334	945	290	365	155
260	347	955	290	365	155
270	360	960	290	365	155
280	374	970	290	365	155
290	387	975	290	365	155
300	400	985	290	365	155
310	414	990	290	365	155
320	427	1000	290	365	155
330	440	1005	290	365	155
340	454	1010	290	365	155
350	467	1020	290	365	155
360	480	1025	290	365	155
370	494	1035	290	365	155
380	507	1040	290	365	155
390	520	1050	290	365	155
400	534	1055	290	365	155
410	547	1065	290	365	155
420	560	1105	290	365	190
430	574	1115	290	365	190
440	587	1120	290	365	190
450	600	1125	290	365	190
460	614	1135	290	365	190
470	627	1140	290	365	190
480	641	1180	290	365	220
490	654	1185	290	365	220
500	667	1195	290	365	220
510	680	1200	290	365	220
520	695	1210	290	365	220
530	708	1215	290	365	220
540	720	1220	290	365	220
550	734	1230	290	365	220
560	747	1235	290	365	220
570	761	1245	290	365	220
580	774	1250	290	365	220
590	787	1260	290	365	220
600	800	1265	290	365	220
610	815	1275	290	365	220

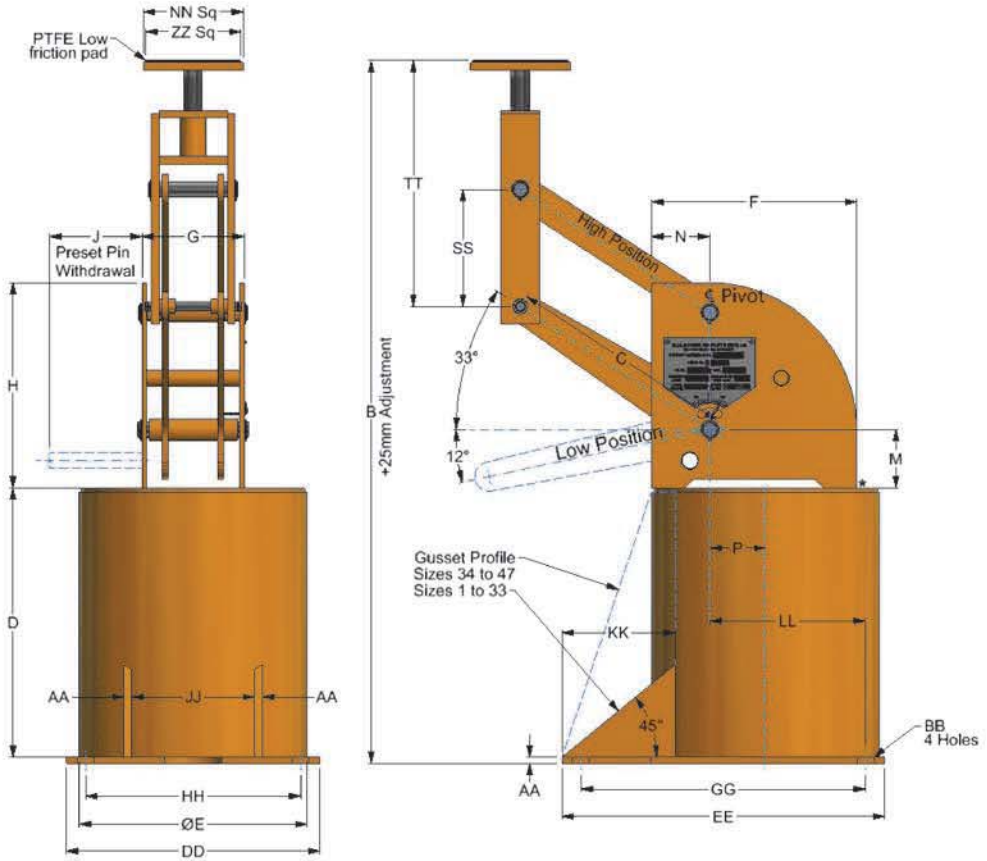
Sizes 40 to 47					
Travel	C	B	L	S	RR
110	147	955	355	455	190
120	160	960	355	455	190
130	174	970	355	455	190
140	187	975	355	455	190
150	200	985	355	455	190
160	214	990	355	455	190
170	227	1000	355	455	190
180	240	1005	355	455	190
190	254	1015	355	455	190
200	267	1020	355	455	190
210	280	1025	355	455	190
220	294	1035	355	455	190
230	307	1040	355	455	190
240	320	1050	355	455	190
250	334	1055	355	455	190
260	347	1065	355	455	190
270	360	1070	355	455	190
280	374	1080	355	455	190
290	387	1085	355	455	190
300	400	1095	355	455	190
310	414	1100	355	455	190
320	427	1110	355	455	190
330	440	1115	355	455	190
340	454	1120	355	455	190
350	467	1130	355	455	190
360	480	1135	355	455	190
370	494	1145	355	455	190
380	507	1150	355	455	190
390	520	1160	355	455	190
400	534	1165	355	455	190
410	547	1175	355	455	190
420	560	1230	355	455	240
430	574	1235	355	455	240
440	587	1245	355	455	240
450	600	1250	355	455	240
460	614	1260	355	455	240
470	627	1265	355	455	240
480	641	1275	355	455	240
490	654	1280	355	455	240
500	667	1285	355	455	240
510	680	1295	355	455	240
520	695	1305	355	455	240
530	708	1310	355	455	240
540	720	1315	355	455	240
550	734	1325	355	455	240
560	747	1330	355	455	240
570	761	1340	355	455	240
580	774	1345	355	455	240
590	787	1355	355	455	240
600	800	1360	355	455	240
610	815	1370	355	455	240

Constant Spring Support – QC150F

QC150F

Height B calculated when the load arm is in the high position.
For up travel, installed height equals B minus up travel.

Square base plates used for travels up to and including 150.
Extended base plates used for travels over 150.



*Access Load Adjuster

Constant Spring Tables – Fig. QC150 – Sizes 1 to 33

Sizes 1 to 6		
Travel	C	B
40	54	570
50	67	580
60	80	585
70	94	595
80	107	600
90	120	605
100	134	615
110	147	620
120	160	630
130	174	640
140	187	645
150	200	650
160	214	660
170	227	665
180	240	670
190	254	680
200	267	685
210	280	695
220	294	700
230	307	710
240	320	715
250	334	725
260	347	730
270	360	735
280	374	745
290	387	750
300	400	760

Sizes 7 to 12		
Travel	C	B
40	54	660
50	67	670
60	80	675
70	94	685
80	107	690
90	120	695
100	134	705
110	147	710
120	160	720
130	174	725
140	187	735
150	200	740
160	214	750
170	227	755
180	240	760
190	254	770
200	267	775
210	280	785
220	294	790
230	307	800
240	320	805
250	334	815
260	347	820
270	360	825
280	374	835
290	387	840
300	400	850

Sizes 13 to 18		
Travel	C	B
60	80	790
70	94	800
80	107	805
90	120	815
100	134	820
110	147	830
120	160	835
130	174	845
140	187	850
150	200	855
160	214	865
170	227	870
180	240	880
190	254	885
200	267	895
210	280	900
220	294	910
230	307	915
240	320	920
250	334	930
260	347	935
270	360	945
280	374	950
290	387	960
300	400	965
310	414	975
320	427	980
330	440	990
340	454	995
350	467	1000
360	480	1010

Sizes 19 to 26		
Travel	C	B
60	80	925
70	94	935
80	107	940
90	120	950
100	134	955
110	147	965
120	160	970
130	174	980
140	187	985
150	200	990
160	214	1000
170	227	1005
180	240	1015
190	254	1020
200	267	1030
210	280	1035
220	294	1045
230	307	1050
240	320	1060
250	334	1065
260	347	1070
270	360	1080
280	374	1085
290	387	1095
300	400	1100
310	414	1110
320	427	1115
330	440	1125
340	454	1130
350	467	1140
360	480	1145
370	494	1150
380	507	1160
390	520	1165
400	534	1175
410	547	1180
420	560	1190
430	574	1195
440	587	1205
450	600	1210
460	614	1215
470	627	1225
480	641	1230
490	654	1240
500	667	1245

Sizes 27 to 33		
Travel	C	B
70	94	1265
80	107	1275
90	120	1280
100	134	1290
110	147	1295
120	160	1300
130	174	1310
140	187	1315
150	200	1325
160	214	1330
170	227	1340
180	240	1345
190	254	1355
200	267	1360
210	280	1370
220	294	1375
230	307	1380
240	320	1390
250	334	1395
260	347	1405
270	360	1410
280	374	1420
290	387	1425
300	400	1435
310	414	1440
320	427	1450
330	440	1455
340	454	1460
350	467	1470
360	480	1475
370	494	1485
380	507	1490
390	520	1500
400	534	1505
410	547	1515
420	560	1520
430	574	1530
440	587	1535
450	600	1540
460	614	1550
470	627	1555
480	641	1565
490	654	1570
500	667	1580

Constant Support Dimensions Sizes 1 to 47								
Size	1~6	7~12	13~18	19~26	27~33	34~39	40~44	45~47
D	250	300	350	400	600	750	1100	1100
E	150	220	295	330	390	440	525	525
F	180	215	270	325	405	495	640	640
G	115	120	135	150	180	225	280	280
J	135	140	160	175	215	270	330	330
M	55	65	75	95	115	145	198	198
N	55	65	75	95	115	145	180	180
BB	14	18	22	22	22	27	33	33
AA	6	6	8	8	10	10	15	15
TT	230	260	315	380	490	610	685	685
P	33	38	65	66	83	100	121	165
NN	80	100	130	150	180	200	230	230
ZZ	75	95	120	145	175	195	225	225
SS	105	120	160	190	240	295	390	390
LL	100	130	195	215	225	285	360	405
GG	180	255	370	395	510	510	740	740
EE	220	305	420	460	585	610	840	840
KK	80	100	170	180	230	170	300	300
H	180	215	270	325	405	495	640	640
JJ	102	127	203	254	305	206	257	257
HH	170	230	280	355	410	460	560	560
DD	210	280	330	420	485	560	660	660

Constant Spring Tables – Fig. QC150 – Sizes 34 to 47

Sizes 34 to 39		
Travel	C	B
90	120	1575
100	134	1585
110	147	1590
120	160	1595
130	174	1605
140	187	1610
150	200	1620
160	214	1625
170	227	1635
180	240	1640
190	254	1650
200	267	1655
210	280	1665
220	294	1670
230	307	1675
240	320	1685
250	334	1690
260	347	1700
270	360	1705
280	374	1715
290	387	1720
300	400	1730
310	414	1735
320	427	1745
330	440	1750
340	454	1755
350	467	1765
360	480	1770
370	494	1780
380	507	1785
390	520	1795
400	534	1800
410	547	1810
420	560	1820
430	574	1830
440	587	1835
450	600	1840
460	614	1850
470	627	1855
480	641	1865
490	654	1870
500	667	1880
510	680	1885
520	695	1895
530	708	1900
540	720	1905
550	734	1915
560	747	1920
570	761	1930
580	774	1935
590	787	1945
600	800	1950
610	815	1960

Sizes 40 to 47		
Travel	C	B
110	147	2080
120	160	2085
130	174	2095
140	187	2100
150	200	2105
160	214	2115
170	227	2120
180	240	2130
190	254	2135
200	267	2145
210	280	2150
220	294	2160
230	307	2165
240	320	2170
250	334	2180
260	347	2185
270	360	2195
280	374	2200
290	387	2210
300	400	2215
310	414	2225
320	427	2230
330	440	2240
340	454	2245
350	467	2250
360	480	2260
370	494	2265
380	507	2275
390	520	2280
400	534	2290
410	547	2295
420	560	2300
430	574	2310
440	587	2320
450	600	2325
460	614	2330
470	627	2340
480	641	2345
490	654	2355
500	667	2360
510	680	2365
520	695	2375
530	708	2385
540	720	2390
550	734	2400
560	747	2405
570	761	2410
580	774	2420
590	787	2425
600	800	2435
610	815	2440

For table of standard dimensions, see page 57

VARIABLE SPRING SUPPORTS

Description

Design Principle
The variable spring unit as manufactured by QPS is designed to support pipework which is subject to vertical movements due to temperature changes or subsidence. It is recommended that a variable spring support be used only when the load variation is less than 25% as calculated between the pre-set (cold) load and the operating (hot) load. The spring units should only be used where the pipework is subject to minor vertical displacements up to approximately 75mm.

Where the vertical movements are greater than 75mm and the load variation exceed 25%, then consideration should be given to using a QPS constant support unit; practical and technical advice is always available from QPS to assist with choosing the correct type of support.

Construction
All our variable spring units are substantially constructed with a wide range of top fixing arrangements available for attachment to supporting steelwork. All materials have been selected to provide a high safety factor, and the helical coil is housed in a casing which prevents the ingress of construction debris, thus reducing the danger of damage or restriction to the function of the unit. All variable units are principally manufactured form carbon steel as standard, but stainless steel units are available for extreme corrosive conditions. Stainless steel scale plates are fitted to each unit and include operating (Red) and pre-set (Blue) load button indicators.

Model Range
The variable support units are available in eight top suspension type arrangements, and one floor mounted pedestal type unit.

Four model ranges are available; these are QV1, QV2, QV3, and QV4, and respectively have a working range of 35mm, 70mm, 140mm and 210mm.

The variable units range in size from 0 to 22, with a maximum load of 24,000kg; all units incorporate a low maintenance design and are supplied with two pre-set travel blocks as standard.

In addition to our standard variable spring supports, we manufacture a range of small compact spring supports for travels up to 150mm and loads up to 270.N (27Kg). See page 76 for details and selection table.

Specials
Our standard range of variable supports will cater for most design conditions, but we can provide special units for higher operating loads than shown in our standard selection table; please contact our technical department for advice.

Pre-setting
The variable spring units are supplied to site in the pre-set load condition by the use of two locking stops, each located either side of the spring casing. These locking stops should only be removed once the complete spring assembly has been attached between the pipework and the supporting steelwork.

Hydrostatic Test Loads
Every variable spring unit is capable of withstanding a hydrostatic test load of up to two times the maximum load shown in the selection table for a particular size.

Surface Protection
Standard finish for spring supports is hot dip galvanised. Multi-coat protective finishes are available if required to suit client specifications.

Description

Ordering

The following information is required when ordering a variable spring unit

- Support / tag number
- Variable type (e.g. Fig QV1)
- Size (0-22)
- Mounting type (e.g. A, B, C, etc.)
- Operating load (Kg or kN)
- Pre-set load (QPS can calculate this if required)
- Hydrostatic test load (if known)
- Vertical movement (mm)
- Direction of movement (up / down)
- Quantity required
- Surface finish specification (standard is hot dip galvanised)
- If hydrostatic test stops are required
- Distance between rod centres and total operating load (for model 'G' only)

Selection Procedure

How to select the appropriate Variable Spring Unit

Initial Information required:

- Operating load at support point
- Load calculated when pipe is in the operating (hot) position including pipe weight, insulation, contents, and ancillary equipment
- Pipe movement (mm)
- Direction of movement (up / down)

Method of Selection

Once the above information has been defined, select the actual spring type attachment that will suit the complete assembly (e.g. Type A, B, C, etc.).

Pre-set Load

The pre-set (cold) load is calculated by adding (up movement) or subtracting (down movement) the resultant figure of 'spring rate' x 'movement' to the operating (hot) load.
Pre-set load for movement up = operating load + (movement x spring rate)
Pre-set load for movement down = operating load – (movement x spring rate)

Example

QV1 size 8
Supported load = 366 kg
Movement up 3mm x spring rate 5.4kg/mm = 16.2 kg
Pre-set load = 366 kg + 16.2kg = 382.2 kg

Selection Procedure

1. Select the operating load in the variable spring selection table
2. Check that the movement can be accommodated within the recommended working range of the spring unit selected
3. If the movement can be accommodated, then check the model type required by using 25% as the maximum load change variability figure (pre-set to operating)

Example where first selection is CORRECT

- Operating load 366kg
- Movement 3mm
- Direction of movement: up

From the selection table it can be seen that model QV1 size 8 will theoretically accommodate the operating load and movement.

Check variability:

$$\frac{\text{Movement x Spring Rate}}{\text{Operating Load}} \times 100 = \text{Variability}$$

From the selection table, model QV1 size 8 has been selected (spring rate = 5.4)

$$\frac{3 \times 5.4}{366} \times 100 = 4.42\%$$

4.42 % (this is acceptable) pre-set load will be 366 kg + (3 x 5.4) = 382.2 kg

Selection Procedure

Example where first selection is INCORRECT

- Operating load 366kg
- Movement 50mm
- Direction of movement: up

From the selection table it can be seen that model QV1 size 8 will theoretically accommodate the operating load and movement.

Check variability for QV1 (spring rate 5.4kg / mm)

$$\frac{\text{Movement x Spring Rate}}{\text{Operating Load}} \times 100 = \text{Variability}$$

$$\frac{50 \times 5.4}{366} \times 100 = 73\% \text{ (This is not acceptable)}$$

Check variability for QV2 (spring rate 2.7kg / mm)

$$\frac{50 \times 2.7}{366} \times 100 = 36.8\% \text{ (This is also not acceptable)}$$

Check variability for QV3 (spring rate 1.4kg / mm)

$$\frac{50 \times 1.4}{366} \times 100 = 19.12\% \text{ (This is acceptable)}$$

Acceptable spring unit will be QV3 size 8. Preset load will be 366 + (50 x 1.4) = 436 kg

NOTE: The pre-set load above is within the 'over travel', which is acceptable in this case. Spring units should not be selected when the operating load lies within the over travel. All variable units have been designed to perform within the working range.

To Calculate Rod Take Out:

- Locate the minimum rod take out in the table for model size and type selected, this is the dimension in the "minimum load position".
- Then determine on working range scale where the preset load is positioned or add to dimension shown in tables, using the above as an example.

QV3 say type A, size 8 look up table	=	463mm
Preset load at 431 read on scale	=	141mm
Rod take out	=	604mm

To Calculate Loaded Length of Model F:

- Look up maximum loaded length in table for model, size and type selected.
- Then determine on working range scale where preset load is positioned and subtract from dimension shown.

Example QV2 size 16 Pre-set load	=	3506.5 Kg
Maximum dimension from table	=	543mm
Pre-set load read on scale at	=	42
Loaded length	=	501mm

Installation Instructions

Variable spring units are pre-set to a specific load in our works that takes into account the operating load and movement at each specific support point.

In the event that the pipework system is subject to hydraulic testing prior to normal service, then the spring units should be ordered with down travel hydrostatic test stops. These should remain in position until after the hydraulic test has been carried out.

In the event that the pipework service is not subject to hydrostatic testing then the standard pre-set stops supplied with the variable units will be sufficient.

Once removed, the pre-set stops on all units should be retained in case of a requirement for future use. If it becomes obvious that an incorrect load is being applied to any supports in the system, it is advisable to contact our technical support team who would be pleased to give you advice.

Adjustment
Once installed the variable spring units should be adjusted until the load indicators point to the installed load position. The units should be checked following a reasonable period of operation. The load indicator should be indicating the operating load. If minor differences are apparent then the units should be adjusted to the correct operating position. No further adjustments should be necessary.

If major differences are noted then either consult the designer or QPS for further advice, prior to making any adjustments.

Range of site adjustment:
Hanging type's ±75mm
Base mounted type's ±25mm

Installation of Spring Units Type A, B & C
The spring unit is fitted between the pipe/duct/bracket to be supported and the steelwork above the unit. The hanger rod coming up from the pipe/duct/bracket is connected with a turnbuckle which is fitted to all three types of spring units.

Rotation of the turnbuckle transfers the operating load of the pipe to the spring unit, thus allowing withdrawal of the pre-set stops. No further adjustment should be required unless it becomes obvious that incorrect loads are being applied to adjacent supports in the system.

Installation of Spring Units Type D & E
Both of these units are mounted on top of the steelwork.

Installation of Spring Units Type D
The hanger rod passes through the unit and is secured to the spring unit at the top of the load tube by two nuts. The hanger rod should be of adequate length and threaded sufficiently to take into account any deviation in the pipe or duct elevation since these units are not supplied with a turnbuckle. Adjustment of the two nuts transfers the load to the spring unit, thus allowing withdrawal of the pre-set stops.

Installation of Spring Units Type E
The hanger rod passes through the unit and is secured by two nuts which prevent it passing through the spring pressure plate. Adjustment in length is provided by a turnbuckle at a convenient situation in the hanger assembly. Rotation of the turnbuckle transfers the load to the spring unit allowing withdrawal of the pre-set stops.

Installation Instructions

Installation of Spring Units Type F, H & K
These units are base mounted and should be aligned directly below the point of support. The height of the load flange is adjusted to contact the lower surface of the support point by rotation of the adjustment nut on the load column. Further rotation of this nut will transfer the load onto the spring unit and the pre-set stops can then be withdrawn.

Installation of Spring Units Type G
These units are fitted with turnbuckles so that hanger rods which have been previously connected to the steelwork above can be inserted into them. The rotation of the turnbuckle transfers the load to the spring unit. When the load is correctly supported the pre-set stops can be withdrawn.

Inspection During Operation
Following commissioning, the variable support should be examined to ensure the correct movement has been achieved in the operating (hot) position. If the internal load plate is shown to be against the stop at either end of the scale, an investigation should be made at once.

Subsequently the spring support should be examined at regular intervals to ensure that no change has occurred either in application or condition. The frequency of examination intervals will depend on the environmental and operating conditions and will range from annual examinations for land based, dry atmospheres, to monthly examinations for hostile offshore conditions with the possibility of salt corrosion.

Maintenance
If an excessive build-up of foreign matter or corrosion is observed it is important that the spring support is cleaned either by hand or with a pressure washer to ensure uninhibited operation.

Variable Spring Supports – Selection Table in kg. Travel in mm

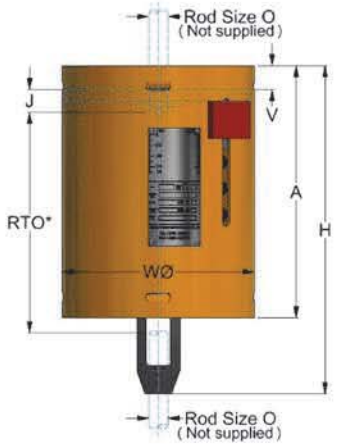
	QV4	QV3	QV2	QV1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Over Travel					20	29	38	49	66	88	118	158	211	282	366	479	634	845	1127	1521	2113	2818	3752	4983	6625	8806	11744
					20.5	30.5	39	51	68	91	121	162	216	289	376	491	650	867	1155	1560	2167	2889	3847	5109	6793	9029	12042
	30	20	10	5	21	31	40	52	70	93	124	166	222	296	385	503	666	888	1184	1599	2221	2960	3942	5236	6961	9252	12340
					21.5	32	41	53	71	95	127	170	227	303	394	515	682	909	1213	1637	2274	3032	4037	5362	7129	9475	12637
					22	32.5	42	54	73	97	130	174	232	310	403	528	698	931	1241	1676	2328	3103	4132	5489	7297	9699	12935
Minimum Working Load	0	0	0	0	22.5	33.5	43	56	75	100	133	178	238	317	413	540	714	952	1270	1714	2381	3175	4227	5615	7465	9922	13233
					23	34.5	44	57	76	102	136	182	243	324	422	552	730	974	1298	1753	2435	3246	4322	5742	7633	10145	13531
					23.5	35	45	58	78	104	139	186	248	332	431	564	746	995	1327	1791	2488	3318	4417	5868	7801	10368	13828
					24	36	46	59	80	107	142	190	254	339	441	576	762	1017	1355	1830	2542	3389	4512	5995	7968	10592	14126
					24.5	36.5	47	61	81	109	145	194	259	346	450	588	779	1038	1384	1869	2596	3461	4607	6121	8136	10815	14424
	30	20	10	5	25	37.5	48	62	83	111	148	198	265	353	459	600	795	1059	1413	1907	2649	3532	4702	6247	8304	11038	14721
					25.5	38	49	63	85	113	151	202	270	360	468	613	811	1081	1441	1946	2703	3603	4797	6374	8472	11261	15019
					26	39	50	64	87	116	154	206	275	367	478	625	827	1102	1470	1984	2756	3675	4892	6500	8640	11485	15317
					27	39.5	50.5	66	88	118	157	210	281	374	487	637	843	1124	1498	2023	2810	3746	4987	6627	8808	11708	15614
					27.5	40.5	51.5	67	90	120	160	214	286	382	496	649	859	1145	1527	2061	2863	3818	5082	6753	8976	11931	15912
	60	40	20	10	28	41	52.5	68	92	122	163	218	291	389	506	661	875	1167	1556	2100	2917	3889	5177	6880	9144	12154	16210
					28.5	42	53.5	69	93	125	166	222	297	396	515	673	891	1188	1584	2139	2971	3961	5272	7006	9311	12378	16508
					29	42.5	54.5	71	95	127	169	226	302	403	524	685	907	1209	1613	2177	3024	4032	5367	7133	9479	12601	16805
					29.5	43.5	55.5	72	97	129	172	230	307	410	533	698	923	1231	1641	2216	3078	4103	5462	7259	9647	12824	17103
					30	44	56.5	73	98	131	175	234	313	417	543	710	939	1252	1670	2254	3131	4175	5557	7386	9815	13047	17400
	90	60	30	15	30.5	45	57.5	74	100	134	178	238	318	424	552	722	955	1274	1698	2293	3185	4246	5652	7512	9983	13271	17698
					31	45.5	58.5	76	102	136	181	242	323	432	561	734	971	1295	1727	2331	3239	4318	5747	7638	10151	13494	17996
					31.5	46.5	59.5	77	103	138	184	246	329	439	571	746	988	1317	1756	2370	3292	4389	5843	7765	10319	13717	18294
					32	47	60.5	78	105	140	187	250	334	446	580	758	1004	1338	1784	2409	3346	4461	5938	7891	10487	13940	18591
					32.5	48	61.5	79	107	143	190	254	340	453	589	771	1020	1359	1813	2447	3399	4532	6033	8018	10655	14164	18889
	120	80	40	20	33.5	48.5	62.5	81	108	145	193	258	345	460	598	783	1036	1381	1841	2486	3453	4604	6128	8144	10822	14387	19187
					34	49.5	63.5	82	110	147	196	262	350	467	608	795	1052	1402	1870	2524	3506	4675	6223	8271	10990	14610	19484
					34.5	50	64	83	112	149	199	266	356	474	617	807	1068	1424	1898	2563	3560	4746	6318	8397	11158	14833	19782
					35	51	65	84	113	152	202	270	361	482	626	819	1084	1445	1927	2602	3614	4818	6413	8524	11326	15057	20080
					35.5	51.5	66	86	115	154	205	274	366	489	636	831	1100	1497	1956	2640	3667	4889	6508	8650	11494	15280	20378
	150	100	50	25	36	52.5	67	87	117	156	208	278	372	496	645	843	1116	1488	1984	2679	3721	4961	6603	8776	11662	15503	20675
					36.5	53	68	88	118	158	211	282	377	503	654	856	1132	1509	2013	2717	3774	5032	6698	8903	11830	15726	20973
					37	54	69	89	120	161	214	286	382	510	664	868	1148	1531	2041	2756	3828	5104	6793	9029	11988	15950	21271
					37.5	54.5	70	91	122	163	217	290	388	517	673	880	1164	1552	2070	2794	3881	5175	6888	9156	12166	16173	21568
					38	55.5	71	92	123	165	220	294	393	524	682	892	1180	1574	2098	2833	3935	5247	6983	9282	12333	16396	21866
	180	120	60	30	38.5	56	72	93	125	167	223	298	398	532	691	904	1196	1595	2127	2872	3989	5318	7078	9409	12501	16619	22164
					39	57	73	94	127	170	226	302	404	539	701	916	1213	1617	2156	2910	4042	5389	7173	9535	12669	16843	22461
					39.5	57.5	74	96	128	172	229	306	409	546	710	928	1229	1638	2184	2949	4096	5461	7268	9662	12837	17066	22759
Maximum Working Load					40	58.5	75	97	130	174	232	310	415	553	719	941	1245	1660	2213	2987	4149	5532	7363	9788	13005	17289	23057
					40.5	59	76	98	132	176	235	314	420	560	729	953	1261	1681	2241	3026	4203	5604	7458	9915	13173	17512	23354
	210	140	70	35	41.5	60	77	99	134	179	238	318	425	567	738	965	1277	1702	2270	3064	4257	5675	7553	10041	13341	17735	23652
Over Travel					42	60.5	77.5	101	135	181	241	322	431	574	747	977	1293	1724	2298	3103	4310	5747	7648	10167	13509	17959	23950
					42.5	61.5	78.5	102	137	183	244	326	436	582	756	989	1309	1745	2327	3142	4364	5818	7743	10294	13676	18182	24248
	30	20	10	5	43	62	79.5	103	139	185	247	330	441	589	766	1001	1325	1767	2356	3180	4417	5889	7838	10420	13844	18405	24545
					43.5	63	80.5	104	140	188	250	334	447	596	775	1013	1341	1788	2384	3219	4471	5961	7933	10547	14012	18629	24843
					44	64	81.5	106	142	190	253	338	452	603	784	1026	1357	1810	2413	3257	4524	6032	8028	10673	14180	18852	25141
																											Spring Rate - Kg per Millimetre
Figure QV1					0.53	0.75	0.96	1.25	1.6	2.2	3	4	5.4	7.1	9.2	12.1	16	21.4	28.6	38.6	53.6	71.4	95	126.4	168	223.2	297.6
Figure QV2					0.26	0.37	0.48	0.62	0.8	1.1	1.5	2	2.7	3.6	4.6	6	8	10.7	14.3	19.3	26.8	35.7	47.5	63.2	84	111.6	148.8
Figure QV3					0.13	0.18	0.24	0.31	0.4	0.5	0.7	1	1.3	1.8	2.3	3	4	5.3	7.1	9.6	13.4	17.8	23.7	31.6	42	55.8	74.4
Figure QV4					0.09	0.12	0.16	0.21	0.27	0.37	0.5	0.67	0.9	1.2	1.53	2	2.67	3.57	4.77	6.43	8.93	11.9	15.83	21.07	28	37.2	49.6
Size					0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Recommended Working Range of Spring

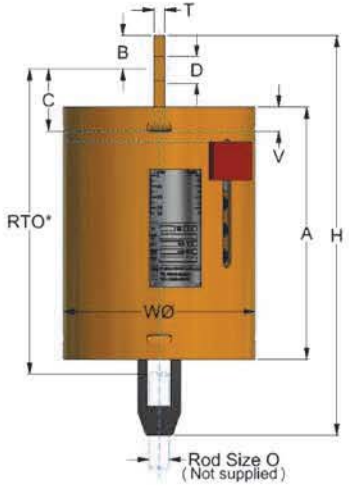
Variable Spring Supports – Selection Table in N. Travel in mm.

	QV4	QV3	QV2	QV1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Over Travel	30	20	10	5	196	292	375	468	652	873	1161	1548	2073	2764	3593	4698	6218	8291	11054	14923	20726	27635	36799	48869	64978	86359	115171
					201	300	385	498	668	895	1190	1587	2125	2834	3684	4817	6375	8501	11334	15301	21252	28356	37731	50109	66624	88549	118091
					207	307	394	510	685	917	1220	1626	2178	2904	3775	4936	6533	8711	11614	15679	21777	29036	38662	51349	68270	90738	121010
					212	314	404	523	701	939	1249	1665	2230	2974	3866	5055	6691	8921	11895	16058	22302	29737	39544	52589	69916	92927	123929
					217	322	413	535	717	961	1287	1704	2283	3044	3957	5174	6848	9131	12175	16436	22828	30437	40526	53829	71563	95116	126849
Minimum Working Load	0	0	0	0	222	329	423	547	734	983	1308	1744	2335	3114	4048	5293	7006	9341	12455	16814	23353	31138	41457	55069	73209	97305	129768
					228	337	432	559	750	1005	1337	1783	2388	3184	4138	5412	7164	9551	12735	17193	23879	31838	42389	56309	74855	99494	132687
					233	344	441	572	767	1027	1367	1822	2440	3254	4230	5532	7321	9762	13015	17571	24404	32539	43321	57549	76501	101683	135607
					238	351	451	584	783	1049	1396	1861	2493	3324	4321	5651	7479	9972	13296	17650	24929	33239	44252	58789	78147	103872	138526
	30	20	10	5	243	359	460	596	800	1071	1426	1901	2545	3394	4412	5770	7636	10182	13576	18327	24455	33940	45184	60029	79974	106061	141445
					249	366	470	608	816	1093	1455	1940	2598	3464	4503	5889	7794	10392	13856	18706	25980	34640	46116	61268	81440	108250	144365
					254	373	479	621	833	1115	1484	1979	2651	3534	4594	6008	7952	10602	14136	19084	26505	35341	47047	62508	83086	110439	147284
					259	381	489	633	849	1138	1514	2018	2703	3604	4685	6127	8109	10812	14416	19462	27031	36041	47979	63748	84372	112628	150204
					264	388	498	645	866	1160	1543	2058	2756	3674	4776	6246	8267	11022	14697	19840	27556	36742	48911	64988	86378	114818	153123
					270	395	508	657	882	1182	1573	2097	2808	3744	4867	6365	8424	11233	14977	20219	28082	37442	49842	66228	88025	117007	156042
	60	40	20	10	275	403	517	670	899	1204	1602	2136	2861	3814	4959	6484	8582	11433	15257	20597	28607	38143	50774	67468	89671	119196	158962
					280	410	527	682	915	1226	1631	2175	2913	3384	5050	6603	8740	11653	15537	20975	29132	38843	51706	68708	91317	121385	161881
					285	417	536	694	931	1248	1661	2214	2966	3954	5141	6722	8897	11863	15817	21354	29658	39544	52638	69948	92963	123574	164800
					291	425	546	706	948	1270	1690	2254	3018	4024	5232	6842	9055	12073	16098	21732	30183	40244	53569	71188	94609	125763	167720
					296	432	555	719	964	1292	1720	2293	3071	4094	5323	6961	9213	12283	16378	22110	30708	40945	54501	72428	96256	127952	170639
	90	60	30	15	301	438	564	731	981	1314	1749	2323	3123	4165	5414	7080	9370	12494	16658	22488	31234	41645	55433	73667	97902	130141	173558
					306	446	574	743	997	1336	1779	2371	3176	4235	5555	7199	9528	12704	16938	22867	31759	42346	56364	74907	99548	132330	176478
					312	454	583	756	1014	1358	1808	2411	3228	4305	5596	7318	9685	12914	17218	23245	32285	43046	57296	76147	101194	134519	179397
					317	462	593	768	1030	1380	1837	2450	3281	4375	5687	7437	9843	13124	17499	23623	32810	43747	58228	77387	102840	136708	182317
					322	469	602	780	1047	1402	1867	2489	3334	4445	5778	7556	10001	13334	17779	24001	33335	44447	59159	78627	104486	138897	185236
	120	80	40	20	327	476	612	792	1063	1424	1896	2528	3386	4515	5869	7675	10158	13544	18059	24380	33861	45148	60091	79867	106133	141087	188155
					333	484	621	805	1080	1446	1926	2567	3439	4585	5960	7794	10316	13754	18339	24758	34386	45848	61023	81107	107779	143276	191075
					338	491	631	817	1096	1469	1955	2607	3491	4655	6051	7913	10473	13965	18619	25136	34912	46549	61954	82347	109425	145465	193994
					343	498	640	829	1113	1491	1984	2646	3544	4725	6142	8032	10631	14175	18900	25515	35437	47249	62886	83587	111071	147654	196913
					348	506	650	841	1129	1513	2014	2685	3596	4795	6233	8151	10789	14385	19180	25893	35962	47950	63818	84827	112717	149843	199833
	150	100	50	25	354	513	659	854	1146	1535	2043	2724	3649	4865	6325	8271	10946	14595	19460	26271	36488	48650	64749	86066	114364	152032	202753
					359	520	668	866	1162	1557	2073	2764	3701	4935	6416	8390	11104	14805	19740	26649	37013	49351	65681	87306	116010	154221	205671
					364	528	678	878	1178	1579	2102	2803	3754	5005	6507	8509	11262	15015	20020	27028	37538	50051	66613	88546	117656	156410	208591
					370	535	687	890	1195	1601	2132	2842	3806	5075	6598	8628	11419	15226	20301	27406	38064	50752	67544	89786	119302	158599	211510
					375	542	697	903	1211	1623	2161	2881	3859	5145	6689	8747	11577	15436	20581	27784	38589	51452	68476	91026	120948	160788	214430
	180	120	60	30	380	550	706	915	1228	1645	2190	2921	3911	5215	6780	8866	11734	15646	20861	28162	39115	52153	69408	92266	122595	162977	217349
					385	557	716	927	1244	1667	2220	2960	3964	5285	6871	8985	11892	15856	21141	28541	39640	52853	70339	93506	124241	165166	220268
					391	564	725	939	1261	1689	2249	3000	4017	5355	6962	9104	12050	16066	21422	28919	40165	53554	71271	94746	125887	167356	223188
					396	572	735	952	1277	1711	2279	3039	4069	5425	7053	9223	12207	16276	21702	29297	40691	54254	72203	95986	127533	169545	226107
Maximum Working Load	210	140	70	35	401	579	744	964	1294	1733	2308	3077	4122	5495	7144	9342	12365	16486	21982	29676	41216	54955	73135	97226	129179	171734	229026
					406	587	754	976	1310	1755	2338	3117	4174	5566	7235	9461	12522	16697	22262	30054	41741	55655	74066	98465	130826	173923	231946
					412	594	763	988	1327	1777	2367	3156	4227	5636	7326	9580	12680	16907	22542	30432	42267	56356	74998	99705	132472	176112	234865
					417	601	772	1001	1343	1799	2396	3195	7279	5706	7417	9700	12838	17117	22823	30810	42792	57056	75929	100945	134118	178301	237784
Over Travel	30	20	10	5	422	609	782	1013	1360	1822	2426	3234	4332	5776	7508	9819	13000	17327	23103	31189	43318	57757	76861	102185	135764	180490	240704
					427	616	791	1025	1376	1844	2455	3274	4384	5846	7599	9938	13153	17537	23383	31567	43843	58457	77793	103425	137410	182679	243623
					433	623	801	1037	1392	1866	2485	3313	4437	5916	7691	10057	13310	17747	23663	31945	44368	59158	78724	104665	139057	184868	246543
																											Spring Rate - N per Millimetre
Figure QV1					5.3	7.4	9.4	12.3	16.5	22.1	29.4	39.2	52.5	70.1	91.1	119.1	157.6	210.2	280.2	378.2	525.4	700.5	931.7	1239.9	1646.2	2189.1	2919.4
Figure QV2					2.6	3.7	4.7	6.1	8.3	11.0	14.7	19.6	26.3	35.0	45.5	59.5	78.8	105.1	140.1	189.1	262.7	350.3	465.3	619.9	823.1	1094.5	1459.7
Figure QV3					1.3	1.8	2.4	3.1	4.2	5.5	7.4	9.8	13.1	17.5	22.8	29.8	39.4	52.5	70.1	94.6	131.3	175.1	232.9	310.0	411.5	547.3	729.8
Figure QV4					0.87	1.23	1.57	2.03	2.77	3.67	4.9	6.53	8.77	11.67	15.17	19.83	26.27	35.03	46.7	63.03	87.57	116.77	155.1	206.63	274.37	364.87	486.57
Size					**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**

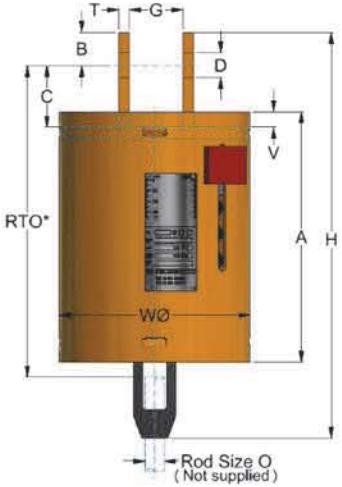
Variable Spring Supports – QV1



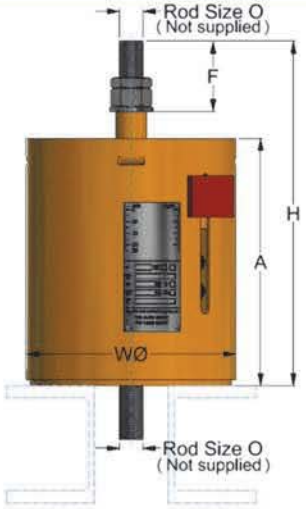
Type A



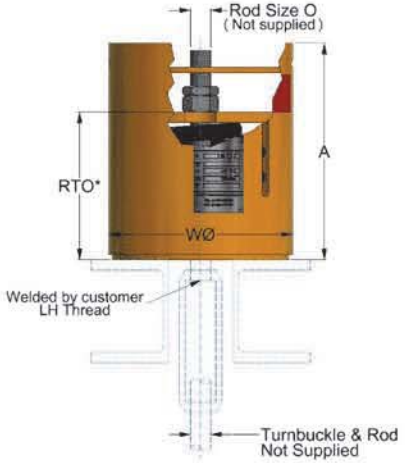
Type B



Type C



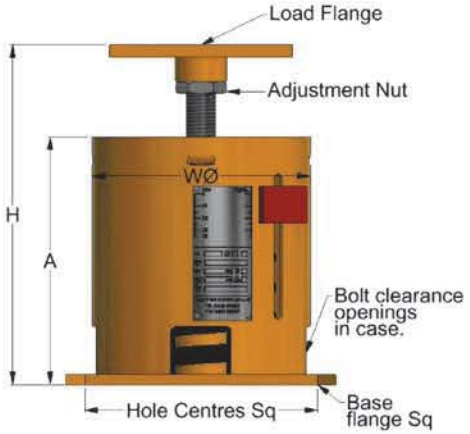
Type D



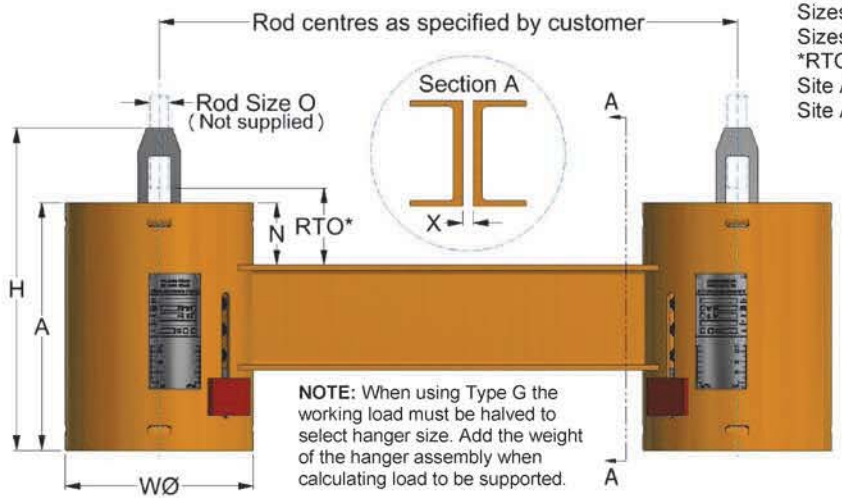
Type E

General Notes:

Sizes 0 – 17 are manufactured using the dimpled casing construction.
Sizes 18 – 22 are manufactured as a totally welded unit.
*RTO – At minimum load position.
Site Adjustments Types A, B, C & G ± 75mm
Site Adjustments Types F, H & K ± 25mm

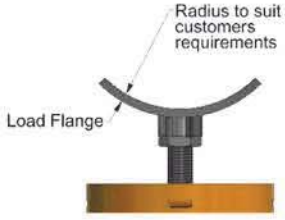


Type F

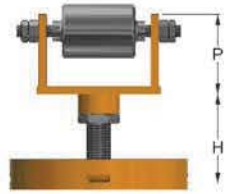


Type G

NOTE: When using Type G the working load must be halved to select hanger size. Add the weight of the hanger assembly when calculating load to be supported.



Type H



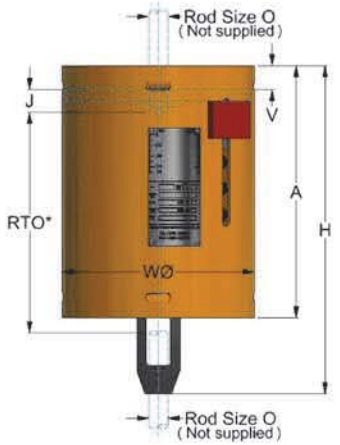
Type K

Size	Dim. 'P'
0 – 5	54
6 – 14	54
15 – 17	70
18 – 20	84
21	115
22	131

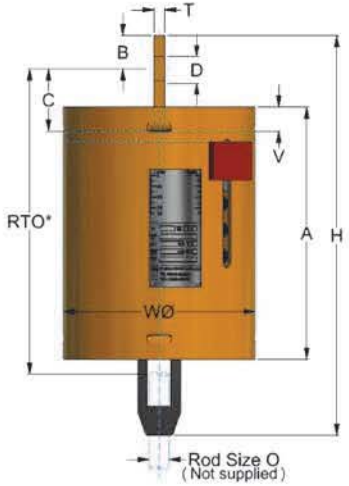
Variable Spring Supports – QV1

Size	Rod Size	Case Ø	Casing Length A			Rod Take Out				J - Thread Depth Type A	Type BC						Type F						Type G						Loaded Length H												Weight (approx.) Kgs			
			Types			Types					Dimensions														Beam Sections			Type A		Type B & C		Type D			Type F		Type G		Types			
	O	W	A B C	D E G	F	A	B C	E	G		D	C	B	G	T	V	Base Plate Square	Base Plate Hole Centres Square	Base Plate Bolts	Base Plate Thickness	Load Pad Square	Load Pad Thickness	Gap Width X	N	900mm Rod Centres	1300mm Rod Centres	1800mm Rod Centres	Min	Max	Min	Max	Min	Max	F	Min	Max	Min	Max	A B C	D E	F	G
0	M12	120	170	129	128	130	200	103	25	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	25	50 12	50 12	50 12	245	280	315	350	182	217	54	182	217	224	259	2.5	2	5	11
1	M12	120	180	136	135	130	203	110	18	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	25	50 12	50 12	50 12	248	283	318	353	189	224	54	188	223	224	259	3	2.5	5	11
2	M12	120	195	152	151	142	212	126	24	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	25	50 12	50 12	50 12	269	304	339	374	205	240	54	204	239	246	281	3	3	5	12
3	M12	160	180	139	138	127	197	113	24	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	25	76 38	76 38	76 38	254	289	324	359	192	227	54	193	228	233	268	4	4	8	13
4	M12	160	190	149	148	139	209	123	26	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	25	76 38	76 38	76 38	266	301	336	371	202	237	54	203	238	245	280	5	4	8	14
5	M12	160	200	159	158	144	214	132	21	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	25	76 38	76 38	76 38	271	306	341	376	211	246	54	212	247	250	285	5	5	9	15
6	M16	180	215	167	165	151	225	138	38	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	281	316	351	386	217	252	54	223	258	255	290	8	7	14	21
7	M16	180	235	182	180	156	230	158	23	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	286	321	356	391	232	267	54	238	273	255	290	9	9	15	23
8	M16	180	235	189	187	149	223	153	23	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	286	321	356	391	239	274	54	245	280	262	297	10	9	15	24
9	M20	240	260	203	201	162	245	166	25	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	51	76 38	100 50	100 50	314	349	384	419	260	295	54	271	306	284	319	21	19	31	48
10	M20	240	270	216	214	151	234	179	-2	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	51	76 38	100 50	100 50	297	332	367	402	273	308	54	283	318	270	305	24	22	34	53
11	M20	240	240	184	182	152	247	147	35	20	26	75	35	37	10	25	260	190	M20	8	180	12	32	51	76 38	100 50	100 50	304	339	389	424	241	276	54	250	285	275	310	21	19	30	46
12	M24	240	255	198	196	152	257	157	17	30	32	75	35	41	12	25	260	190	M20	8	180	12	38	38	100 50	125 65	125 65	321	356	406	441	251	286	54	258	293	291	326	22	20	31	51
13	M30	240	300	233	231	183	314	192	41	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	76	100 50	125 65	125 65	366	401	491	526	286	321	54	293	328	326	361	27	24	32	61
14	M30	240	300	239	237	192	323	198	50	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	76	100 50	125 65	125 65	375	410	500	535	292	327	54	299	334	341	376	28	25	37	63
15	M30	250	320	266	261	215	351	211	5	35	38	101	49	51	12	25	260	190	M20	10	200	15	54	25	150 75	200 75	200 75	403	438	528	563	321	356	70	308	343	374	409	34	30	39	78
16	M36	250	360	298	293	240	376	243	16	35	46	101	64	60	20	25	260	190	M20	10	200	15	54	51	150 75	200 75	200 75	433	468	573	608	353	388	70	340	375	394	429	40	35	45	92
17	M42	250	380	311	306	268	414	256	24	35	51	111	74	67	20	25	260	190	M20	10	200	15	54	51	150 75	200 75	200 75	471	506	631	666	380	415	70	372	407	427	462	48	41	51	108
18	M48	320	360	311	303	276	423	281	-27	45	60	102	80	73	20	-	350	283	M24	12	250	20	60	12	200 90	260 90	300 90	446	481	628	663	420	456	84	393	428	397	432	104	89	112	222
19	M56	320	395	337	329	309	473	307	-11	50	68	114	80	79	20	-	350	283	M24	12	250	20	67	25	200 90	260 90	300 90	484	519	678	713	446	481	84	418	453	426	461	116	98	114	245
20	M64	320	460	393	388	365	534	357	-15	55	75	114	102	86	25	-	350	283	M24	15	250	20	73	25	200 90	260 90	300 90	555	590	771	806	496	531	84	472	507	488	523	145	124	146	304
21	M72	320	495	423	413	347	526	393	-58	65	84	114	102	92	25	-	350	283	M24	15	250	20	79	25	300 90	300 100	380 100	562	597	778	813	556	591	115	499	534	490	525	169	141	149	377
22	M80	320	620	536	526	459	651	501	-20	65	94	127	102	98	25	-	350	283	M24	15	250	20	86	76	300 90	300 100	380 100	699	734	928	963	680	715	131	607	642	615	650	210	186	190	458

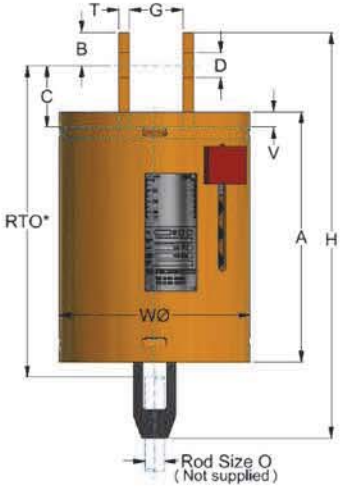
Variable Spring Supports – QV2



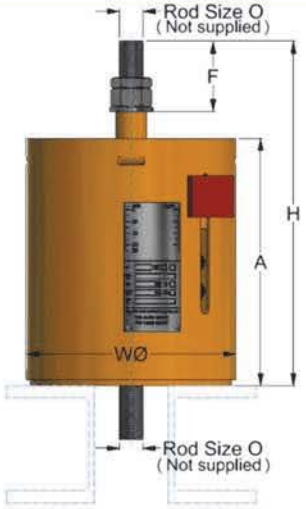
Type A



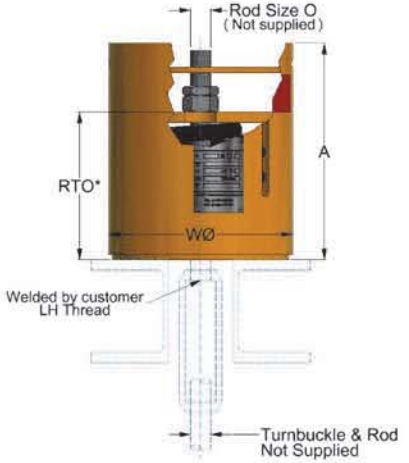
Type B



Type C



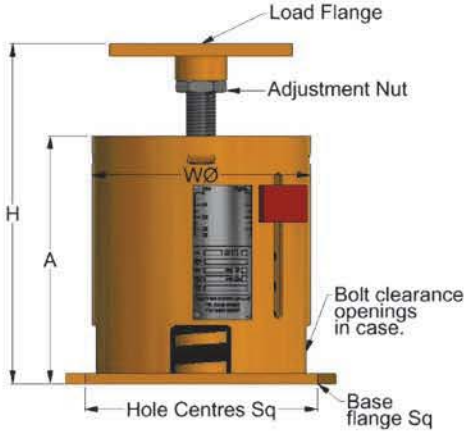
Type D



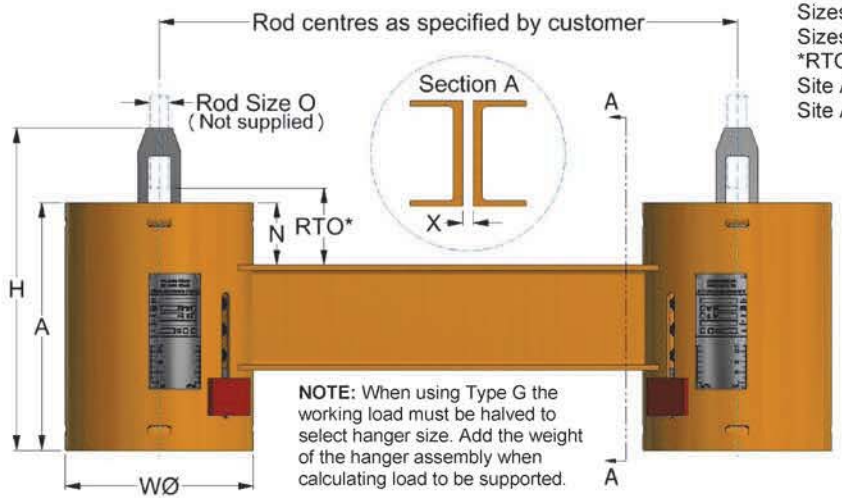
Type E

General Notes:

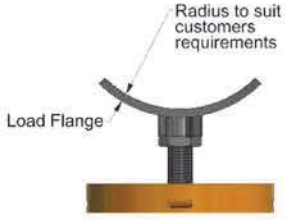
Sizes 0 – 17 are manufactured using the dimpled casing construction.
Sizes 18 – 22 are manufactured as a totally welded unit.
*RTO – At minimum load position.
Site Adjustments Types A, B, C & G ± 75mm
Site Adjustments Types F, H & K ± 25mm



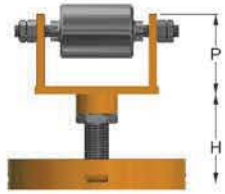
Type F



Type G



Type H



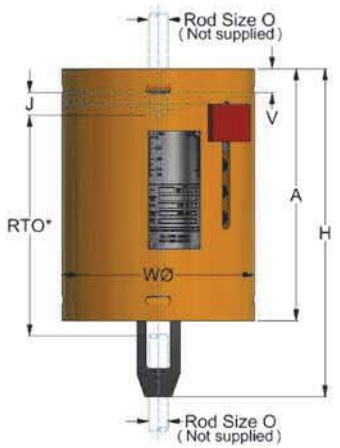
Type K

Size	Dim. 'P'
0 – 5	54
6 – 14	54
15 – 17	70
18 – 20	84
21	115
22	131

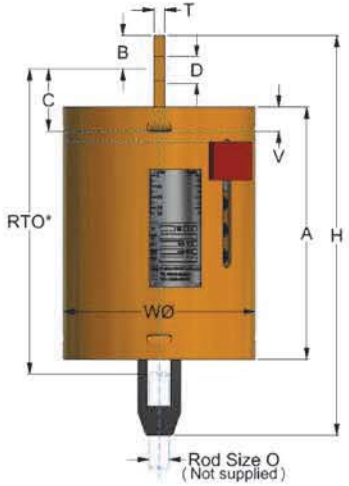
Variable Spring Supports – QV2

Size	Rod Size	Case Ø	Casing Length A			Rod Take Out				J - Thread Depth Type A	Type BC						Type F						Type G						Loaded Length H												Weight (approx.) Kgs			
			Types			Types					Dimensions														Beam Sections			Type A		Type B & C		Type D			Type F		Type G		Types			
	O	W	A B C	D E G	F	A	B C	E	G		D	C	B	G	T	V	Base Plate Square	Base Plate Hole Centres Square	Base Plate Bolts	Base Plate Thickness	Load Pad Square	Load Pad Thickness	Gap Width X	N	900mm Rod Centres	1300mm Rod Centres	1800mm Rod Centres	Min	Max	Min	Max	Min	Max	F	Min	Max	Min	Max	A B C	D E	F	G
0	M12	120	220	181	180	149	219	150	19	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	276	346	346	416	234	304	54	233	303	257	327	3	3	6	13
1	M12	120	240	198	197	169	239	167	19	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	296	366	366	436	251	321	54	255	325	274	344	3	3	6	13
2	M12	120	260	217	216	187	257	186	17	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	314	384	384	454	270	340	54	274	344	291	361	4	4	7	14
3	M12	160	235	193	192	166	236	162	34	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	293	363	363	433	246	316	54	252	322	271	341	6	5	10	17
4	M12	160	255	209	208	178	248	178	26	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	305	375	375	445	262	332	54	268	338	284	354	6	7	11	17
5	M12	160	270	227	226	202	272	196	35	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	329	399	399	469	280	350	54	285	355	306	376	7	7	11	18
6	M16	180	280	234	232	207	281	200	36	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	344	414	414	484	284	354	54	294	364	328	398	11	10	17	26
7	M16	180	305	258	256	230	304	224	34	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	367	437	437	507	308	378	54	320	390	342	412	12	12	20	29
8	M16	180	320	270	268	243	317	236	32	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	380	450	450	520	320	390	54	331	401	352	422	13	12	20	31
9	M20	240	330	275	273	243	326	233	61	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	395	465	465	535	337	407	54	347	417	367	437	25	23	37	56
10	M20	240	360	307	305	277	360	265	65	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	429	499	499	569	369	439	54	379	449	403	473	28	26	40	62
11	M20	240	305	251	249	250	345	209	93	20	26	75	35	37	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	402	472	487	557	313	383	54	323	393	375	445	25	28	36	57
12	M24	240	335	273	271	210	315	227	59	30	32	75	35	41	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	379	449	464	534	331	401	54	339	409	344	414	28	25	39	62
13	M30	240	395	338	336	287	418	291	76	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	470	540	595	665	396	466	54	404	474	440	510	36	33	48	80
14	M30	240	400	341	339	294	425	295	78	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	477	547	602	672	399	469	54	407	477	448	518	38	35	50	83
15	M30	250	415	360	355	326	462	300	98	35	38	101	49	51	12	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	514	584	639	709	425	495	70	417	487	476	546	44	40	53	102
16	M36	250	480	419	414	376	512	359	83	35	46	101	64	60	20	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	569	639	709	779	483	553	70	475	545	533	603	54	49	62	123
17	M42	250	545	471	466	429	575	411	71	35	51	111	74	67	20	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	632	702	792	862	536	606	70	528	598	583	653	67	60	72	148
18	M48	320	480	430	422	406	554	395	73	45	60	102	80	73	20	-	350	283	M24	12	250	20	60	102	200 90	260 90	300 90	577	647	759	829	549	619	84	523	593	526	596	136	119	146	286
19	M56	320	545	488	480	472	636	453	79	50	68	114	80	79	20	-	350	283	M24	12	250	20	67	102	200 90	260 90	300 90	647	717	841	911	607	677	84	580	650	590	660	157	136	163	328
20	M64	320	640	575	570	561	730	535	78	55	75	114	102	86	25	-	350	283	M24	15	250	20	73	102	200 90	260 90	300 90	751	821	967	1037	689	759	84	663	733	666	756	204	168	204	424
21	M72	320	735	658	648	607	786	623	39	65	84	114	102	92	25	-	350	283	M24	15	250	20	79	102	300 90	300 100	380 100	822	892	1038	1108	789	859	115	733	803	745	815	251	219	228	543
22	M80	320	900	817	807	765	957	777	32	65	94	127	102	98	25	-	350	283	M24	15	250	20	86	102	300 90	300 100	380 100	1005	1075	1234	1304	959	1029	131	887	957	922	992	323	242	296	675

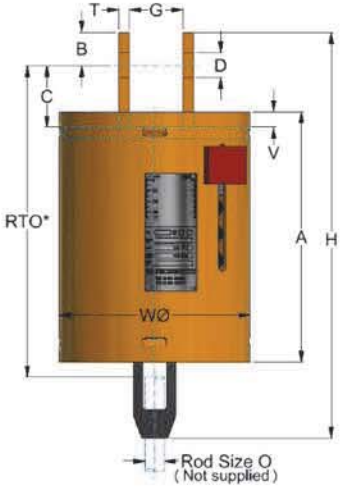
Variable Spring Supports – QV3



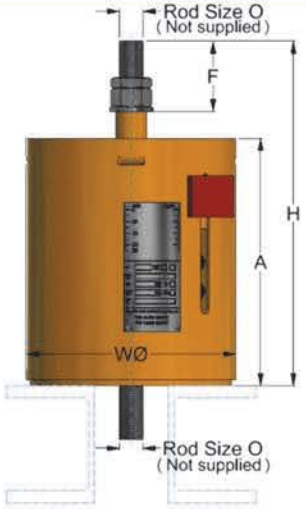
Type A



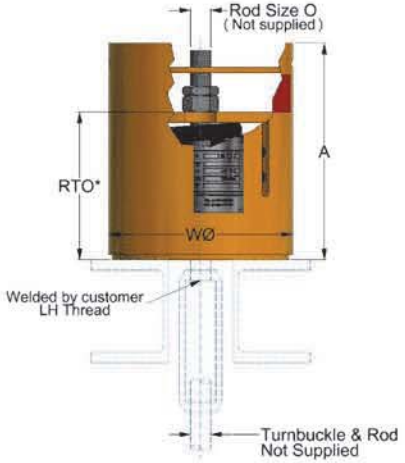
Type B



Type C



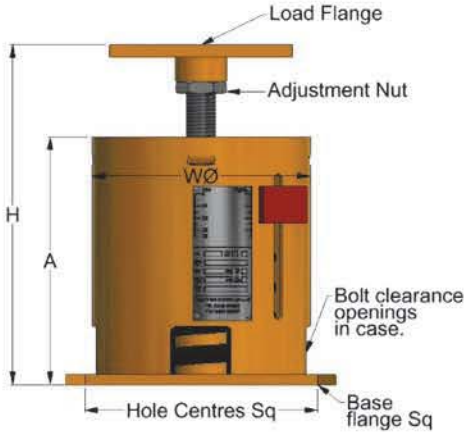
Type D



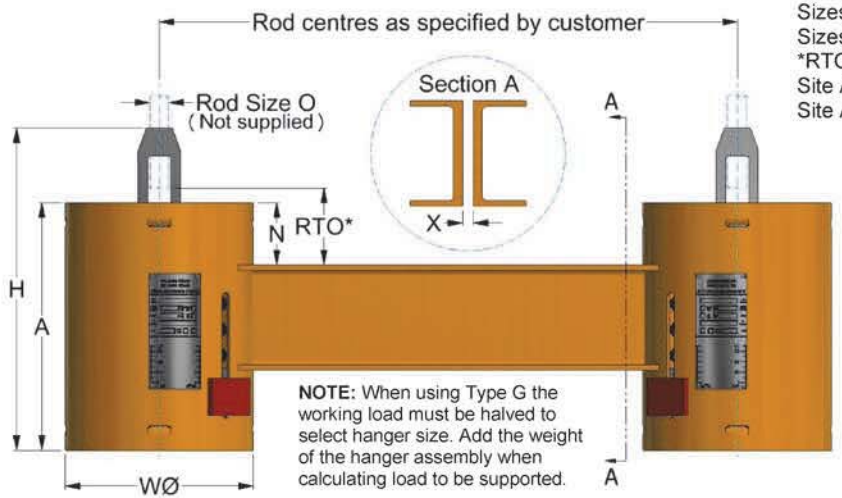
Type E

General Notes:

Sizes 0 – 17 are manufactured using the dimpled casing construction.
Sizes 18 – 22 are manufactured as a totally welded unit.
*RTO – At minimum load position.
Site Adjustments Types A, B, C & G ± 75mm
Site Adjustments Types F, H & K ± 25mm

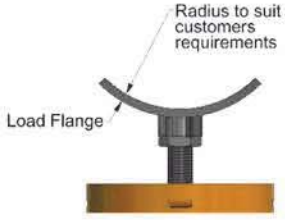


Type F

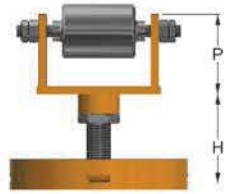


NOTE: When using Type G the working load must be halved to select hanger size. Add the weight of the hanger assembly when calculating load to be supported.

Type G



Type H



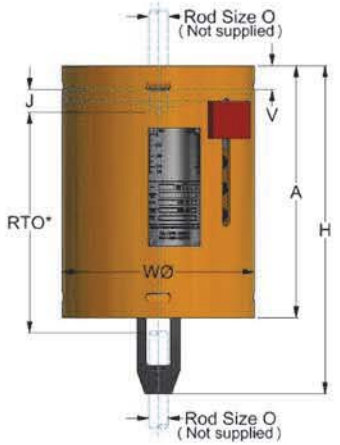
Type K

Size	Dim. 'P'
0 – 5	54
6 – 14	54
15 – 17	70
18 – 20	84
21	115
22	131

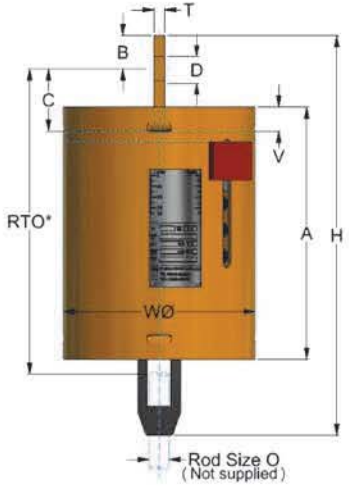
Variable Spring Supports – QV3

Size	Rod Size	Case Ø	Casing Length A			Rod Take Out				J - Thread Depth Type A	Type BC						Type F						Type G						Loaded Length H												Weight (approx.) Kgs			
			Types			Types					Dimensions														Beam Sections			Type A		Type B & C		Type D			Type F		Type G		Types			
	O	W	A B C	D E G	F	A	B C	E	G		D	C	B	G	T	V	Base Plate Square	Base Plate Hole Centres Square	Base Plate Bolts	Base Plate Thickness	Load Pad Square	Load Pad Thickness	Gap Width X	N	900mm Rod Centres	1300mm Rod Centres	1800mm Rod Centres	Min	Max	Min	Max	Min	Max	F	Min	Max	Min	Max	A B C	D E	F	G
0	M12	120	370	329	328	294	364	294	14	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	421	561	491	631	387	527	54	380	520	400	540	3	5	9	16
1	M12	120	405	363	362	338	408	328	23	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	465	605	535	675	422	562	54	423	563	443	583	6	6	9	18
2	M12	120	445	401	400	367	455	366	12	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	38	50 12	50 12	50 12	494	634	582	722	460	600	54	461	601	470	610	7	7	10	20
3	M12	160	400	354	353	322	392	318	25	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	449	589	519	659	413	553	54	415	555	423	563	9	9	15	23
4	M12	160	430	386	385	364	434	350	37	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	491	631	561	101	445	585	54	447	587	467	607	11	10	17	26
5	M12	160	465	421	420	397	467	385	35	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	51	76 38	76 38	76 38	524	664	594	734	480	620	54	482	622	500	640	12	11	18	26
6	M16	180	470	424	422	399	473	386	38	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	536	676	606	746	480	620	54	489	629	512	652	18	17	27	40
7	M16	180	520	472	470	459	533	434	48	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	596	736	666	806	528	668	54	538	678	570	710	22	21	32	47
8	M16	180	540	496	494	465	539	458	34	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	51	76 38	76 38	76 38	602	742	672	812	552	692	54	562	702	580	720	27	22	33	58
9	M20	240	555	494	496	467	550	452	60	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	619	759	689	829	571	711	54	576	716	589	729	40	38	57	85
10	M20	240	615	562	560	531	614	516	64	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	683	823	753	893	634	774	54	638	778	657	797	47	45	64	100
11	M20	240	505	450	448	428	523	404	71	20	26	75	35	37	10	25	260	190	M20	8	180	12	32	76	76 38	100 50	100 50	580	720	665	805	523	663	54	527	667	552	692	40	39	56	86
12	M24	240	545	488	486	413	518	438	52	30	32	75	35	41	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	582	722	667	807	556	696	54	559	699	552	692	45	43	61	97
13	M30	240	675	618	616	572	703	568	81	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	755	895	880	1020	687	827	54	689	829	725	865	61	59	78	130
14	M30	240	685	624	622	585	716	574	84	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	102	100 50	125 65	125 65	768	908	893	1033	693	833	54	695	836	734	874	65	62	81	138
15	M30	250	695	640	635	595	731	580	87	35	38	101	49	51	12	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	783	923	908	1048	721	861	70	702	842	753	893	72	68	86	155
16	M36	250	815	757	752	715	851	698	87	35	46	101	64	60	20	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	908	1048	1048	1188	838	978	70	819	959	873	1013	93	86	103	217
17	M42	250	930	862	857	830	976	802	87	35	51	111	74	67	20	25	260	190	M20	10	200	15	54	102	150 75	200 75	200 75	1033	1173	1193	1333	943	1083	70	924	1064	990	1130	118	106	124	247
18	M48	320	850	795	787	790	938	750	87	45	60	102	80	73	20	-	350	283	M24	12	250	20	60	102	200 90	260 90	300 90	961	1101	1143	1283	925	1065	84	897	1037	905	1045	219	203	241	452
19	M56	320	965	911	903	923	1087	866	110	50	68	114	80	79	20	-	350	283	M24	12	250	20	67	102	200 90	260 90	300 90	1098	1238	1292	1432	1040	1180	84	1011	1151	1044	1184	259	235	274	531
20	M64	320	1145	1080	1075	1077	1246	1031	89	55	75	114	102	86	25	-	350	283	M24	15	250	20	73	102	200 90	260 90	300 90	1267	1407	1483	1623	1205	1345	84	1177	1317	1202	1347	351	315	357	714
21	M72	320	1315	1241	1231	1178	1357	1196	30	65	84	114	102	92	25	-	350	283	M24	15	250	20	79	102	300 90	300 100	380 100	1393	1533	1609	1749	1386	1526	115	1310	1450	1319	1459	413	370	382	864
22	M80	320	1640	1550	1540	1481	1673	1504	8	65	94	127	102	98	25	-	350	283	M24	15	250	20	86	102	300 90	300 100	380 100	1721	1861	1950	2090	1710	1850	131	1520	1760	1631	1771	549	504	524	1137

Variable Spring Supports – QV4



Type A



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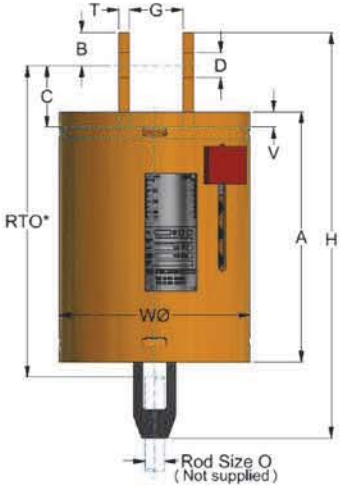
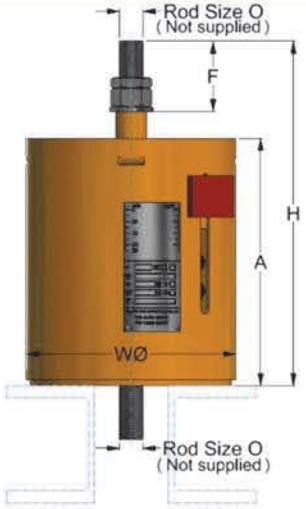
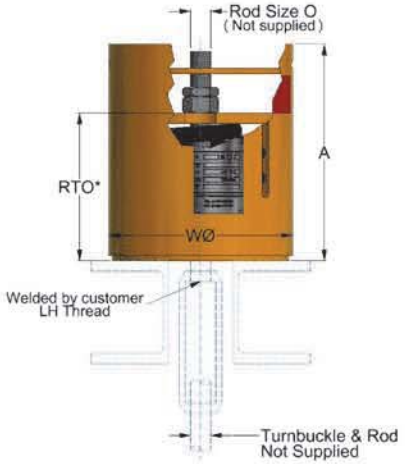


Type C



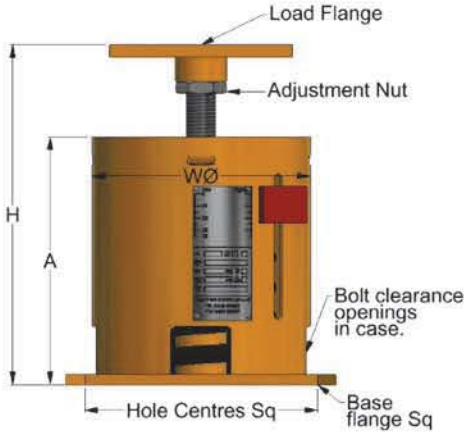
Type D



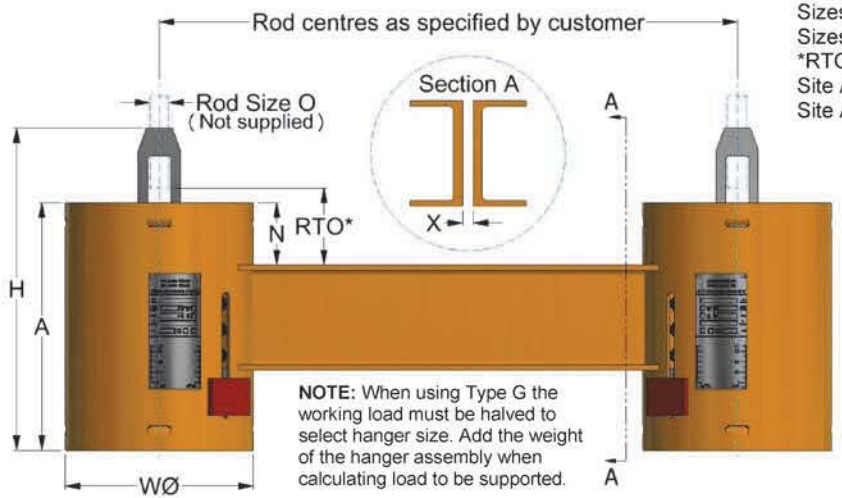
Type E

General Notes:

Sizes 0 – 17 are manufactured using the dimpled casing construction.
Sizes 18 – 22 are manufactured as a totally welded unit.
*RTO – At minimum load position.
Site Adjustments Types A, B, C & G ± 75mm
Site Adjustments Types F, H & K ± 25mm

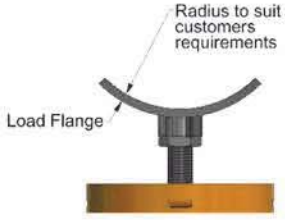


Type F

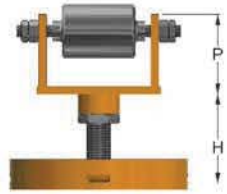


Type G

NOTE: When using Type G the working load must be halved to select hanger size. Add the weight of the hanger assembly when calculating load to be supported.



Type H



Type K

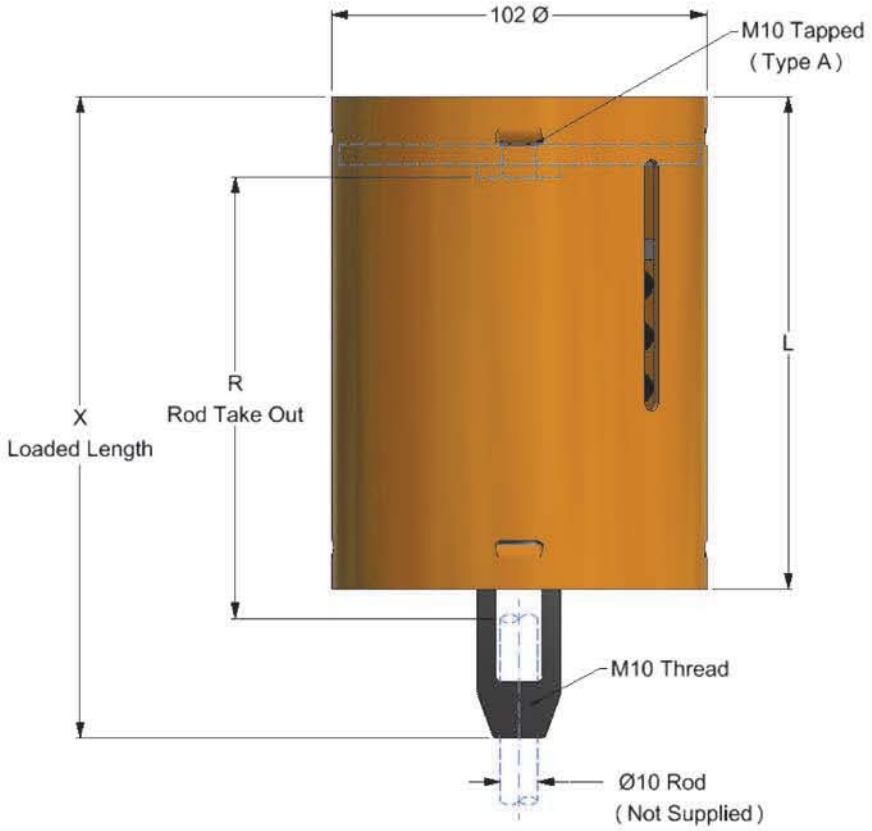
Size	Dim. 'P'
0 – 5	54
6 – 14	54
15 – 17	70
18 – 20	84
21	115
22	131

Variable Spring Supports – QV4

Size	Rod Size	Case Ø	Casing Length A			Rod Take Out				J - Thread Depth Type A	Type BC						Type F						Type G						Loaded Length H												Weight (approx.) Kgs			
			Types			Types					Dimensions														Beam Sections			Type A		Type B & C		Type D			Type F		Type G		Types			
	O	W	A B C	D E G	F	A	B C	E	G	D	C	B	G	T	V	Base Plate Square	Base Plate Hole Centres Square	Base Plate Bolts	Base Plate Thickness	Load Pad Square	Load Pad Thickness	Gap Width X	N	900mm Rod Centres	1300mm Rod Centres	1800mm Rod Centres	Min	Max	Min	Max	Min	Max	F	Min	Max	Min	Max	A B C	D E	F	G
0	M12	120	530	492	485	465	535	440	34	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	40	50 12	50 12	50 12	592	802	662	872	550	760	54	560	770	571	781	7	7	12	19
1	M12	120	580	542	535	525	595	490	43	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	40	50 12	50 12	50 12	652	862	722	932	605	815	54	620	830	640	850	9	9	12	23
2	M12	120	635	602	595	570	640	545	42	12	18	58	32	22	6	20	150	113	M16	6	130	6	16	40	50 12	50 12	50 12	697	907	767	977	660	870	54	680	890	699	909	10	10	13	26
3	M12	160	565	527	520	500	570	475	50	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	50	76 38	76 38	76 38	627	837	697	907	590	800	54	610	820	622	832	12	13	20	29
4	M12	160	615	577	570	560	630	525	55	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	50	76 38	76 38	76 38	687	897	757	967	640	850	54	655	865	677	887	16	13	23	35
5	M12	160	665	632	625	610	680	575	52	12	18	58	32	22	6	20	200	139	M20	6	130	6	20	50	76 38	76 38	76 38	737	947	807	1017	695	905	54	710	920	729	939	17	15	25	35
6	M16	180	670	635	625	605	680	575	47	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	50	76 38	76 38	76 38	742	952	813	1023	690	900	54	710	920	733	943	25	22	37	54
7	M16	180	740	705	695	690	765	645	57	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	50	76 38	76 38	76 38	827	1037	898	1108	760	970	54	785	995	813	1023	32	30	44	65
8	M16	180	775	740	730	710	785	680	43	16	22	58	32	27	10	20	220	144	M20	8	150	10	25	50	76 38	76 38	76 38	847	1057	918	1128	795	1005	54	820	1030	834	1044	41	32	46	85
9	M20	240	785	735	725	710	795	670	75	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	75	76 38	100 50	100 50	862	1072	934	1144	810	1020	54	830	1040	842	1052	55	53	77	114
10	M20	240	880	835	825	805	890	770	78	20	26	63	32	32	10	25	260	190	M20	8	180	12	32	75	76 38	100 50	100 50	957	1167	1029	1239	910	1120	54	920	1130	945	1155	66	64	88	135
11	M20	240	710	665	655	645	740	600	85	20	26	75	35	37	10	25	260	190	M20	8	180	12	32	75	76 38	100 50	100 50	797	1007	882	1092	740	950	54	760	970	786	996	55	50	76	115
12	M24	240	775	725	715	690	795	650	112	30	32	75	35	41	12	25	260	190	M20	8	180	12	38	100	100 50	125 65	125 65	859	1069	944	1154	790	1000	54	805	1015	851	1061	62	61	83	132
13	M30	240	975	915	905	880	1010	845	122	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	100	100 50	125 65	125 65	1063	1273	1187	1397	990	1200	54	1000	1210	1065	1275	86	85	108	180
14	M30	240	980	930	920	890	1020	855	125	30	38	101	49	46	12	25	260	190	M20	8	180	12	38	100	100 50	125 65	125 65	1073	1263	1197	1407	1000	1210	54	1010	1220	1083	1293	92	89	112	193
15	M30	250	990	945	930	900	1035	860	138	35	38	101	49	51	12	25	260	190	M20	10	200	15	54	100	150 75	200 75	200 75	1088	1298	1212	1422	1020	1230	70	1015	1225	1111	1321	100	96	119	208
16	M36	250	1175	1120	1105	1080	1215	1040	138	35	46	101	64	60	20	25	260	190	M20	10	200	15	54	100	150 75	200 75	200 75	1273	1483	1412	1622	1200	1410	70	1190	1400	1291	1501	132	129	144	311
17	M42	250	1335	1280	1265	1245	1390	1195	139	35	51	111	74	67	20	25	260	190	M20	10	200	15	54	100	150 75	200 75	200 75	1448	1658	1607	1817	1360	1570	70	1350	1560	1462	1672	169	152	176	346
18	M48	320	1230	1168	1160	1180	1330	1110	87	45	60	102	80	73	20	-	350	283	M24	12	250	20	60	100	200 90	260 90	300 90	1350	1560	1535	1745	1315	1525	84	1285	1495	1288	1498	302	287	336	618
19	M56	320	1395	1336	1330	1380	1550	1290	110	50	68	114	80	79	20	-	350	283	M24	12	250	20	67	100	200 90	260 90	300 90	1555	1765	1755	1965	1485	1695	84	1442	1652	1498	1708	361	334	385	734
20	M64	320	1660	1595	1590	1605	1775	1540	88	55	75	114	102	86	25	-	350	283	M24	15	250	20	73	100	200 90	260 90	300 90	1795	2005	2010	2220	1735	1945	84	1705	1915	1730	1940	498	462	510	1004
21	M72	320	1910	1835	1825	1760	1930	1780	3	65	84	114	102	92	25	-	350	283	M24	15	250	20	79	100	300 90	300 100	380 100	1975	2185	2182	2392	1985	2195	115	1905	2115	1900	2110	575	521	536	1185
22	M80	320	2395	2295	2285	2210	2400	2245	6	65	94	127	102	98	25	-	350	283	M24	15	250	20	86	100	300 90	300 100	380 100	2450	2660	2680	2890	2465	2675	131	2360	2570	2350	2560	775	766	752	1599

Variable Spring Supports

Variable Spring Supports – QV38, QV75 & QV150



Loads N		Loads Kg		Travels mm		
Size 01	Size 02	Size 01	Size 02	QV150	QV75	QV38
88.97	177.95	9.07	18.14	0	0	0
95.15	184.13	9.70	18.77	10	5	2.5
101.33	190.31	10.33	19.40	20	10	5
107.51	196.49	10.96	20.03	30	15	7.5
113.69	202.67	11.59	20.66	40	20	10
119.87	208.85	12.22	21.29	50	25	12.5
126.05	215.03	12.85	21.92	60	30	15
132.23	221.21	13.48	22.55	70	35	17.5
138.41	227.39	14.11	23.18	80	40	20
144.59	233.57	14.74	23.81	90	45	22.5
150.77	239.75	15.37	24.44	100	50	25
156.96	245.93	16.00	25.07	110	55	27.5
163.14	252.11	16.63	25.70	120	60	30
169.32	258.29	17.26	26.33	130	65	32.5
175.50	264.47	17.89	26.96	140	70	35
181.68	270.66	18.52	27.59	150	75	37.5
Spring Rate		Kg/mm		0.063	0.125	0.25
		N/mm		0.618	1.226	2.45

Fig No		QV150 mm		QV75 mm	QV38 mm
		01	02		
Rod Takeout 'R'		416	416	202	120
Can Length 'L'		450	450	270	200
Loaded Length 'X'	Min	539	539	330	245
	Max	689	689	405	283

This range of spring supports is available for the following types:-
A, B, C, D, E & F.

These units are not pre-set unless required.

ANCILLARY EQUIPMENT

Standard Code of Practice

All piping systems must satisfy the designing engineer's specifications for being sufficiently supported throughout the piping system. All supports shall have vertical adjustment so that the piping lines are able to be levelled after the support lines are in place.

All hanger supports shall be adjustable and either supplied with a turnbuckle and sling rod assembly or a hemispherical washer and nut, with the rod passing through the supporting structure.

Where there is longitudinal movement due to temperature changes, sliding or roller supports may be used to support the piping system.

On steam supply and return piping with longitudinal movement, pipe covering protection saddles should be used in conjunction with a roller support of sufficient size to take the saddle.

All supports will be spaced so that no sag occurs in the pipe line, and proper drainage of the pipe system is achieved.

In areas of the piping system where vertical thermal movement occurs, variable spring supports shall be used only if 25% variation of the load is allowable.

Where vertical movement occurs and a minimum variation in the supporting load is required, a constant support hangar should be installed.

The following conditions are desirable:-

- The constant supporting force must be equal to the sum of the pipeline weight.
- The sum of the piping weight at their centre of gravity and the supporting forces shall be equal.
- All constant support hangers will be calibrated so that they support the calculated load of the piping system.

On pipelines where vibration and lateral movement occurs and dampening is required, vibration controls can be installed.

Anchors shall be installed so that the piping system is allowed to take up its expansion and contraction freely in opposite directions away from the anchored point and shall be so designed for the particular location and loading conditions.

Pipe guides shall be used to allow the expansion and contraction of the pipeline to move freely, wherever expansion joints are used.

Included within the supports illustrated in this section, are a range of support components in accordance with British Standards 3974 Part 1, 2 & 3.

Maximum Spacing of Supports (metres)																		
NPS	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
Span	2.0	2.5	3.0	3.5	4.0	4.5	5.5	6.0	6.5	7.0	8.5	9.0	10.0	10.0	10.5	11.0	12.0	14.0

Ancillary Index 1

Ancillary Index 2

Ancillary Equipment – Pictorial Index Page 1

Fig.	Page	Description	Pictorial
2G	88	U-Bolt Grip	
2NG	88	U-Bolt Non-Grip	
3AR	107	All Thread Rod	
3BR	106	Composite Eye Rod	
3DE	106	Double Eye Rod (Unwelded)	
3DEW	106	Double Eye Rod (Welded)	
3ER	106	Eye Rod (Unwelded)	

Fig.	Page	Description	Pictorial
3ERW	106	Eye Rod (Welded)	
3FR	106	Forged Eye Rod	
3J	107	J Bolt	
3LE	107	Linked Eye Rod (Unwelded)	
3LEW	107	Linked Eye Rod (Welded)	
3R	107	Tie Rod	
4B	108	Weldless Bow Nut	

Ancillary Equipment – Pictorial Index Page 2

Fig.	Page	Description	Pictorial
4RC	107	Rod Coupling	
4SC	108	Clevis	
4T	108	Turnbuckle	
4TF	108	Forged Turnbuckle	
6AP	109	Adjustable Pipe Support	
9WL	105	Welding Lug	

Fig.	Page	Description	Pictorial
12H	90	2 Bolt Pipe Clamp (Heavy)	
12L	90	2 Bolt Pipe Clamp (Light)	
13H	93	3 Bolt Pipe Clamp (Heavy)	
13L	93	3 Bolt Pipe Clamp (Light)	
14BL	92	Extended Pipe Clamp (Bent Legs)	
14SL	92	Extended Pipe Clamp (Straight Legs)	
15BL	92	Multiple Pipe Clamp (Bent Legs)	

Ancillary Equipment – Pictorial Index Page 3

Fig.	Page	Description	Pictorial
15NL	92	Multiple Pipe Clamp (No Legs)	
15SL	92	Multiple Pipe Clamp (Straight Legs)	
16A	98	Saddle Anchor	
16S	98	Saddle Guide	
17B	104	Beam Clamp	
18B	104	Beam Clamp	
19B	104	Beam Clamp	

Fig.	Page	Description	Pictorial
20H	93	Alloy Steel 3 Bolt Pipe Clamp (Heavy)	
20L	93	Alloy Steel 3 Bolt Pipe Clamp (Light)	
51H	91	2 Bolt Pipe Clamp (Heavy) BS3974	
51L	91	2 Bolt Pipe Clamp (Light) BS3974	
57H	94	3 Bolt Pipe Clamp (Heavy) BS3974	
57L	94	3 Bolt Pipe Clamp (Light) BS3974	
58H	94/95	3 Bolt Pipe Clamp (Heavy) BS3974	

Ancillary Equipment – Pictorial Index Page 4

Fig.	Page	Description	Pictorial
58L	94/95	3 Bolt Pipe Clamp (Light) BS3974	
59	94/95	Alloy Steel 3 Bolt Pipe Clamp BS3974	
67	89	U-Bolt Non Grip (Steel Pipes) BS3974	
68	89	U-Bolt Non Grip (Cast Iron Pipes) BS3974	
69	89	U-Bolt Gripping (Steel Pipes) BS3974	
70	89	U-Bolt Gripping (Cast Iron Pipes) BS3974	
71	98	Overstrap BS3974	

Fig.	Page	Description	Pictorial
120B	104	Beam Clamp	
121	105	Bolted Beam Attachment	
122	103	Band Clamp	
123	103	Band Clamp	
124	103	Clevis Hanger	
125	115	Adjustable Beam Attachment	
126	115	Adjustable Beam Attachment (Off Centre)	

Ancillary Equipment – Pictorial Index Page 5

Fig.	Page	Description	Pictorial
127	114	Yoke Pipe Clamp Moderate	
128	114	Yoke Pipe Clamp Heavy	
129	116	Fabricated Trapeze Support	
130	116	Trapeze Beam	
131	115	Trapeze Beam	
300	96/97	4 Bolt Riser Clamp	
301	96/97	6 Bolt Riser Clamp	

Fig.	Page	Description	Pictorial
302	96/97	10 Bolt Riser Clamp	
500	110	Cast Pipe Roller	
501	110	Pipe Roller (Heavy Duty)	
510	110	Roller Support	
520	111	Roller Chair	
530	111	Adjustable Roller Chair	
540	112	Roller Chair & Guide Strap	

Ancillary Equipment – Pictorial Index Page 6

Fig.	Page	Description	Pictorial
550	112	Roller Support (Heavy Duty)	
560	113	Roller Hanging Cage	
580	112	Roller Chair	
610	117	Steel Wall Bracket	
620	117	Steel Wall Bracket	
630	117	Medium Welded Steel Wall Bracket	
640	118	Heavy Welded Steel Wall Bracket	

Fig.	Page	Description	Pictorial
645	99	Sliding Support (Welded)	
646	99	Sliding Support With Guides (Welded)	
650	100	Clamped Pipe Shoe (Up to 150NB)	
660	100	Clamped Pipe Shoe (Over 150NB)	
660 I	101	Clamped Pipe Shoe (For Insulation up to 200mm)	
660 SI	101	Pipe Saddle (For Insulation up to 200mm)	
670	102	Sliding Pipe Shoe	

Ancillary Equipment – Pictorial Index Page 7

Fig.	Pg	Description	Pictorial
680	102	Sliding Pipe Shoe	
690	119	Elbow Hanger	
700MR	113	Pipe Ring	
700	119	Rigid/Sliding Base Support	
701	119	Rigid/Sliding Base Support	
702	119	Base Anchor	
703	118	Pipe Chair	

Fig.	Pg	Description	Pictorial
710MR	113	Pipe Ring Plate	
720MR	113	Extended Pipe Ring	
800N	105	Welded Beam Attachment	
800U	105	Welded Beam Attachment	
805	118	Steel Square Plate	
810C	109	Hemispherical Cup	
810RW	109	Hemispherical Washer	

Ancillary Equipment – Fig. 2G & Fig. 2NG

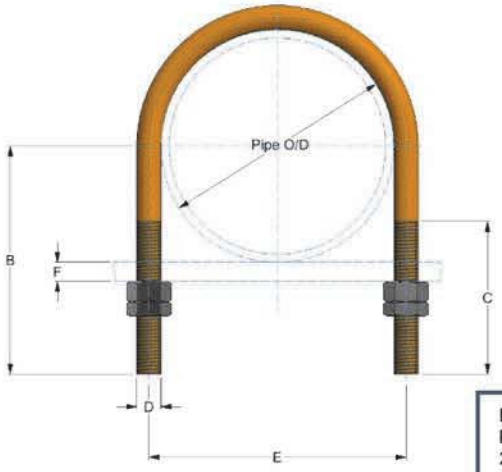


Fig. 2G
Material: Carbon Steel
2 x Full Nuts
2 x Locknuts

Please Specify:-
- Figure Number:
- Nominal Pipe Size:

Fig. 2G – Gripping U-Bolt

NPS	Pipe O/D	B	C	D	E	F	Max Load Kg
15	21.3	37	25	6	28	7	220
20	26.9	40	25	6	33	10	220
25	33.7	43	25	6	40	10	220
32	42.4	49	35	10	53	10	545
40	48.3	56	35	10	60	16	545
50	60.3	60	35	10	71	16	545
65	76.1	78	40	12	89	20	1000
80	88.9	85	40	12	102	20	1000
90	101.6	90	40	12	116	20	1000
100	114.3	97	40	12	128	20	1000
125	139.7	110	40	12	152	20	1000
150	168.3	125	40	12	182	20	1000
200	219.1	154	40	16	236	20	1635
225	244.5	173	50	20	266	20	3405
250	273	185	50	20	294	22	3405
300	323.9	210	50	20	346	22	3405
350	355.6	230	55	20	378	24	3405
400	406.4	255	55	20	429	24	3405
450	457	280	55	24	483	24	4450
500	508	305	60	24	534	24	4450
550	559	335	60	24	585	24	4450
600	610	360	60	24	636	24	4450

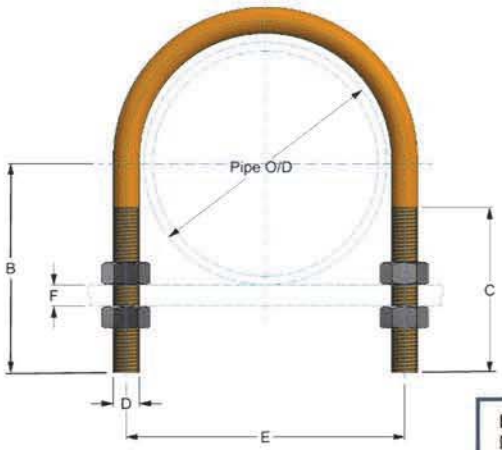


Fig. 2NG
Material: Carbon Steel
4 x Full Nuts

Please Specify:-
- Figure Number:
- Nominal Pipe Size:

Fig. 2NG – Non-Grip U-Bolt

NPS	Pipe O/D	B	C	D	E	F	Max Load Kg
15	21.3	65	60	6	30	10	220
20	26.9	68	60	6	35	10	220
25	33.7	70	65	6	42	10	220
32	42.4	74	65	10	54	10	545
40	48.3	78	65	10	62	16	545
50	60.3	84	65	10	74	16	545
65	76.1	92	80	12	90	20	1000
80	88.9	100	80	12	106	20	1000
90	101.6	109	80	12	116	20	1000
100	114.3	114	80	12	128	20	1000
125	139.7	129	80	12	155	20	1000
150	168.3	154	100	16	189	20	1635
200	219.1	176	100	16	238	20	1635
225	244.5	187	110	20	268	20	3405
250	273	213	110	20	296	22	3405
300	323.9	246	110	20	348	22	3405
350	355.6	260	110	20	380	24	3405
400	406.4	285	110	20	431	24	3405
450	457	320	120	24	484	24	4450
500	508	345	120	24	536	24	4450
550	559	373	120	24	586	24	4450
600	610	400	120	24	638	24	4450

Fig. 2G

Fig. 2NG

Ancillary Equipment – Fig. 67, 68, 69 & 70 (BS3974)

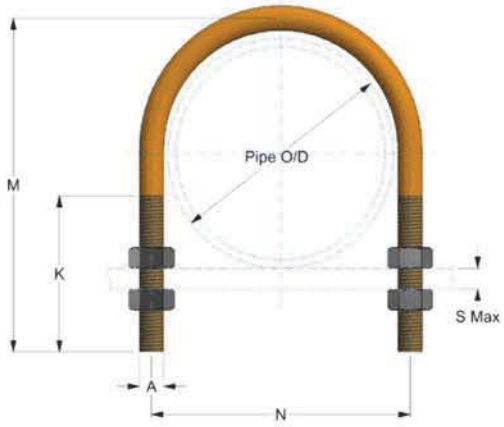


Fig. 67 – Non-Grip U-Bolt (Steel Pipes)

NPS	Pipe O/D	A	K	M	N	S (Max)
15	21.3	8	25	45	40	10
20	26.9	8	30	55	45	10
25	33.7	8	30	60	50	10
32	42.4	8	30	70	60	10
40	48.3	10	40	85	65	16
50	60.3	10	40	100	80	16
65	76.1	12	50	120	95	19
80	88.9	16	55	140	110	19
100	114.3	16	55	165	140	19
125	139.7	16	55	190	165	19
150	168.3	20	65	225	195	19
175	193.7	20	65	250	220	19
200	219.1	20	65	275	250	19
225	244.5	20	65	300	275	19
250	273	20	75	335	305	22
300	323.9	20	75	385	355	22
350	355.6	24	80	425	390	22
400	406.4	24	80	475	440	22
450	457	24	80	525	495	22
500	508	24	80	575	545	22
550	559	24	80	625	595	22
600	610	24	80	675	645	22

Fig. 68 – Non-Grip U-Bolt (Cast Iron Pipes)

NPS	Pipe O/D	A	K	M	N	S (Max)
80	98	16	55	150	120	19
*100	118	16	55	165	140	19
*150	170	20	65	225	195	19
*200	222	20	65	275	250	19
*250	274	20	75	335	305	22
*300	326	20	75	385	355	22
350	378	24	80	450	410	22
400	429	24	80	500	465	22
450	480	24	80	550	520	22
500	532	24	80	600	570	22
600	635	24	80	700	670	22
*These U-Bolts are identical to Fig. 67						

Fig. 67 & 68
Material: Carbon Steel
4 x Full Nuts

Please Specify:-
- Figure Number:
- Nominal Pipe Size:

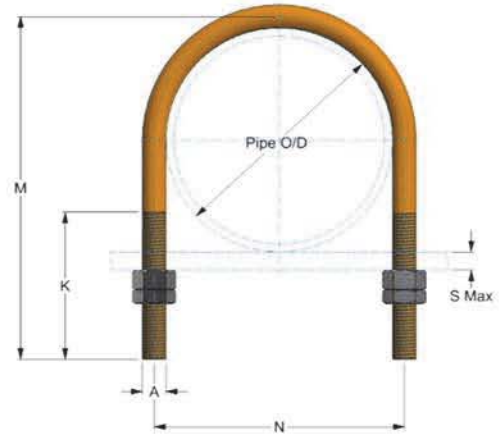


Fig. 69 – Gripping U-Bolt (Steel Pipes)

NPS	Pipe O/D	A	K	M	N	S (Max)
15	21.3	8	25	50	30	7
20	26.9	8	25	60	35	10
25	33.7	8	25	65	45	10
32	42.4	8	25	75	55	10
40	48.3	10	35	90	60	16
50	60.3	10	35	100	75	16
65	76.1	12	45	130	90	19
80	88.9	15	50	150	105	19
100	114.3	16	50	175	135	19
125	139.7	16	50	200	160	19
150	168.3	20	55	235	190	19
175	193.7	20	55	260	215	19
200	219.1	20	55	295	245	19
225	244.5	20	55	310	270	19
250	273	20	60	350	300	22
300	323.9	20	60	400	350	22
350	355.6	24	65	440	385	22
400	406.4	24	65	500	435	22
450	457	24	70	540	485	22
500	508	24	70	600	540	22
550	559	24	70	650	590	22
600	610	24	70	700	640	22

Fig. 70 – Gripping U-Bolt (Cast Iron Pipes)

NPS	Pipe O/D	A	K	M	N	S (Max)
80	98	16	50	160	115	19
*100	118	16	50	175	135	19
*150	170	20	55	235	190	19
*200	222	20	55	295	245	19
*250	274	20	60	350	300	22
*300	326	20	60	400	350	22
350	378	24	65	460	405	22
400	429	24	65	520	455	22
450	480	24	70	560	505	22
500	532	24	70	620	560	22
600	635	24	70	720	660	22
*These U-Bolts are identical to Fig. 69						

Fig. 69 & 70
Material: Carbon Steel
2 x Full Nuts
2 x Locknuts

Please Specify:-
- Figure Number:
- Nominal Pipe Size:

Fig. 67/68

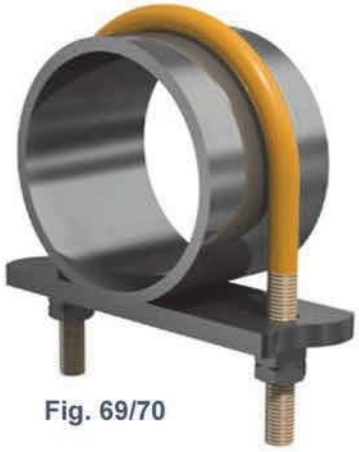


Fig. 69/70

Ancillary Equipment – Fig. 12L & Fig. 12H

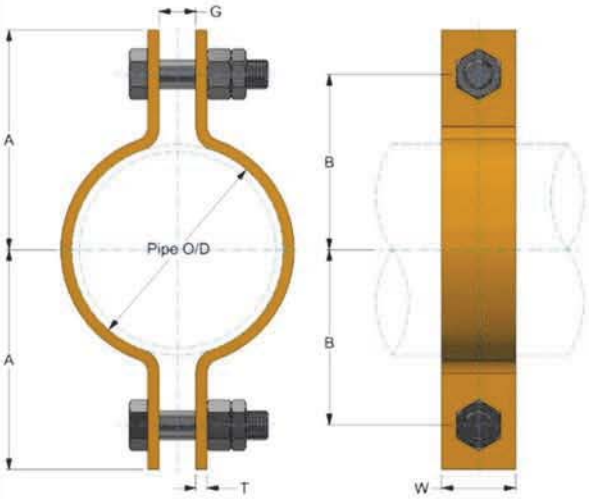


Fig. 12L – 2 Bolt Pipe Clamp (Light Series)								
NPS	Pipe O/D	Clip I/D	A	B	Bolt	G	W x T	Max load Kg 400°C
15	21.3	23	51	32	M10	12	25x3	225
20	26.9	28	51	32	M10	12	25x3	225
25	33.7	36	57	38	M10	12	25x3	225
32	42.4	44	63	44	M10	12	25x3	225
40	48.3	50	70	51	M10	12	30x6	365
50	60.3	62	76	57	M12	16	30x6	455
65	76.1	80	89	70	M12	16	30x6	455
80	88.9	92	96	76	M12	16	30x6	455
90	101.6	106	102	83	M12	16	30x6	455
100	114.3	118	119	95	M16	20	40x6	455
125	139.7	144	138	114	M16	20	40x6	455
150	168.3	172	157	127	M20	24	40x10	725
175	193.7	198	176	146	M20	24	40x10	725
200	219.1	224	189	159	M20	24	40x10	725
225	244.5	248	208	178	M20	24	40x10	725
250	273	278	226	190	M24	27	50x12	1090
300	323.9	330	252	216	M24	27	50x12	1090
350	355.6	362	271	235	M24	27	65x12	1090
400	406.4	412	296	260	M24	27	65x12	1090
450	457	464	334	298	M24	27	65x15	1360
500	508	516	360	324	M24	27	65x15	1360
550	558.8	566	402	357	M30	34	80x15	1360
600	610	618	432	387	M30	34	80x15	1360

Fig. 12H – 2 Bolt Pipe Clamp (Heavy Series)								
NPS	Pipe O/D	Clip I/D	A	B	Bolt	G	W x T	Max load Kg 400°C
40	48.3	50	70	50	M12	16	40x6	500
50	60.3	62	85	58	M12	16	40x6	500
65	76.1	80	96	70	M16	20	40x6	500
80	88.9	92	115	85	M20	24	40x6	1500
90	101.6	106	120	90	M20	24	40x6	1500
100	114.3	118	132	96	M24	27	50x10	1590
125	139.7	144	151	115	M24	27	50x10	1590
150	168.3	172	171	135	M24	27	65x12	2180
175	193.7	198	181	145	M24	27	65x12	2180
200	219.1	224	196	160	M24	27	65x12	2180
225	244.5	248	216	180	M24	27	65x12	2180
250	273	278	245	200	M30	34	65x15	2720
300	323.9	330	280	235	M30	34	80x20	3900
350	355.6	362	309	255	M36	40	90x20	4130
400	406.4	412	334	280	M36	40	90x20	4130
450	457	464	359	305	M36	40	90x20	4130
500	508	516	384	330	M36	40	90x20	4130
550	558.8	566	424	370	M36	40	90x20	4130
600	610	618	449	395	M36	40	90x20	4130
650	660.4	670	494	440	M36	40	110x25	4750
700	711.2	721	520	466	M36	40	110x25	4750
750	762	773	546	492	M36	40	110x25	4750
800	812.8	824	572	518	M36	40	110x25	4750

Fig. 12L & 12H
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 51L & Fig. 51H (BS 3974)

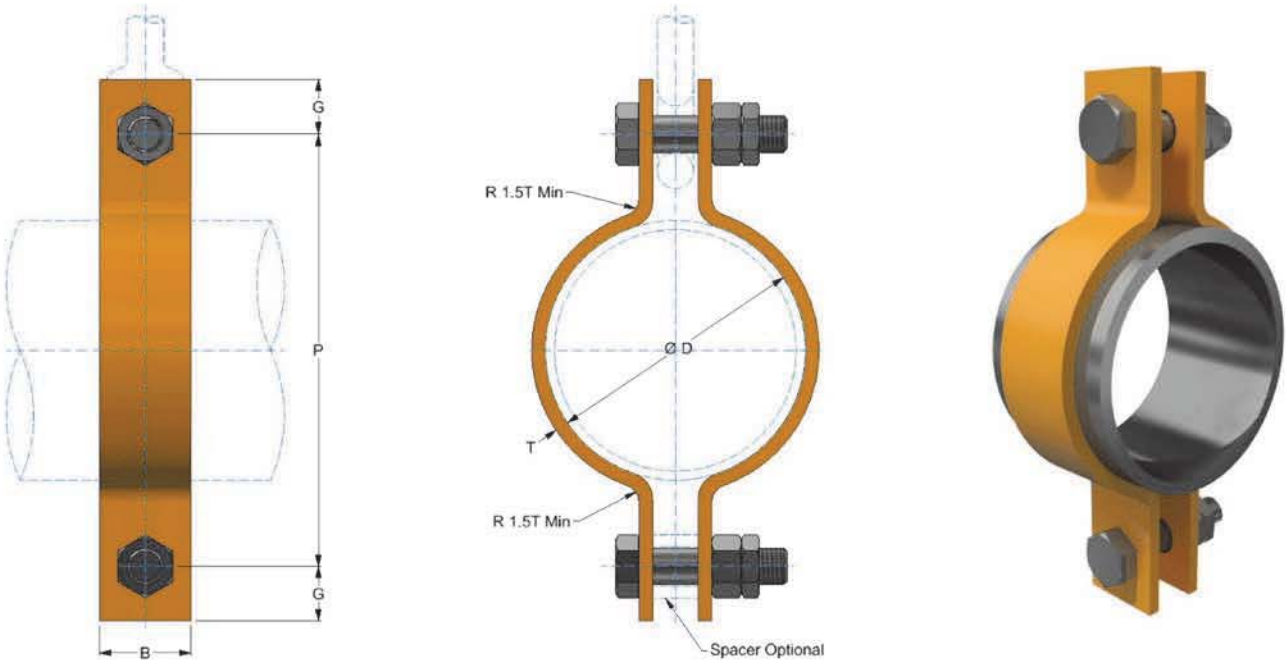


Fig.51 Dimensions of pipe clamps are for steel pipes (Range A: -20°C to 100°C

Pipe		Fig.51L - 2 Bolt Pipe Clamp (Light)								Fig.51H - 2 Bolt Pipe Clamp (Heavy)							
NPS	Pipe O/D	Sling Rod Ø	D	B x T	P	Bolt	Hole Ø	G	SWL Kg	Sling Rod Ø	D	B x T	P	Bolt	Hole Ø	G	SWL Kg
15	21.3	Use Fig.51H Heavy Series								10	23	35x5	65	M10	12	15	280
20	26.9									10	28	35x5	70	M10	12	15	280
25	33.7									10	36	35x5	75	M10	12	15	280
32	42.4									12	44	35x5	90	M12	15	18	280
40	48.3									12	50	35x5	95	M12	15	18	280
50	60.3									12	62	35x5	105	M12	15	18	280
65	76.1	12	80	35x5	125	M12	15	18	165	16	80	35x8	155	M16	19	24	450
80	88.9	12	92	35x5	135	M12	15	18	165	16	92	35x8	165	M16	19	24	450
100	114.3	12	118	35x5	170	M12	15	18	165	16	118	35x8	190	M16	19	24	450
125	139.7	16	144	35x5	195	M16	19	24	280	16	144	35x8	215	M16	19	24	450
150	168.3	16	172	35x5	225	M16	19	24	280	16	172	35x8	245	M16	19	24	450
175	193.7	16	198	35x8	270	M16	19	24	450	16	198	45x10	280	M16	19	24	900
200	219.1	16	224	35x8	295	M16	19	24	450	16	224	45x10	305	M16	19	24	900
225	244.5	16	248	35x8	320	M16	19	24	450	20	248	60x10	340	M20	24	30	1350
250	273	16	278	35x8	350	M16	19	24	450	20	278	60x10	365	M20	24	30	1350
300	323.9	20	330	45x10	420	M20	24	30	900	24	330	60x15	455	M24	28	36	1800
350	355.6	24	362	60x10	460	M24	28	36	900	30	362	60x15	500	M30	35	45	2250
400	406.4	24	412	60x15	535	M24	28	36	1350	30	412	65x20	575	M30	35	45	2700
450	457	30	464	65x20	625	M30	35	45	2250	36	464	80x20	635	M36	42	54	3600
500	508	30	516	65x20	675	M30	35	45	2250	36	516	90x25	715	M36	42	54	4500
550	559	30	566	65x20	725	M30	35	45	2250	36	566	90x25	765	M36	42	54	4500
600	610	30	618	80x20	780	M30	35	45	2700	42	618	110x25	830	M42	48	63	5900
650	660	30	665	80x20	830	M30	35	45	1400	42	665	110x25	870	M42	48	63	5700
700	711	30	716	80x20	880	M30	35	45	1300	42	716	100x30	950	M42	48	63	6800
750	762	30	765	80x20	930	M30	35	45	1200	42	765	100x30	1000	M42	48	63	6500
800	813	30	816	90x25	1020	M30	35	45	2000	42	816	100x35	1080	M42	48	63	8200
850	864	30	868	90x25	1070	M30	35	45	1900	42	868	100x35	1130	M42	48	63	8000
900	914	30	918	90x25	1120	M30	35	45	1800	42	918	120x35	1180	M42	48	63	9200
1000	1016	36	1020	100x30	1250	M36	42	54	2600	42	1020	100x40	1300	M42	48	63	9400

Fig. 51L & 51H
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 14BL, 14SL, 15BL, 15SL & 15NL

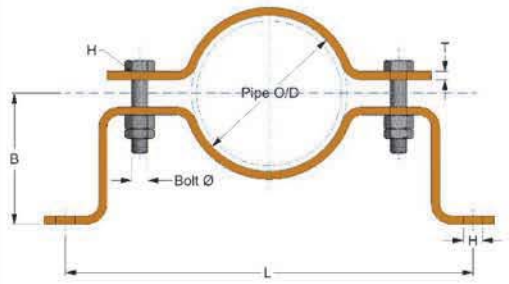


Fig. 14BL – Extended Pipe Clamp							
NPS	Pipe O/D	Clamp I/D	B	Bolt Ø	H	L	Steel Size
20	26.9	28	65	M10	12	185	25x6
25	33.7	36	65	M10	12	190	30x6
32	42.4	44	70	M10	12	200	30x6
40	48.3	50	75	M10	12	210	30x6
50	60.3	62	80	M12	14	230	40x6
65	76.1	80	85	M12	14	265	40x6
80	88.9	92	95	M12	14	280	40x6
90	101.6	106	100	M12	14	295	40x6
100	114.3	118	105	M12	14	315	40x6
125	139.7	144	120	M12	14	350	40x6
150	168.3	172	135	M16	18	420	50x10
200	219.1	224	160	M16	18	475	50x10

Fig. 14BL
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Non Standard (B):
- Finish:

Standard clearance of 50mm from back of pipe to wall or floor.

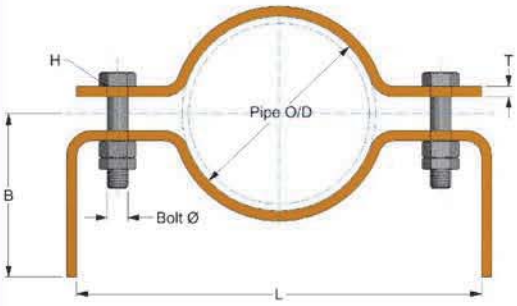
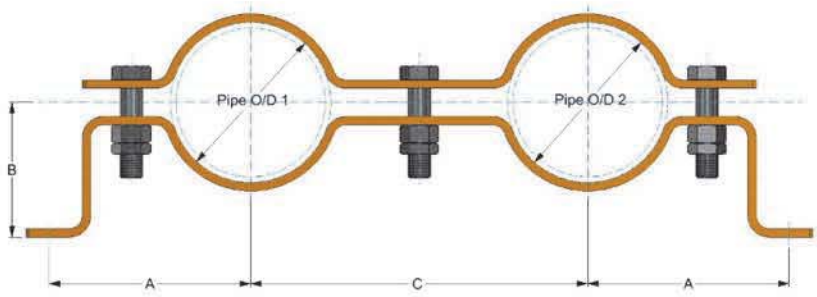


Fig. 14SL – Extended Pipe Clamp							
NPS	Pipe O/D	Clamp I/D	B	Bolt Ø	H	L	Steel Size
20	26.9	28	65	M10	12	115	25x6
25	33.7	36	65	M10	12	125	30x6
32	42.4	44	70	M10	12	130	30x6
40	48.3	50	75	M10	12	135	30x6
50	60.3	62	80	M12	14	158	40x6
65	76.1	80	85	M12	14	190	40x6
80	88.9	92	95	M12	14	206	40x6
90	101.6	106	100	M12	14	219	40x6
100	114.3	118	105	M12	14	241	40x6
125	139.7	144	120	M12	14	273	40x6
150	168.3	172	135	M16	18	330	50x10
200	219.1	224	160	M16	18	380	50x10

Fig. 14SL
Material: Carbon Steel

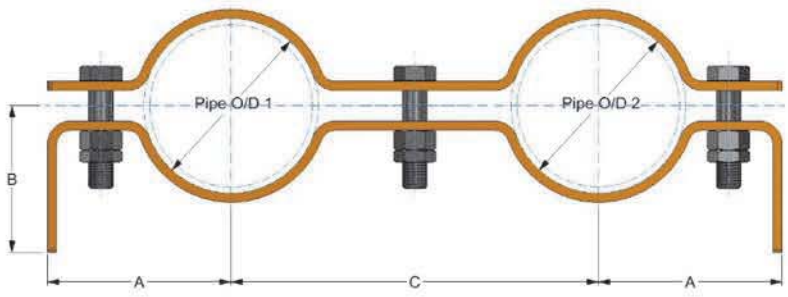
Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Non Standard (B):
- Finish:



One bolt is supplied between centres of clamps. When centres are extended two bolts are required.

Fig. 15BL
Material: Carbon Steel

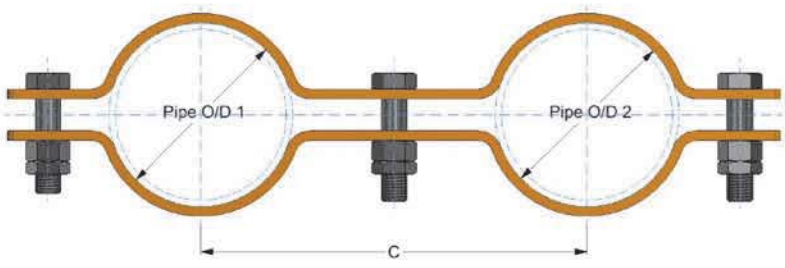
Please Specify:-
- Figure Number:
- Pipe O/D 1 & 2:
- Dimension C:
- Length (A):
- Height (B):
- Finish:



One bolt is supplied between centres of clamps. When centres are extended two bolts are required.

Fig. 15SL
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Pipe O/D 1 & 2:
- Dimension C:
- Length (A):
- Height (B):
- Finish:



One bolt is supplied between centres of clamps. When centres are extended two bolts are required.

Fig. 15NL
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Pipe O/D 1 & 2:
- Dimension C:
- Finish:

Ancillary Equipment – Fig. 13L & 13H (Carbon Steel up to 400°C) and 20L & 20H (Alloy Steel 400°C to 570°C)

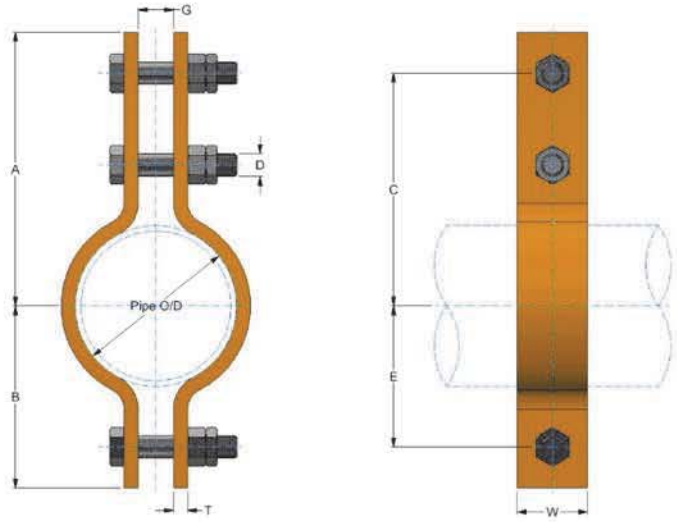


Fig. 13H & 20H – 3 Bolt Pipe Clamp (Heavy Series)

NPS	Pipe O/D	A	B	D	C	E	G	W x T
150	168.3	279	193	M30	229	143	44	100x12
175	193.7	291	208	M30	241	158	44	110x12
200	219.1	305	223	M30	254	172	44	110x12
225	244.5	359	258	M36	305	198	51	100x20
250	273	359	268	M36	305	214	51	100x20
300	323.9	384	294	M36	330	240	51	100x20
350	355.6	419	325	M42	356	262	57	110x20
400	406.4	444	355	M42	381	292	57	110x25
450	457	469	380	M42	406	317	57	110x25
500	508	521	417	M42	457	353	57	130x25
550	558.8	559	469	M42	483	393	57	150x30
600	610	584	494	M42	508	418	57	150x30
650	660.4	657	519	M42	581	443	57	150x30
700	711.2	686	548	M42	610	472	57	150x30
750	762	711	573	M42	635	497	57	150x30
800	812.8	737	601	M42	661	525	57	150x30
900	914.4	787	651	M42	711	575	57	150x30

Fig. 13L & 20L – 3 Bolt Pipe Clamp (Light Series)

NPS	Pipe O/D	A	B	D	C	E	G	W x T
15	21.3	110	50	M12	92	32	12	30x6
20	26.9	113	56	M12	95	38	12	30x6
25	33.7	115	62	M12	97	44	12	30x6
32	42.4	120	64	M12	102	46	12	30x6
40	48.3	120	68	M12	102	49	25	30x6
50	60.3	149	76	M12	127	54	25	30x6
65	76.1	162	89	M12	140	67	25	45x8
80	88.9	175	99	M12	152	76	25	45x8
90	101.6	181	104	M12	159	82	25	45x8
100	114.3	194	129	M16	165	100	25	50x10
125	139.7	206	142	M16	178	114	25	50x10
150	168.3	254	173	M20	216	135	38	65x10
175	193.7	268	188	M20	230	150	38	65x10
200	219.1	279	201	M20	241	163	38	65x10
225	244.5	303	218	M20	265	180	38	65x12
250	273	317	230	M20	279	192	38	65x12
300	323.9	343	258	M20	305	220	38	65x12
350	355.6	378	291	M24	330	243	51	80x15
400	406.4	403	320	M24	356	273	51	80x15
450	457.2	429	348	M24	381	300	51	80x15
500	508	457	380	M24	406	329	51	80x20
550	558.8	489	422	M24	432	365	51	100x20
600	610	514	447	M24	457	390	51	100x20
650	660.4	622	494	M30	559	431	51	130x25
700	711.2	648	520	M30	585	457	51	130x25
750	762	673	545	M30	610	482	51	130x25
800	812.8	710	571	M30	647	508	51	130x25
900	914.4	762	623	M30	699	560	51	130x25

Fig.13L & 13H up to 400°C

SWL Kg			Material: Carbon Steel				Material: Alloy Steel					
Temperature			340°C		400°C		510°C		538°C		566°C	
NPS	Pipe O/D	Clip I/D	Figure No				Figure No					
			13L	13H	13L	13H	20L	20H	20L	20H	20L	20H
15	21.3	23	250		250		210		210		210	
20	26.9	28	250		250		210		210		210	
25	33.7	36	250		250		210		210		210	
32	42.4	44	250		250		210		210		210	
40	48.3	50	680		635		635		455		315	
50	60.3	62	680		635		635		455		315	
65	76.1	80	680		635		635		455		315	
80	88.9	92	680		635		635		455		315	
90	101.6	106	680		635		635		455		315	
100	114.3	118	1135		1000		1045		725		500	
125	139.7	144	1135		1000		1045		725		500	
150	168.3	172	1270	3630	1135	3220	1180	3310	815	2360	590	1680
175	193.7	198	1270	3630	1135	3220	1180	3310	815	2360	590	1680
200	219.1	224	1270	3630	1135	3220	1180	3310	815	2360	590	1680
225	244.5	248	1450	4990	1315	4445	1360	4535	950	3265	680	2270
250	273	278	1450	4990	1315	4445	1360	4535	950	3265	680	2270
300	323.9	330	1450	4990	1315	4445	1360	4535	950	3265	680	2270
350	355.6	362	1950	5760	1725	5125	1770	5260	1270	3765	910	2270
400	406.4	412	1950	5760	1725	5125	1770	5260	1270	3765	910	2270
450	457	464	1950	5760	1725	5125	1770	5260	1270	3765	910	2270
500	508	516	2495	6805	2220	6805	2270	6185	1450	4810	1135	3400
550	558.8	566	2720	6805	2405	6805	2495	6185	1590	5900	1225	4080
600	610	618	2720	6805	2405	6805	2495	6185	1590	5900	1225	4080
650	660.4	670	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
700	711.2	721	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
750	762	773	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
800	812.8	824	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
900	914.4	926	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080

Fig. 13L, 13H, 20L & 20H
Material: 13L/H Carbon Steel
Material: 20L/H Alloy Steel

Please Specify:-

- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 57L/H, Fig. 58L/H & Fig. 59 (BS 3974)

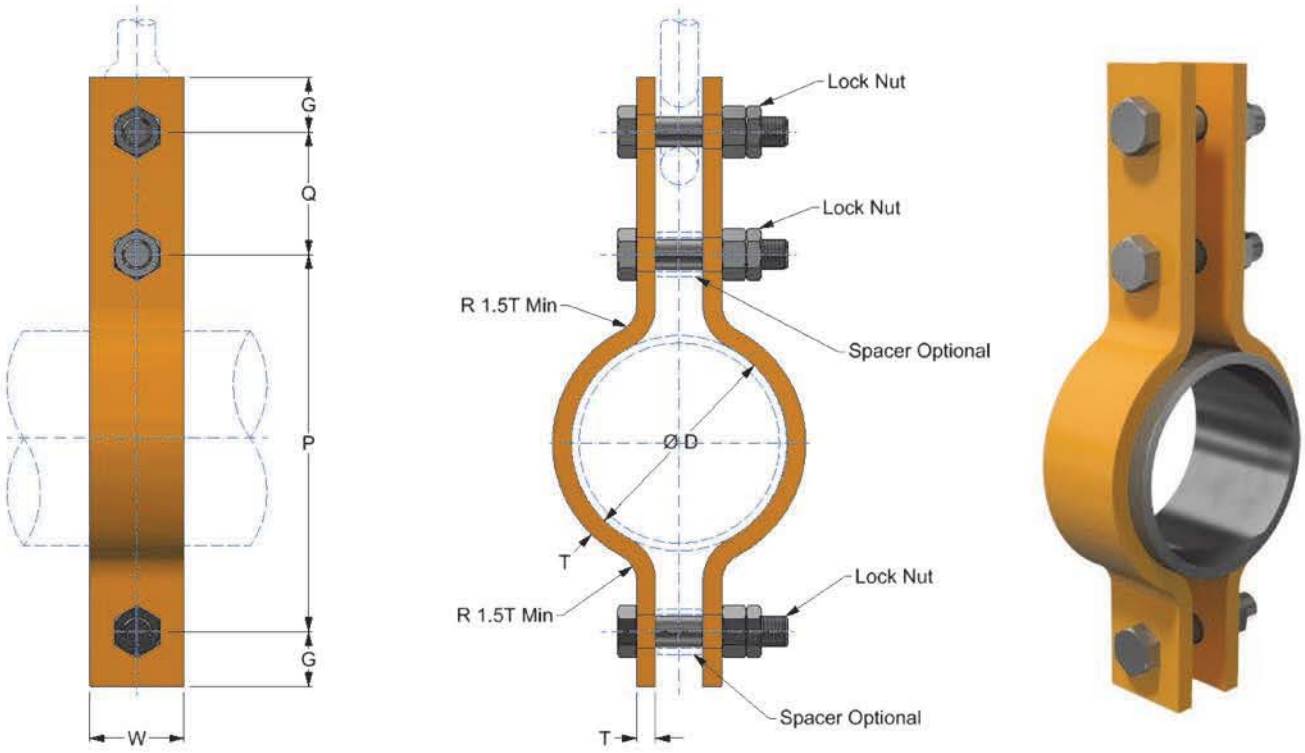


Fig.57 Dimensions of pipe clamps are for steel pipes (Range B: -20°C to 400°C)

Pipe		Fig.57L - 3 Bolt Pipe Clamp (Light)									Fig.57H - 3 Bolt Pipe Clamp (Heavy)								
NPS	Pipe O/D	Bolt	Hole Ø	D	G	P	Q	Sling Rod Ø	W x T	SWL Kg	Bolt	Hole Ø	D	G	P	Q	Sling Rod Ø	W x T	SWL Kg
15	21.3	Use Heavy Series									M10	12	23	15	65	70	10	35x5	280
20	26.9										M10	12	28	15	70	70	10	35x5	280
25	33.7										M10	12	36	15	75	70	10	35x5	280
32	42.4										M12	15	44	18	90	70	12	35x5	280
40	48.3										M12	15	50	18	95	85	12	35x5	280
50	60.3										M12	15	62	18	105	80	12	35x5	280
65	76.1	M12	15	80	18	125	105	12	35x5	165	M16	19	80	24	155	90	16	35x8	450
80	88.9	M12	15	92	18	135	105	12	35x5	165	M16	19	92	24	165	95	16	35x8	450
100	114.3	M12	15	118	18	170	105	12	35x5	165	M16	19	118	24	190	95	16	35x8	450
125	139.7	M16	19	144	24	215	95	16	35x8	280	M16	19	144	24	215	95	16	35x8	450
150	168.3	M16	19	172	24	245	95	16	35x8	280	M16	19	172	24	245	95	16	35x8	450
175	193.7	M16	19	198	24	270	95	16	35x8	280	M20	24	198	30	288	85	20	45x10	900
200	219.1	M16	19	224	24	295	100	16	35x8	280	M20	24	224	30	315	95	20	45x10	900
225	244.5	M16	19	248	24	330	95	16	45x10	450	M20	24	248	30	365	85	20	60x15	1350
250	273	M16	19	278	24	360	105	16	45x10	450	M20	24	278	30	390	90	20	60x15	1350
300	323.9	M20	24	330	30	445	115	20	60x15	900	M24	28	330	36	475	115	24	65x20	1800
350	355.6	M24	28	362	36	485	115	24	60x15	900	M30	35	362	45	525	115	30	65x20	2250
400	406.4	M24	28	412	36	560	115	24	65x20	1350	M30	35	412	45	600	115	30	90x25	2700
450	457	M30	35	464	45	625	115	30	65x20	1800	M36	42	464	54	660	115	36	90x25	3600
500	508	M30	35	516	45	700	115	30	90x25	2700	M36	42	516	54	740	115	36	100x30	4500
550	559	M30	35	566	45	750	115	30	90x25	2700	M36	42	566	54	790	115	36	100x30	4500
600	610	M30	35	618	45	805	115	30	90x25	2700	M42	48	618	63	880	115	42	100x35	5900

Fig. 57L & 57H
Material: High Temp. Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 58L, 58H & 59 (BS 3974)

Fig.58 Dimensions of pipe clamps are for steel pipes (Range C: 400°C to 470°C)

Pipe		Fig.58L - 3 Bolt Pipe Clamp (Light)									Fig.58H - 3 Bolt Pipe Clamp (Heavy)								
NPS	Pipe O/D	Bolt	Hole Ø	D	G	P	Q	Sling Rod Ø	W x T	SWL Kg	Bolt	Hole Ø	D	G	P	Q	Sling Rod Ø	W x T	SWL Kg
15	21.3	Use Heavy Series									M10	12	23	15	65	70	10	35x5	280
20	26.9										M10	12	28	15	70	70	10	35x5	280
25	33.7	M10	12	36	15	75	70	10	35x5	90	M10	12	36	15	95	60	10	35x8	280
32	42.4	M12	15	44	15	90	70	12	35x5	90	M12	15	44	18	110	60	12	35x8	280
40	48.3	M12	15	50	15	95	85	12	35x5	90	M12	15	50	18	115	75	12	35x8	280
50	60.3	M12	15	62	15	105	80	12	35x5	90	M12	15	62	18	125	70	12	35x8	280
65	76.1	M12	15	80	18	145	95	12	35x8	165	M16	19	80	24	155	90	16	35x8	450
80	88.9	M12	15	92	18	155	95	12	35x8	165	M16	19	92	24	165	95	16	35x8	450
100	114.3	M12	15	118	18	190	95	12	35x8	165	M16	19	118	24	200	90	16	45x10	450
125	139.7	M16	19	144	24	225	90	16	45x10	280	M16	19	144	24	225	90	16	45x10	450
150	168.3	M16	19	172	24	255	90	16	45x10	280	M16	19	172	24	255	90	16	45x10	450
175	193.7	M16	19	198	24	280	90	16	45x10	280	M20	24	198	30	315	75	20	60x15	900
200	219.1	M16	19	224	24	305	100	16	45x10	280	M20	24	224	30	340	80	20	60x15	900
225	244.5	M16	19	248	24	350	85	16	60x15	450	M20	24	248	30	390	70	20	65x20	1350
250	273	M16	19	278	24	385	95	16	60x15	450	M20	24	278	30	415	80	20	65x20	1350
300	323.9	M20	24	330	30	470	115	20	65x20	900	M24	28	330	36	505	115	24	90x25	1800
350	355.6	M24	28	362	36	510	115	24	65x20	900	M30	35	362	45	550	115	30	110x25	2250
400	406.4	M24	28	412	36	585	115	24	90x25	1350	M30	35	412	45	625	115	30	120x30	2700
450	457	M30	35	464	45	650	115	30	110x25	1800	M36	42	464	54	710	115	36	120x35	3600
500	508	M30	35	516	45	725	115	30	120x30	2250	M36	42	516	54	815	115	36	110x45	4500
550	559	M30	35	566	45	775	115	30	120x30	2250	M36	42	566	54	865	115	36	110x45	4500
600	610	M30	35	618	45	855	115	30	120x35	2700	M42	48	618	63	955	115	42	130x50	5900

Fig.59 Dimensions of pipe clamps are for alloy steel pipes (Range D: 20°C to 570°C)

Pipe		Fig.59 - 3 Bolt Pipe Clamp										
NPS	Pipe O/D	Bolt	Hole Ø	D	G	P	Q	Sling Rod Ø	W x T Sub Ranges		SWL Kg	
									D1	D2 & D3	D1 & D2	D3
15	21.3	M12	15	23	18	85	65	12	40x6	60x6	450	375
20	26.9	M12	15	28	18	90	65	12	40x6	60x6	450	375
25	33.7	M12	15	36	18	105	65	12	40x6	60x6	450	375
32	42.4	M12	15	44	18	105	65	12	40x6	60x6	450	375
40	48.3	M16	19	50	24	115	75	16	50x10	60x10	900	750
50	60.3	M16	19	62	24	130	75	16	50x10	60x10	900	750
65	76.1	M16	19	80	24	155	75	16	50x10	60x10	900	750
80	88.9	M16	19	92	24	165	100	16	50x10	60x10	900	750
100	114.3	M16	19	118	24	195	100	16	60x10	70x12	900	750
125	139.7	M20	24	144	30	235	100	20	70x12	80x12	1350	1130
150	168.3	M24	28	172	36	275	100	24	70x12	80x15	1800	1500
175	193.7	M24	28	198	36	325	100	24	80x12	100x20	1800	1500
200	219.1	M24	28	224	36	360	100	24	80x12	100x20	1800	1500
225	244.5	M24	28	248	36	385	100	24	110x12	100x20	1800	1500
250	273	M24	28	276	36	435	100	24	110x12	100x25	1800	1500
300	323.9	M30	35	330	45	500	115	30	100x20	120x25	2700	2260
350	355.6	M30	35	362	45	585	115	30	100x20	120x25	2700	2260
350	355.6	M42	48	362	63	585	115	42	140x25	100x40	5900	4950
400	406.4	M30	35	412	45	625	115	30	110x20	140x25	2700	2260
400	406.4	M42	48	412	63	625	115	42	140x25	130x40	5900	4950
450	457	M30	35	464	45	690	115	30	100x25	140x30	3600	3020
450	457	M42	48	464	63	690	115	42	120x30	140x40	5900	4950
500	508	M30	35	516	45	745	115	30	120x25	160x30	3600	3020
500	508	M42	48	516	63	745	115	42	130x30	160x40	5900	4950
550	559	M30	35	566	45	800	115	30	130x25	180x30	3600	3020
550	559	M42	48	566	63	800	115	42	150x30	160x40	5900	4950
600	610	M30	35	618	45	845	115	30	140x25	200x30	3600	3020
600	610	M42	48	618	63	845	115	42	160x30	200x40	5900	4950

Fig. 58L, 58H & 59
Fig. 58L/H Material: Boiler Plate
Fig. 59 Material: Range D1, D2 & D3 Alloy Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 300, 301 & 302

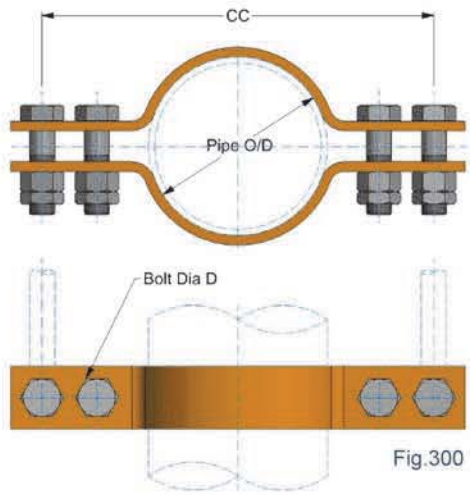


Fig.300

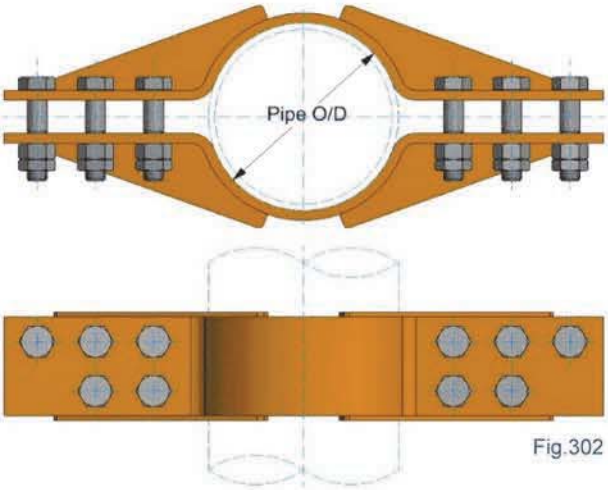


Fig.302

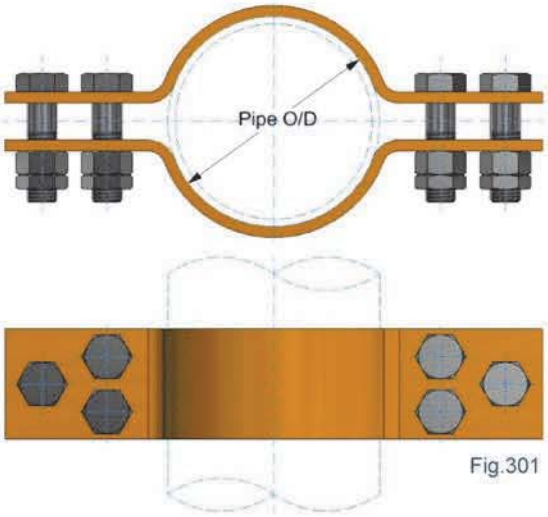


Fig.301

Stress-Temperature Correction Factors			
Design °C Temperature	Material		
	Carbon Steel	2¼ Cr-1 Mo BS 1501 PT2-622	Stainless Steel Grade 316
343	0.80	0.80	0.70
371	0.85	0.80	0.71
399	0.93	0.80	0.71
427		0.80	0.72
454		0.83	0.73
482		0.92	0.75
510		1.10	0.80
538		1.50	0.86
566		2.20	0.99
593			1.20
620			1.80
640			2.30
650			3.00

The total load to be supported must be multiplied by 2 before the stress temperature correction factor is applied. This is the total load value at which you enter the upper selection chart.

Stress Temperature Correction Factor

The selection chart on the next page is based on a maximum allowable stress in the clamp of 8.50 kg/mm^2. The table of stress temperature correction factors gives STCF for more commonly used materials.

$$\text{STFC} = \frac{8.50}{\text{S. A. Design @ Temperature}}$$

Or: corrected load = calculated load x STCF

Typical example:

- Pipe Nominal Bore = 400mm
- Load = 4545kg
- Rod Centres (C) = 1100mm
- Temperature = 510°C
- Procedure = Stock Material – Alloy Steel 2% Cr 1% Mo.
- Correction Factor from table STCF = 1.1
- Corrected Load = 9090 x 1.1 = 10,000kg.

Using Charts:

1. Enter lower chart @ rod centres = 1100mm move horizontally until sloping line 400 pipe size is intersected.
2. Project this intersection vertically upwards.
3. Enter upper chart @ load = 11000kg. Move horizontally to the right until the vertical line from (B) s intersected.
4. Read stock size of curve immediately above the (C) intersection.

Solution:
Stock Size = 250x45 (Fig. 301).
Bolt Size = M48 (Selected on uncorrected load).

Fig. 300, 301 & 302
Material: Carbon Steel

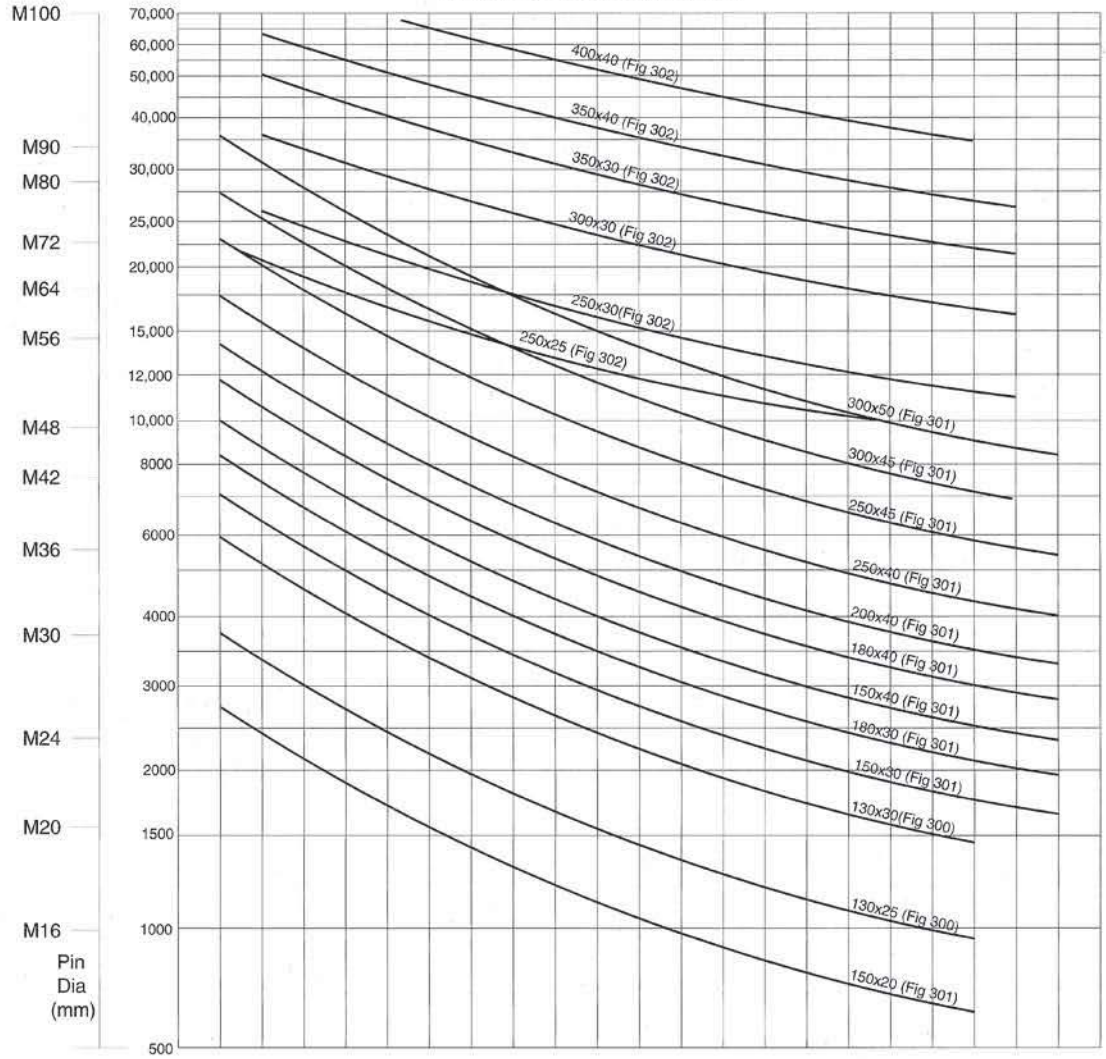
Please Specify:-

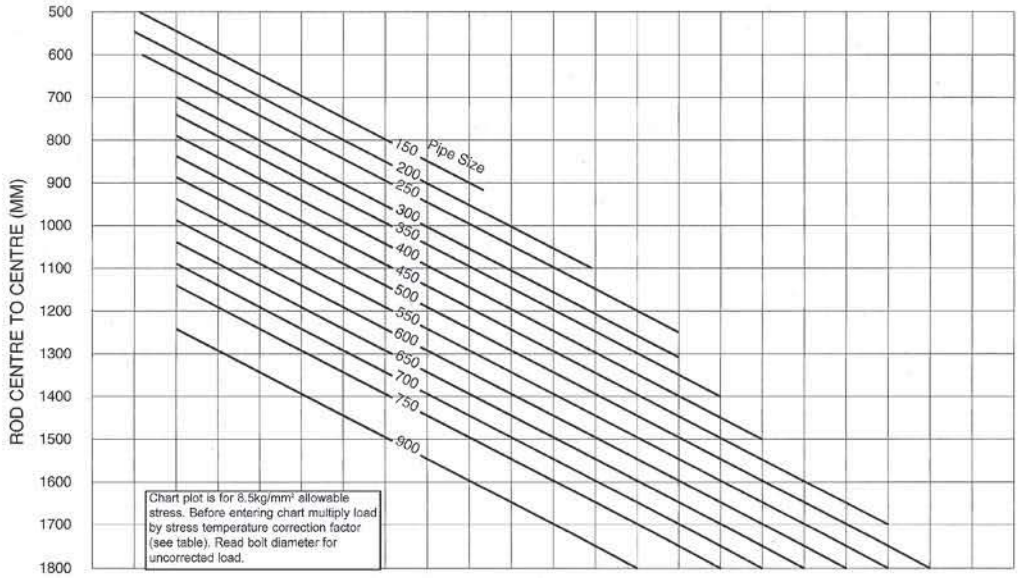
- Figure Number:
- Exact Pipe O/D:
- Load:
- Operating Temperature:
- Clamp Material:
- Centre to Centre dimension of load bolts:
- Rod Ø:
- Load Bolt Ø:
- Finish:

Sheer lugs by others.

Ancillary Equipment – Fig. 300, 301 & 302

RISER SELECTION CHART





Ancillary Equipment – Fig. 16S, 16A & Fig. 71 (BS3974)

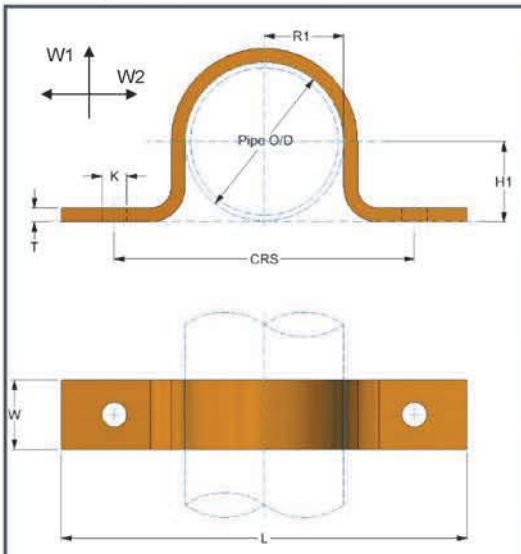


Fig. 16S/A
2 x holes in saddles 21.3 to 219.1 O/D
4 x holes in saddles 273 to 508 O/D
Fig. 71
See table

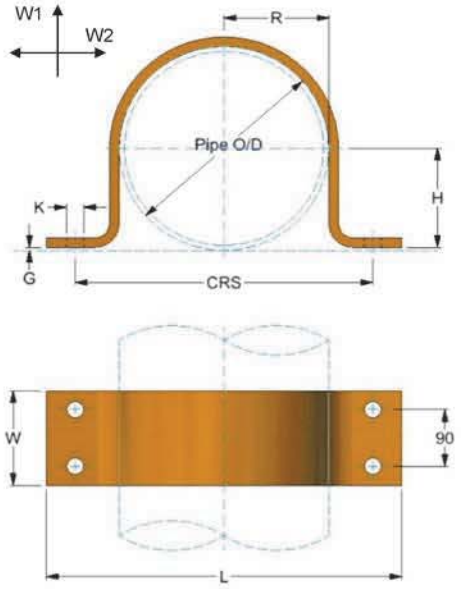


Fig. 16S & 16A – Saddle Guide & Saddle Anchor												
NPS	Pipe O/D	CRS	K	L	Guide Fig. 16S		Anchor Fig. 16A			Mat'l WxT	Max Load Kg	
					H1	R1	G	H	R		W1	W2
15	21.3	90	12	120	11	11.5	2	8	11.5	40x6	235	370
20	26.9	90	12	120	14	14	2	11	14	40x6	235	290
25	33.7	100	12	140	17	18	2	15	18	40x6	235	240
32	42.4	110	14	160	22	22	2	19	22	40x8	365	330
40	48.3	120	14	160	25	25	2	22	25	40x8	365	290
50	60.3	140	14	200	31	31	2	28	31	40x8	365	235
65	76.1	170	18	254	38	40	2	36	40	50x10	520	370
80	88.9	198	18	274	45	46	3	41	46	50x10	520	315
100	114.3	216	18	292	58	59	3	54	59	50x10	520	245
125	139.7	280	26	360	70	72	3	67	72	60x15	1080	550
150	168.3	310	26	400	85	86	3	81	86	60x15	1080	450
200	219.1	360	26	460	110	112	4	105	112	60x15	1080	345
4 Holes in all Saddles below this line												
250	273	410	26	500	137	139	4	132	139	150x15	2445	305
300	323.9	460	26	550	163	165	5	157	165	150x15	2445	305
350	356.6	490	26	580	179	181	5	173	181	150x15	2445	305
400	406.4	570	26	660	205	206	5	198	206	200x20	2750	975
450	457.2	620	26	710	230	232	5	223	232	200x20	2750	975
500	508	670	26	760	256	258	5	249	258	200x20	2750	975

Fig. 71 - Overstrap (BS 3974)									
NPS	Pipe O/D	Bolt Size	Bolt Qty.	CRS	H1	K	L	R1	Steel Size
15	21.3	M10	2	106	10	12	182	11.5	35x5
20	26.9	M10	2	110	13	12	186	14	35x5
25	33.7	M10	2	114	16	12	190	18	35x5
32	42.4	M12	2	128	20	15	204	22	35x8
40	48.3	M12	2	158	23	15	234	25	35x8
50	60.3	M12	2	162	29	15	238	31	35x8
65	76.1	M16	2	178	36	19	254	40	45x10
80	88.9	M16	2	198	43	19	274	46	45x10
100	114.3	M16	2	216	55	19	292	59	45x10
125	139.7	M20	2	238	68	24	320	72	60x10
150	168.3	M20	2	272	82	24	348	86	60x10
175	193.7	M20	2	310	95	24	390	99	60x15
200	219.1	M20	2	340	107	24	420	112	60x15
225	244.5	M20	2	360	122	24	410	124	60x15
250	273	M20	2	390	135	24	440	138	60x15
300	323.9	M20	2	440	162	24	490	164	60x15
350	355	M20	2	470	172	24	520	180	60x15
400	406.4	M24	2	530	202	28	590	205	60x15
450	457	M24	2	580	228	28	640	231	60x15
500	508	M24	2	630	253	28	690	256	60x15
550	559	M24	2	680	278	28	740	282	60x15
600	610	M20	4	730	305	24	780	308	100x15
650	660	M20	4	780	328	24	830	333	100x15
700	711	M20	4	830	355	24	880	358	100x15
750	762	M20	4	880	380	24	930	385	100x15
800	813	M24	4	960	405	28	1020	410	110x20
850	864	M24	4	1010	430	28	1070	435	110x20
900	914	M24	4	1060	455	28	1120	460	110x20
1000	1016	M24	4	1170	507	28	1230	511	110x20

Fig. 16S, 16A & 71
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Ancillary Equipment – Fig. 645 & 646

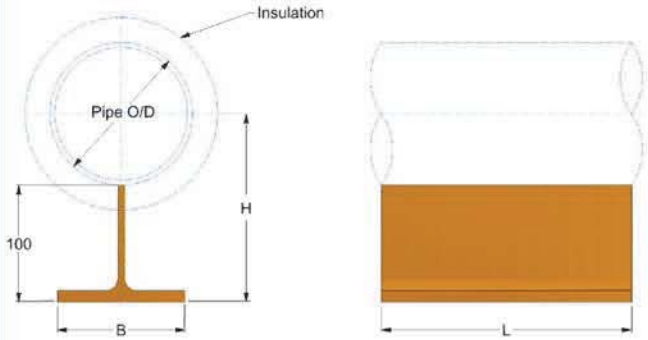


Fig. 645 - NPS 200 to 600

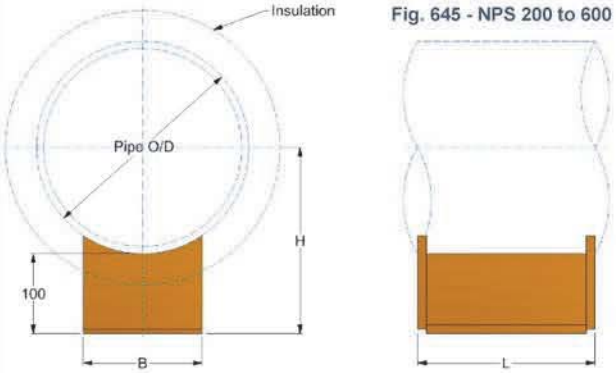


Fig. 646 - NPS 20 to 150

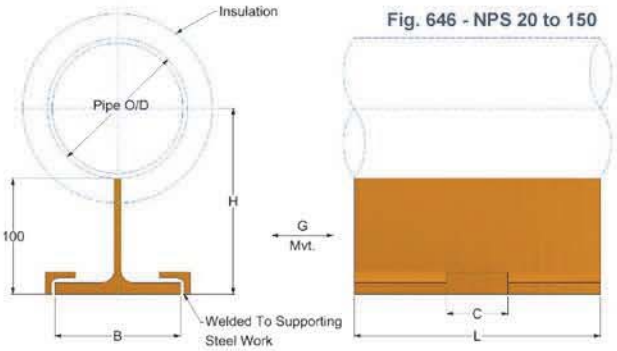


Fig. 646 - NPS 200 to 600

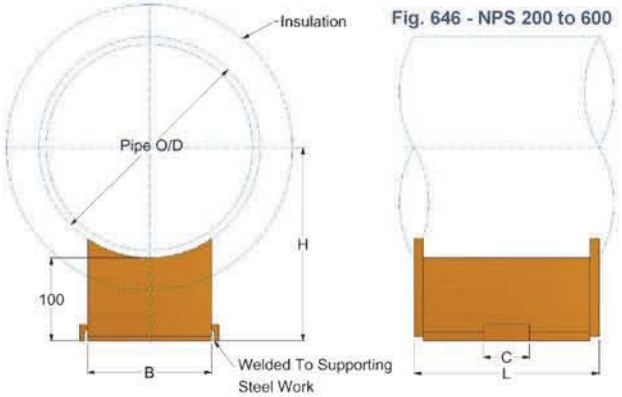


Fig. 645 - (Sliding Support) & 646 - (Sliding Guide)								
NPS	Pipe O/D	B	C	Cut From	G Max Mvt.	H	L	Max Load (Kg)
20	26.6	60	50	Plate	100	114	150	230
25	33.4	60	50	Plate	100	117	150	230
32	42..1	60	50	Plate	100	121	150	230
40	48.3	60	50	Plate	100	125	150	230
50	60.3	60	50	Plate	100	131	150	230
65	76.1	100	50	203x102x23 U/B	100	138	150	450
80	88.9	100	50	203x102x23 U/B	100	145	150	450
90	101.6	100	50	203x102x23 U/B	100	151	150	450
100	114.3	100	50	203x102x23 U/B	90	158	150	450
125	139.7	100	50	203x102x23 U/B	90	170	150	800
150	168.3	100	50	203x102x23 U/B	90	185	150	800
200	219.1	134	50	203x133x30 U/B	100	210	200	2900
250	273	134	50	203x133x30 U/B	100	237	200	2900
300	323.9	205	50	203x203x60 U/C	100	262	200	5900
350	355.6	205	50	203x203x60 U/C	150	278	250	6500
400	406.4	205	50	203x203x60 U/C	150	304	250	6500
450	457	254	50	254x254x73 U/C	145	329	250	7900
500	508	305	50	305x305x97 U/C	180	354	300	7900
550	558.8	305	50	305x305x97 U/C	180	380	300	8700
600	610	305	50	305x305x97 U/C	180	405	300	9200

Dimensions may be modified to suit specific applications, and low friction bearing surfaces applied, e.g. P.T.F.E.

Fig. 645 & 646
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 646

Ancillary Equipment – Fig. 650 & 660

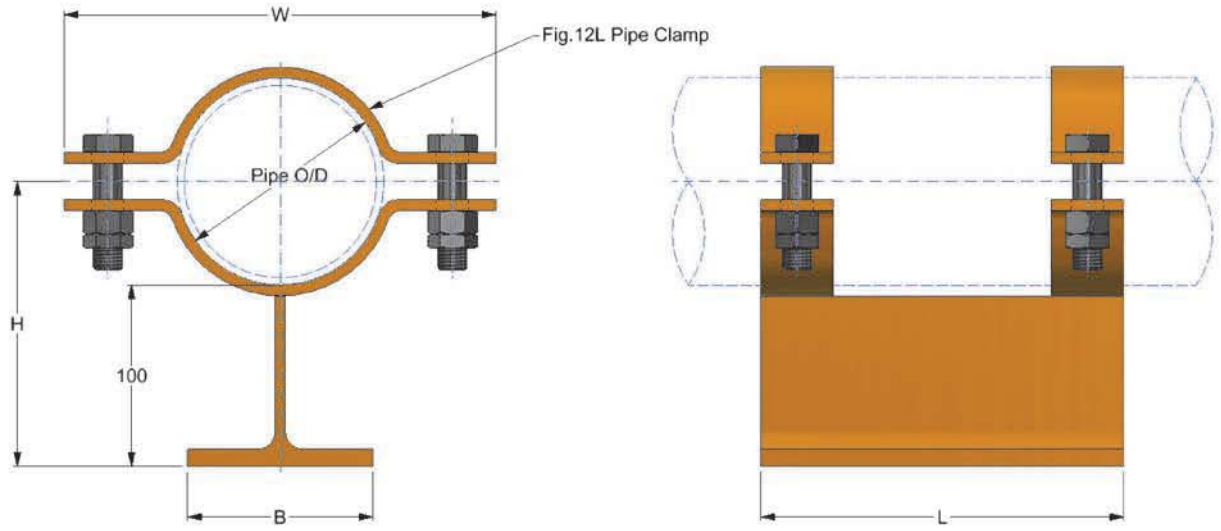


Fig. 650 – Clamped Pipe Shoe (150NB & Below)											
Max Load Kg	230					450				800	
NPS	20	25	32	40	50	65	80	90	100	125	150
Pipe O/D	26.9	33.7	42.4	48.3	60.3	76.1	88.9	101.6	114.3	139.7	168.3
H	114	117	121	124	130	138	144	151	157	170	184
B	60	60	60	60	60	100	100	100	100	100	100
L	150	150	150	150	150	150	150	150	150	150	150
W	102	114	126	140	152	178	192	204	238	276	314

Fig. 650
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

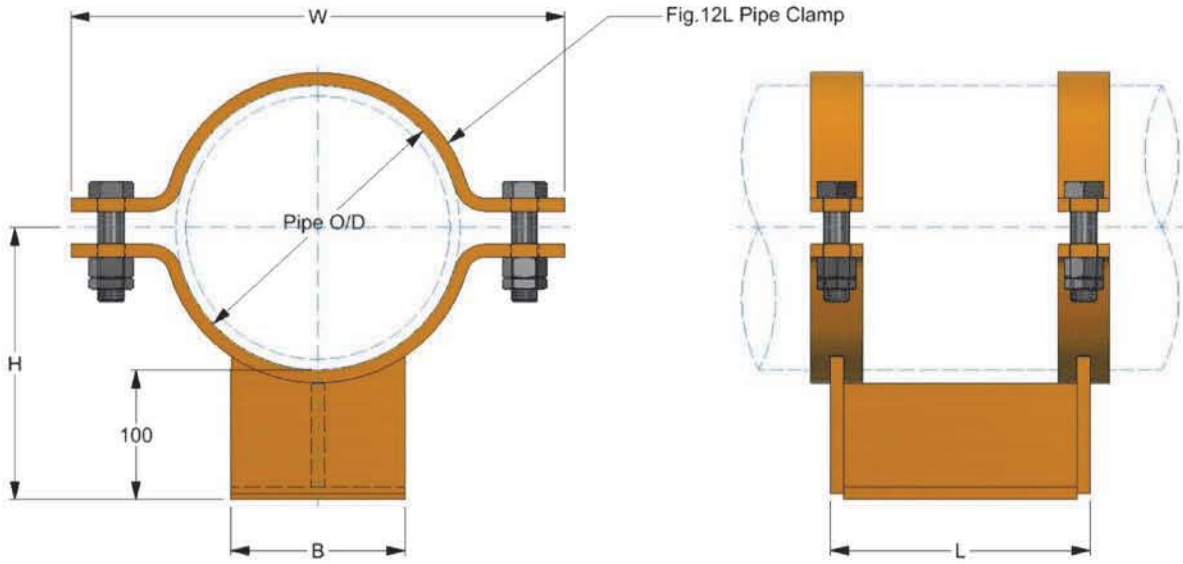
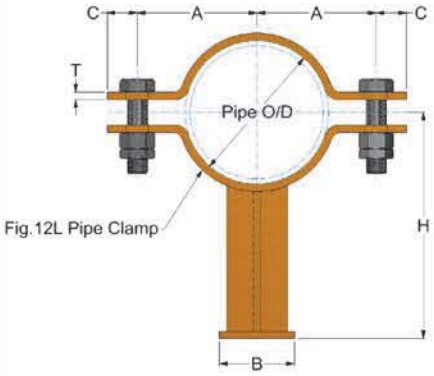


Fig. 660 – Clamped Pipe Shoe (200NB & Over)									
Max Load Kg	2900		5900	6500		7900		8700	9200
NPS	200	250	300	350	400	450	500	550	600
Pipe O/D	219.1	273	323.9	355.6	406.4	457	508	558.8	610
H	210	237	262	278	303	329	354	379	405
B	134	134	205	205	205	254	305	305	305
L	200	200	200	250	250	250	300	300	300
W	378	452	504	542	592	668	720	804	864

Fig. 660
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Ancillary Equipment – Fig. 660I & 660SI



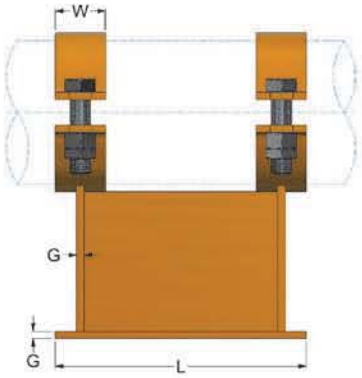


Fig. 660I – Clamped Pipe Shoe For Insulation Up To 200mm

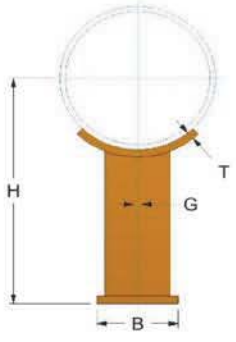
Pipe		A	C	L	WxT	Up To 100mm Insulation				100 – 200mm Insulation			
NPS	O/D					B	G	H	Max Load Kg	B	G	H	Max Load Kg
65	76.1	70	19	200	30x6	62	6	161	2345	66	8	261	3670
80	88.9	76	20	200	30x6	62	6	169	2345	66	8	269	3670
90	101.6	83	19	200	30x6	62	6	175	2345	66	8	275	3670
100	114.3	95	24	200	40x6	62	6	182	2650	66	8	282	3870
125	139.7	114	24	300	40x6	120	10	184	4075	124	12	284	6110
150	168.3	127	30	300	40x10	120	10	207	5200	124	12	307	8360
175	193.7	146	30	300	40x10	120	10	222	5200	124	12	322	8360
200	219.1	159	30	300	40x10	120	10	236	5200	124	12	336	8360
225	244.5	178	30	300	40x10	120	10	249	5200	124	12	349	8360
250	273	190	36	300	50x12	174	12	257	7240	182	16	357	13350
300	323.9	216	36	300	50x12	174	12	287	7240	182	16	387	13350
350	355.6	235	36	300	65x12	215	16	299	11420	220	20	399	15290
400	406.4	260	36	300	65x12	230	16	326	11420	245	20	426	16310
450	457	298	36	300	65x15	245	16	352	15300	255	20	452	17840
500	508	324	36	300	65x15	280	16	375	16300	290	20	475	20385
550	558.8	357	45	300	80x15	330	20	400	17025	350	25	500	21410
600	610	387	45	300	80x15	330	20	425	17840	350	25	525	22935

{Ranges A & B Only

Range A Carbon Steel (-20 to 340°C)
Range B Carbon Steel (341 to 400°C)
Range C Alloy Steel

Fig. 660I
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Insulation Thickness:
- Finish:



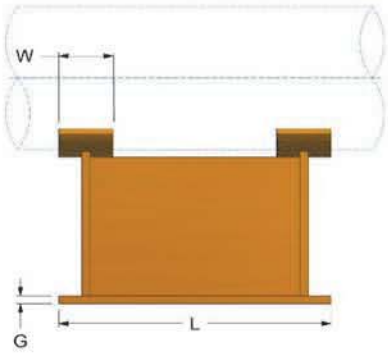


Fig. 660SI – Pipe Saddle For Insulation Up To 200mm

Pipe		L	WxT	Up To 100mm Insulation				100 – 200mm Insulation			
NPS	O/D			B	H	G	Max Load Kg	B	H	G	Max Load Kg
65	76.1	200	30x6	62	161	6	2345	66	261	8	3670
80	88.9	200	30x6	62	169	6	2345	66	269	8	3670
90	101.6	200	30x6	62	175	6	2345	66	275	8	3670
100	114.3	200	40x6	62	182	6	2650	66	282	8	3870
125	139.7	300	40x6	120	184	10	4075	124	284	12	6110
150	168.3	300	40x10	120	207	10	5200	124	307	12	8360
175	193.7	300	40x10	120	222	10	5200	124	322	12	8360
200	219.1	300	40x10	120	236	10	5200	124	336	12	8360
225	244.5	300	40x10	120	249	10	5200	124	349	12	8360
250	273	300	50x12	174	257	12	7240	182	357	16	13350
300	323.9	300	50x12	174	287	12	7240	182	387	16	13350
350	355.6	300	65x12	215	299	16	11420	220	399	20	15290
400	406.4	300	65x12	230	326	16	11420	245	426	20	16310
450	457	300	65x15	245	352	16	15300	255	452	20	17840
500	508	300	65x15	280	375	16	16300	290	475	20	20385
550	558.8	300	80x15	330	400	20	17025	350	500	25	21410
600	610	300	80x15	330	425	20	17840	350	525	25	22935

{Ranges A & B Only

Range A Carbon Steel (-20 to 340°C)
Range B Carbon Steel (341 to 400°C)
Range C Alloy Steel

Fig. 660SI
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Insulation Thickness:
- Finish:

Ancillary Equipment – Fig. 670 & 680

Fig. 670: NPS 20-150

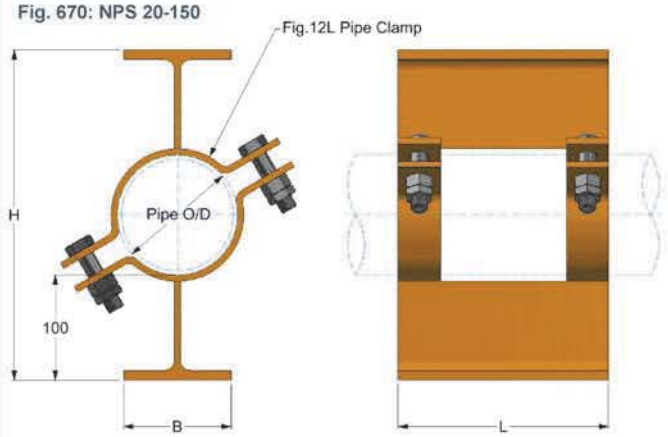


Fig. 670: NPS 200-600

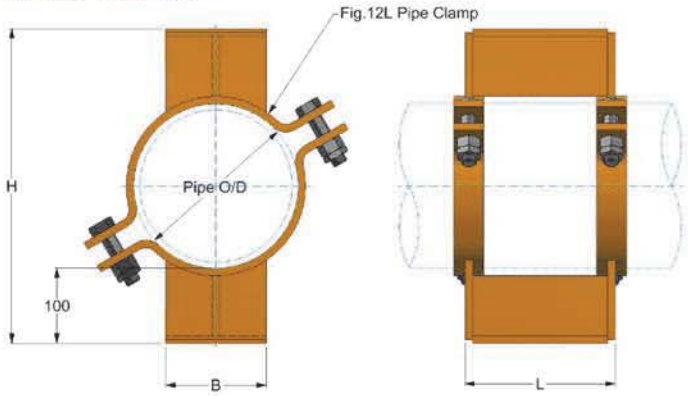


Fig. 670 – Sliding Pipe Shoe

NPS	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600
Pipe O/D	26.9	33.7	42.4	48.3	60.3	76.1	88.9	101.6	114.3	139.7	168.3	219.1	273	323.9	355	406.4	457	508	610
B	60	60	60	60	60	100	100	100	100	100	100	134	134	205	205	205	254	305	305
H	228	234	242	250	262	276	290	302	316	340	370	420	474	524	556	608	658	708	810
L	150	150	150	150	150	150	150	150	150	150	150	200	200	200	250	250	250	300	300
Max Load Kg	230					450				800		2900		5900	6500		7900		9200

Fig.670

Fig. 670
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig.680

Fig. 680
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 680: NPS 20-150

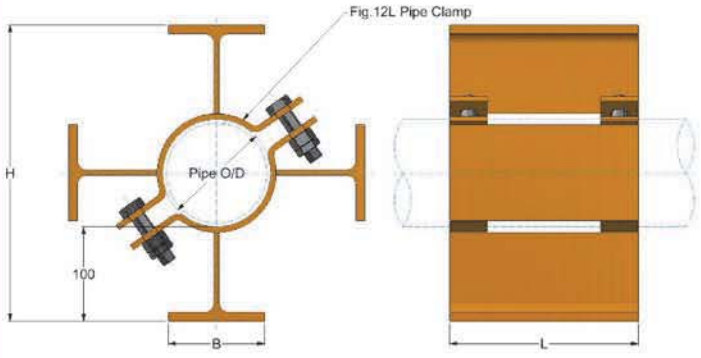


Fig. 680: NPS 200-600

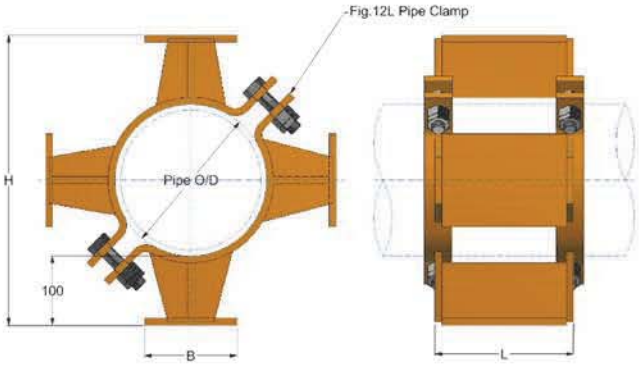


Fig. 680 – Sliding Pipe Shoe

NPS	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600
Pipe O/D	26.9	33.7	42.4	48.3	60.3	76.1	88.9	101.6	114.3	139.7	168.3	219.1	273	323.9	355	406.4	457	508	610
B	60	60	60	60	60	100	100	100	100	100	100	134	134	205	205	205	254	305	305
H	228	234	242	250	262	276	290	302	316	340	370	420	474	524	556	608	658	708	810
L	150	150	150	150	150	150	150	150	150	150	150	200	200	200	250	250	250	300	300
Max Load Kg	230					450				800		2900		5900	6500		7900		9200

Ancillary Equipment – Fig. 122, 123 & 124

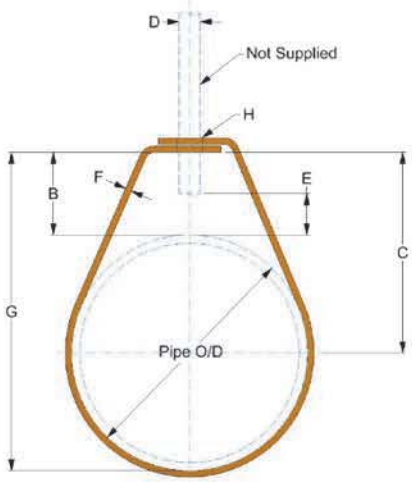


Fig.122 - Band Clamp

NPS	Pipe O/D	B	C	D	E	G	H	Steel Size F	Max Load Kg
15	21.3	30	41	10	14	51	12	25x1.625	280
20	26.9	30	43	10	14	57	12	25x1.625	280
25	33.7	35	52	10	19	69	12	25x1.625	280
32	42.4	35	56	10	19	77	12	25x1.625	280
40	48.3	40	64	10	24	88	12	25x1.625	280
50	60.3	50	80	12	30	110	14	25x3	440
65	76.1	40	78	12	20	116	14	25x3	440
80	88.9	40	84	12	20	129	14	25x3	440
90	101.6	40	91	12	20	142	14	25x3	440
100	114.3	40	97	12	20	154	14	25x3	440
125	139.7	55	125	12	35	195	14	25x3	440
150	168.3	60	144	16	35	228	18	30x6	570
200	219.1	60	170	20	28	279	22	40x6	820

Fig. 122
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Vertical adjustment 14-35mm.

Suspended rod and nuts not included.

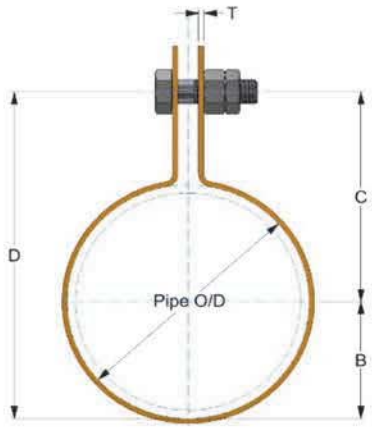


Fig.123 - Band Clamp

NPS	Pipe O/D	B	Bolt Size	C	D	Steel Size	Max Load Kg
15	21.3	11	M8	44	55	20x1.625	136
20	26.9	13	M8	47	60	20x1.625	136
25	33.7	17	M8	48	65	20x1.625	136
32	42.4	21	M8	54	75	20x1.625	136
40	48.3	24	M8	61	85	20x1.625	136
50	60.3	30	M10	65	95	25x1.625	136
65	76.1	38	M10	67	105	25x1.625	204
80	88.9	44	M10	81	125	25x2.032	204
90	101.6	50	M10	90	140	25x2.032	204
100	114.3	57	M12	103	160	30x2.336	236
125	139.7	70	M12	115	185	30x2.336	236
150	168.3	84	M12	126	210	30x2.640	236
175	193.7	94	M12	146	240	36x2.640	390
200	219.1	110	M12	155	265	36x2.640	390

Fig. 123
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

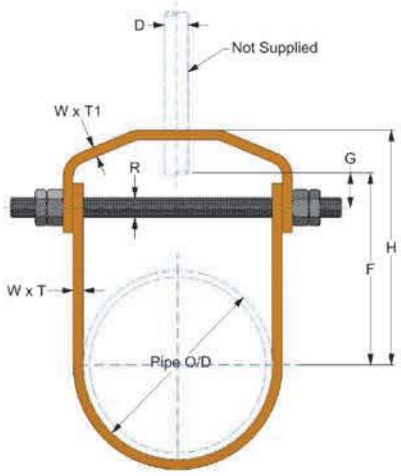


Fig.124 - Clevis Hanger

NPS	Pipe O/D	D	F	G	H	R	WxT	WxT1	Max Load Kg
15	21.3	10	40	13	65	M6	20x6	20x6	270
20	26.9	10	47	13	72	M6	20x6	20x6	270
25	33.7	10	47	13	72	M6	20x6	20x6	270
32	42.4	10	51	13	78	M6	20x6	20x6	270
40	48.3	10	59	13	84	M6	20x6	20x6	270
50	60.3	10	62	13	87	M6	20x6	20x6	270
65	76.1	12	81	22	108	M8	30x6	30x6	500
80	88.9	12	84	22	111	M8	30x6	30x6	500
90	101.6	12	93	22	120	M10	30x6	30x6	500
100	114.3	16	108	22	139	M12	30x6	30x6	635
125	139.7	16	131	22	159	M12	40x6	40x6	635
150	168.3	20	150	29	184	M16	50x6	50x6	860
175	193.7	20	163	29	197	M16	50x6	50x6	860
200	219.1	20	176	29	214	M16	50x6	50x10	910
225	244.5	20	198	32	236	M16	50x6	50x10	910
250	273	24	215	38	256	M20	50x6	50x10	1630
300	323.9	24	243	38	286	M20	50x6	50x15	1725
350	355.6	24	275	38	321	M24	50x6	50x15	1910
400	406.4	24	338	80	384	M24	65x6	65x15	2090
450	457	24	352	83	403	M30	65x6	65x15	2180
500	508	30	393	89	444	M30	80x10	80x15	2180
600	609	30	451	95	502	M30	80x10	80x15	2180

Fig. 124
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Nominal Pipe Size:
- Finish:

Suspended rod and nuts not included.

Ancillary Equipment – Fig. 17B, 18B, 19B & 120B

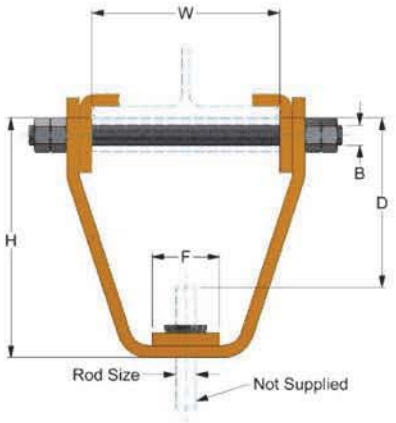


Fig. 17B – Beam Clamp								
Size	Bolt Size	D	F	H	Rod Max	Steel Size	W	Max Load Kg
1	M10	85	50	179	12	40x8	76-203	360
2	M12	85	55	180	16	50x8	76-203	530
3	M16	80	70	192	20	50x10	76-203	1010
4	M20	80	85	214	24	60x15	102-254	1580
5	M24	80	85	228	30	80x15	102-254	2280
6	M30	95	85	260	36	90x15	102-254	3650
7	M36	110	90	300	42	100x20	102-254	5340
8	M42	125	100	333	48	130x25	127-254	7400

Fig. 17B
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Beam Flange Width 'W':
- Beam Flange Thickness:
- Rod Diameter:
- Finish:

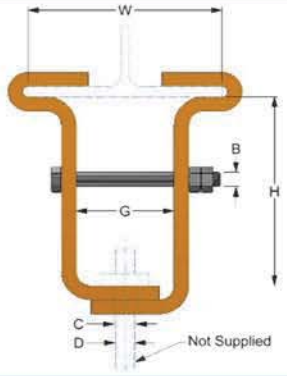


Fig. 18B – Beam Clamp								
Size	B	C Max	D Max	G	H	Steel Size	W	Max Load Kg
1	M10	14	M12	50	115	30x6	76-203	320
2	M12	26	M24	80	155	50x12	113-254	680

Note: This clamp cannot be supplied for flange widths less than 75mm.

Fig. 18B
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Beam Flange Width 'W':
- Beam Flange Thickness:
- Rod Diameter:
- Finish:

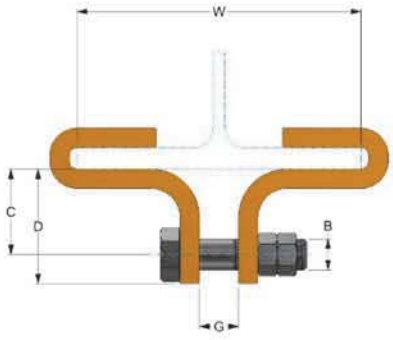


Fig. 19B – Beam Clamp							
Size	Bolt	C	D	G	Steel Size	W	Max Load Kg
1	M12	30	45	16	30x6	76-203	320
2	M12	45	60	20	40x10	76-203	400
3	M16	45	70	20	50x10	76-203	450
4	M20	50	80	24	50x12	76-254	680

Fig. 19B
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Beam Flange Width 'W':
- Beam Flange Thickness:
- Finish:

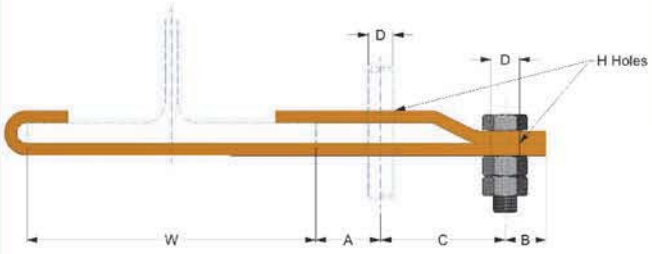


Fig. 120B – Beam Clamp								
Size	A	B	D	C	H	Steel Size	W	Max Load Kg
1	10	20	M12	60	14	30x6	76-305	230
2	12	25	M16	65	18	40x10	76-305	320
3	12	30	M20	75	22	50x10	76-305	360
4	14	30	M24	90	26	65x12	76-305	550

Fig. 120B
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Beam Flange Width 'W':
- Beam Flange Thickness:
- Finish:

Ancillary Equipment – Fig. 800U, 800N, 9WL & 121

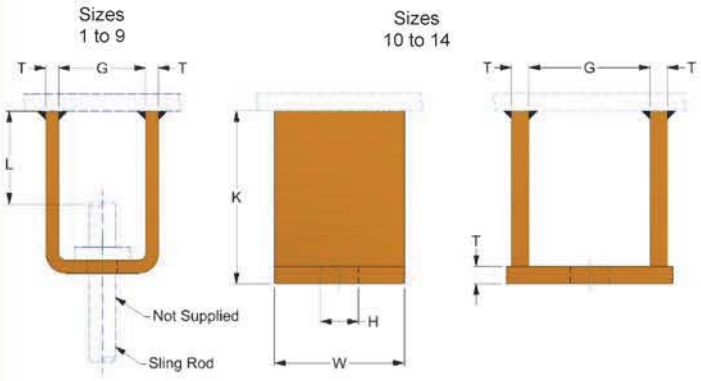


Fig. 800U – Welded Beam Attachment								
Size	G	H	K	L	Rod	W x T	Min Weld	Max Load Kg
1	40	12	75	30	M10	50x6	3x45	380
2	40	14	75	30	M12	50x6	3x45	560
3	60	18	85	30	M16	80x10	3x55	1040
4	70	22	85	30	M20	80x10	4x55	1630
6	75	26	115	40	M24	100x12	4x90	2360
7	110	32	120	40	M30	100x15	5x90	3750
9	120	39	165	60	M36	150x15	5x140	5460
Size 10 Upward Are Fabricated Attachments								
10	140	45	200	70	M42	150x20	6x135	7480
11	175	51	210	70	M48	150x25	6x135	9820
12	185	60	240	85	M56	180x25	8x130	13560
13	220	68	250	85	M64	180x30	8x130	17900
14	230	76	260	85	M72	200x30	8x150	22740

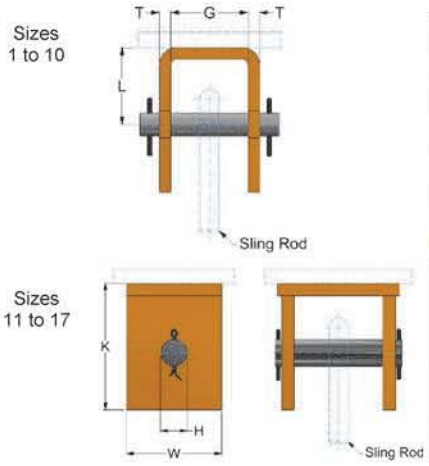


Fig. 800N – Welded Beam Attachment										
Size	G	H	K	L	Pin Size	Rod	S/Pin Size	W x T	Min. Weld	Max Load Kg
1	30	12	50	30	10x65	M10	2.5x30	50x60	3x30	380
2	30	14	65	40	12x65	M12	3.2x30	50x60	3x30	560
3	30	18	70	45	16x65	M16	3.2x30	50x60	3x30	1040
4	35	22	85	55	20x85	M20	4.0x40	80x10	4x35	1630
6	40	26	110	70	24x90	M24	5.0x40	80x10	4x50	2360
7	50	32	125	80	30x105	M30	5.0x40	100x12	5x55	3750
9	70	39	160	100	36x135	M36	6.3x60	130x15	5x70	5460
10	90	45	180	110	42x155	M42	6.3x70	130x15	6x90	7480
Size 11 Upward Are Fabricated Attachments										
11	90	51	210	130	48x170	M48	8.0x70	150x20	6x90	9820
12	100	60	235	145	56x180	M56	8.0x80	180x20	8x100	13560
13	110	68	255	160	64x195	M64	8.0x90	200x20	8x110	17900
14	120	76	280	180	72x215	M72	8.0x100	220x25	8x120	22740
15	130	84	300	200	80x230	M80	10.0x100	250x25	10x100	28600
16	140	94	335	220	90x250	M90	10.0x120	300x30	10x120	36000
17	150	104	375	260	100x285	M100	10.0x120	300x40	10x130	44700

Bolts may be supplied in lieu of pins, unless specified otherwise.

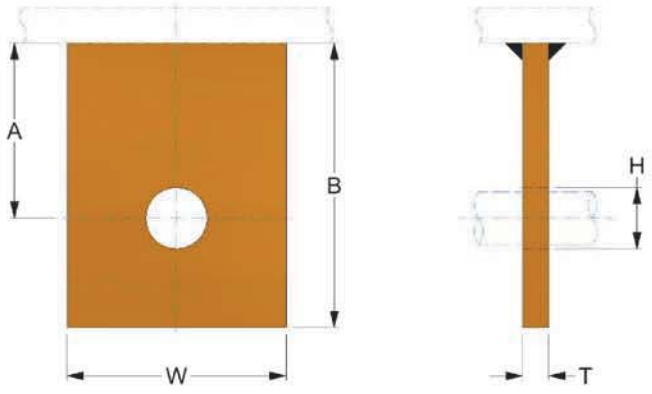


Fig. 9WL – Welding Lug							
Size	A	B	Bolt	H	W x T	Min. Weld	Max Load Kg
1	30	55	M10	12	50x6	3	380
2	40	65	M12	14	50x6	3	560
3	50	75	M16	18	50x6	3	1040
4	60	90	M20	22	80x10	5	1630
6	80	115	M24	26	80x10	5	2360
7	90	135	M30	32	100x12	7	3750
9	110	175	M36	39	130x15	7	5460
10	130	200	M42	45	130x15	8	7480
11	150	235	M48	51	150x20	8	9820
12	170	260	M56	60	180x20	10	13560
13	200	295	M64	68	200x20	10	17900
14	220	325	M72	76	220x25	12	22740
15	240	340	M80	84	250x25	12	28600
16	270	385	M90	94	300x30	12	36000
17	300	415	M100	104	300x40	12	44700

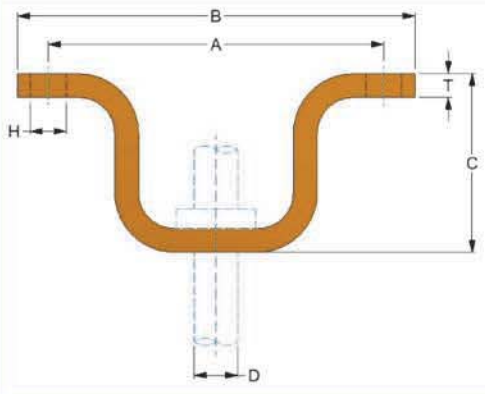


Fig. 121 Bolted Beam Attachment							
Size	A	B	C	D	H	W x T	Max Load Kg
1	120	155	75	M12	12	30x10	560
2	135	180	75	M16	14	40x10	1040
3	160	205	85	M20	18	40x12	1630
4	175	230	85	M24	22	50x12	2360

Fig. 800U, 800N, 9WL & 121
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Finish:

Ancillary Equipment – Fig. 3FR, 3BR, 3ER, 3ERW, 3DE & 3DEW

Fig. 3FR – Solid Forged Eye Rod								
Size D	M10	M12	M16	M20	M24	M30	M36	M42
B	7	9	12	14	17	21	26	30
H	16	18	22	26	30	36	42	48
A	30	36	46	54	64	78	94	108
Max Load kg	380	560	1040	1630	2360	3750	5460	7480

Fig. 3FR
Material: Forged Steel

Please Specify:-
- Figure Number:
- Size:
- Length & Thread length if non-standard:

Thread is right hand as standard.
(Left hand available on request).

Where overall length required is greater than 300mm a rod coupling and threaded bar will be utilised.

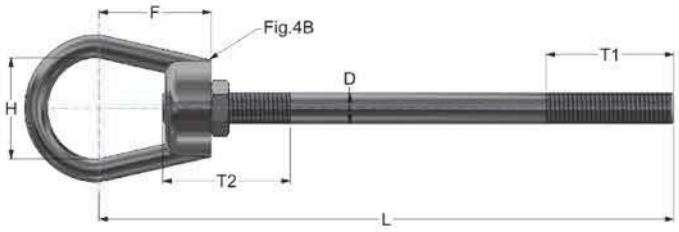


Fig. 3BR – Composite Eye Rod												
Size D	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72
F	41.5	45	45	64	80	85	85	100	70	80	100	100
H	25	30	30	44	50	70	70	100	70	80	100	100
T1	150	150	150	150	150	250	250	250	250	250	250	250
T2	50	50	50	50	50	80	80	80	130	130	130	130
Max Load kg	380	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740

Fig. 3BR
Material: Carbon Steel
Fig. 4B Supplied with Locknut

Please Specify:-
- Figure Number:
- Size:
- Length & Thread length if non-standard:

Thread is right hand as standard.
(Left hand available on request).

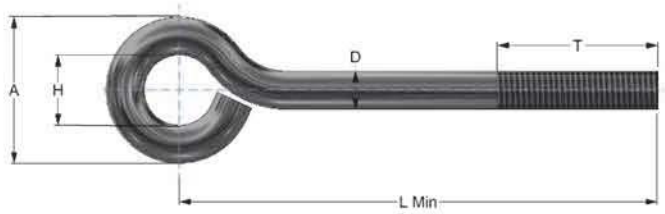


Fig. 3ER (Un-Welded) & 3ERW (Welded) – Eye Rod						
Size D	M8	M10	M12	M16	M20	M24
A	28	40	46	60	72	86
H	12	20	22	28	32	38
L (Min.)	175	200	200	250	250	250
T	150	150	150	150	150	150
Fig. 3ER Max Load kg	70	105	200	320	470	880
Fig. 3ERW Max Load kg	220	380	560	1040	1630	2360

Fig. 3ER & 3ERW
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Length & Thread length if non-standard:

Thread is right hand as standard.
(Left hand available on request).

Fig.3ER Rod & Eye not welded.
Fig.3ERW Rod & Eye welded.

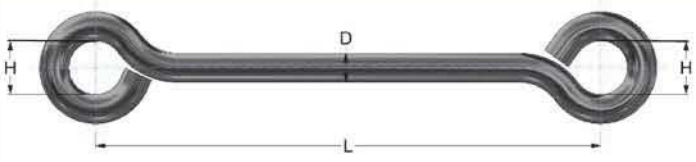


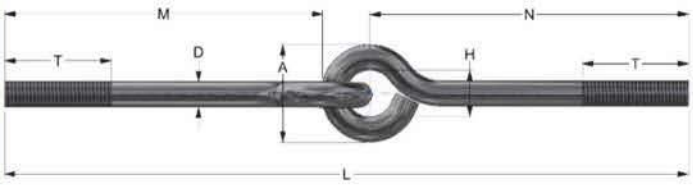
Fig. 3DE (Un-Welded) & DEW (Welded) – Double Eye Rod					
Size D	M10	M12	M16	M20	M24
H	20	22	28	32	38
L (Min.)	100	150	150	200	200
Fig. 3DE Max Load kg	105	200	320	470	880
Fig. 3DEW Max Load kg	380	560	1040	1630	2360

Fig. 3DE & 3DEW
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Length:

Fig.3DE Rod & Eye not welded.
Fig.3DEW Rod & Eye welded.

Ancillary Equipment – Fig. 3LE, 3LEW, 3J, 3AR, 3R & 4RC



When eye rods are ordered with machine threads longer than the standard thread shown or with left hand threads there will be an additional charge.

Fig. 3LE (Un-Welded) & LEW (Welded) – Linked Eye Rod

Size	M8	M10	M12	M16	M20	M24
A	26	33	46	56	70	83
H	10	13	22	24	30	35
L (Min.)	410	410	485	485	540	540
T	150	150	150	150	150	150
Fig. 3LE Max Load Kg	70	105	200	320	470	880
Fig. 3LEW Max Load Kg	220	380	560	1040	1630	2360

Fig. 3LE & 3LEW
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Length M:
- Length N:

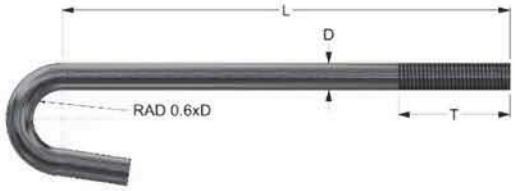


Fig. 3J – J Beam Hook

D	T	Length L							Max Load Kg
M10	65	100	125	150	175	200	250	300	105
M12	65	100	125	150	175	200	250	300	200
M16	65	~	125	150	175	200	250	300	320
M20	75	~	125	150	175	200	250	300	470
M24	100	~	~	150	175	200	250	300	880

Fig. 3J
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Length L:
- Beam Flange Thickness:

Thread is right hand as standard.
(Left hand available on request).

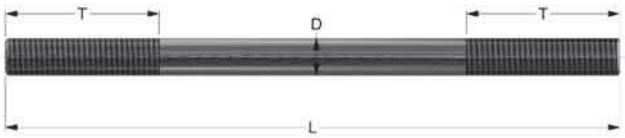
Available in 1, 2 & 3 metre lengths as self-colour. Galvanised – See table.

Non-standard diameters and lengths available on request.

Fig. 3AR
Material: Carbon Steel
Please Specify:-
- Fig. Number:
- Size:
- Length:

Fig. 3AR – All Threaded Rod

Size D	M6	M8	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
Max Load Kg	135	240	380	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740	28600	36000
Galv. Length Availability	1000	1000	1000	1000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000



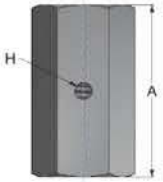
Non-standard diameters, overall lengths, thread lengths and handed threads available on request at additional charges.

Fig. 3R – Tie Rod

Size D	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
L	400	430	440	470	510	550	570	650	680	710	750	790	870	950
T	175	185	190	200	205	225	235	250	265	280	300	320	360	400
Max Load Kg	380	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740	28600	36000

Fig. 3R
Material: Carbon Steel

Please Specify:-
- Fig. Number:
- Size:
- Length:
- Thread:



Tapped right hand.
Threaded completely through.

Fig. 4RC
Material: Carbon Steel
Please Specify:-
- Fig. Number:
- Size:
- Thread (If Non-Standard):

Fig. 4RC – Rod Coupling

Size D	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
A	45	45	55	55	70	75	110	120	130	150	175	200	225	225
H	6	6	6	6	8	8	8	10	10	10	10	10	10	10
S	17	19	24	30	36	46	55	65	75	85	95	105	115	130
Max Load Kg	380	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740	28600	36000

Ancillary Equipment – Fig. 4TF, 4T, 4B & 4SC

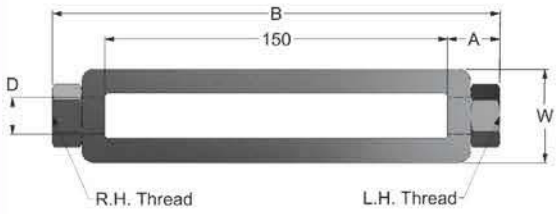


Fig. 4TF – Forged Turnbuckle				
Size D	A	B	W	Max Load Kg
M10	17	184	28	380
M12	20	190	31	560
M16	26	202	41	1040
M20	32	214	49	1630
M24	39	228	59	2360
M30	53	256	67	3750
M36	58	266	78	5460
M42	68	286	92	7480

Fig. 4TF
Material: Forged Steel

Please Specify:-
- Figure Number:
- Size:
- Thread if Non-Standard:

Can be supplied with longer openings on request.

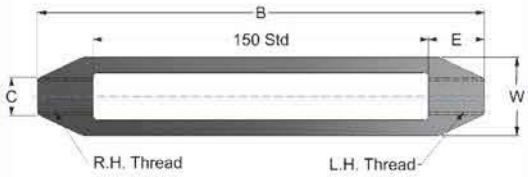


Fig. 4T - Turnbuckle					
Size C	B	C	E	W	Max Load Kg
M24	200	35	25	65	2360
M30	210	50	30	83	3750
M36	210	50	30	83	5460
M42	230	65	40	91	7480
M48	250	75	50	92	9820
M56	250	85	50	113	13560
M64	270	95	60	124	17900
M72	300	105	75	150	22740

Fig. 4T
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Thread if Non-Standard:

Can be supplied with longer openings on request.

Fig. 4B – Weldless Bow Nut						
Size T	A	B	C	D	E	Max Load Kg
M8	10	25	64	32	16	240
M10	10	25	64	32	16	380
M12	13	30	73	38	18	560
M16	13	30	73	38	18	1040
M20	16	44	102	45	25	1630
M24	19	50	124	50	28	2360
M30	29	70	149	70	40	3750
M36	29	70	149	70	40	5460
M42	30	100	180	80	45	7480
M48	31	70	240	100	75	9820
M56	36	80	270	100	80	13560
M64	42	100	330	130	80	17900
M72	47	100	330	130	80	22740

Fig. 4B
Material: Forged Steel
(BS3974 Pt1 M42 and Below)

Please Specify:-
- Figure Number:
- Size:
- Left or Right Hand Thread:

Sizes M48 Upward, Type Change.

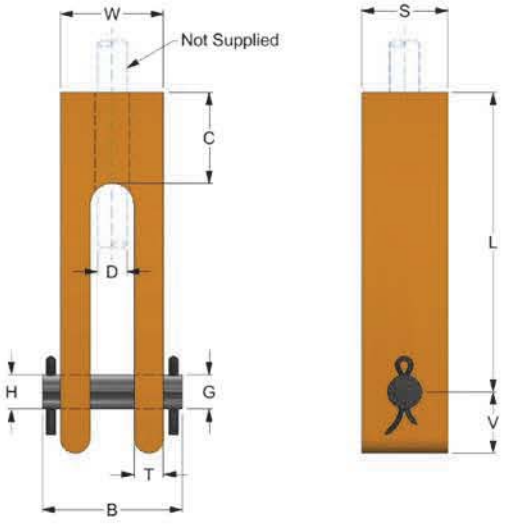


Fig. 4SC – Steel Clevis											
Size	B	C	D	G	H	L	S	T	V	W	Max Load Kg
2	60	32	M10	10	12	114	30	10	19	38	380
2	60	32	M12	12	14	114	30	10	19	38	560
2.5	75	32	M16	16	18	100	45	10	33	50	1040
2.5	75	32	M20	20	22	100	45	10	33	50	1630
3	90	32	M24	24	26	95	65	12	38	58	2360
3	90	32	M30	30	32	95	65	12	38	58	3750
3.5	115	41	M36	36	39	193	70	12	45	80	5460
4	130	44	M42	42	45	196	90	12	51	85	7480
5	165	57	M48	48	51	235	100	16	64	102	9820
6	195	70	M56	56	60	273	130	19	76	127	13560
6	195	70	M64	64	68	273	130	19	76	127	17900
7	210	80	M72	72	76	315	140	22	90	140	22740
8	220	105	M80	80	84	365	150	40	110	180	28600
9	290	120	M90	90	95	415	175	45	125	205	36000

Fig. 4SC
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Finish:
- Rod Size Tapping:
- Pin Hole

Larger sizes available on request.
Bolts may be supplied in lieu of suspension pins unless specified.

Ancillary Equipment – Fig. 6AP, 810RW & 810C

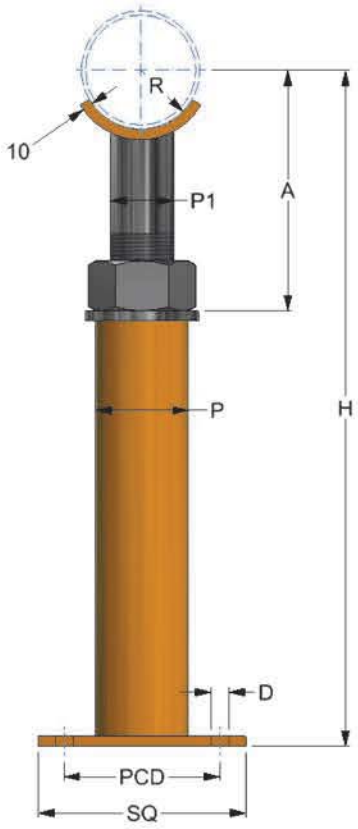


Fig. 6AP – Adjustable Pipe Support											
NPS	Pipe O/D	A	D	H		P	P1	PCD	R	SQ	Max Load Kg
				Min	Max						
65	76.1	184	14	398	1750	50	M48	110	38	150	75
80	88.9	191	14	405	1750	50	M48	110	45	150	110
90	101.6	197	18	411	1750	80	M48	150	51	200	150
100	114.3	196	18	420	1750	80	50NB	150	57	200	200
125	139.7	208	18	434	1750	80	50NB	150	70	200	305
150	168.3	223	18	450	1750	100	65NB	200	84	280	435
200	219.1	249	18	476	1750	100	65NB	200	110	280	725
250	273	276	18	503	1400	100	65NB	200	137	280	1250
300	323.9	302	18	529	1400	100	65NB	200	162	280	1785
350	355.6	318	18	545	1400	100	65NB	200	178	280	2300
400	406.4	343	18	570	1400	100	65NB	200	204	280	3190
450	457	370	22	603	1400	150	100NB	240	230	350	4150
500	508	395	22	627	1400	150	100NB	240	254	350	5310
550	558.8	421	22	652	1400	150	100NB	240	280	350	6650
600	610	446	22	678	1400	150	100NB	240	305	350	7985
650	660.4	471	22	703	1400	150	100NB	240	330	350	9730
700	711.2	497	22	729	1400	150	100NB	240	356	350	11470
750	762	522	22	781	1000	150	100NB	240	381	350	13210
800	812.8	548	22	816	1000	150	100NB	240	407	350	15370
900	914.4	600	22	832	1000	150	100NB	240	458	350	19680

Fig. 6AP
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Distance from Floor to Pipe Centre (Dim H):
- Finish:

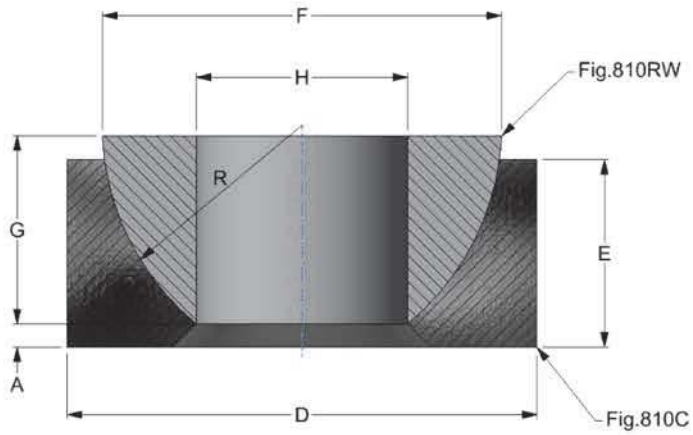


Fig. 810RW & 810C – Hemispherical Washer & Cup								
Rod Ø	Fig 810C		Fig 810RW			A	H	Max Load Kg
	D	E	F	G	R			
M6	25	9	19	8	10	3	8	135
M8	28	10	22	10	11	3	10	240
M10	32	12	25	12	12	5	12	380
M12	35	12	28	12	14	5	14	560
M16	41	16	34	16	17	6	18	1040
M20	54	19	44	19	22	6	22	1630
M24	67	25	57	25	28	8	26	2360
M30	86	32	76	32	38	10	33	3750
M36	100	35	80	35	40	10	40	5460
M42	102	38	89	38	44	12	46	7480
M48	120	40	100	40	50	12	52	9820
M56	130	45	110	45	55	15	60	13560
M64	150	50	120	50	60	15	68	17900
M72	165	55	135	55	68	15	76	22740
M80	180	60	150	60	75	20	84	28600
M90	200	70	170	70	85	20	95	36000

Fig. 810RW & 810C
Material: Malleable Iron Up To M30.
Carbon Steel M36 Up.

Please Specify:-
- Figure Number:
- Rod Ø:
- Finish:

Ancillary Equipment – Fig. 500, 501 & 510

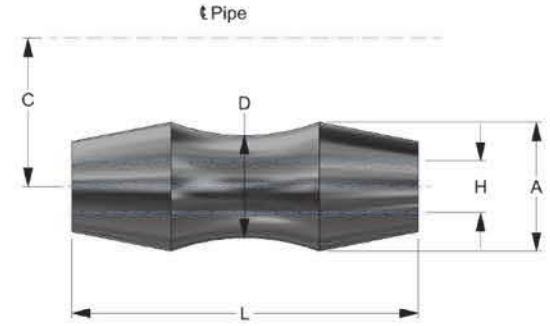


Fig. 500
Material: Cast Iron

Please Specify:-
- Figure Number:
- NPS:

Fig. 500 – Cast Pipe Roller

NPS	Pipe O/D	A	C	D	H	L	Rod Ø	Max Load Kg
25	33.7	20	27	15	11	25	M10	136
32	42.4	21	32	15	11	37	M10	136
40	48.3	22	35	16	11	40	M10	136
50	60.3	24	41	16	11	44	M10	136
65	76.1	29	49	21	14	60	M12	272
80	88.9	35	57	24	14	94	M12	272
100	114.3	35	71	24	14	94	M12	315
125	139.7	49	87	31	20	146	M16	315
150	168.3	49	103	31	20	146	M16	455
175	193.7	71	117	41	24	203	M20	455
200	219.1	69	130	38	24	228	M20	590
250	273	85	159	44	27	280	M24	770
300	323.9	100	189	50	27	330	M24	1043
350	355.6	120	213	66	27	361	M24	1395
400	406.4	130	240	67	27	412	M24	1395
450	457.2	138	267	70	27	463	M24	1900
500	508	152	295	76	33	514	M30	2050
550	558.8	164	326	84	33	577	M30	2375
600	609.6	183	365	92	33	615	M30	2700

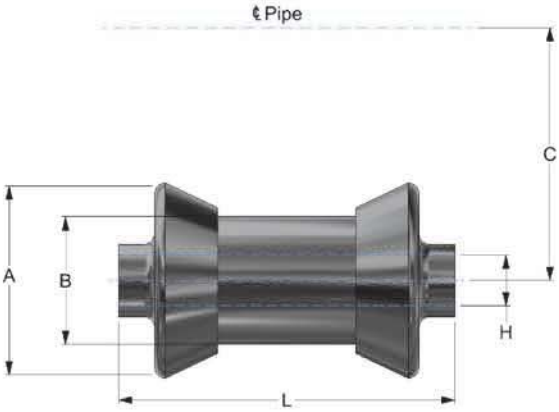


Fig. 501
Material: Cast Iron

Please Specify:-
- Figure Number:
- NPS:

Fig. 501 – Pipe Roller (Heavy Duty)

NPS	Pipe O/D	A	B	C	H	L	Rod Ø	Max Load Kg
50	60.3	45	32	46	14	67	M12	175
65	76.1	45	32	52	14	67	M12	175
80	88.9	45	32	62	14	67	M12	175
90	101.6	45	32	68	14	67	M12	175
100	114.3	54	38	71	14	93	M12	430
125	139.7	54	38	87	14	93	M12	430
150	168.3	54	38	102	14	93	M12	430
175	193.7	54	38	117	14	93	M12	430
200	219.1	90	52	133	22	153	M20	950
250	273	90	52	162	22	153	M20	950
300	323.9	98	58	190	26	205	M24	1385
350	355.6	98	58	206	26	205	M24	1385
400	406.4	115	80	235	32	232	M30	2255
450	457.2	115	80	263	32	232	M30	2255
500	508	115	80	292	32	232	M30	2255
550	558.8	112	80	318	38	255	M36	2765
600	609.6	112	80	350	38	255	M36	2765
650	660.4	136	104	380	44	320	M42	3400
700	711.2	136	104	406	44	320	M42	3400
750	762	136	104	438	44	320	M42	3400
800	812.8	159	112	460	50	379	M48	3400
900	914.4	159	112	514	50	379	M48	3400
1050	1066.8	159	112	590	50	379	M48	3400
1200	1219.2	159	112	667	50	379	M48	3400

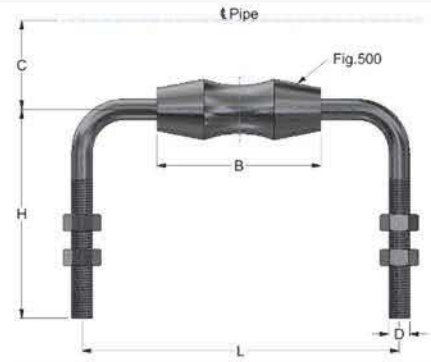


Fig. 510
Material: Carbon Steel Spindle, Cast Iron Roller

Please Specify:-
- Figure Number:
- NPS:

Fig. 510 – Roller Support

NPS	Pipe O/D	B	C	D	H	L	Max Load Kg
50	60.3	44	41	M10	95	115	136
65	76.1	60	49	M12	115	125	272
80	88.9	94	57	M12	115	150	272
100	114.3	94	71	M12	115	180	315
125	139.7	146	87	M16	118	215	315
150	168.3	146	103	M16	118	255	455
175	193.7	203	117	M20	135	300	455
200	219.1	228	130	M20	135	315	590
250	273	280	159	M24	140	380	770
300	323.9	330	189	M24	155	430	1043
350	355.6	361	213	M24	180	460	1395
400	406.4	412	240	M24	205	515	1395
450	457.2	463	267	M24	230	565	1900
500	508	514	295	M30	260	640	2050
550	558.8	577	326	M30	300	710	2375
600	609.6	615	365	M30	350	740	2700

Ancillary Equipment – Fig. 520 & 530

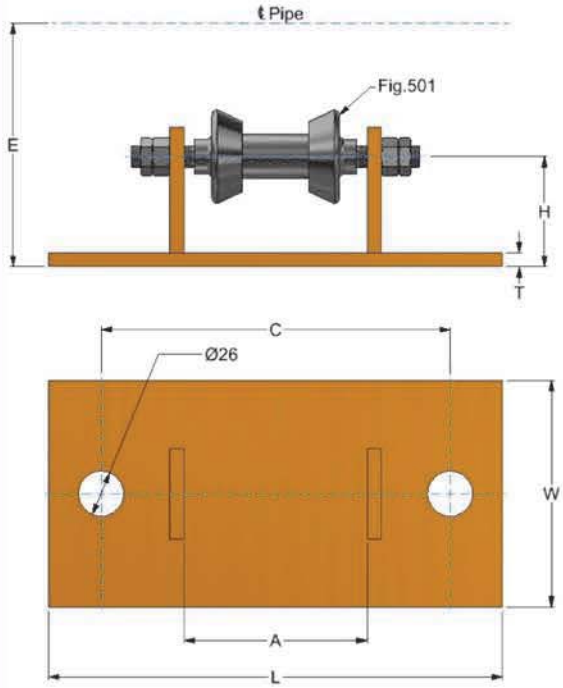
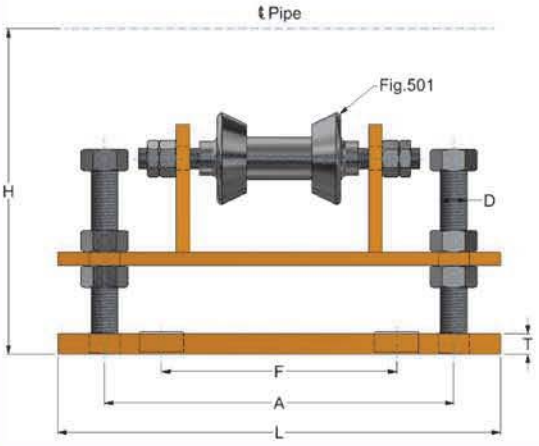


Fig. 520 – Roller Chair										
Size	NPS	Pipe O/D	A	C	E	H	L	T	W	Max Load Kg
1A	50	60.3	75	160	99	53	210	8	150	175
1A	65	73	75	160	105	53	210	8	150	175
1A	80	88.9	75	160	115	53	210	8	150	175
1A	90	101.6	75	160	121	53	210	8	150	175
1	100	114.3	105	200	134	63	255	8	150	430
1	125	139.7	105	200	150	63	255	8	150	430
1	150	168.3	105	200	165	63	255	8	150	430
1	175	193.7	105	200	180	63	255	8	150	430
2	200	219.1	160	100	233	100	205	10	150	950
2	250	273	160	100	262	100	205	10	150	950
3	300	323.9	210	145	313	123	265	10	200	1395
3	350	355.6	210	145	329	123	265	10	200	1395
4	400	406.4	242	170	380	145	305	12	200	2260
4	450	457.2	242	170	408	145	305	12	200	2260
4	500	508	242	170	437	145	305	12	200	2260
5	550	558.8	264	190	440	122	330	12	250	2765
5	600	610	264	190	472	122	330	12	250	2765
6	650	660.4	329	250	523	143	510	15	300	3400
6	700	711.2	329	250	549	143	510	15	300	3400
6	750	762	329	250	581	143	510	15	300	3400

Fig. 520
Material: Carbon Steel Plate and Spindle.
Cast Iron Roller.

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 530 – Adjustable Roller Chair										
Size	NPS	A	B	D	F	H Min	H Max	L	T	W	Max Load Kg
1A	50	155	100	M16	145	124	162	210	12	150	180
1A	65	155	100	M16	145	130	168	210	12	150	180
1A	80	155	100	M16	145	140	178	210	12	150	180
1A	90	155	100	M16	145	146	184	210	12	150	180
1	100	203	100	M16	190	159	197	255	12	150	430
1	125	203	100	M16	190	175	213	255	12	150	430
1	150	203	100	M16	190	190	228	255	12	150	430
1	175	203	100	M16	190	205	243	255	12	150	430
2	200	133	114	M20	130	264	294	205	15	150	955
2	250	133	114	M20	130	293	323	205	15	150	955
3	300	203	145	M20	187	349	414	265	20	200	1385
3	350	203	145	M24	187	368	429	265	20	200	1385
4	400	247	150	M24	230	424	488	305	25	200	2255
4	450	247	150	M24	230	452	516	305	25	200	2255
4	500	247	150	M24	230	481	545	305	25	200	2255
5	550	254	178	M30	248	489	555	330	25	250	2765
5	600	254	178	M30	248	521	588	330	25	250	2765
6	650	432	230	M30	425	572	666	510	25	300	3400
6	700	432	230	M30	425	598	692	510	25	300	3400
6	750	432	230	M30	425	630	724	510	25	300	3400



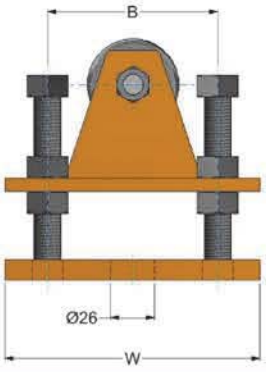


Fig. 530
Material: Carbon Steel Plate and Spindle.
Cast Iron Roller.

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Ancillary Equipment – Fig. 540, 550 & 580

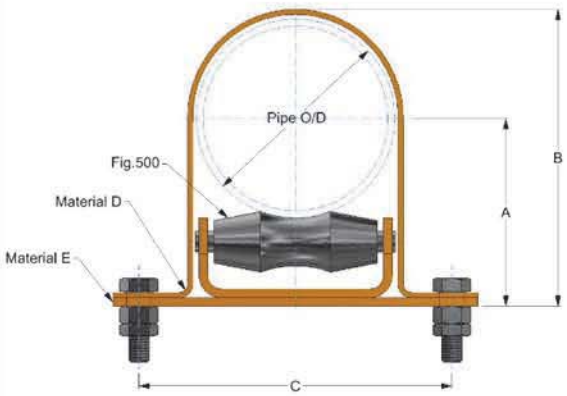


Fig. 540 – Roller Chair & Guide Strap								
NPS	Pipe O/D	A	B	Bolt	C	D	E	Max Load Kg
65	76.1	81	128	M12x40	140	40x3	40x5	290
80	88.9	88	137	M12x40	180	40x3	40x5	320
100	114.3	101	163	M12x40	180	40x3	40x5	340
125	139.7	125	205	M16x50	230	50x3	50x6	340
150	168.3	141	237	M16x50	230	50x3	50x6	480
200	219.1	200	322	M20x60	375	50x6	50x10	580
250	273	250	400	M24x70	430	50x6	50x12	770
300	323.9	289	469	M24x70	490	50x10	50x12	1060
350	355.6	335	530	M24x70	510	70x10	70x12	1380
400	406.4	363	586	M24x70	570	70x10	70x12	1790
450	457.2	410	665	M24x70	645	100x10	100x12	1880
500	508	440	720	M24x70	660	100x10	100x12	1965
600	609.6	515	850	M24x70	790	100x10	100x12	2750

Fig. 540
Material: Carbon Steel Flat Bar and Spindle.
Cast Iron Roller.

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 550 – Roller Support								
NPS	Pipe O/D	B	C	D	E	H	L	Max Load Kg
125	139.7	93	87	M12	54	115	160	315
150	168.3	93	102	M12	54	115	160	455
175	193.7	93	117	M12	54	115	160	455
200	219.1	153	133	M20	90	140	250	590
250	273	153	162	M20	90	140	250	770
300	323.9	205	190	M24	98	155	310	1043
350	355.6	205	206	M24	98	155	310	1225
400	406.4	232	235	M30	115	180	360	1395

Fig. 550
Material: Carbon Steel Spindle.
Cast Iron Roller.

Please Specify:-
- Figure Number:
- NPS:
- Finish:

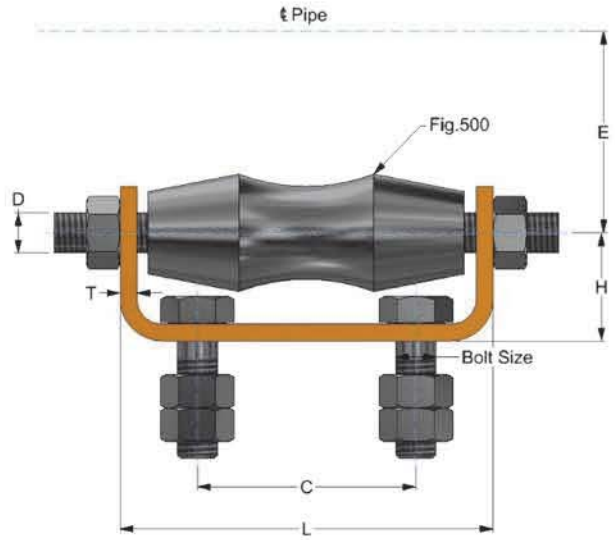


Fig. 580 - Roller Chair									
NPS	Pipe O/D	Bolt Size	C	D	E	H	L	Steel Size T	Max Load Kg
50	60.3	M10	45	M10	41	38	100	30x6	136
65	76.1	M10	45	M12	49	40	116	30x6	272
80	88.9	M10	45	M12	57	55	135	40x6	272
100	114.3	M10	65	M12	71	55	135	40x6	272
125	139.7	M12	75	M16	87	70	210	40x10	315
150	168.3	M12	85	M16	103	70	210	50x10	455
175	193.7	M16	100	M20	117	76	255	50x10	455
200	219.1	M16	115	M20	130	76	270	50x10	590
250	273	M20	125	M24	159	92	330	50x12	770
300	323.9	M20	150	M24	189	105	390	50x12	1043

Fig. 580
Material: Carbon Steel Plate and Spindle.
Cast Iron Roller.

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Ancillary Equipment – Fig. 560, 700MR, 710MR & 720MR

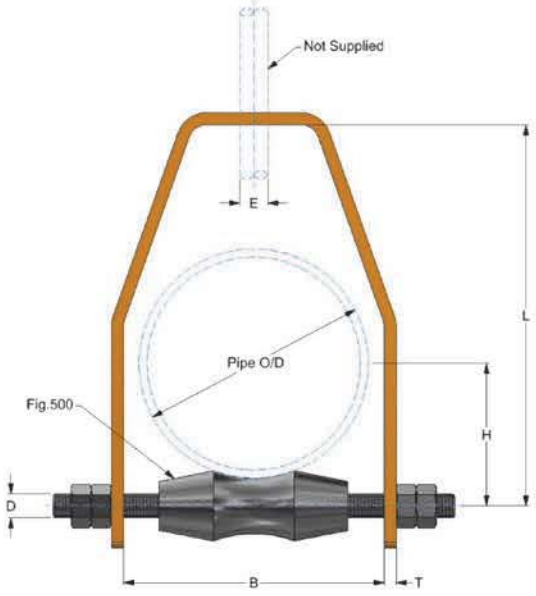


Fig. 560 - Roller Hanging Cage								
NPS	Pipe O/D	B	D	E	H	L	Steel Size T	Max Load Kg
25	33.7	45	M10	M10	27	89	30x6	60
32	42.4	55	M10	M10	32	89	30x6	60
40	48.3	60	M10	M10	35	95	30x6	60
50	60.3	65	M10	M10	41	108	30x6	70
65	76.1	80	M12	M12	49	124	40x6	105
80	88.9	115	M12	M12	57	160	40x6	140
100	114.3	130	M12	M12	71	190	40x6	215
125	139.7	170	M16	M16	87	213	50x6	310
150	168.3	200	M20	M16	103	250	50x6	355
175	193.7	225	M20	M20	117	283	50x6	355
200	219.1	255	M20	M20	130	319	50x10	355
250	273	305	M20	M24	159	381	50x12	435
300	323.9	355	M24	M24	189	435	50x15	435
350	355.6	390	M24	M24	213	467	65x15	545
400	406.4	440	M24	M24	240	520	80x15	635

Fig. 560
Material: Carbon Steel Flat Bar and Spindle
Cast Iron Roller

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 700MR – Pipe Ring				
NPS	Pipe O/D	H	Max Load Kg	T Rod Ø
10	17.1	24	82	M10
15	21.3	26	82	M10
20	26.6	28	82	M10
25	33.4	32	82	M10
32	42.1	36	82	M10
40	48.2	40	82	M10
50	60.3	46	82	M10
65	73	57	218	M12
80	88.9	65	218	M12
100	114.3	84	218	M12

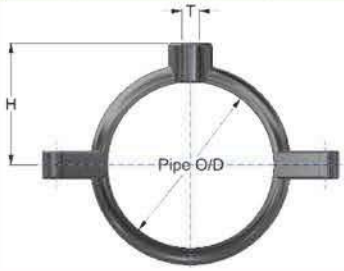


Fig. 700MR
Material: Malleable Iron

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Fig. 710MR – Pipe Ring Plate								
No	A	B	H1	H2	C	E	Max T	Max Load Kg
1	62	25	3	12	45	8	M10	82
2	62	25	3	12	45	8	M12	218
2A	70	30	3	12	48	8	M12	218
3	76	35	3	16	55	8	M20	250

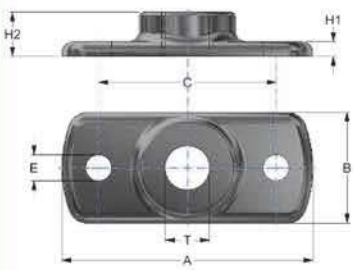


Fig. 710MR
Material: Malleable Iron

Please Specify:-
- Figure Number:
- NPS:
- Tapping T:
- Finish:

Fig. 720MR – Extended Pipe Ring					
NPS	Pipe O/D	H	C	Max Load Kg	P
10	17.1	106	45	82	M10
15	21.3	108	45	82	M10
20	26.6	111	45	82	M10
25	33.4	114	45	82	M10
32	42.1	119	45	82	M10
40	48.2	122	45	82	M10
50	60.3	128	45	82	M10
65	73	133	55	218	M12
80	88.9	141	55	218	M12
100	114.3	160	55	218	M12

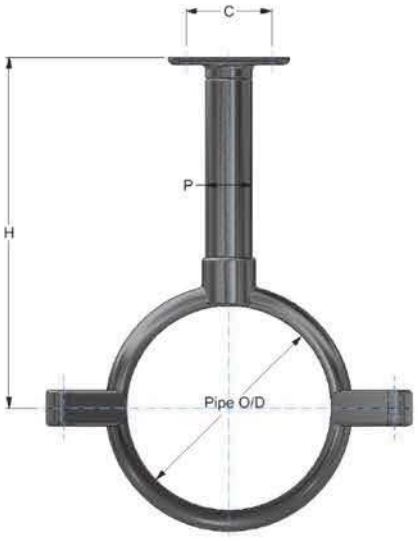


Fig. 720MR
Material: Malleable Iron Ring & Plate
Carbon Steel Rod

Please Specify:-
- Figure Number:
- NPS:
- Tapping Size P:
- Finish:

Ancillary Equipment – Fig. 127 & 128

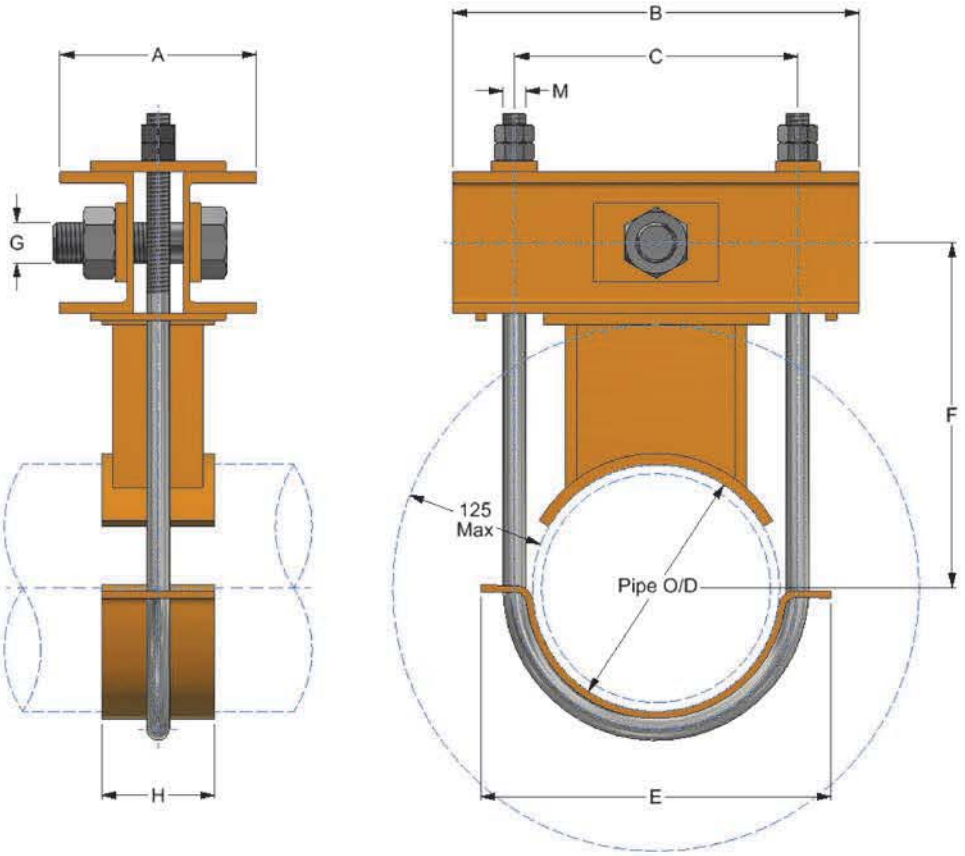


Fig. 127 – Standard Yoke Pipe Clamp											
NPS	Pipe O/D	A	B	C	D	E	F	G	Max Load Kg		
									550°C	580°C	600°C
200	219	184	360	256	M20	310	306	M36	5090	4635	3580
250	273	184	410	310	M20	360	334	M36	5090	4635	3580
300	323.9	184	460	362	M20	410	359	M36	5090	4635	3580
350	355.6	220	540	398	M24	460	387	M48	7320	7150	5520
400	406.4	220	590	448	M24	510	412	M48	7320	7150	5520
450	457.2	220	640	500	M24	570	438	M48	7320	7150	5520
500	508	220	705	562	M30	645	465	M56	11450	11170	8620
550	558.8	220	780	612	M30	725	490	M56	11450	11170	8620
600	609.6	220	805	664	M30	750	516	M56	11450	11170	8620
650	660.4	228	875	721	M30	805	556	M56	11450	11170	8620
700	711.2	228	925	772	M30	855	581	M56	11450	11170	8620
750	762	228	975	826	M30	915	612	M56	11450	11170	8620
800	812.8	236	1035	881	M36	970	638	M64	16490	15200	11730
900	914.4	236	1140	982	M36	1070	690	M64	16490	15200	11730

Fig. 127
Material: Yoke Carbon Steel.
U-Bolt Stainless Steel
Spacer Alloy Steel

Please Specify:-
- Figure Number:
- NPS:
- Insulation Thickness:
- Finish:

Fig. 128 – Heavy Duty Yoke Pipe Clamp											
NPS	Pipe O/D	A	B	C	D	E	F	G	Max Load Kg		
									550°C	580°C	600°C
200	219	220	360	260	M24	330	318	M48	7320	7150	5520
250	273	228	420	320	M30	390	346	M56	11450	11170	8620
300	323.9	228	475	372	M30	440	371	M56	11450	11170	8620
350	355.6	228	550	404	M30	465	400	M56	11450	11170	8620
400	406.4	228	600	454	M30	515	425	M56	11450	11170	8620
450	457.2	228	650	506	M30	580	451	M56	11450	11170	8620
500	508	236	710	568	M36	650	491	M64	16490	15200	11730
550	558.8	236	795	618	M36	730	529	M64	16490	15200	11730
600	609.6	236	815	670	M36	755	555	M64	16490	15200	11730
650	660.4	244	880	735	M42	815	582	M72	22440	19300	14910
700	711.2	244	950	785	M42	865	607	M72	22440	19300	14910
750	762	244	1115	838	M42	930	633	M72	22440	19300	14910
800	812.8	244	1160	888	M42	980	657	M72	22440	19300	14910
900	914.4	244	1215	988	M42	1080	709	M72	22440	19300	14910

Fig. 128
Material: Yoke Carbon Steel.
U-Bolt Stainless Steel
Spacer Alloy Steel

Please Specify:-
- Figure Number:
- NPS:
- Insulation Thickness:
- Finish:

Ancillary Equipment – Fig. 125, 126 & 131

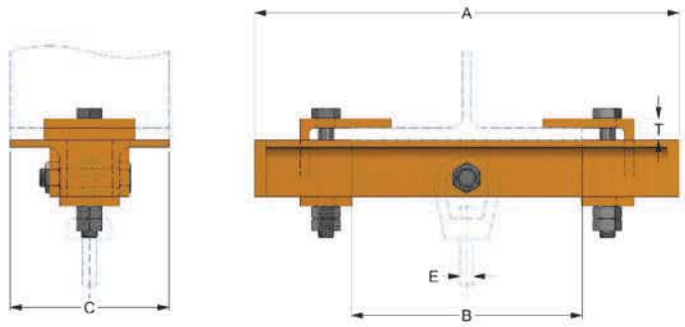


Fig. 125 – Adjustable Beam Attachment					
A	B	C	E (Max)	T	Max Load Kg.
B+150	*	140	M16	*	1045

Fig. 125
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Beam Width B*:
- Beam Flange Thickness T*:
- Finish:

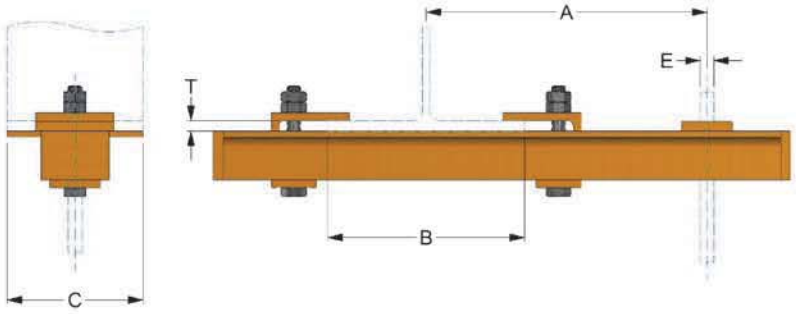


Fig. 126 – Adjustable Beam Attachment					
A	B	C	E (Max)	T	Max Load Kg.
Min = B/2 + 120	*	140	M16	*	1045

Fig. 126
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Beam Width B*:
- Beam Flange Thickness T*:
- Finish:

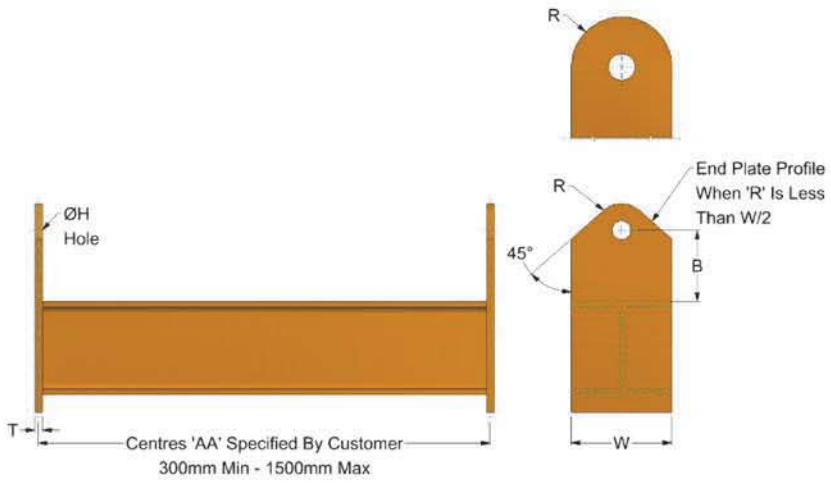


Fig. 131 – Trapeze Beam			
Size	Beam Sizes	End Plate	
	UC/SHS/HEB	W	B
1	80x80x6.3 SHS	90	65
2	100x100x20.4 HEB	140	90
3	120x120x26.7 HEB	170	120
4	152x152x30 UC	170	120
5	203x203x46 UC	225	150
6	203x203x71 UC	225	160
7	305x305x97 UC	325	190
8	356x368x153 UC	390	220

Fig. 131
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Centres:
- Hanging Rod Ø:
- Finish:

Fig. 131 – Load Table																
Size	Beam Size	Maximum Load (Kg) Rod Centres 'AA' (mm)														
		300	350	400	450	500	550	600	650	700	750	900	1050	1200	1350	1500
1	80x80	4075	3465	3055	2750	2445	2240	2140	1935	1835	1730	1425	1220	1020	915	815
2	100x100	6930	5910	5200	4585	4075	3770	3365	3160	2955	2750	2345	1935	1730	1525	1325
3	120x120	10500	9380	8155	7240	6525	5910	5400	4995	4690	4385	3670	3055	2750	2445	2140
4	152x152	17335	14985	13560	12030	10910	9890	9075	8360	7750	7240	6015	5200	4485	3975	3670
5	203x203			21210	19575	17640	16005	14680	13560	12540	11725	9785	8360	7340	6525	5810
6	203x203					29060	26510	24265	22430	20800	19370	16210	13865	12135	10805	9685
7	305x305							38745	35790	33240	30995	25900	22225	19370	17230	15495
8	356x368									64750	60365	50370	43235	37830	33650	30285

Fig. 131 – Rod Size Table														
Rod Size OD	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
ØH	12	14	18	22	26	32	39	45	51	60	68	76	84	94
R	25	25	25	30	35	45	65	70	85	90	95	105	120	135
T	10	10	10	12	12	12	15	15	20	20	20	25	25	30
Max Load Per Rod (Kg)	380	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740	28600	36000

Ancillary Equipment – Fig. 129 & 130

Fig. 129 – Fabricated Trapeze Support

Size	Channel Size	Maximum Load in Kg for Rod Centres (mm)														
		300	350	400	450	500	550	600	650	700	750	900	1050	1200	1350	1500
1	76x38	4075	3465	3055	2750	2445	2240	2140	1935	1835	1730	1425	1220	1020	915	815
2	100x50	6930	5910	5200	4585	4075	3770	3365	3160	2955	2750	2345	1935	1730	1525	1325
3	125x65	10500	9380	8155	7240	6525	5910	5400	4995	4690	4385	3670	3055	2750	2445	2140
4	150x75	17335	14985	13560	12030	10910	9890	9075	8360	7750	7240	6015	5200	4485	3975	3670
5	200x75			21210	19575	17640	16005	14680	13560	12540	11725	9785	8360	7340	6525	5810
6	260x75					29080	26510	24265	22430	20800	19370	16210	13865	12135	10805	9685
7	300x100							38745	35790	33240	30995	25900	22225	19370	17230	15495
8	430x100									64750	60365	50370	43235	37830	33650	30285

Rod Ø	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
Hole Ø	16	18	22	30	33	43	48	56	64	74	84	94	102	112
Max Load Per Rod Kg	380	560	1040	1630	2360	3750	5480	7480	9820	13560	17900	22740	28600	36000

Channel Size		Spacer Plate						Max Rod Ø
Size	Channel	A	E	B	D	C	F	
1	76x38	20	6	120	120	20	55	30
2	100x50	30	6	140	140	20	70	42
3	125x65	40	8	190	190	25	85	48
4	150x75	40	8	200	200	25	85	48
5	200x75	40	8	230	230	30	110	56
6	260x75	50	10	250	250	40	135	64
7	300x100	50	10	320	320	45	150	72
8	430x100	60	15	340	340	60	180	90

Fig. 129
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Rod Centres:
- Rod Ø:
- Finish:

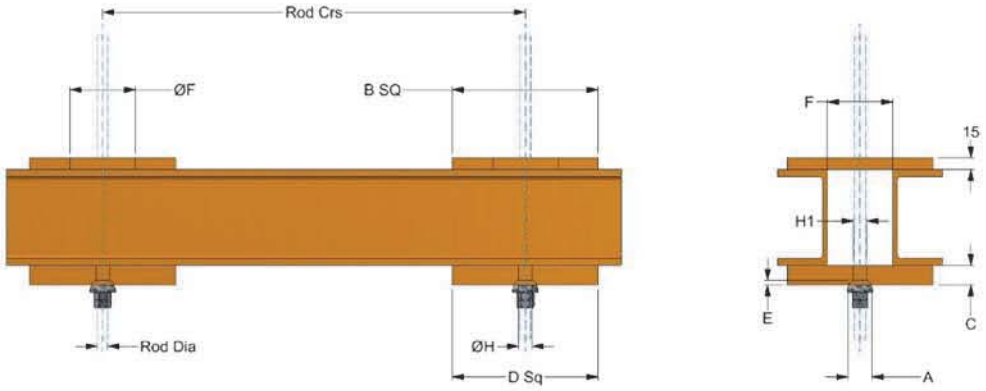


Fig. 129

Fig. 130 – Trapeze Beam

Size	Beam Size	Maximum Load in Kg for Rod Centres (mm)														
		300	350	400	450	500	550	600	650	700	750	900	1050	1200	1350	1500
1	HEA 100	4090	3485	3100	2900	2550	2350	2200	2000	1900	1820	1520	1300	1110	1030	905
2	HEB 100	6990	6000	5250	4600	4200	3850	3500	3250	3100	2900	2500	1935	1820	1610	1420
3	HEB 120	11000	9400	8200	7400	6650	6100	5550	5100	4800	4500	3800	3100	2900	2550	2300
4	152x152x30 UC	17500	15000	14000	12200	11000	10000	9250	8450	7900	7400	6150	5320	4600	4100	3800
5	203x203x46 UC			22000	19800	17800	16200	14820	13700	12600	11900	9920	8490	7450	6650	5950
6	203x203x71 UC					29200	26700	24400	22600	21000	19500	16400	14050	12300	10950	9800
7	305x305x97 UC							38900	35900	33400	31500	26100	22400	19500	17400	15620
8	356x368x153 UC									64900	60500	50500	43450	37950	33820	30450

Rod Ø	M10	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72	M80	M90
A	40	40	40	45	45	55	65	75	80	85	90	100	105	115
Max Load Per Rod Kg	385	565	1050	1635	2370	3755	5475	7495	9840	13625	18010	22805	28700	36250

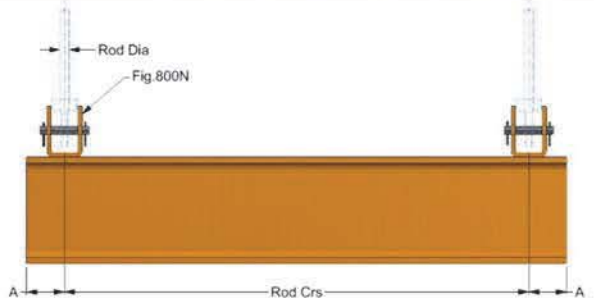


Fig. 130

Fig. 130
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Rod Centres:
- Rod Ø:
- Finish:

Ancillary Equipment – Fig. 610, 620 & 630

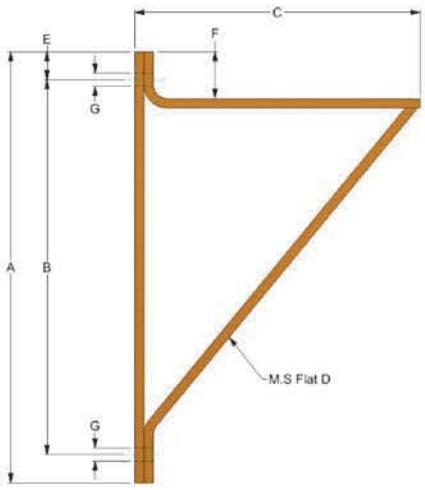


Fig. 610 – Steel Bracket							
Size	A	B	C	D	E	F	G
1	460	380	305	100x10	30	76	14
2	610	535	460	100x10	30	76	14
3	760	685	610	100x12	30	76	18
4	915	840	760	100x12	30	76	18
5	1070	990	915	100x15	30	76	22

Fig. 610
Material: Carbon Steel

Maximum Load: 230 Kg

Please Specify:-
- Figure Number:
- Size:
- Finish:

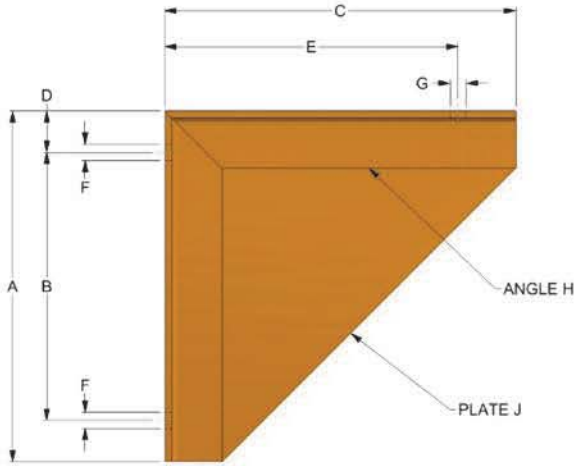


Fig. 620 – Wall / Steel Bracket								
Size	A	B	C	D	F	Angle H	Plate J	Max Load Kg
1	305	230	305	50	14	50x50x6	6	310
2	460	380	460	50	14	50x50x6	6	320
3	610	520	610	50	18	50x50x8	6	550
4	760	645	760	65	18	60x60x10	6	600
5	915	780	915	75	22	80x80x10	10	850

Fig. 620
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Distance from wall to centre of pipe (dim. E):
- Hole Size G:
- Finish:

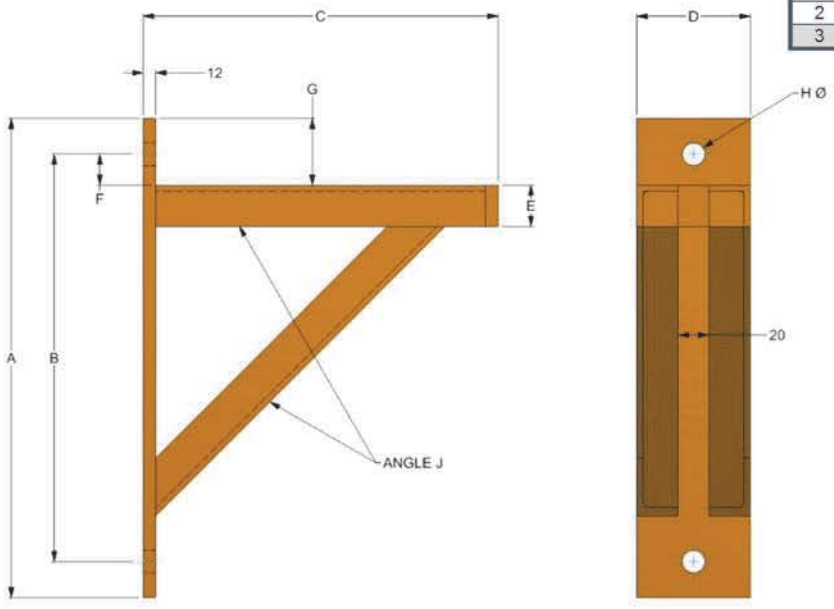


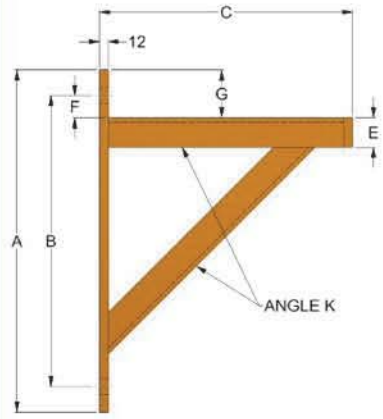
Fig. 630 Welded Steel Bracket (Moderate Load)									
Size	A	B	C	D	E	F	G	H	J
1	465	395	305	110	40	30	65	22	40x40x5
2	615	545	460	130	50	30	65	22	50x50x6
3	770	700	610	130	50	30	65	22	50x50x6

Fig. 630
Material: Carbon Steel

Maximum Load: 700 Kg

Please Specify:-
- Figure Number:
- Size:
- Finish:

Ancillary Equipment – Fig. 640, 703 & 805



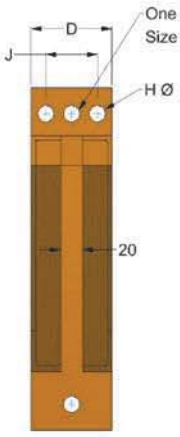


Fig. 640 Welded Steel Bracket (Heavy Load)										
Size	A	B	C	D	E	F	G	H	J	K
1	470	390	305	110	40	30	70	22	—	40x40x6
2	615	545	460	130	50	35	70	22	70	50x50x8
3	760	700	610	130	65	40	70	26	65	50x50x8
4	925	845	765	130	65	40	80	26	65	50x50x8
5	1075	990	915	160	100	40	80	26	90	65x65x10
6	1270	1170	1065	160	100	40	90	26	90	65x65x10

Fig. 640
Material: Carbon Steel

Maximum Load: 1360 Kg

Please Specify:-
- Figure Number:
- Size:
- Finish:

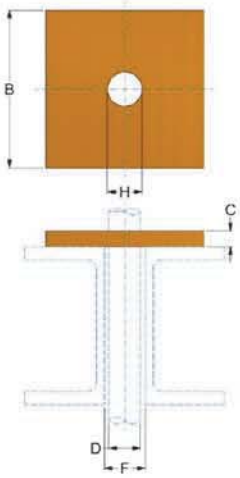
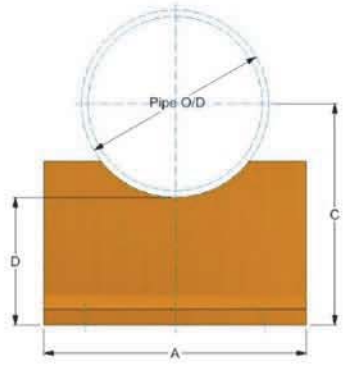


Fig. 805
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Rod Ø:
- Finish:

Fig. 805 – Steel Square Plate						
Size	B Sq	C	D	F	H	Max Load Kg
1	80	6	M10	15	12	380
2	80	6	M12	18	14	560
3	80	10	M16	22	18	1040
4	100	10	M20	26	22	1630
6	100	12	M24	32	26	2360
7	100	15	M30	38	32	3750
9	130	15	M36	48	40	5460
10	130	20	M42	54	46	7480
11	130	20	M48	64	52	9820
12	150	20	M56	70	60	13560
13	200	30	M64	78	68	17900
14	200	30	M72	92	76	22740
15	250	30	M80	110	84	28600
16	300	40	M90	120	94	36000
17	300	40	M100	140	104	44700

Fig.805: For non-angulation of sling rod.



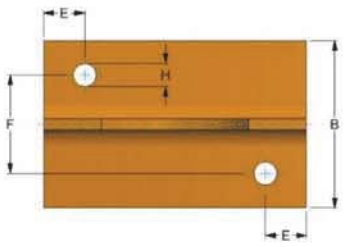


Fig. 703 – Pipe Chair										
NPS	Pipe O/D	A	B	C	D	E	F	H	Cut from UB Size	Max Load Kg
80	88.9	110	102	110	65	20	60	12	254x102x28	210
100	114.3	160	102	135	78	25	60	14	254x102x28	270
125	139.7	190	102	155	85	25	60	14	254x102x28	590
150	168.3	225	102	168	84	25	60	14	305x102x28	680
200	219.1	275	102	205	95	35	60	18	305x102x28	990
250	273	330	140	230	94	35	80	18	406x140x46	1400
300	323.9	380	140	270	108	35	80	18	406x140x46	1700

Fig. 703
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Ancillary Equipment – Fig. 690, 700, 701 & 702

Fig.690

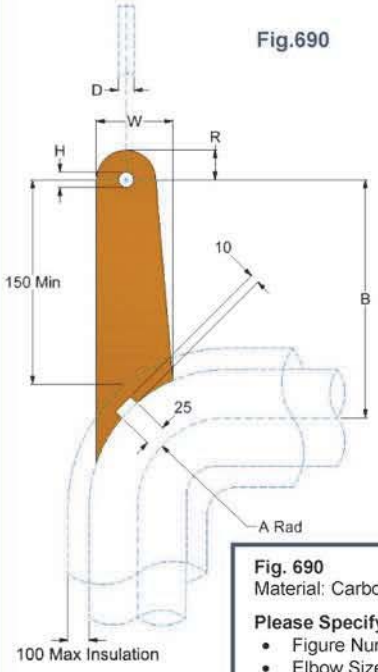


Fig. 690
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Elbow Size:
- Rod Ø:
- Finish:

Fig. 690 – Elbow Hanger (SRWE)											
D Rod	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72
Max Load Kg	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740
Thickness	6	10	10	12	15	20	25	25	25	25	25
W	90	90	90	125	125	175	175	215	220	260	300
R	25	35	40	50	60	75	85	95	110	130	150
H	15	18	22	27	32	39	48	53	59	69	79

Fig. 690 – Elbow Hanger (SRWE)													
NPS	65	80	90	100	125	150	200	250	300	350	400	450	500
Pipe O/D	76.1	88.9	101.6	114.3	139.7	168.3	219.1	273	323.9	355.6	406.4	457	508
B	278	278	280	288	292	297	308	320	327	328	337	342	354
A	64	76	89	102	127	152	203	254	305	356	406	457	508

Fig. 690 – Elbow Hanger (LRWE)											
D Rod	M12	M16	M20	M24	M30	M36	M42	M48	M56	M64	M72
Max Load Kg	560	1040	1630	2360	3750	5460	7480	9820	13560	17900	22740
Thickness	6	10	10	12	15	20	25	25	25	25	25
W	90	90	90	125	125	175	175	200	220	260	300
R	25	35	40	50	60	75	85	95	110	130	150
H	15	18	22	27	32	39	48	53	59	69	79

Fig. 690 – Elbow Hanger (LRWE)													
NPS	65	80	90	100	125	150	200	250	300	350	400	450	500
Pipe O/D	76.1	88.9	101.6	114.3	139.7	168.3	219.1	273	323.9	355.6	406.4	457	508
B	264	268	270	272	268	266	262	257	245	226	220	215	205
A	95	114	133	152	190	229	305	381	457	533	610	686	762

Fig.700 / 701

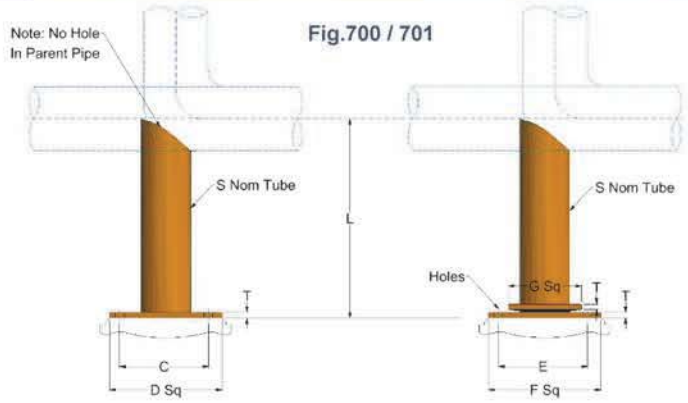


Fig. 700 / 701 – Rigid / Sliding Base Support											
NPS	Pipe O/D	Max L	C	D	E	F	G	Holes H	T	S Nom Tube	Max Vertical Load Kg
65	76.1	300	114	150	165	200	100	2 x 14	6	50	205
80	88.9	300	114	150	165	200	100	2 x 14	6	50	365
90	101.6	300	114	150	165	200	100	2 x 14	6	50	454
100	114.3	600	152	200	215	265	130	4 x 22	10	80	544
125	139.7	600	152	200	215	265	130	4 x 22	10	80	907
150	168.3	600	152	200	215	265	130	4 x 22	10	80	1134
200	219.1	600	203	250	250	300	160	4 x 22	10	100	1360
250	273	600	203	250	250	300	190	4 x 22	10	150	1724
300	323.9	600	241	300	250	300	190	4 x 22	10	150	1814
350	355.6	600	241	300	300	350	220	4 x 22	12	150	2721
400	406.4	900	290	350	300	350	240	4 x 22	12	200	2948
450	457	900	290	350	300	350	240	4 x 22	12	200	3175
500	508	1100	330	400	360	430	300	4 x 26	15	250	3630
600	610	1100	330	400	360	430	300	4 x 26	15	250	4080

Note: Please specify if being used on horizontal pipe, either long radius elbow or short radius elbow.

Fig. 700 & 701
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Height L:
- Finish:

Fig.702

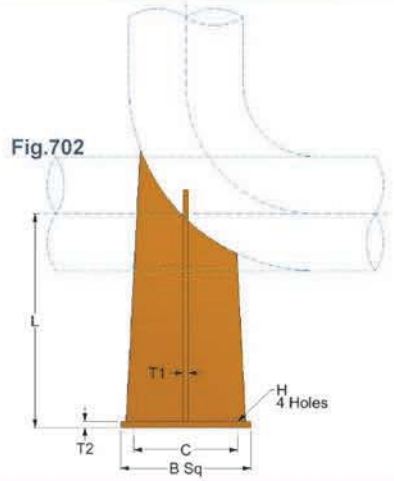


Fig. 702 – Base Anchor								
NPS	Pipe O/D	B	C	H	T1	T2	Max Vertical Load Kg	Max L
100	114.3	150	115	14	6	10	600	250
125	139.7	200	150	22	6	10	900	250
150	168.3	200	150	22	6	10	1200	300
200	219.1	250	200	22	10	12	1500	300
250	273	250	200	22	10	12	1750	350
300	323.9	300	240	22	10	12	2250	350
350	355.6	300	240	22	10	12	3000	400
400	406.4	350	290	22	10	12	3500	450
450	457	400	340	22	10	12	4000	500
500	508	500	420	26	10	15	4500	550
600	610	600	520	26	10	15	5000	650

Note: Please specify if being used on horizontal pipe, either long radius elbow or short radius elbow.

Fig. 702
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Height L:
- Finish:

DYNAMIC RESTRAINTS

Hydraulic Snubbers

Description

Hydraulic snubbers are dynamic linear supports designed to protect piping systems and components by restraining undesirable displacements due to the following:

- Seismic / earthquake loadings
- Water Hammer effects
- Violent thrusts due to safety valve discharges
- Extreme wind conditions
- Other similar conditions

The snubbers allow free movement during the thermal displacement, but lock up and transfer the energy to the fixed structure when seismic loadings occur; this is achieved by using the snubbers' sophisticated valve mechanism.

Once the disturbance has passed, the device returns to its initial state and enables slow movements once again. In this way the snubber provides temporary additional support to the installation in order to prevent it from entering into resonance and thereby minimising the risk of breaking due to vibrations.

Hydraulic Snubbers are used on:

- Piping
- Tanks
- Control Valves
- Stream Generators
- Safety Valves
- Pumps, motors, etc.

Snubber selection considerations

Dynamic Load

At normal loading, check that the snubber is capable of handling dynamic forces during normal operation.

Stroke

The selected snubber must be able to accommodate the maximum travel between the assembly position and the extreme operation position.

Available space

Ensure that once the snubber is in place, the expected movements are achievable within the space envelope.
An extension adaptor should be included If the space available is larger than the travel capacity of the snubber.

Snubber Types

Our hydraulic snubbers are available as standard configurations, but large loads and extended travels can be accommodated. In the first instance please email your snubber requirements to enquiries@qps.co.uk; we will then provide technical recommendations, generate specific drawings and provide prices / delivery periods.

Dynamic Restraints Index

Fig.	Page	Desc.	Pictorial
230	123	Sway Brace	
240	124/125	Rigid Strut	
250	128	Yoke Clamp	
260/ H	126/127	Pipe Clamp	

Fig.	Page	Desc.	Pictorial
260A/AH	126/127	Pipe Clamp	
280	129	Rigid Strut Attachment	
290	129	Pipe Whip Restraint	
300R 301R 302R	130/131	Riser Clamp	

Dynamic Equipment – Fig. 230

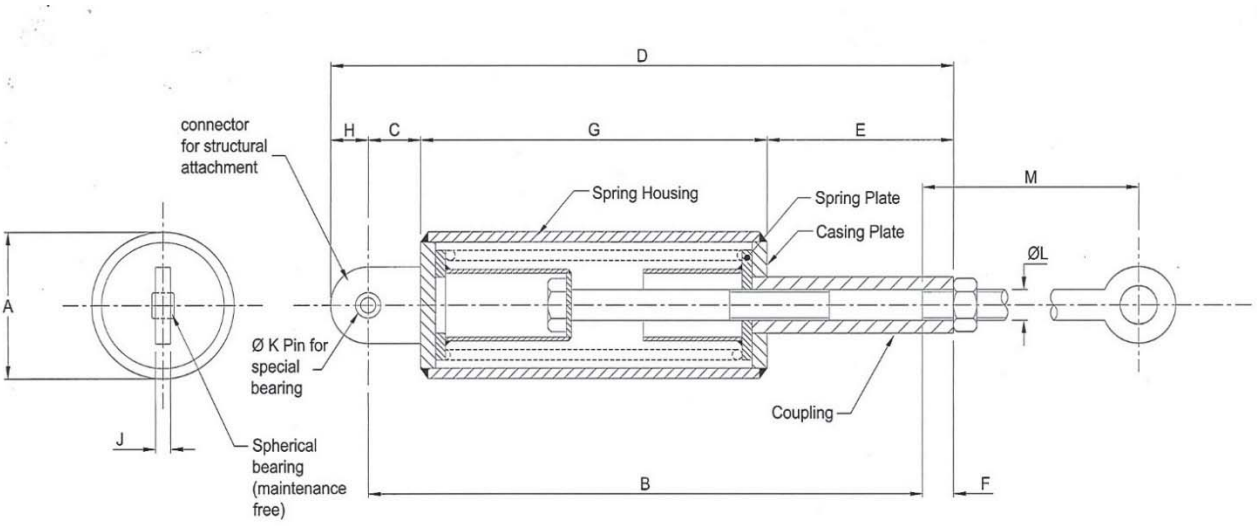


Fig.230 – Sway Brace

Size	Pipe Size	Preload Kg	Spring Rate Kg mm	Max Force Kg	Max Rod Length at Max force M mm	L	Pin Ø K	Plate Thick J	A	RTO B	C	D	E	F	G	H	Use With Structural Attachment
1	50-90	23	0.89	90	1500	20	12	12	115	345	42	395	100	25	225	25	Fig.280-15
2	100-200	68	2.68	270	1000	24	12	12	115	360	42	410	120	25	225	25	Fig.280-15
3	225-600	204	8.04	815	1000	24	12	12	115	450	42	500	150	25	280	25	Fig.280-15
4	225-600	400	16.07	1630	1000	30	20	25	168	430	58	500	140	40	270	30	Fig.280-55
5	225-600	614	24.48	2540	1000	36	20	25	168	470	58	555	150	50	312	30	Fig.280-55
6	225-600	820	32.66	3270	1000	36	20	25	168	520	58	605	150	50	362	30	Fig.280-55

Our Spring Sway Brace is recommended for controlling vibration, absorbing shock loading, or restraining the pipe movement due to thermal expansion. The Sway Brace is available in six sizes with a maximum load of 3270 kg.

The Sway Brace should be in a neutral position when the pipe is at operating condition, at which time the two spring plates should be in contact with the end plates. Any adjustment required should be undertaken by use of the load coupling.

Sizes available: 1 to 6
Preset Loads: 23kg to 820kg
Maximum Force: 90kg to 3270kg

Features

- Vibration is dampened with an immediate opposing force thus allowing the pipe to return to its normal position.
- All units have 75mm travel in either direction.
- The preloaded spring provides two-way movement
- Accurate neutral adjustment is assured
- A wide range of Surface Finishes is available
- The Sway Brace is shipped ready for installation.

Optional Features

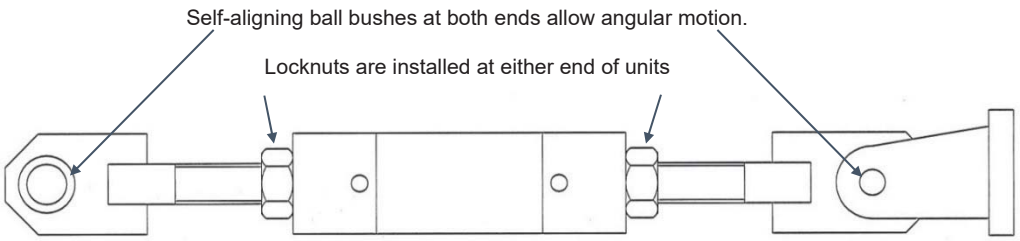
- Larger sizes can be supplied to suit.

Fig. 230
Material: Carbon Steel

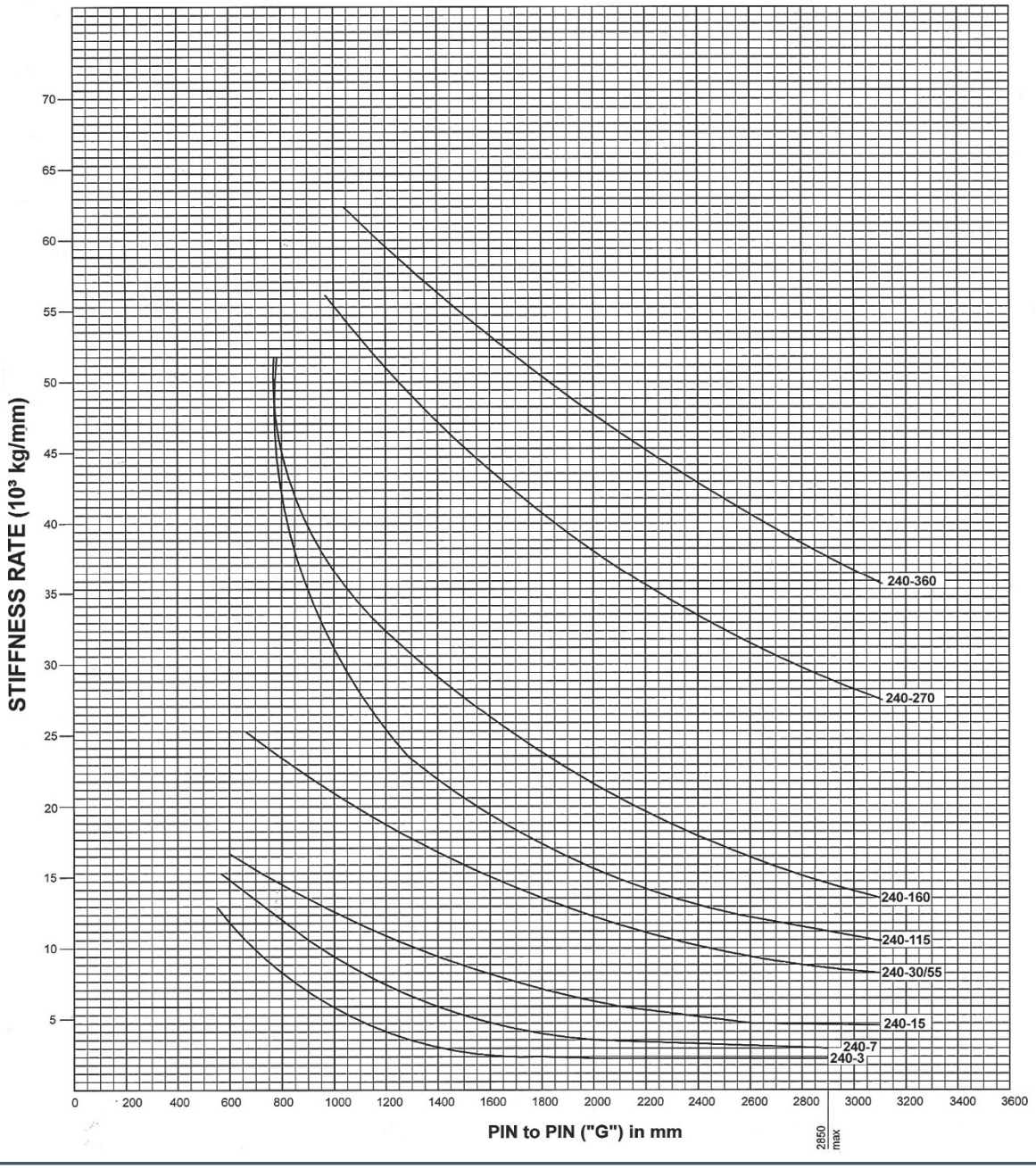
Please Specify:-

- Figure Number:
- Size:
- Finish:

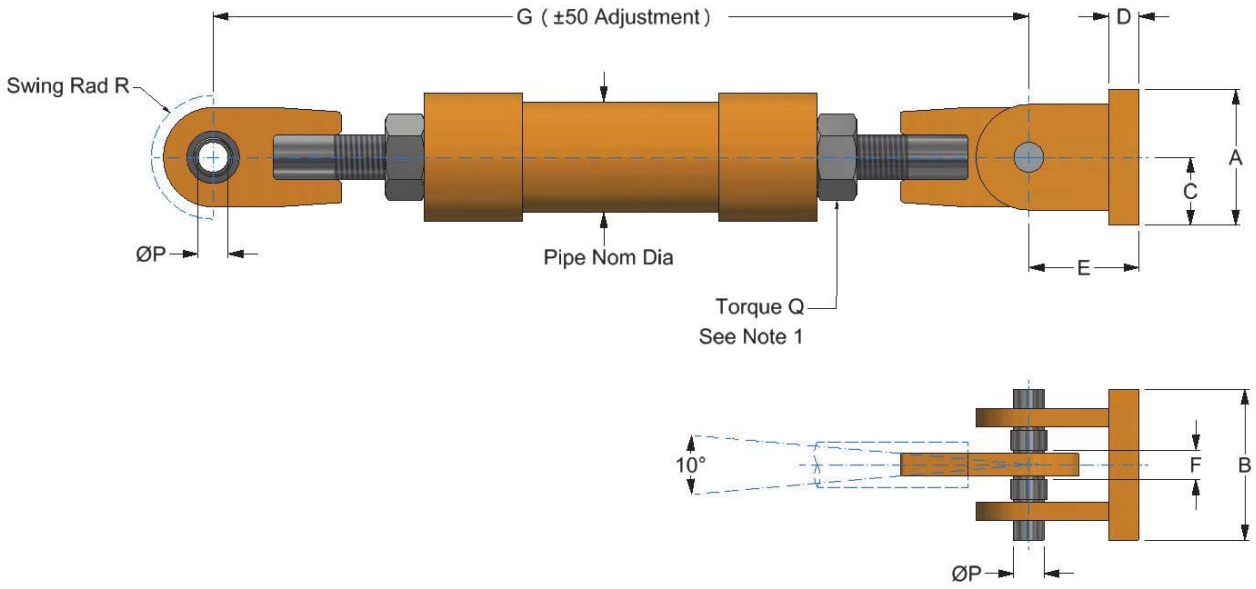
Dynamic Equipment – Fig. 240



Our range of Rigid Struts is available in ten sizes ranging from 300Kg to 60,000Kg.
Stiffness values shown are for Pin to Pin dimensions shown.



Dynamic Equipment – Fig. 240



Description
Our Rigid Strut is used to restrain movement of piping in one direction whilst providing for movement due to thermal expansion or contraction in another direction.

Features.

- Used in either tensile or compressive loadings.
- Provides between 50mm-100mm on site adjustment in either direction.
- The spherical ball bushing at either end allows +/- 5 degrees angular motion.
- Positive control of piping systems is allowed by tight fitting connections.

Fig.240 – Rigid Strut

Size	A	B	C	D	E	F	G Min	G Max	Pipe N.B./Sch	Q/Q1 KgF/Metre	P	R	Max Load Kg
240-3	60	60	30	10	48	9	360	2850	40/S40	2.1/2.1	10	22	300
240-7	65	65	32	12	57	10	375	2850	40/S40	2.1/2.8	12	29	700
240-15	65	65	32	12	57	10	375	3050	50/S80	4.8/9.0	12	29	1500
240-30	90	100	45	20	73	16	555	3050	65/S80	13.8/41.5	20	35	3000
240-55	90	100	45	20	73	16	555	3050	65/S80	13.8/41.5	20	35	5500
240-115	140	120	58	25	98	20	660	3050	80/S80	13.8/82.9	25	60	11500
240-160	150	140	63	30	108	22	790	3050	90/S80	13.8/138.2	30	65	16000
240-270	190	170	78	40	143	28	850	3050	125/S80	13.8/69.1	40	85	27000
240-360	230	200	100	45	159	32	960	3050	150/S80	13.8/69.1	45	85	36000
240-600	290	250	115	45	216	44	1120	3050	200/S80	13.8	60	135	60000

Please note for Installation:

Adjust the Strut to the required “pin to pin” dimension G and then tighten the locking nuts to the torque value ‘Q’ shown.

In order to arrive at the larger Torque Value Q1, just tighten the nuts to higher torque value shown.

Fig. 240
Material: Carbon Steel

Please Specify:-

- Figure Number:
- Size:
- Finish:

Dynamic Equipment – Fig. 260A/260AH & 260/260H

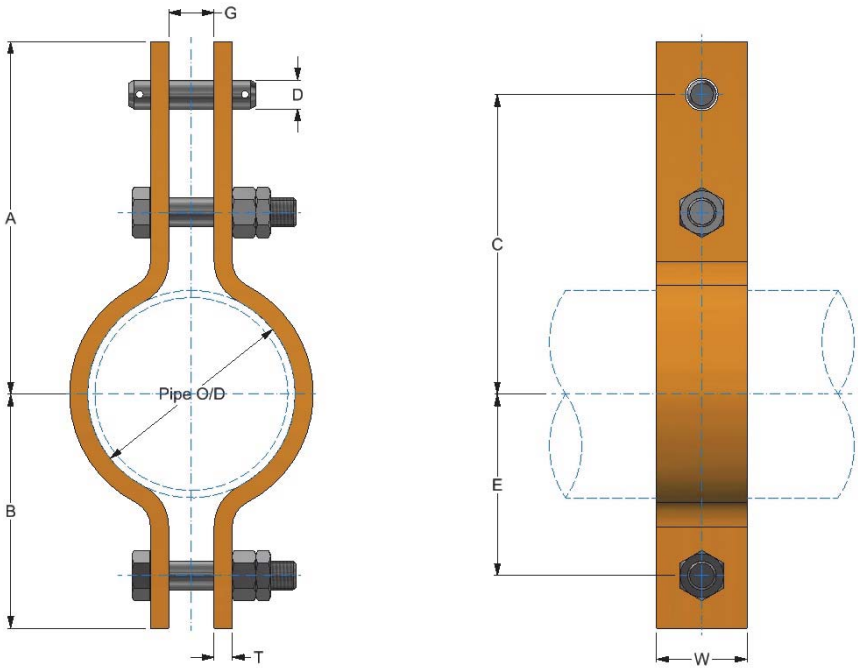


Fig. 260 & 260A – Restraint Pipe Clamp								
NPS	Pipe O/D	A	B	C	D	FxT	G	H
15	21.3	92	32	12	12	30 x 6	110	50
20	26.9	95	38	12	12	30 x 6	113	56
25	33.7	97	44	12	12	30 x 6	115	62
32	42.4	102	46	12	12	30 x 6	120	64
40	48.3	102	49	25	12	30 x 6	120	68
50	60.3	127	54	25	12	30 x 6	149	76
65	76.1	140	67	25	12	45 x 8	162	89
80	88.9	152	76	25	12	45 x 8	175	99
90	101.6	159	82	25	12	45 x 8	181	104
100	114.3	165	100	25	16	50 x 10	194	129
125	139.7	178	114	25	16	50 x 10	206	142
150	168.3	216	135	38	20	65 x 10	254	173
175	193.7	230	150	38	20	65 x 10	268	188
200	219.1	241	163	38	20	65 x 10	279	201
225	244.5	265	180	38	20	65 x 12	303	218
250	273	279	192	38	20	65 x 12	317	230
300	323.9	305	220	38	20	65 x 12	343	258
350	355.6	330	243	51	24	80 x 15	378	291
400	406.4	356	273	51	24	80 x 15	403	320
450	457.2	381	300	51	24	80 x 15	429	348
500	508	406	329	51	24	80 x 20	457	380
550	558.8	432	365	51	24	100 x 20	489	422
600	610	457	390	51	24	100 x 20	514	447
650	660.4	559	431	51	30	130 x 25	622	494
700	711.2	585	457	51	30	130 x 25	648	520
750	762	610	482	51	30	130 x 25	673	545
800	812.8	647	508	51	30	130 x 25	710	571
900	914.4	699	560	51	30	130 x 25	762	623

Fig. 260AH & 260H – Restraint Pipe Clamp								
NPS	Pipe O/D	A	B	C	D	FxT	G	H
150	168.3	229	143	44	30	100x12	279	193
175	193.7	241	158	44	30	110x12	291	208
200	219.1	254	172	44	30	110x12	305	223
225	244.5	305	198	51	36	100x20	359	258
250	273	305	214	51	36	100x20	359	268
300	323.9	330	240	51	36	100x20	384	294
350	355.6	356	262	57	42	110x20	419	325
400	406.4	381	292	57	42	110x25	444	355
450	457	406	317	57	42	110x25	469	380
500	508	457	353	57	42	130x25	521	417
550	558.8	483	393	57	42	150x30	559	469
600	610	508	418	57	42	150x30	584	494
650	660.4	581	443	57	42	150x30	657	519
700	711.2	610	472	57	42	150x30	686	548
750	762	635	497	57	42	150x30	711	573
800	812.8	661	525	57	42	150x30	737	601
900	914.4	711	575	57	42	150x30	787	651

Dynamic Equipment – Fig. 260/260H & 260A/260AH

Fig. 260/260H & 260A/260AH - SWL in Kg												
Material			Carbon Steel				Alloy Steel					
Temperature			340ºC		400ºC		510ºC		538ºC		566ºC	
NPS	Pipe O/D	Clip I/D	Figure Number				Figure Number					
			260	260H	260	260H	260A	260AH	260A	260AH	260A	260AH
15	21.3	23	250		250		210		210		210	
20	26.9	28	250		250		210		210		210	
25	33.7	36	250		250		210		210		210	
32	42.4	44	250		250		210		210		210	
40	48.3	50	680		635		635		455		315	
50	60.3	62	680		635		635		455		315	
65	76.1	80	680		635		635		455		315	
80	88.9	92	680		635		635		455		315	
90	101.6	106	680		635		635		455		315	
100	114.3	118	1135		1000		1045		725		500	
125	139.7	144	1135		1000		1045		725		500	
150	168.3	172	1270	3630	1135	3220	1180	3310	815	2360	590	1680
175	193.7	198	1270	3630	1135	3220	1180	3310	815	2360	590	1680
200	219.1	224	1270	3630	1135	3220	1180	3310	815	2360	590	1680
225	244.5	248	1450	4990	1315	4445	1360	4535	950	3265	680	2270
250	273	278	1450	4990	1315	4445	1360	4535	950	3265	680	2270
300	323.9	330	1450	4990	1315	4445	1360	4535	950	3265	680	2270
350	355.6	362	1450	5760	1725	5125	1770	5260	1270	3765	910	2720
400	406.4	412	1950	5760	1725	5125	1770	5260	1270	3765	910	2720
450	457	464	1950	5760	1725	5125	1770	5260	1270	3765	910	2720
500	508	516	2495	6805	2220	6805	2270	6185	1450	4810	1135	3400
550	558.8	566	2720	6805	2405	6805	2495	6185	1590	5900	1225	4080
600	610	618	2720	6805	2405	6805	2495	6185	1590	5900	1225	4080
650	660.4	670	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
700	711.2	721	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
750	762	773	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
800	812.8	824	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080
900	914.4	926	3630	6805	3175	6805	3265	6185	2085	5900	1590	4080

This range of Pipe Clamps is primarily used with Hydraulic Shock Arrestor and Rigid Strut dynamic supports.

When selecting, please note that the load rating of the rigid struts and snubbers should not exceed the SWL of the pipe clamp.

Please consult our Technical Department for advice.

The pin diameters and gap dimension G should always be specified.

Note:

Pin dia. D and gap G will vary depending on whether used in conjunction with a strut or shock arrestor.

See component section for details. (Pin & Gap dimensions given are suitable for rigid rod connection)

Fig.260 & 260H Material = Carbon Steel
Fig.260A & 260AH Material = Alloy Steel

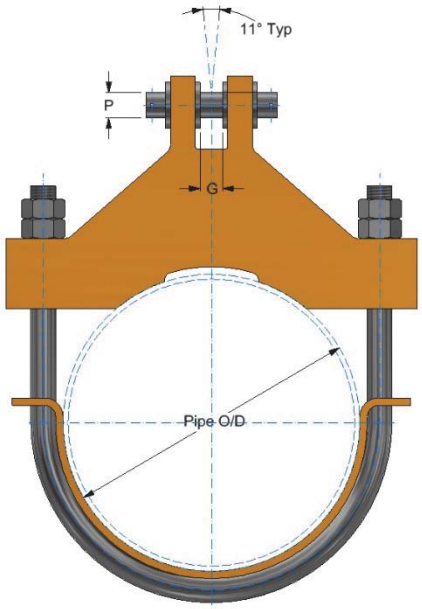
Fig.260 & 260H up to 400°C
Fig.260A & 260AH above 400°C

Fig. 260/A/AH/H
Material: See Note

Please Specify:-

- Figure Number:
- NPS:
- Finish:

Dynamic Equipment – Fig. 250



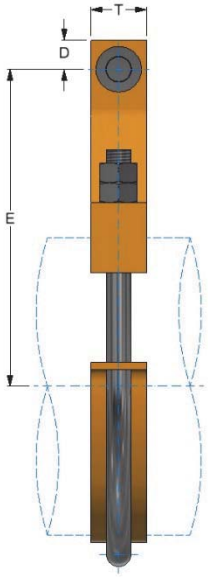


Fig.250 – Size 7 to 160

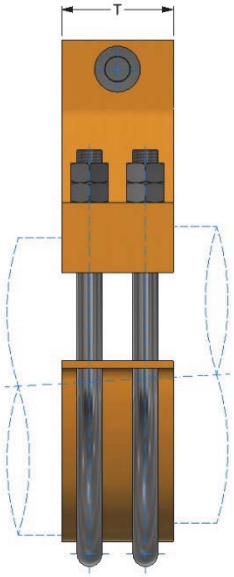


Fig.250 – Size 270 to 600

Our standard Yoke Clamps are recommended for the support of hot pipework, and where loadings are relatively high. They are used in conjunction with our range of hydraulic shock arrestors and rigid struts.

Please note that load pin dia. P and dimension G are dependent upon whether the clamp is used in conjunction with a rigid strut or a hydraulic shock arrestor.

Yoke Clamps

Size	D	G	P	T	Maximum Load Kg			
					350°C	510°C	538°C	566°C
250-7	20	10	12	25	700	415	195	80
250-15	20	10	12	30	1500	895	420	180
250-55	30	16	20	45	5500	3285	1550	670
250-115	50	20	25	75	11500	6865	3240	1400
250-160	60	22	30	90	16000	9555	4510	1945
250-270	60	28	40	150	27000	16125	7610	3285
250-360	80	32	45	200	36000	21500	10150	4380
250-600	100	44	60	200	60000	35835	16920	7305

Yoke Clamp - Materials

Component	Temp.	
	Up To 200°C	201°C & Over
Yoke Body	Carbon Steel	Alloy Steel
Saddle Strap	Carbon Steel	Alloy Steel
U-Bolt	Alloy Steel	Alloy Steel
Load Pin	Stainless Steel	Stainless Steel

Yoke Clamps – Dimension E

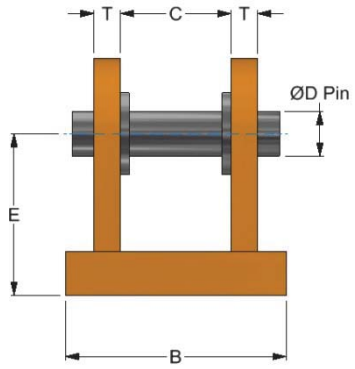
NPS	Size							
	250-7	250-15	250-55	250-115	250-160	250-270	250-360	250-600
65	125	125						
80	150	150	205					
90	160	160	210					
100	165	165	215					
125	180	180	235					
150	190	190	245	270				
175	220	220	260	285				
200	240	240	270	295				
225	255	255	285	310				
250	270	270	295	320				
300	295	295	320	350	385	390		
350		310	340	360	405	450	485	485
400		335	360	385	440	455	510	510
450			385	410	470	480	535	535
500			415	440	500	510	585	585
550			435	510	535	555	605	605
600			460	540	565	585	635	635
650			505	565	600	620	670	670
700			550	590	630	650	705	705
750			595	615	660	685	735	735
800				645	690	735	765	765
900				695	735	825	810	810

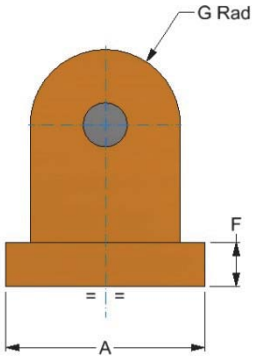
Note:
The Yoke Clamp is designed to accommodate a 10° cone in relation to the pipe.

Fig. 250 – available in
- Carbon Steel
- Alloy Steel
- Stainless Steel

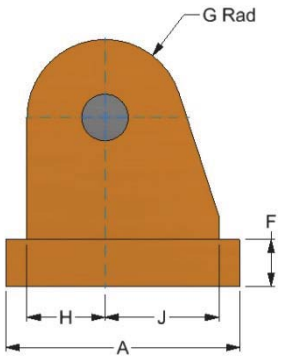
Please Specify:-
- Figure Number:
- Size:
- Surface Finish:

Dynamic Equipment – Fig. 280 & 290





Type 280 Size 3 to 55



Type 280 Size 115 to 600

Fig. 280– Rigid Strut Attachment

Size	A	B	C	D	E	F	G	H	J	T
280-3	60	60	25	10	48	10	22	22	~	10
280-7	65	65	30	12	57	12	25	25	~	10
280-15	65	65	30	12	57	12	25	25	~	10
280-30	90	100	50	20	73	20	34	34	~	12
280-55	90	100	50	20	73	20	34	34	~	12
280-115	140	120	60	25	98	25	45	45	70	15
280-160	150	140	70	30	108	30	50	50	73	20
280-270	190	170	80	40	143	40	65	65	100	25
280-360	230	200	95	45	159	45	75	75	105	30
280-600	290	250	110	60	216	45	90	90	150	45

Fig. 280
Material: Carbon Steel

Please Specify:-
- Figure Number:
- Size:
- Finish:

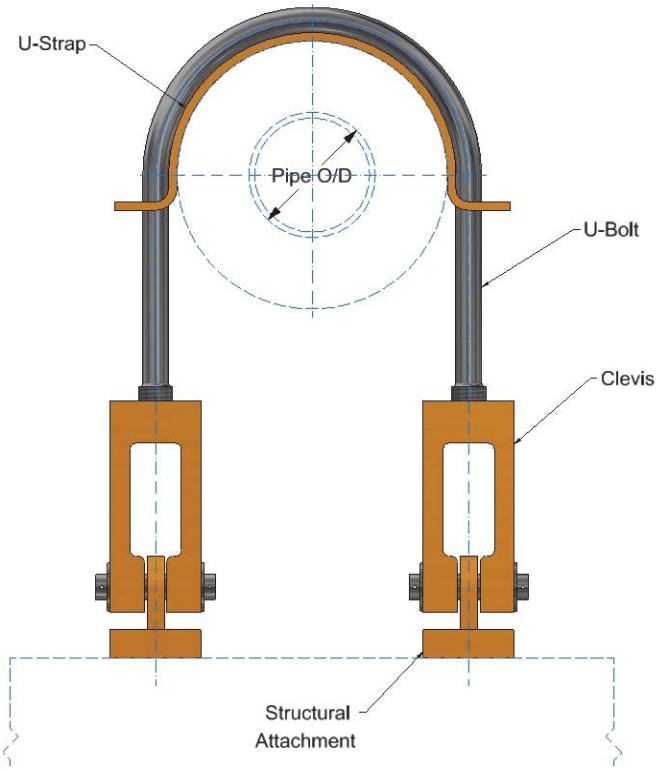


Fig 290 Pipe Whip Restraint.

Pipe Whip Restraints are exclusively used in the Nuclear Industry.

The restraints dampen and absorb the kinetic energy of bursting pipes in emergency cases. For this purpose the elongation capacity of the encompassing U-Bolts is used, as they are designed to absorb the expected dynamic loads.

Features
- The restraint absorbs the energy of the moving pipe and has high energy absorption in relation to its size.
- The restraint is compact in size.
- The restraint provides a relatively large normal clearance between the restraint and pipe to allow for normal thermal movement.
- Design of restraints can be undertaken to suit clients' requirements.

Fig. 290
Material: Carbon Steel

Please Specify:-
- Figure Number:
- NPS:
- Finish:

Dynamic Equipment – Fig.300R, 301R & 302R – Riser Clamps

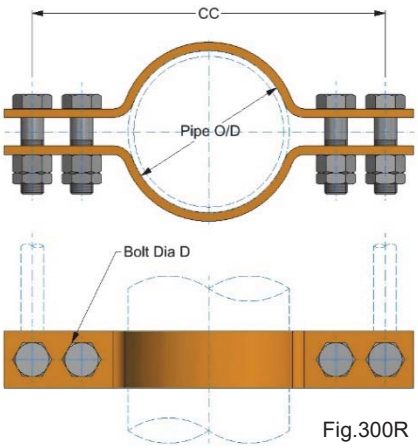


Fig.300R

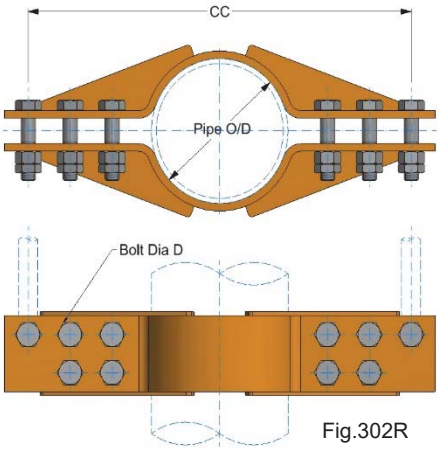


Fig.302R

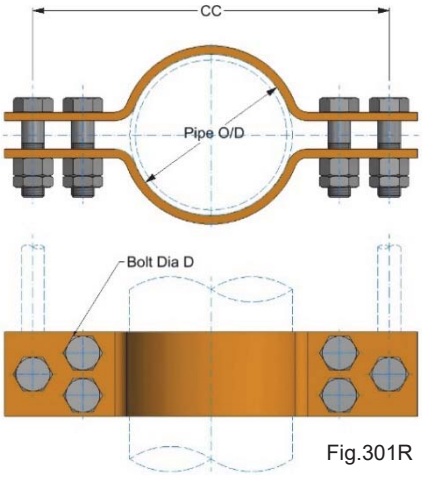


Fig.301R

Stress-Temperature Correction Factors			
Design °C Temperature	Material		
	Carbon Steel	2¼ Cr-1 Mo BS 1501 PT2-622	Stainless Steel Grade 316
343	0.80	0.80	0.70
371	0.85	0.80	0.71
399	0.93	0.80	0.71
427		0.80	0.72
454		0.83	0.73
482		0.92	0.75
510		1.10	0.80
538		1.50	0.86
566		2.20	0.99
593			1.20
620			1.80
640			2.30
650			3.00

The total load to be supported must be multiplied by 2 before the Stress Temperature Correction Factor is applied.

Stress Temperature Correction Factor

The selection chart is based on a maximum allowable stress in the clamp of 8.50 Kg/mm^2; the table of Stress Temperature Correction Factors provides details for the most commonly used materials.

$$\text{Stress Temperature Correction Factor.} = \frac{8.50}{\text{S. A. Design @ Temperature}}$$

Or: Corrected Load = calculated load x Stress Temperature Correction Factor.

Example:

- Pipe Nominal Bore = 400mm
- Support Load = 4545Kg
- Rod Centres (C) = 1100mm
- Temperature = 510°C
- Procedure = Stock Material – Alloy Steel 2% Cr 1% Mo.
- Correction Factor from table STCF = 1.1
- Corrected Load = 9090 x 1.1 = 10,000Kg.

Using Charts:

1. Enter lower chart @ rod centres = 1100mm, move horizontally until sloping line 400mm pipe size is intersected.
2. Project this intersection vertically upwards.
3. Enter upper chart @ load = 11000Kg. Move horizontally to the right until the vertical line from (B) is intersected.
4. Read stock size of curve immediately above the (C) intersection.

These Riser Clamps are similar to the ones shown in our Ancillary section and should be used together with our dynamic restraints.

For selection purposes please ensure that the load rating of the strut / snubber is not greater than the load capacity of the pipe clamp.

If the loads are greater then our Yoke Pipe clamp should be used. (Clamp gaps and load pins should always be checked)

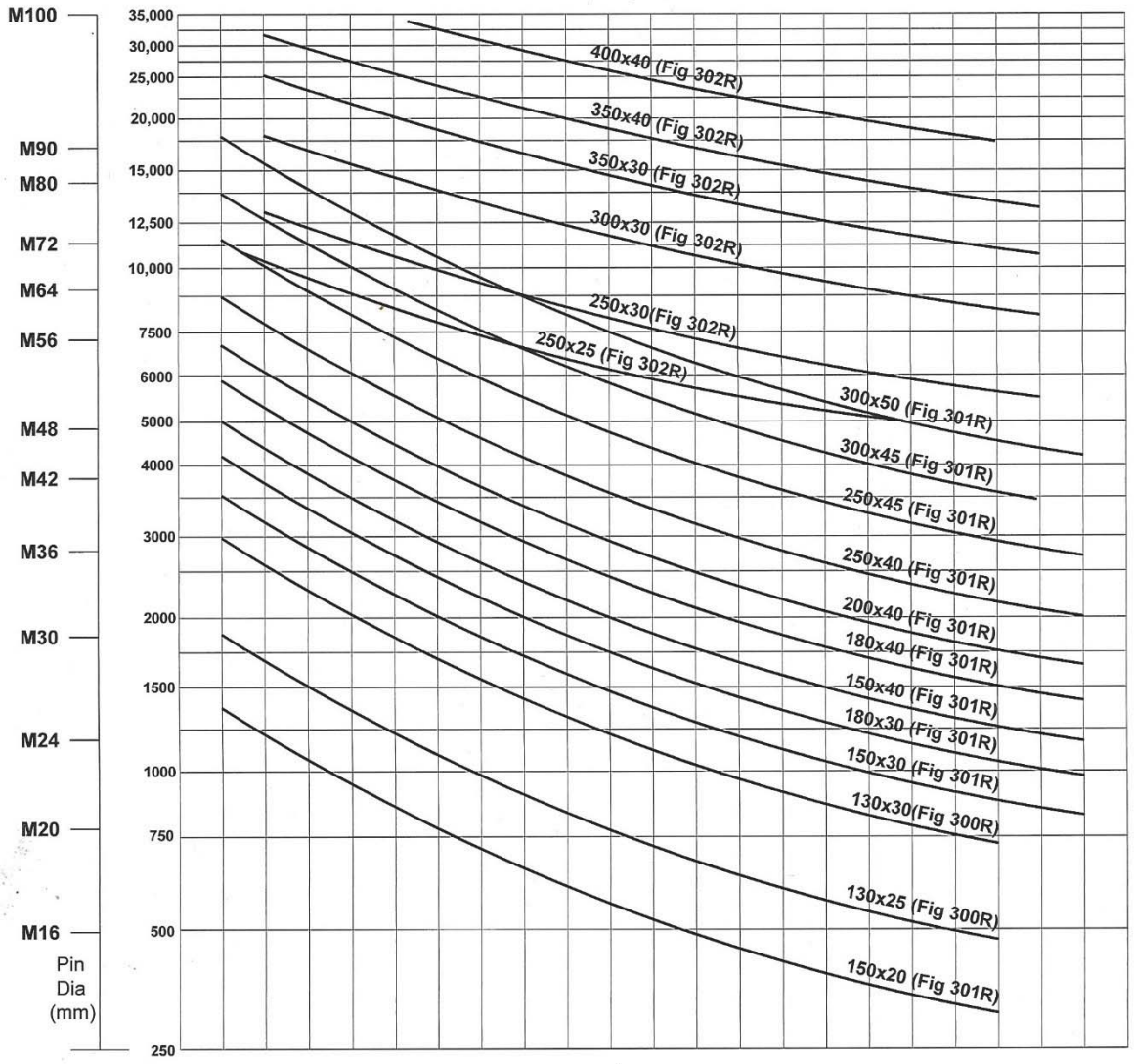
Fig. 300R, 301R & 302R
Material: Carbon Steel

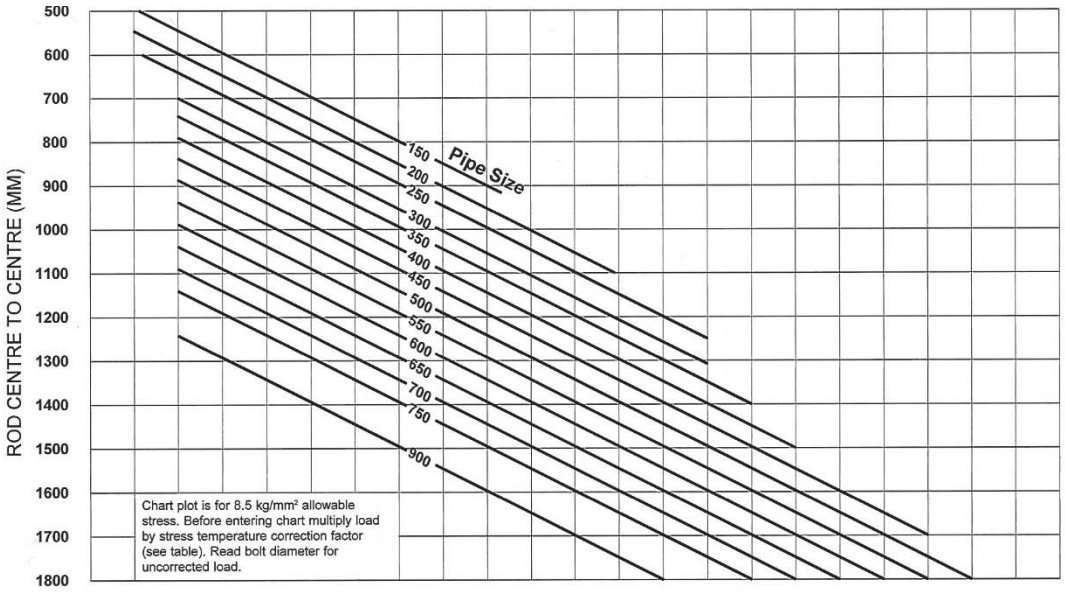
Please Specify:-

- Figure Number
- Nominal Pipe Size
- Temperature Range
- Surface Finish

Dynamic Equipment – Fig.300R, 301R & 302R

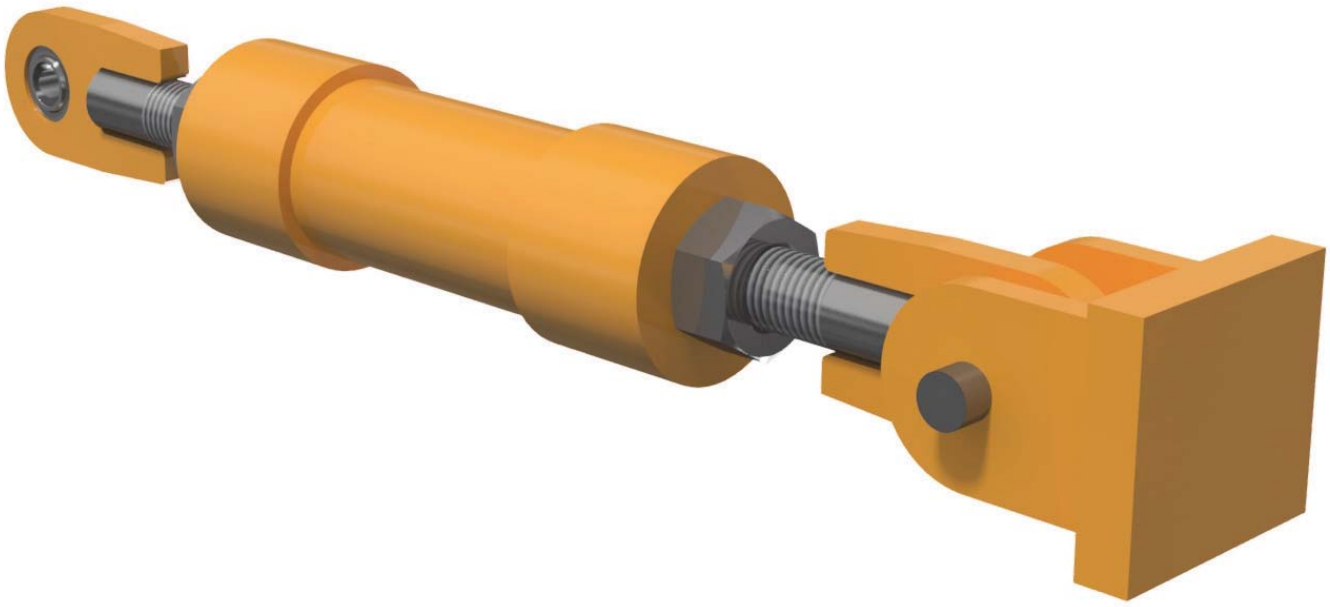
RISER SELECTION CHART





Dynamic Restraints

“Pages 132 to 144
being held for future amendments”



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QPS

SUPPORTING THE FUTURE

ISOLATION EQUIPMENT

Isolation Equipment Index

If you can't find the size support you are after, or you need a special/bespoke size, please contact our sales team on +44(0)1686 629898 for more assistance.

Isolation Equipment – Pictorial Index

Fig.	Page	Description	Pictorial
107	151	2 Bolt Pipe Clamp	
108	152	3 Bolt Pipe Clamp	
109	150	Pipe Saddle	
110	150	Clip Strip	
111	148	U-Bolt Castellated Profile (Grip Type)	
112	148	U-Bolt PTFE Lined (Non-Grip)	

Fig.	Page	Description	Pictorial
113G	149	U-Bolt (Grip Type)	
113NG	149	U-Bolt (Non-Grip)	
115	153	Anti-Vibration Pad	
116	153	Anti-Vibration Pad	
117	153	Slider Unit	
118	150	Isolation Pad	

Introduction

Isolation
QPS offers a wide range of isolating products to suit stainless steel, duplex, super duplex and cupro-nickel piping. These products incorporate moulded isolation / encasing materials such as:-

- Neoprene (temperature range -30°C to 100°C)
- VHT Silicone (temperature range -70°C to 350°C)

Both materials offer extensive performance qualities and can be utilised in a wide range of pipework installations.

Benefits

- Clamping damage restraint to thin wall pipes.
- Prevention of electrolytic erosion between dissimilar metals.
- Curtailment of noise and vibration.
- Cost effective and time saving.
- Wide range of standard products/sizes available.
- Bespoke sizes/designs available on request based on client's specification.

Properties and Isolating Material
The steel parts of both u-bolts and clamps are isolated from the pipe utilising either extruded 70/80 flame retardant neoprene (conforming to BS4255) or very high temperature flame retardant silicone.

70/80 FR Neoprene
This material is strong, resilient and achieves an extremely high performance in the reduction of noise and vibration in pipework. Neoprene also has an outstanding resistance to a wide range of chemicals, including; acids, alkalis, fats, oils, greases and solvents. It has advantageous physical properties including resistance to tear and abrasion, ozone and weathering.

• Working temperature range -30°C to 100°C
• Specific gravity 1.5
• Elongation at break 150 min, (%)
• Accelerated ageing
  ○ Hardness change IRHD plus 10 max.
  ○ Change T/S% minus 15% max.
  ○ Change in E/B% minus 40% max.
	• Hardness IRHD 76 – 85
	• Tensile strength 10.5 min. (Mpa)
	• Compression set 25% max.
	• Static ozone resistance – No cracks
	• Low temperature hardness change IRHD plus 12 max.
	• Colour: Black

VHT/FR Silicone
Silicone rubber is a chemically inert synthetic elastomer which differs from other synthetic and natural rubbers in that it is able to maintain excellent elasticity and resilience over a wide temperature range. It has excellent resistance to fire, very low toxicity and can perform at temperatures up to 300°C (max) with minimum loss of characteristics.

The material has excellent resistance to ozone, weathering and a wide range of chemicals, solvents, oils and greases.

• Working temperature range -70°C to 300°C • Density 1.44 (gms/cubic cm) • Elongation at break 165 (%) • Tear strength 10 (KN/M) • Flame resistance UL94 VO 2 mm • Oxygen index 39% (norm NFT 5107 1) • Colour: Grey	• Shore hardness 60 (A±5 deg) • Tensile strength 7.8 (Mpa) • Compression set 30% (70hrs @ 150°C) • Static ozone resistance – No cracks • Smoke toxicity to AFNOR norm NFX.70100 CT approx. 2.3 BS6853 category 1

Isolation Equipment – Fig. 111 & Fig. 112

Fig. 111 – Grip Isolation U-Bolt (C.S./S.S. Pipe)									
Pipe Size		A	B	C	D	E	H	WxT	Max Load Kg
NB	O/D								
15	21.3	60	60	37	6	60	11.5	25x10	220
20	26.9	65	60	43	6	70	14.5	25x10	220
25	33.7	65	60	50	6	75	17	25x10	220
32	42.4	80	75	69	10	95	21	25x10	545
40	48.3	80	70	75	10	100	24.5	25x10	545
50	60.3	90	75	87	10	110	30.5	25x10	545
65	76.1	95	75	102	12	135	38	30x10	1000
80	88.9	100	75	115	12	140	44.5	30x10	1000
100	114.3	110	75	141	12	170	57.5	30x10	1000
150	168.3	180	120	210	16	250	84	50x10	1635
200	219.1	200	120	262	16	315	109.5	50x10	1635
250	273	235	130	324	20	375	136.5	50x10	3405
300	323.9	265	130	375	20	425	162	50x10	3405

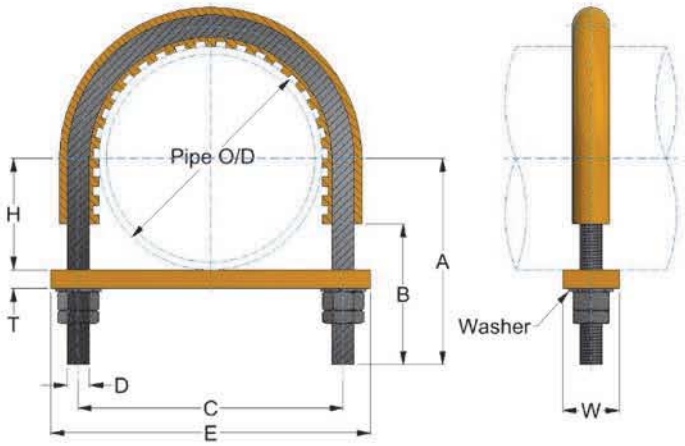


Fig. 111 – Grip Isolation U-Bolt (CuNi Pipe)								
Part No.	O/D	A	B	C	D	E	WxT	Max Load Kg
16	16	60	60	32	6	60	25x10	220
20	20	65	65	36	6	70	25x10	220
25	25	65	65	41	6	75	25x10	220
30	30	75	70	48	6	85	25x10	220
38	38	80	75	64	10	95	25x10	545
45	44.5	80	70	71	10	100	25x10	545
57	57	90	75	83	10	110	25x10	545
76	76.1	95	75	101	12	135	30x10	1000
89	88.9	100	75	115	12	140	30x10	1000
108	108	110	75	134	12	170	30x10	1000
159	159	180	120	201	16	250	50x10	1635
219	219.1	200	120	262	16	315	50x10	1635
267	267	235	130	318	20	370	50x10	3405
324	323.9	265	130	375	20	425	50x10	3405

Fig. 111
Materials:
U-Bolt: Carbon Steel
Base Pad: 70/80 FR Neoprene
Sleeve: Extruded 70/80 FR Neoprene

2 x Full Nuts
2 x Locknuts
2 x Washers

Please Specify:-
- Figure Number:
- Part Number (CuNi):
- NB (CS/SS Lines):
- O/D (CuNi Lines):

Fig. 112 – U-Bolt with PTFE Lining (C.S./S.S. Pipe)										
Pipe Size		A	B	C	D	E	G	H	WxT	Max Load Kg
NB	O/D									
15	21.3	60	60	37	M6	60	21	10.5	25x10	220
20	26.9	65	60	43	M6	70	27	13.5	25x10	220
25	33.7	65	60	50	M6	75	34	17	25x10	220
32	42.4	80	75	69	M10	95	42	21	25x10	545
40	48.3	80	70	75	M10	100	49	24.5	25x10	545
50	60.3	90	75	87	M10	110	61	30.5	25x10	545
65	76.1	95	75	102	M12	135	76	38	30x10	1000
80	88.9	100	75	115	M12	140	89	44.5	30x10	1000
100	114.3	110	75	141	M12	170	115	57.5	30x10	1000
150	168.3	180	120	210	M16	250	168	84	50x10	1635
200	219.1	200	120	262	M16	315	219	109.5	50x10	1635
250	273	235	130	324	M20	375	273	136.5	50x10	3405
300	323.9	265	130	375	M20	425	324	162	50x10	3405

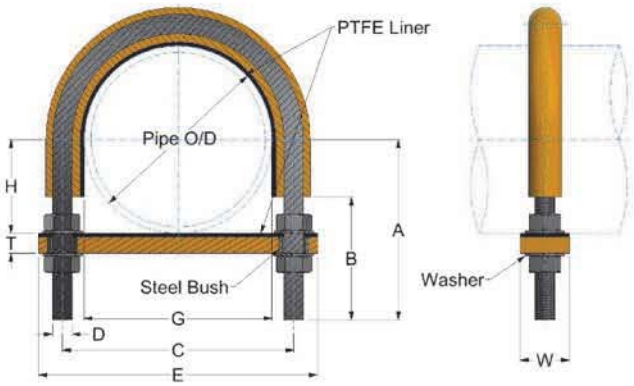


Fig. 112 – U-Bolt with PTFE Lining (CuNi Pipe)										
Part No.	O/D	A	B	C	D	E	G	H	WxT	Max Load Kg
16	16	60	60	32	M6	60	16	8	25x10	220
20	20	65	65	36	M6	70	20	10	25x10	220
25	25	65	60	41	M6	75	25	12.5	25x10	220
30	30	75	70	48	M6	85	30	15	25x10	220
38	38	80	75	64	M10	95	38	19	25x10	545
45	44.5	80	70	71	M10	100	45	22.5	25x10	545
57	57	90	75	83	M10	110	57	28.5	25x10	545
76	76.1	95	75	101	M12	135	76	38	30x10	1000
89	88.9	100	75	115	M12	140	89	44.5	30x10	1000
108	108	110	75	134	M12	170	108	54	30x10	1000
159	159	180	120	201	M16	250	159	79.5	50x10	1635
219	219.1	200	120	262	M16	315	219	109.5	50x10	1635
267	267	235	130	318	M20	370	267	133.5	50x10	3405
324	323.9	265	130	375	M20	425	324	182	50x10	3405

Fig. 112
Materials:
U-Bolt: Carbon Steel
Base Pad: 70/80 FR Neoprene
Sleeve: Extruded 70/80 FR Neoprene
PTFE: Etched & Bonded

4 x Full Nuts
4 x Washers
2 x Steel Bushes

Please Specify:-
- Figure Number:
- Part Number (CuNi):
- NB (CS/SS Lines):
- O/D (CuNi Lines):

Isolation Equipment – Fig. 113G & Fig. 113NG

Fig. 113G – Gripping Isolation U-Bolt (C.S. / S.S. Pipe)

Pipe Size		A	B	C	D	E	G	H	WxT	Max Load Kg
NB	O/D									
15	21.3	60	60	37	M6	60	21	10.5	25X10	220
20	26.9	65	60	43	M6	70	27	13.5	25X10	220
25	33.7	65	60	50	M6	75	34	17	25X10	220
32	42.4	80	70	69	M10	95	43	21	25X10	545
40	48.3	80	70	75	M10	100	49	24.5	25X10	545
50	60.3	90	75	87	M10	110	61	30.5	25X10	545
65	76.1	95	75	102	M12	135	76	38	30X10	1000
80	88.9	100	75	115	M12	140	89	44.5	30X10	1000
100	114.3	110	75	141	M12	170	115	57.5	30X10	1000
150	168.3	180	120	210	M16	250	168	84	50X10	1635
200	219.1	200	120	262	M16	315	219	109.5	50X10	1635
250	273	235	120	324	M20	375	273	136.5	50X10	3405
300	323.9	265	120	375	M20	425	324	162	50X10	3405

Fig. 113G – Gripping Isolation U-Bolt (CuNi Pipe)

Part No.	O/D	A	B	C	D	E	G	H	WxT	Max Load Kg
16	16	60	60	32	M6	60	16	8	25x10	220
20	20	65	65	36	M6	70	20	10	25x10	220
25	25	65	60	41	M6	75	25	12.5	25x10	220
30	30	75	65	46	M6	85	30	15	25x10	220
38	38	80	70	64	M10	95	38	19	25x10	545
45	44.5	80	70	71	M10	100	45	22.5	25x10	545
57	57	90	75	83	M10	110	57	28.5	25x10	545
76	76.1	95	75	102	M12	135	76	38	30x10	1000
89	88.9	100	75	115	M12	140	89	44.5	30x10	1000
108	108	110	75	134	M12	170	108	54	30x10	1000
159	159	180	120	201	M16	250	159	79.5	50x10	1635
219	219.1	200	120	262	M16	315	219	109.5	50x10	1635
267	267	235	120	318	M20	370	267	133.5	50x10	3405
324	323.9	265	120	375	M20	425	324	162	50x10	3405

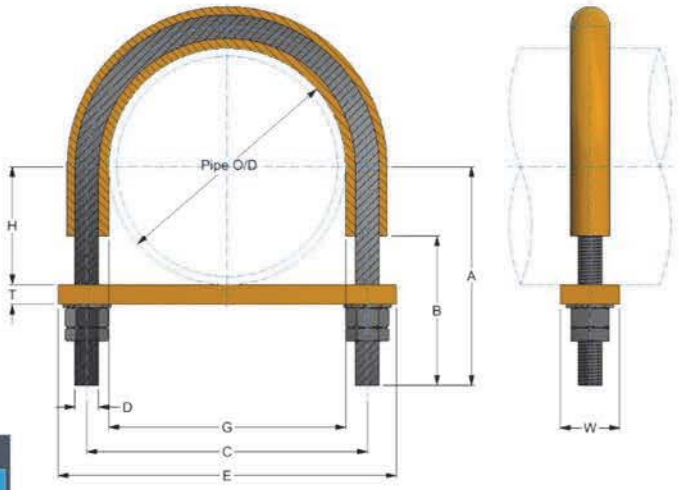


Fig. 113G
Materials:
U-Bolt: Carbon Steel
Base Pad: HT/FR Silicone
Sleeve: Extruded HT/FR Silicone

2 x Full Nuts
2 x Locknuts
2 x Washers

Please Specify:-
- Figure Number:
- Part Number (CuNi):
- Nominal Pipe Size:

Fig. 113NG – Non-Grip Isolation U-Bolt (C.S. / S.S. Pipe)

Pipe Size		A	B	C	D	E	G	H	WxT	Max Load Kg
NB	O/D									
15	21.3	60	60	37	M6	60	23	11.5	25x10	220
20	26.9	65	60	43	M6	70	29	14.5	25x10	220
25	33.7	65	60	50	M6	75	36	18	25x10	220
32	42.4	80	70	69	M10	95	45	22.5	25x10	545
40	48.3	80	70	75	M10	100	52	26	25x10	545
50	60.3	90	75	87	M10	110	64	32	25x10	545
65	76.1	95	75	102	M12	135	79	39.5	30x10	1000
80	88.9	100	75	115	M12	140	92	46	30x10	1000
100	114.3	110	75	141	M12	170	118	59	30x10	1000
150	168.3	180	120	210	M16	250	172	86	50x10	1635
200	219.1	200	120	262	M16	315	224	112	50x10	1635
250	273	235	130	324	M20	375	278	139	50x10	3405
300	323.9	265	130	375	M20	425	329	164.5	50x10	3405

Fig. 113NG – Non-Grip Isolation U-Bolt (CuNi Pipe)

Part No.	O/D	A	B	C	D	E	G	H	WxT	Max Load Kg
16	16	60	60	32	M6	60	18	9	25x10	220
20	20	65	65	36	M6	70	23	11.5	25x10	220
25	25	65	60	41	M6	75	28	14	25x10	220
30	30	75	70	48	M6	85	33	16.5	25x10	220
38	38	80	75	64	M10	95	41	20.5	25x10	545
45	44.5	80	70	71	M10	100	48	24	25x10	545
57	57	90	75	83	M10	110	60	30	25x10	545
76	76.1	95	75	102	M12	135	79	39.5	30x10	1000
89	88.9	100	75	115	M12	140	92	46	30x10	1000
108	108	110	75	134	M12	170	112	56	30x10	1000
159	159	180	120	201	M16	250	163	81.5	50x10	1635
219	219.1	200	120	262	M16	315	224	112	50x10	1635
267	267	235	130	318	M20	370	272	136	50x10	3405
324	323.9	265	130	375	M20	425	329	164.5	50x10	3405

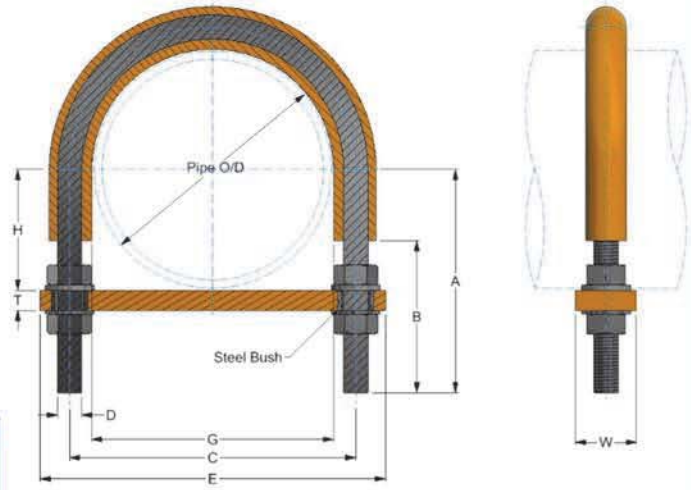
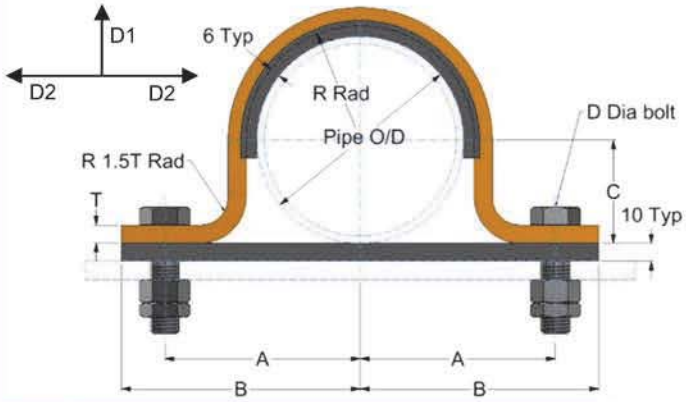


Fig. 113NG
Materials:
U-Bolt: Carbon Steel
Base Pad: HT/FR Silicone
Sleeve: Extruded HT/FR Silicone

4 x Full Nuts
2 x Steel Bushes
4 x Washers

Please Specify:-
- Figure Number:
- Part Number (CuNi):
- Nominal Pipe Size:

Isolation Equipment – Fig. 109, 110 & 118



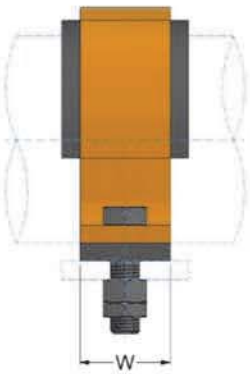


Fig. 109
Material: Carbon Steel
Clipstrip: HT/FR Silicone
Base Pad: HT/FR Silicone
Rubber Elastomer

2 x Full Nuts
2 x Locknuts

Please Specify:-
- Figure Number:
- NB (CS/SS Lines):
- O/D (CuNi Lines):
- Finish:

Fig. 109 – Isolation Pipe Saddle (C.S. / S.S. Pipe)

Pipe Size		WxT	A	B	C	D	R	Max Load Kg	
NB	O/D							D1	D2
15	21.3	35x5	53	68	10	M10	16.5	170	270
20	26.9	35x5	55	70	13	M10	19.5	170	210
25	33.7	35x5	57	72	16	M10	23	170	175
32	42.4	35x8	64	82	20	M12	27	315	285
40	48.3	35x8	79	97	23	M12	30	315	250
50	60.3	35x8	81	99	29	M12	36	315	200
65	76.1	50x10	89	113	36	M16	44	465	330
80	88.9	50x10	99	123	43	M16	50.5	465	280
100	114.3	50x10	108	132	55	M16	63	465	220
150	168.3	60x15	160	190	82	M20	90	990	410
200	219.1	60x15	185	215	107	M20	115.5	990	315
250	273.0	60x15	215	245	135	M20	142.5	2060	280
300	323.9	60x15	240	270	160	M20	168	2060	280

Fig. 109 – Isolation Pipe Saddle (CuNi Pipe)

Pipe O/D	WxT	A	B	C	D	R	Max Load Kg	
							D1	D2
16	35x5	53	68	8	M10	14	170	270
20	35x5	53	68	10	M10	16	170	270
25	35x5	55	70	12.5	M10	18.5	170	210
30	35x5	57	72	15	M10	21	170	210
38	35x8	64	82	19	M12	25	315	285
44.5	35x8	79	97	22	M12	28	315	285
57	35x8	81	99	28.5	M12	34.5	315	200
76.1	50x10	89	113	38	M16	44	465	330
88.9	50x10	99	123	44.5	M16	50.5	465	280
108	50x10	108	132	54	M16	60	465	220
133	60x15	136	166	66	M20	72.5	990	410
159	60x15	155	185	79.5	M20	85.5	990	410
193.7	60x15	175	205	97	M20	103	990	315
219.1	60x15	185	215	109.5	M20	115.5	990	315
267	60x15	215	245	133.5	M20	139.5	2060	280
323.9	60x15	240	270	162	M20	168	2060	280

Fig. 110A

Ref.	A	B	C	D	E
27x5	37	27	7.5	5	5
32x5	42	32	7.5	5	5
42x6	52	42	8.5	6	5
52x6	62	52	8.5	6	5
67x6	77	67	8.5	6	5
82x6	110	82	10	6	14
90x9.5	105	90	14.5	9.5	7.5
110x9.5	125	110	14.5	9.5	7.5
130x9.5	145	130	14.5	9.5	7.5

Fig. 110B

Ref.	A	B	C	D	E
35x2	45	35	6	2	5
45x2	55	45	6	2	5
55x2	65	55	6	2	5
65x2	75	65	6	2	5
75x2	85	75	6	2	5
85x2	95	85	6	2	5
95x2	105	95	6	2	5
105x2	115	105	6	2	5
115x2	125	115	6	2	5
135x2	145	135	6	2	5

Other sizes available on request

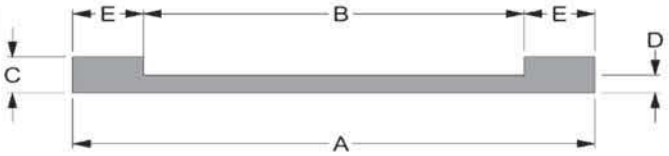


Fig. 110A & 110B
Material: HT/FR Silicone

Please Specify:-
- Figure Number:
- Ref.:
- Pipe O/D:

Fig.118A – For Stainless Steel Pipes

Part No.	Pipe Size		C	H x T
	NB	O/D		
21	15	21.3	60	25x10
27	20	26.9	70	
34	25	33.7	75	
43	32	42.4	95	
49	40	48.3	100	
61	50	60.3	110	
77	65	76.1	135	30x10
89	80	88.9	140	
115	100	114.3	170	
168	150	168.3	250	50x10
219	200	219.1	315	
273	250	273	375	
324	300	323.9	425	

Fig.118B – For CuNi Pipes

Part No.	Pipe Size	C	H x T
	O/D		
16	16	60	25x10
20	20	60	
25	25	70	
30	30	75	
38	38	95	
45	44.5	100	
57	57	110	30x10
76	76.1	135	
89	88.9	140	
108	108	170	50x10
159	159	250	
219	219	315	
267	267	375	
324	323.9	425	

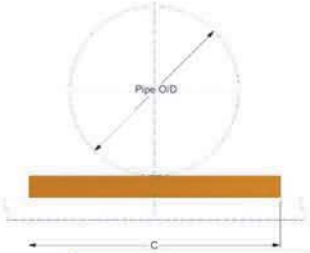
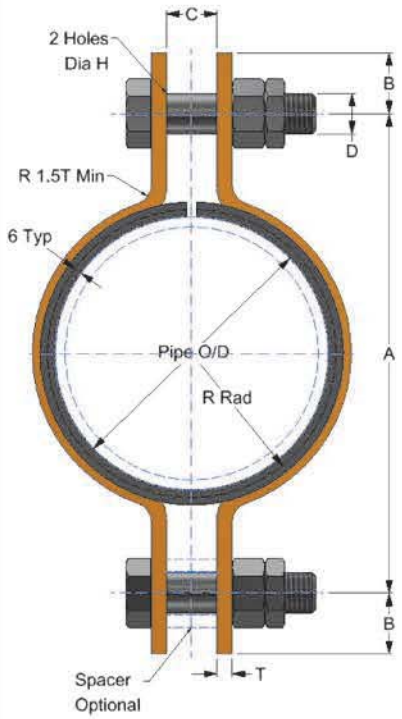


Fig. 118A & 118B
Material: Extruded 70/80 FR Neoprene (-30 to 100°C)

Please Specify:-
- Figure Number:
- Part Number:

Isolation Equipment – Fig. 107



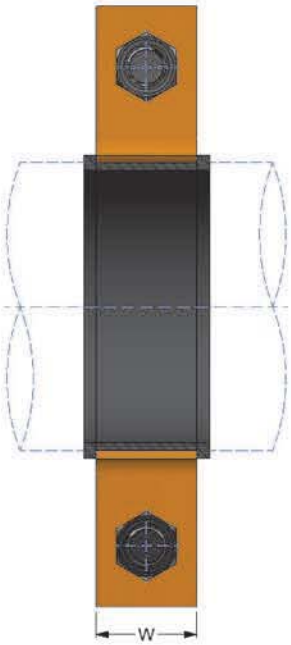


Fig. 107 – Isolation 2 Bolt Clamp (C.S. / S.S. Pipe)											
Pipe Size		A	B	C	D	H	*L	R	Spacer	WxT	Max Load Kg
NB	O/D										
15	21.3	100	15	10	M10	12	85	16.5	10NB	35x5	280
20	26.9	105	15	10	M10	12	91	19.5	10NB	35x5	280
25	33.7	110	15	10	M10	12	112	23	10NB	35x5	280
32	42.4	120	18	12	M12	15	139	27	15NB	35x5	280
40	48.3	125	18	12	M12	15	158	30	15NB	35x5	280
50	60.3	140	18	12	M12	15	196	36	15NB	35x5	280
65	76.1	155	18	12	M12	15	245	44	15NB	35x5	280
80	88.9	170	18	12	M12	15	286	50.5	15NB	35x5	280
100	114.3	195	18	12	M12	15	365	63	15NB	35x5	280
150	168.3	255	24	16	M16	19	535	90	20NB	35x8	450
200	219.1	325	24	16	M16	19	695	115.5	20NB	35x8	450
250	273	380	24	16	M16	19	875	142.5	20NB	35x8	450
300	323.9	450	30	20	M20	24	1030	168	20NB	50x10	900

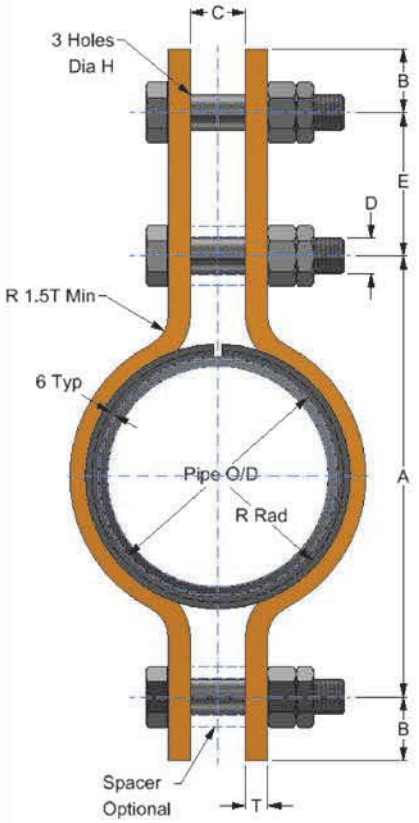
Fig. 107/A
Material: Carbon Steel
Isolation: Silicone Rubber Elastomer

Please Specify:-
- Figure Number:
- NB (CS/SS Lines):
- O/D (CuNi Lines):
- Finish:

*L = Developed length of isolator

Fig. 107A – Isolation 2 Bolt Clamp (CuNi Pipe)										
Pipe O/D	A	B	C	D	H	*L	R	Spacer	WxT	Max Load kg
16	95	15	10	M10	12	67	14	10NB	35x5	280
20	95	15	10	M10	12	85	16	10NB	35x5	280
25	100	15	10	M10	12	91	18.5	10NB	35x5	280
30	105	15	10	M10	12	109	21	10NB	35x5	280
38	120	18	12	M12	15	134	25	15NB	35x5	280
44.5	120	18	12	M12	15	151	28	15NB	35x5	280
57	140	18	12	M12	15	190	34.5	15NB	35x5	280
76.1	155	18	12	M12	15	245	44	15NB	35x5	280
88.9	170	18	12	M12	15	286	50.5	15NB	35x5	280
108	190	18	12	M12	15	355	60	15NB	35x5	280
159	240	24	16	M16	19	515	86	20NB	35x8	450
219.1	325	24	16	M16	19	695	118	20NB	35x8	450
267	375	24	16	M16	19	855	140	20NB	35x8	450
323.9	450	30	20	M20	24	1030	168	20NB	50x10	900

Isolation Equipment – Fig. 108



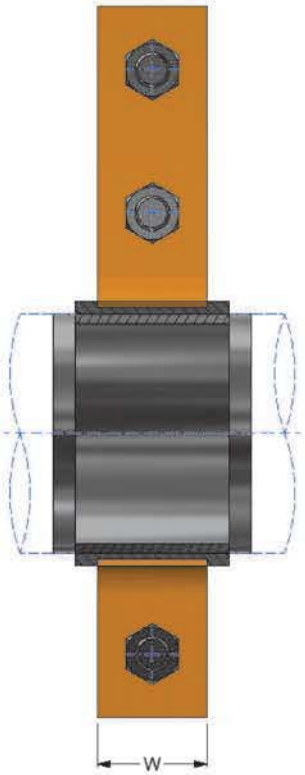


Fig. 108 – 3 Bolt Isolation Clamp (C.S. / S.S. Pipe)												
Pipe Size		A	B	C	D	E	H	*L	R	Spacer	WxT	Max Load Kg
NB	O/D											
15	21.3	100	15	13	M10	70	12	85	16.5	10NB	35x5	280
20	26.9	105	15	13	M10	70	12	91	19.5	10NB	35x5	280
25	33.7	110	15	13	M10	70	12	112	23	10NB	35x5	280
32	42.4	120	18	15	M12	70	15	139	27	15NB	35x5	280
40	48.3	125	18	15	M12	85	15	158	30	15NB	35x5	280
50	60.3	140	18	15	M12	80	15	196	36	15NB	35x5	280
65	76.1	155	18	15	M12	105	15	245	44	15NB	35x5	280
80	88.9	170	18	15	M12	105	15	286	50	15NB	35x5	280
100	114.3	195	18	15	M12	105	15	365	63	15NB	35x5	280
150	168.3	255	24	19	M16	95	19	535	90	20NB	35x8	450
200	219.1	325	24	19	M16	100	19	695	115.5	20NB	35x8	450
250	273	380	24	19	M16	105	19	875	142.5	20NB	50x10	450
300	323.9	450	30	23	M20	115	24	1030	168	20NB	60x15	900

Fig. 108/A
Material: Carbon Steel
Isolation: Silicone Rubber Elastomer

Please Specify:-

- Figure Number:
- NB (CS/SS Lines):
- O/D (CuNi Lines):
- Finish:

*L = Developed Length of Isolator

Fig. 108A – 3 Bolt Isolation Clamp (CuNi Pipe)											
Pipe O/D	A	B	C	D	E	H	*L	R	Spacer	WxT	Max Load kg
16	95	15	13	M10	70	12	67	14	10NB	35x5	280
20	95	15	13	M10	70	12	85	16	10NB	35x5	280
25	100	15	13	M10	70	12	91	18.5	10NB	35x5	280
30	105	15	13	M10	70	12	109	21	10NB	35x5	280
38	120	18	15	M12	70	15	134	25	15NB	35x5	280
44.5	120	18	15	M12	85	15	151	28	15NB	35x5	280
57	140	18	15	M12	80	15	190	34.5	15NB	35x5	280
76.1	155	18	15	M12	105	15	245	44	15NB	35x5	280
88.9	170	18	15	M12	105	15	286	50.5	15NB	35x5	280
108	190	18	15	M12	105	15	355	60	15NB	35x5	280
159	240	24	19	M16	95	19	515	85.5	20NB	35x8	450
219.1	325	24	19	M16	100	19	695	115.5	20NB	35x8	450
267	375	24	19	M16	105	19	855	140	20NB	50x10	450
323.9	450	30	23	M20	95	24	1030	168	20NB	60x15	900

Isolation Equipment – Fig. 115, 116 & 117

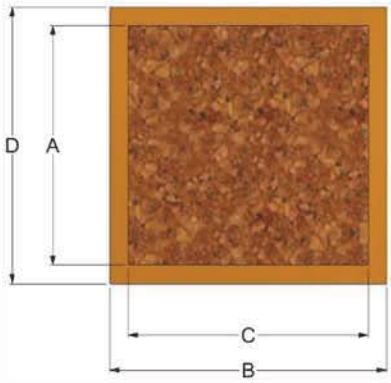
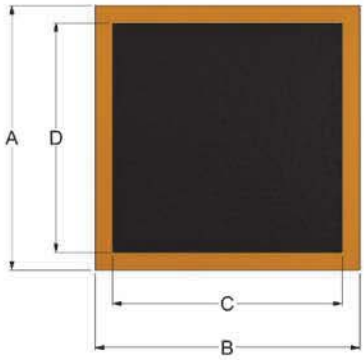


Fig. 115
Material: See Drawing

Please Specify:-
- Figure Number:
- Dimension A, B, C & D:



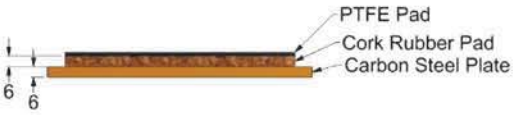


Fig. 116
Material: See Drawing

Please Specify:-
- Figure Number:
- Dimension A, B, C & D:

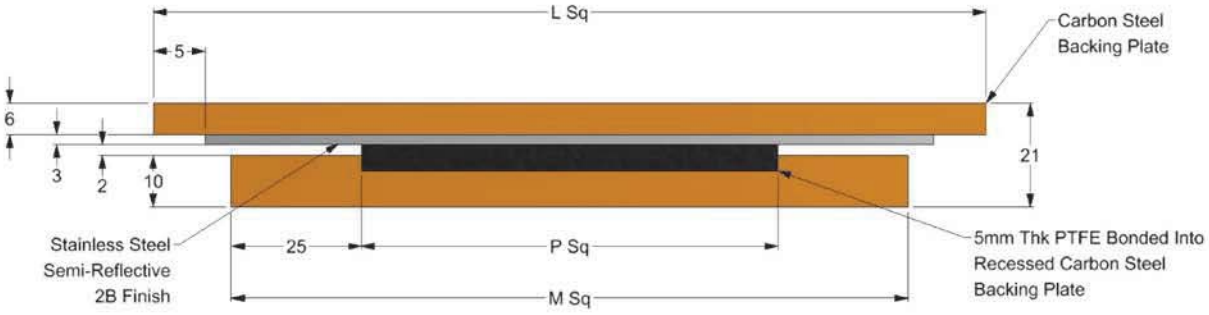


Fig.117 – Slider Unit

Size	Recommended Loading (Kgf)	M	P	L Movement Range A	B	C
1	100-500	70	20	60	90	120
2	400-2000	90	40	80	110	140
3	800-4500	110	60	100	130	160
4	1500-8000	130	80	120	150	180
5	2500-13000	150	100	140	170	200
6	4000-22000	180	130	170	200	230
7	7000-43000	230	180	220	250	280
8	12000-70000	280	230	270	300	330

Fig. 117
Material: See Drawing

Please Specify:-
- Figure Number:
- Dimension L, M & P:
- Movement Range:

Notes:

Adhesives available for bonding recessed PTFE will limit the maximum allowable temperature to 140°C.
Alternative mechanical bonding using countersunk screws will allow a maximum temperature of 200°C.

Range A allows ± 13mm movement
Range B allows ± 25mm movement
Range C allows ± 40mm movement

Top plate can be supplied square or rectangular to cater for coordinate direction movements.

Standard sliders are designed for site welding, alternative bolted attachments can be supplied.

It is recommended that sliding contact surfaces are installed parallel throughout the movement range.

PTFE Slide Bearings

General information
In a wide range of applications, PTFE slide bearings are superior to conventional expansion plates, rollers and rocker arm type supports. They support petrochemical plant, heavy machinery, pipelines, buildings and bridge girders; they accommodate expansion, contraction and other reciprocating motions of any structure that moves as a result of thermal, seismic or differential forces.

Bearings for such applications must operate at high loads and low speeds, and it is under just these conditions that the self-lubricating properties of PTFE are at maximum. This factor, together with its no stick-slip and anti-weathering characteristics, is the principle reason why PTFE has proved to be so successful as a slide bearing material.

Advantages
- The simplicity of the bearing design and its ease of fabrication and installation make the unit cost efficient.
- The costs of a construction can be reduced by designing for expansion rather than strain.
- Coefficient of friction over the bearing surface remains constant, even under worst case conditions.
- The bearings are maintenance free – PTFE is inherently self-lubricating, while dirt particles are absorbed into the material. Only simple maintenance is required against the significant ingress of dirt.

Design / Selection
QPS offers a specialist service, based on many years' experience in the use of PTFE and its application to slide bearings to assist in the design of bearing systems.

Low friction sliders with a coefficient of friction less than 0.1 are available. They are designed specifically for the loads and movements required. Most assemblies are also designed to be compatible with our range of standard shoes and saddles.

Stand-alone slide bearing sandwich plates Fig.117 as shown on page 156.

Bearing Assemblies
QPS slide bearings consist of a single PTFE pad counterfaced with a polished stainless steel plate. The assembly is designed to ensure that the PTFE pad is covered by the stainless steel plate throughout the expected design movements.

The basic element is a 5mm PTFE sheet, recessed into a 10mm steel backing plate for straight forward field installation by welding or bolting. The corresponding 3mm thick polished stainless steel plate is shop fitted to a 6mm thick carbon steel plate. Alternative thickness and materials for the backing plates can be supplied.

Where operating conditions require them, thermal insulation and vibration damping pads maybe bonded between the PTFE sheet and backing plate, or between the backing plate and the structure. To allow operation at high ambient temperature, a high temperature epoxy resin system is used for bonding, and the adhesives are cured under strictly controlled conditions, ensuring the bond is stronger than the PTFE itself.

As standard glass filled PTFE is used as the bearing material, the load bearing capacity is 140 Kg/cm^2.

Coefficients of Friction
The coefficient of friction of PTFE materials is dependent on many variables, including pressure, sliding velocity and temperature. Opinion is divided about the effect of some variables, although it is agreed that high pressure and low velocities favour low friction.

The coefficient is less than that of any other solid engineering material. It has been variously reported from 0.02 to 0.2, but this depends on surface preparation and the test method. The load friction chart (Fig. 1) shows the effect of the load.

In general the coefficient of friction between the mating surface and the PTFE slide bearing pad will be at a minimum when the stress in the PTFE is at maximum (consistent with acceptable limits of creep), the bearing is made from unfilled PTFE, and the finish of the mating surface is highly polished.

In addition, one of the most important frictional characteristics of the PTFE is the absence of 'stick-slip', because unlike all other conventional bearings, the static friction of PTFE is equal to or only marginally higher than the dynamic friction.

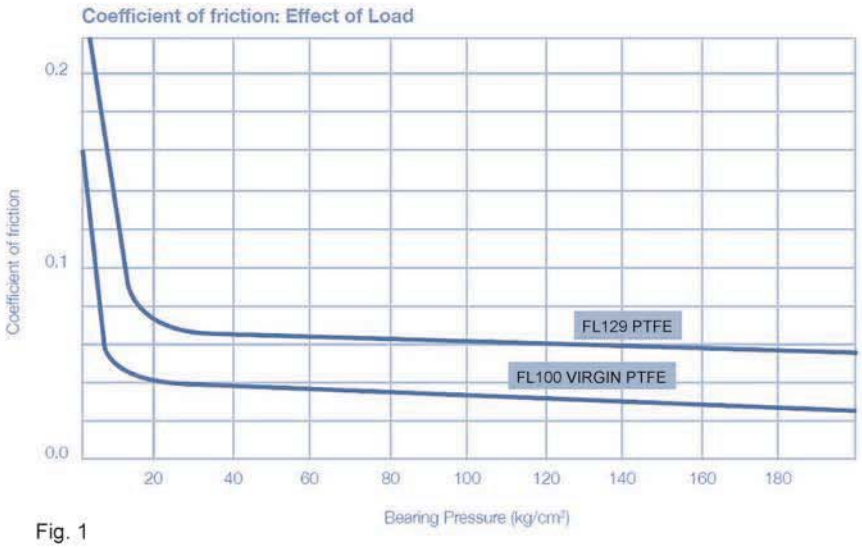


Fig. 1

PTFE Slide Bearings

Recommended Maximum Bearing Pressures
Fig. 2 indicates the optimum pressure, but depending on circumstances, design pressures may be allowed to vary from the optimum.

With the pressures, a design coefficient of friction 0.1 for unfilled PTFE or 0.12 for filled PTFE will give a significant margin of safety when operating conditions cannot accurately be predicted, but the figures obtained in practise will normally be considerably less than these.

Thermal Insulation
Where the temperature at the faces of the PTFE is likely to exceed 200°C by conduction through the bearing components, a thermal barrier must be interposed between the heat source and the sliding unit, QPS recommend using the use of Monolux 500 – the thickness required can be computed from the graph in Fig. 3. The graph shows the external surface temperature that can be anticipated using Monolux 500 in constructions up to 100mm thickness based on the practical tests. The actual surface temperature will differ with variations in surface conductance.

Bonding of PTFE
Chemical bonding is the recommended method for locating the bearing material on its support, because the shear value of the epoxy adhesive is greater than that of the PTFE. The temperature at the surface of the PTFE shall never exceed 140°C.

All bonded PTFE elements are not adversely affected by exposure to ultra violet light providing the minimum thickness requirement of 1.5mm is met.

Site bonding of PTFE is not recommended – strictly controlled conditions of cleanliness, pressure and temperature are required to obtain a satisfactory bond between PTFE and the substrate.

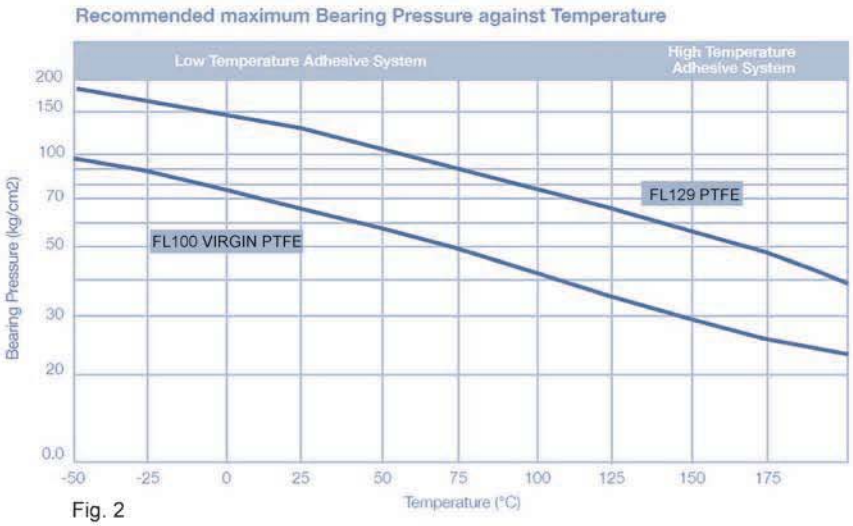


Fig. 2

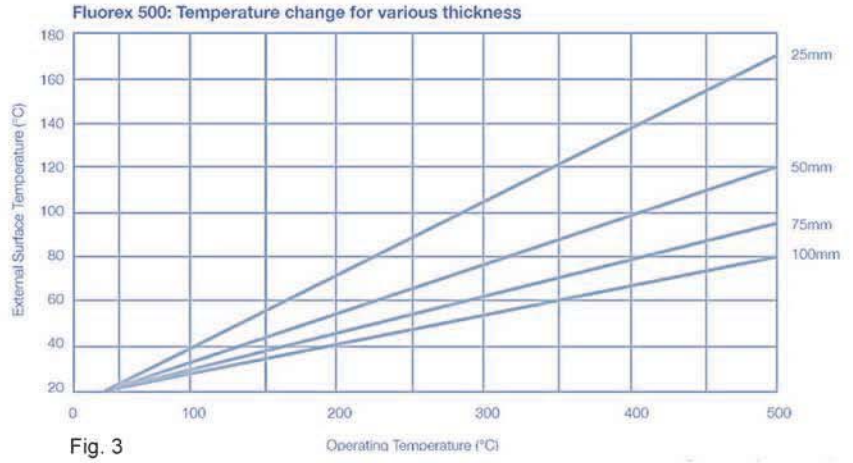


Fig. 3

Material Thickness
The ideal thickness has been found to be 5mm, due to the recessing requirement. This is thick enough to allow for some constructional misalignment and to allow for dirt and grit embedment.

Installation
The bearing components can be located to the installation by bolting, tack-welding, full welding or mortar embedment, and the appropriate type of bearing should be chosen according to the installation method. The PTFE should be adequately protected against weld splatter, paint spray, metal swarf, etc. during installation.

Pad Dimensions
The top bearing pad should be larger than the bottom pad by an amount equal to the expected movement, in order to maintain a constant contact area.

Bearing Temperature
The temperature at the surface of the PTFE should generally be less than 120°C and should never exceed 200°C. As a rule of thumb, under normal conditions the temperature falls by 200°C for every 100mm from the heat source (in ambient air) – for example, a typical horizontal vessel operating at 500°C will have a bottom of saddle temperature of about 150°C.

Temperature does not normally present a problem. However, if the bearing temperature is likely to exceed 200°C a thermal insulator should be fitted between the structure and the bearing back plate (see above topic – Thermal Insulation).

Vibration / Acoustic Dampening
Slide bearing units can be built with a variety of elastomer composite interlayers or backings to suit customers design parameters when acoustic or dampening is necessary. Elastomers may be used when simple angular or rotational movements are required.

PTFE Slide Bearings

Slideway Rigidity
When a series of slide bearings is used to form a slideway, e.g. for oil rig movement, the slide supports must be sufficiently rigid to avoid deflection of the individual bearings or uneven loading. Deflection of only a few degrees could significantly increase the apparent coefficient of friction, and cause bearing failure if all the load is carriedby one end of the bearing pad.

Design Steps
The following steps will provide an indication of the slide bearing requirements for a particular application:

- Determine the load of the structure – this will indicate the total load bearing area required at a suitable bearing pressure.
- Decide the number and position of the bearings according to the rigidity and function of the structure.
- Take account of operating temperature limits, and specify any necessary thermal insulation.
- Consider any unusual conditions affecting the bearings, such as the need for additional thermal insulation, damping pads, etc.
- Decide the most appropriate method of mounting the bearings.
- Select the types of bearings required and specify their dimensions.

Technical Advantages of PTFE Slide Bearings

- PTFE has the lowest coefficient of friction of any known solid engineering material including lubricated metal.
- There is no stick-slip action.
- They have indefinite life, since chemicals and weather have no effect on PTFE – moisture absorption is less than 0.01% even under icing conditions or immersion, and the material is chemically inert.
- No maintenance is required, PTFE will never cold weld to itself and therefore requires no lubrication.
- The bearings are easily installed, either pre-assembled or on site.
- PTFE bearings are far less bulky than alternative assemblies.
- There is no possibility of fatigue failure.
- Electrical and thermal insulation minimise galvanic corrosion and heat loss.
- Vibrations are damped.
- Small particles which may become embedded do not cause binding of the surfaces.
- The slide bearings can accommodate some misalignment in construction without setting up stress corrosion along a leading edge, as can occur in conventional bearings.

INSULATION EQUIPMENT

Insulation Equipment Index

Insulation Equipment – Pictorial Index

Fig.	Page	Description	Pictorial
101A	169	Insulating Wood Block Type A	
101B	169	Insulating Wood Block Type B	
114	169	U-Bolt c/w Insulating Wood Block	
400	161	Insulated Hanging Support	
410	162	Insulated All in One Clamped Support	
420	163	150mm QplaS Cold Line Support	

Fig.	Page	Description	Pictorial
430	164	300mm QplaS Cold Line Support	
440	165	300mm QplaS Cold Line Stop Support	
450	166	300mm QplaS Vertical Cold Line Stop Support	
460	167	QplaS Cold Line Base Support	
470	168	QplaS Cold Line Clamped Shoe	

Insulation Equipment

In addition to QPS's QPLAS material we also supply a large range of insulating pipe supports to suit a large range of temperatures, from cryogenic pipe work to high temperature pipes and vessels. We supply a number of different insulating materials to suit our client's individual, insulating needs.

Cellular Glass
A highly efficient impermeable insulation material. It is totally inert and non combustible and is suited to severe cryogenic temperature cycles.

Low Density & High Density Polyurethane Foam
This is CFC free foam with good load carrying cap abilities and a large temperature range, used in oil and petrochemical industries where a high efficiency of insulation is required. The material also has excellent fire retardant properties.

Low Density & High Density Calcium Silicate
This is a tough and hard wearing insulation, which has an excellent thermal efficiency on hot process applications. The material is inert and non-combustible and contains no asbestos.

QPlaS
A high strength glass reinforced composite, which has a wide temperature range and can be machined, bored and tapped. It has excellent fire safety properties and is resistant to UV and chemical corrosion.

Phenolic
This is a CFC free high density foam with a large temperature range is, fire resistant and has an extremely low smoke emission. It is also treated with a dust suppressant, which makes it suitable for pharmaceutical, food processing, medical and other clean air environments.

Material Specifications				
Material	**Density**	**Comp Strength**	**Thermal Conductivity**	**Temp Range**
Cellular Glass	165 kg/m³	1.6 Mpa	0.047 (W/m K) @ +10°C	-260°C to +430°C
Low Density Polyurethane	50 kg/m³	0.26 Mpa	0.027 (W/m K) @ -160°C	-120°C to +140°C
High Density Polyurethane	400 kg/m³	7 Mpa	0.028 (W/m K) @ -160°C	-200°C to +80°C
Low Density Calcium Silicate	260 kg/m³	1.5 Mpa	0.058 (W/m K) @ +200°C	0°C to +1000°C
High Density Calcium Silicate	770 kg/m³	11 Mpa	0.18 (W/m K) @ +200°C	0°C to +500°C
QPLAS	1850 kg/m³	140 Mpa	0.35 (W/m K) @ +20°C	-190°C to +160°C
Phenolic	60 to 160 kg/m³	0.4 to 2.3 Mpa	0.028 to 0.036 (W/m K) @ +10°C	-180°C to +120°C

QPlaS - Insulation Equipment

QPS Description

The insulation we use in the blocks and pipe shoes is moulded from a high strength glass reinforced composite and is referred to as QPlaS.

The QPlaS material has a number of advantages over other materials such as steel and wood, in that no maintenance is required after installation, as it requires no painting or special coatings. The QPlaS material absorbs no moisture and suffers no corrosive effects. The versatility of this material means that it can be machined, bored and tapped so that it can incorporate steel supports and fixings. QPlaS is also extremely safe as it has excellent fire safety properties tested to BS 476 Parts 5&6 (1968) and is classified as 'Not Easily Ignitable'.

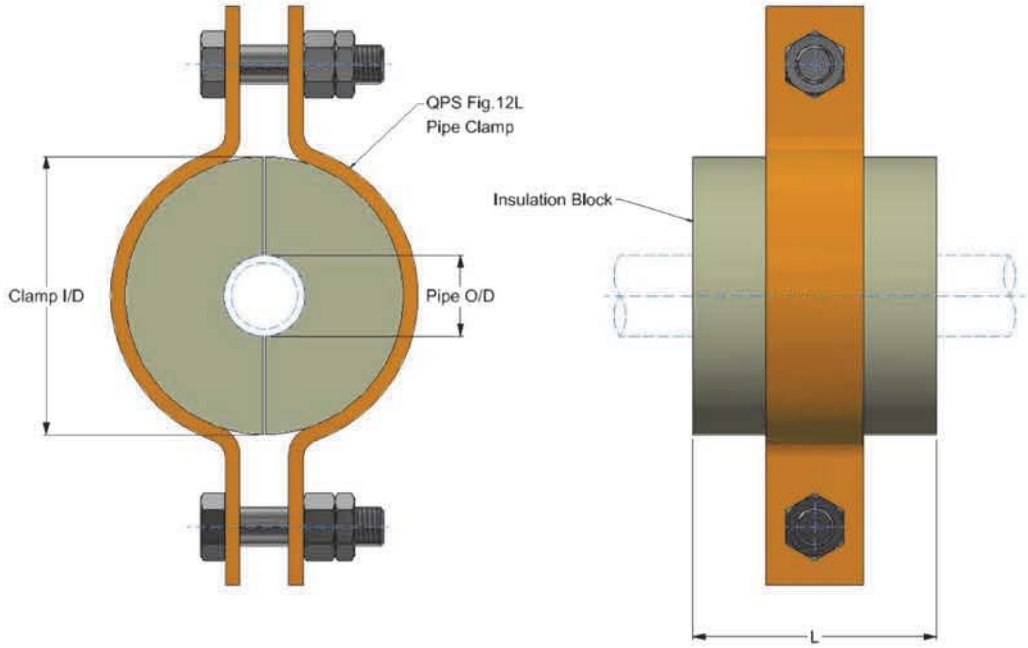
Material Benefits

- Worldwide installations (in diverse climates, conditions & applications).
- High strength in all directions.
- Robust and durable.
- Thermal and electrical insulator.
- Dimensionally stable.
- Fire retardant.
- Flame resistant.
- Corrosion free.
- Resistant to UV and chemical attack.
- Non-hazardous.
- Wide temperature range.
- Maintenance free.
- No significant moisture absorption.
- No protective coating required.
- Product life expectancy in excess of 30 years.

Material Properties and Technical Information

Compressive Strength 20°C (Mpa)	140
Compressive Strength 1000°C (Mpa)	50
Compressive Strength 150°C (Mpa)	30
Tensile Strength 20°C	45
Shear Strength 20°C	50
Flexural Strength 20°C	90
Density (g/cm³)	1.85
Elastic Modulas (GPa)	14
Thermal Conductivity (W/m K) @ 20°C	0.35
Impact Strength 20°C	25
Electrical Strength MV/m	9.5
Volume Resistivity TWm	1.5
Surface Resistivity TW	1000
Upper Operating Temperature (°C)	160
Lower Operating Temperature (°C)	-190

Insulation Equipment – Fig. 400



			Cellular Glass	LD Polyurethane	HD Polyurethane	LD Calcium Silicate	HD Calcium Silicate	Phenolic
NPS	Pipe O/D	L	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg
15	21.3	100	73	12	222	68	222	12 to 75
20	26.9	100	92	15	222	86	222	16 to 95
25	33.7	100	115	19	222	108	222	19 to 119
32	42.4	100	145	24	222	136	222	24 to 149
40	48.3	100	165	27	365	155	365	28 to 170
50	60.3	100	206	33	365	193	365	35 to 213
65	76.1	100	260	42	365	244	365	44 to 268
80	88.9	100	304	49	365	285	365	51 to 313
100	114.3	100	365	63	365	365	365	66 to 365
125	136.7	100	365	76	365	365	365	79 to 365
150	168.3	125	735	117	735	674	735	121 to 735
200	219.1	125	735	152	735	735	735	158 to 735
250	273	125	1095	190	1095	1095	1095	197 to 1095
300	323.9	200	1095	360	1095	1095	1095	374 to 1095
350	355.6	200	1095	395	1095	1095	1095	410 to 1095
400	406.4	200	1095	451	1095	1095	1095	469 to 1095
450	457	200	1450	508	1450	1450	1450	527 to 1450

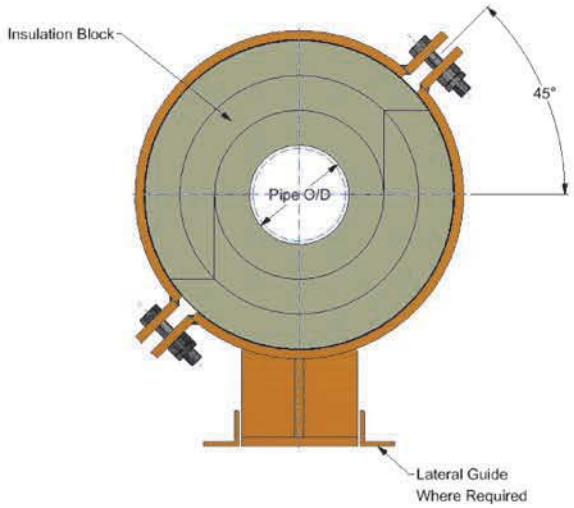
Fig. 400
Material: Carbon Steel + Insulation

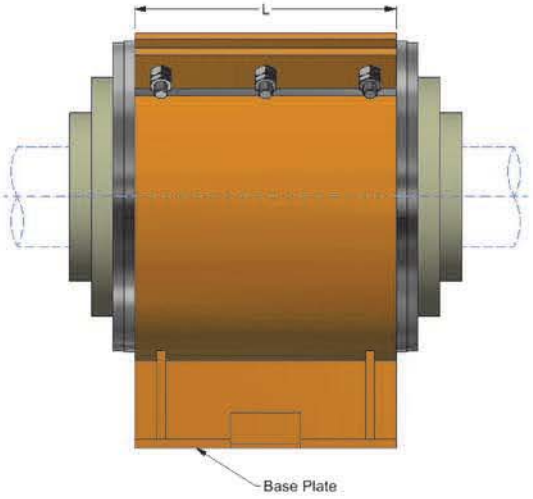
Galvanised Steel wrapper plate supplied with the insulation.

Please Specify:-

- Figure Number:
- NPS:
- Insulation Thickness:
- Insulation Type:

Insulation Equipment – Fig. 410





			Cellular Glass	LD Polyurethane	HD Polyurethane	LD Calcium Silicate	HD Calcium Silicate	Phenolic
NPS	Pipe O/D	L	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg	Max Load Kg
15	21.3	200	146	24	637	136	1001	25 to 150
20	26.9	200	184	30	804	172	1264	31 to 184
25	33.7	200	230	37	1008	216	1584	39 to 230
32	42.4	200	290	47	1268	272	1992	49 to 290
40	48.3	200	330	54	1444	309	2270	56 to 330
50	60.3	200	412	67	1803	386	2833	70 to 412
65	76.1	200	520	85	2276	488	3576	88 to 520
80	88.9	300	911	148	3700	854	3700	154 to 911
100	114.3	300	1172	190	3900	1099	3900	198 to 1172
125	136.7	300	1401	228	6150	1314	6150	236 to 1401
150	168.3	300	1725	280	7549	1618	7549	291 to 1725
200	219.1	300	2246	365	8400	2106	8400	379 to 2246
250	273	400	3732	606	13500	3499	13500	630 to 3732
300	323.9	400	4428	719	13500	4151	13500	747 to 4428
350	355.6	400	4861	790	15500	4557	15500	820 to 4861
400	406.4	400	5555	903	16500	5208	16500	937 to 5555
450	457	400	6247	1015	18000	5857	18000	1054 to 6247

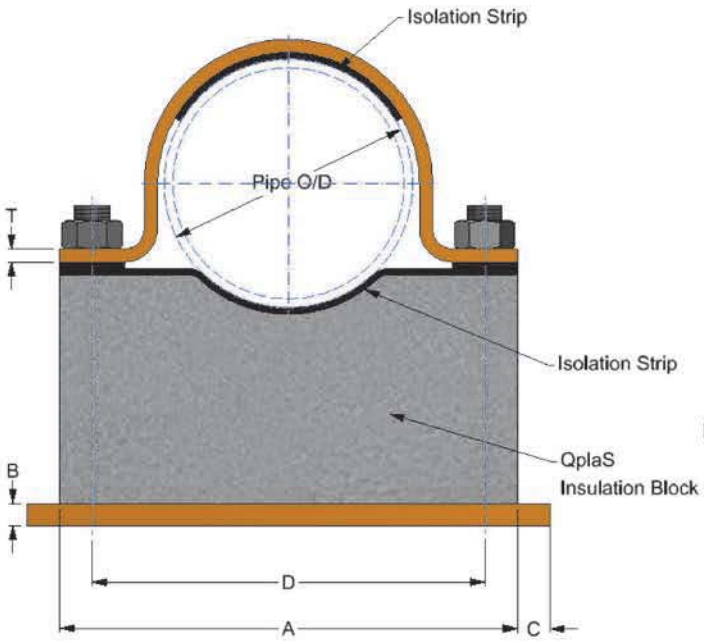
Fig. 410
Material: Carbon Steel + Insulation

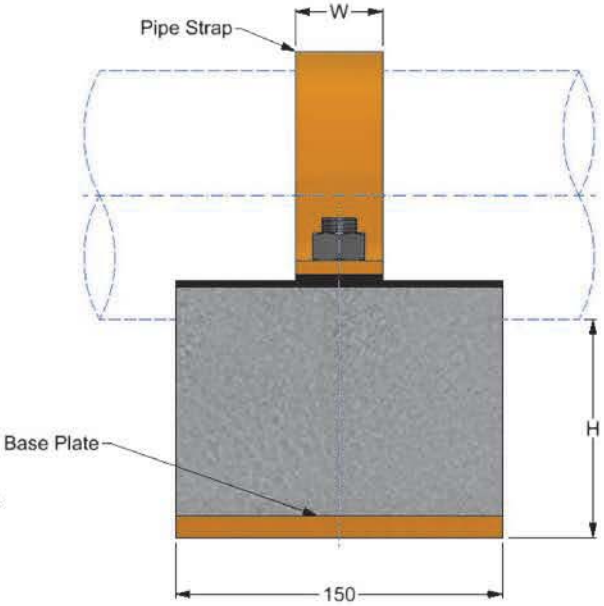
Galvanised Steel wrapper plate supplied with the insulation.

Please Specify:-

- Figure Number:
- NPS:
- Height:
- Insulation – No. of Layers:
- Insulation Thickness:
- Insulation Type:

Insulation Equipment – Fig. 420



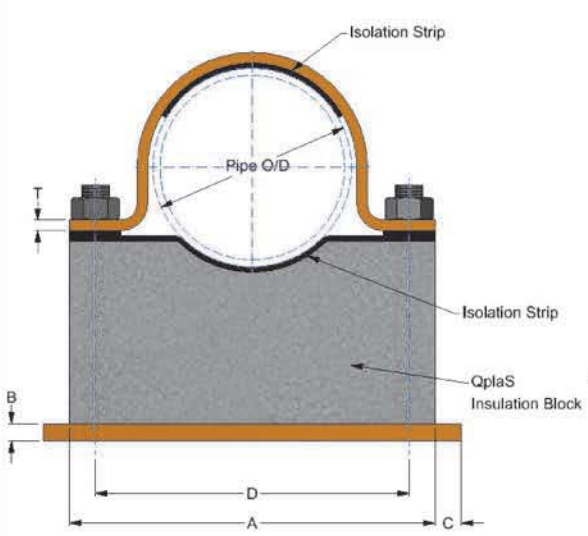


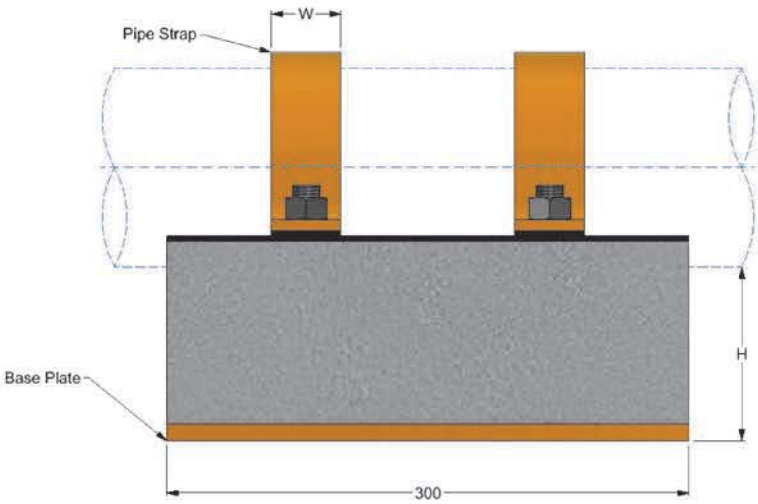
NPS	Pipe O/D	Stud Ø	A	B	C	D	WxT	Max Load kg	
								Vertical	Lateral
25	33.7	M6	100	10	5	70	40x3	306	306
32	42.4	M10	100	10	5	80	40x3	358	358
40	48.3	M10	120	10	5	90	40x3	408	408
50	60.3	M10	150	10	5	120	40x6	510	510
65	76.1	M12	150	10	5	130	40x6	610	610
80	88.9	M12	170	10	5	140	40x6	714	714
90	101.6	M12	190	10	5	150	40x6	760	760
100	114.3	M16	210	10	5	170	40x6	815	815
125	136.7	M16	250	10	5	200	50x6	1000	900
150	168.3	M16	290	12	5	240	50x6	1223	1019
200	219.1	M16	340	12	5	290	50x8	1630	1121
250	273	M20	400	12	5	350	60x8	2038	1223
300	323.9	M20	460	12	5	400	60x8	3057	1427
350	355.6	M20	500	12	5	440	60x8	3566	1529
400	406.4	M20	550	15	5	490	60x8	4281	1630
450	457	M20	600	15	5	540	60x8	5097	2038
500	508	M20	650	15	5	590	60x8	6116	2446
600	609	M20	760	15	5	700	60x8	7645	2955
700	711.2	M22	870	15	5	800	60x8	8665	3057
750	762	M24	950	15	5	860	60x8	10194	3262

Fig. 420
Materials:-
Base Plate: Carbon Steel
Clamp: Carbon Steel
Insulation: QPlaS
Isolation Strips: Neoprene

Please Specify:-
- Figure Number:
- NPS:
- Height (H):

Insulation Equipment – Fig. 430



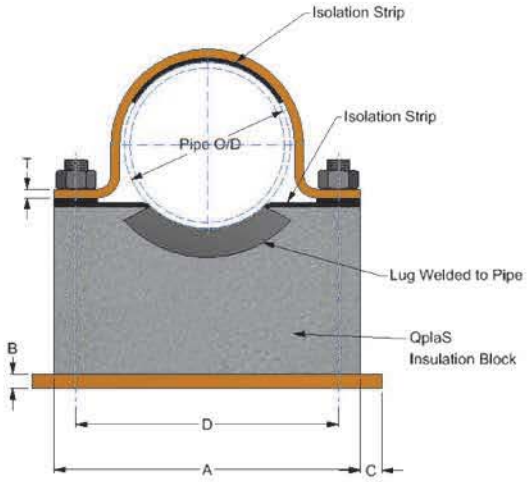


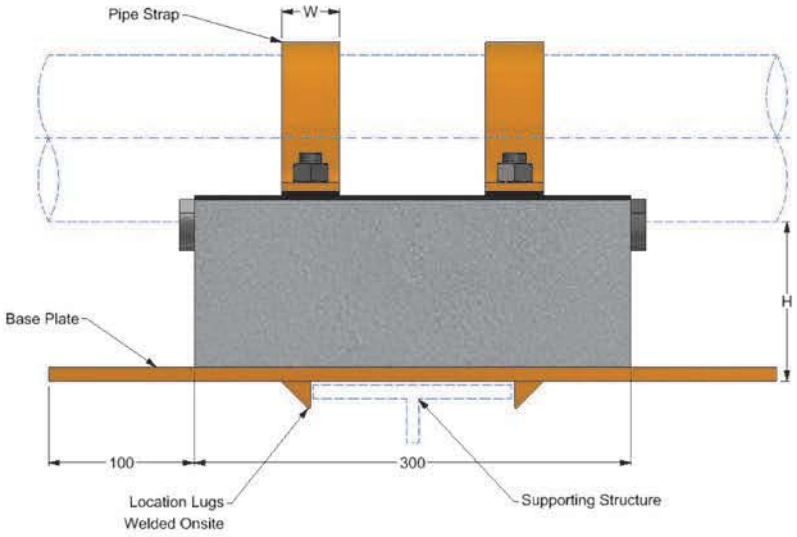
NPS	Pipe O/D	Stud Ø	A	B	C	D	WxT	Max Load kg	
								Vertical	Lateral
25	33.7	M6	100	10	5	70	40x3	510	510
32	42.4	M10	100	10	5	80	40x3	620	550
40	48.3	M10	120	10	5	90	40x3	714	611
50	60.3	M10	150	10	5	120	40x6	917	815
65	76.1	M12	150	10	5	130	40x6	1000	950
80	88.9	M12	170	10	5	140	40x6	1223	1121
90	101.6	M12	190	10	5	150	40x6	1350	1230
100	114.3	M16	210	10	5	170	40x6	1427	1325
125	136.7	M16	250	10	5	200	50x6	1730	1532
150	168.3	M16	290	12	5	240	50x6	2038	1732
200	219.1	M16	340	12	5	290	50x8	2751	1834
250	273	M20	400	12	5	350	60x8	3466	2038
300	323.9	M20	460	12	5	400	60x8	5097	2446
350	355.6	M20	500	12	5	440	60x8	6014	2548
400	406.4	M20	550	15	5	490	60x8	7238	2751
450	457	M20	600	15	5	540	60x8	8665	3466
500	508	M20	650	15	5	590	60x8	10703	4076
600	609	M20	760	15	5	700	60x8	12946	5097
700	711.2	M22	870	15	5	800	60x8	14985	5505
750	762	M24	950	15	5	860	60x8	18043	6014

Fig. 430
Materials:-
Base Plate: Carbon Steel
Clamps: Stainless Steel
Insulation: QPlaS
Isolation Strips: Neoprene

Please Specify:-
- Figure Number:
- NPS:
- Height (H):

Insulation Equipment – Fig. 440



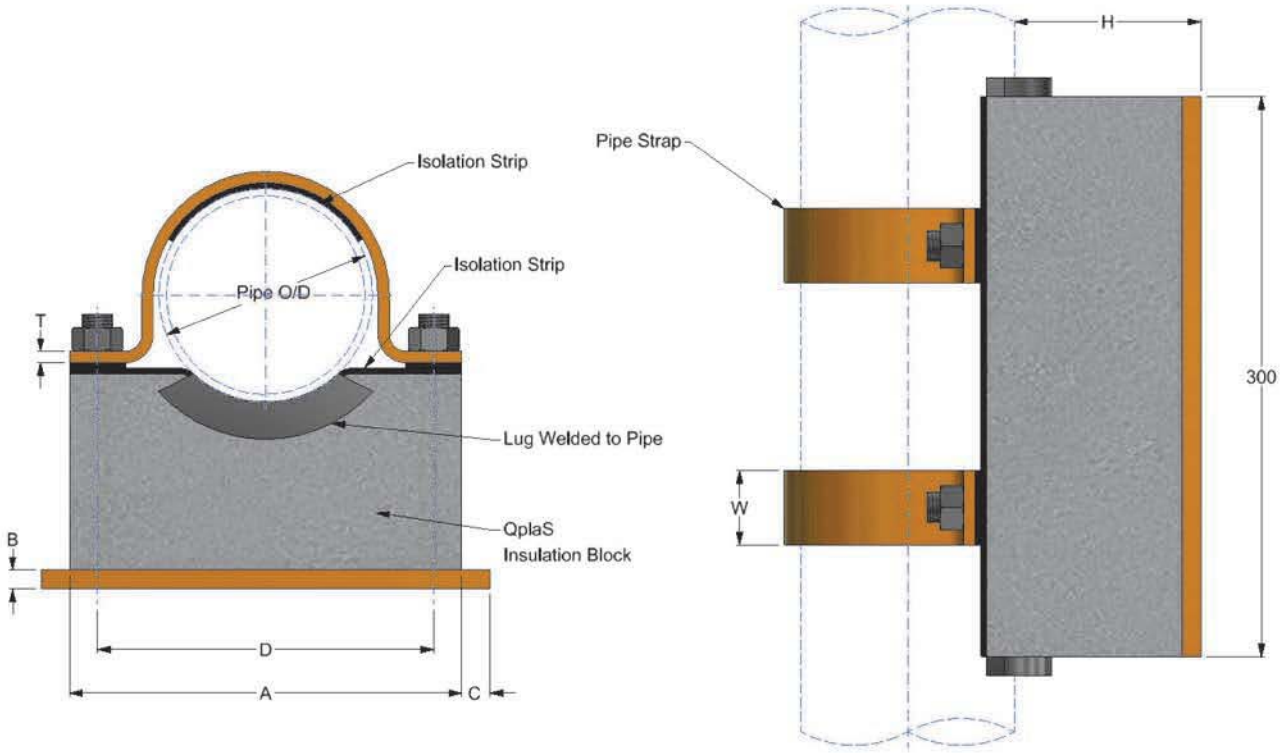


NPS	Pipe O/D	Stud Ø	A	B	C	D	WxT	Max Load kg	
								Vertical	Lateral
25	33.7	M6	100	10	5	70	40x3	510	510
32	42.4	M10	100	10	5	80	40x3	620	550
40	48.3	M10	120	10	5	90	40x3	714	611
50	60.3	M10	150	10	5	120	40x6	917	815
65	76.1	M12	150	10	5	130	40x6	1000	950
80	88.9	M12	170	10	5	140	40x6	1223	1121
90	101.6	M12	190	10	5	150	40x6	1350	1230
100	114.3	M16	210	10	5	170	40x6	1427	1325
125	136.7	M16	250	10	5	200	50x6	1730	1532
150	168.3	M16	290	12	5	240	50x6	2038	1732
200	219.1	M16	340	12	5	290	50x8	2751	1834
250	273	M20	400	12	5	350	60x8	3466	2038
300	323.9	M20	460	12	5	400	60x8	5097	2446
350	355.6	M20	500	12	5	440	60x8	6014	2548
400	406.4	M20	550	15	5	490	60x8	7238	2751
450	457	M20	600	15	5	540	60x8	8665	3466
500	508	M20	650	15	5	590	60x8	10703	4076
600	609	M20	760	15	5	700	60x8	12946	5097
700	711.2	M22	870	15	5	800	60x8	14985	5505
750	762	M24	950	15	5	860	60x8	18043	6014

Fig. 440
Materials:-
Base Plate: Carbon Steel
Clamps: Stainless Steel
Insulation: QPlaS
Isolation Strips: Neoprene

Please Specify:-
- Figure Number:
- NPS:
- Height (H):

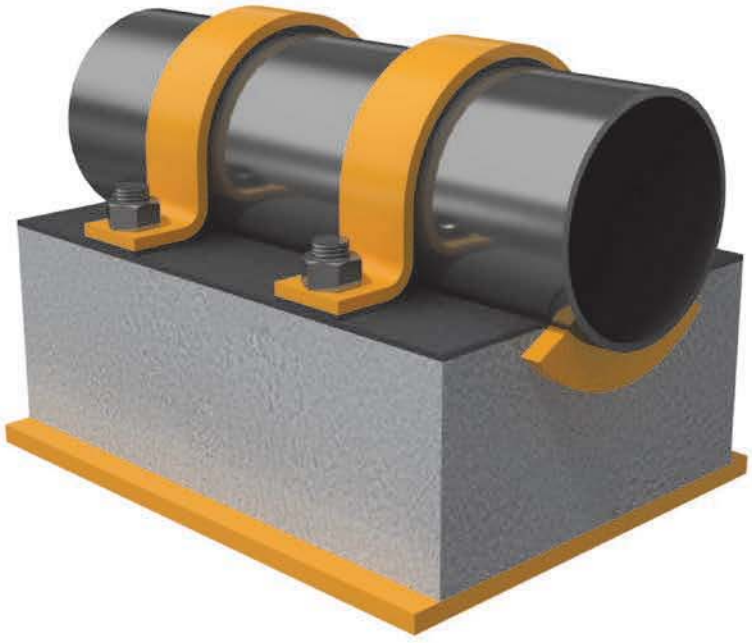
Insulation Equipment – Fig. 450



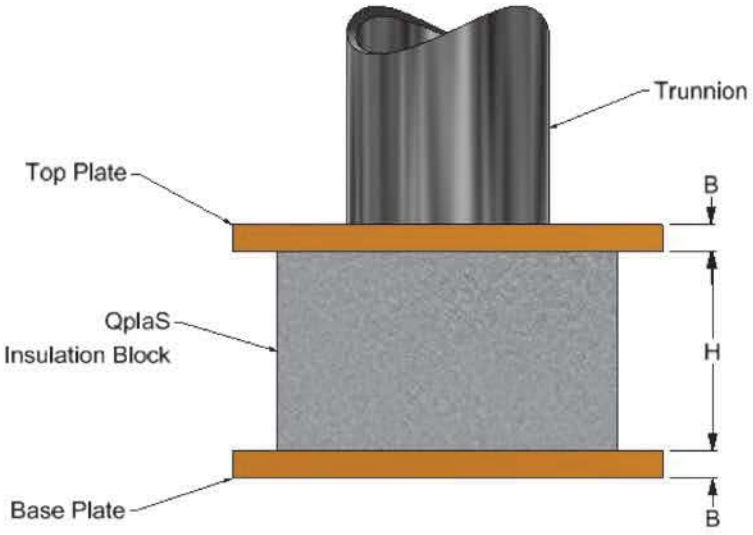
NPS	Pipe O/D	Stud Ø	A	B	C	D	WxT	Max Load kg		
								Dir X	Dir Y	Dir Z
25	33.7	M6	100	10	5	70	40x3	306	306	306
32	42.4	M10	100	10	5	80	40x3	356	356	356
40	48.3	M10	120	10	5	90	40x3	408	408	408
50	60.3	M10	150	10	5	120	40x6	510	510	510
65	76.1	M10	150	10	5	130	40x6	620	620	620
80	88.9	M12	170	10	5	140	40x6	714	714	714
90	101.6	M12	190	10	5	150	40x6	774	774	774
100	114.3	M16	210	10	5	170	40x6	815	815	815

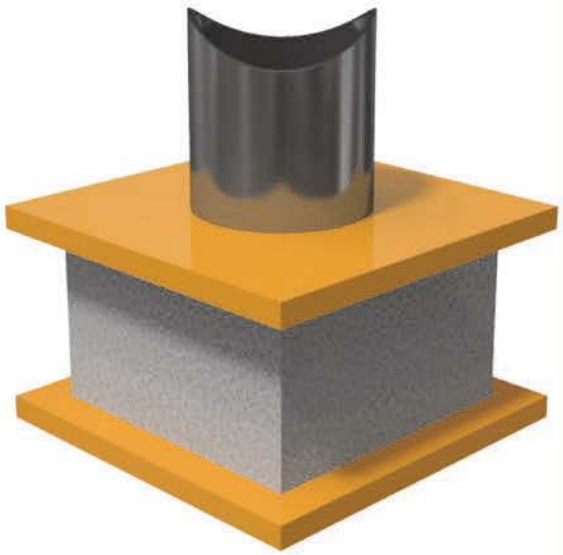
Fig. 450
Materials:-
Base Plate: Carbon Steel
Clamps: Stainless Steel
Insulation: QPlaS
Isolation Strips: Neoprene

Please Specify:-
- Figure Number:
- NPS:
- Height (H):



Insulation Equipment – Fig. 460





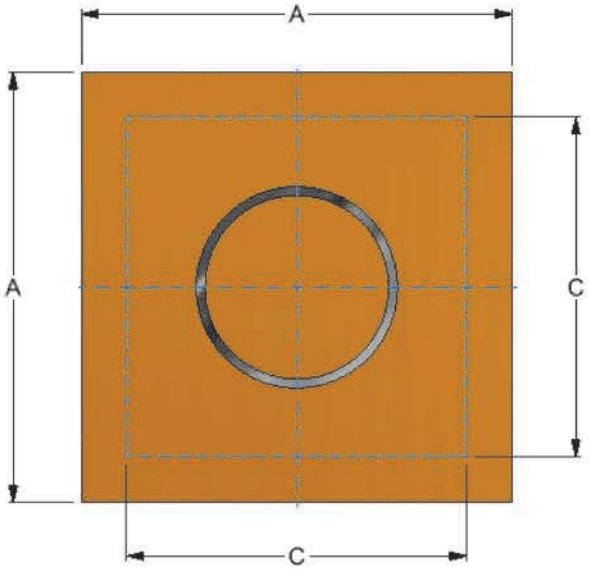
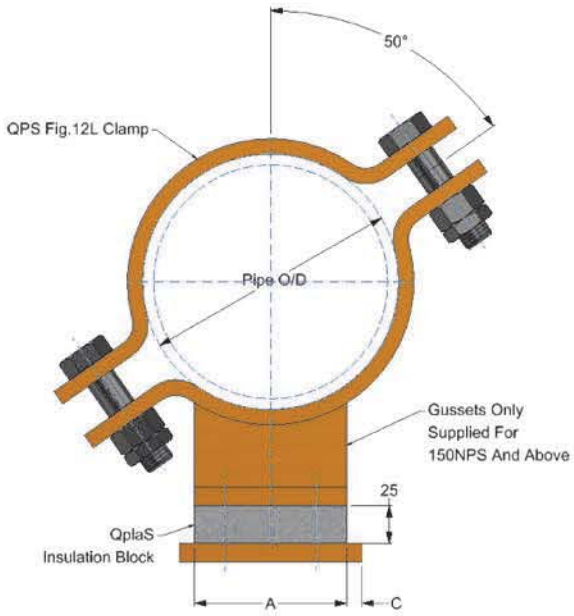


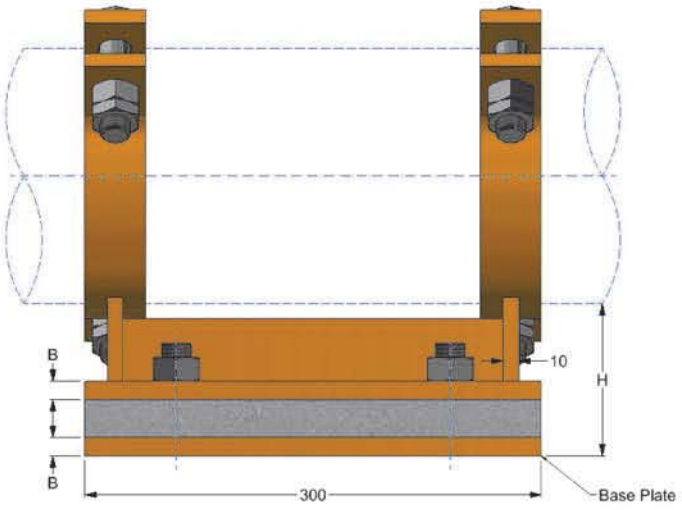
Fig. 460
Materials:-
Base/Top Plate: Carbon Steel
Insulation: QPlaS

Please Specify:-
- Figure Number:
- NPS:
- Height (H):

NPS	Pipe O/D	Trunnion Size	Plate Dimensions AxAxB	Block Dimensions CxCxH	Plate Fixings (Per Plate)		Max Load Kg	
					Number	Size	Vertical	Lateral
25	33.7	20	140x140x10	100x100x90	4	M8x30	1529	510
32	42.4	25	140x140x10	100x100x90	4	M8x30	1529	510
40	48.3	32	140x140x10	100x100x90	4	M8x30	1529	510
50	60.3	40	140x140x10	100x100x90	4	M8x30	1529	510
65	76.1	40	140x140x10	100x100x90	4	M8x30	1529	510
80	88.9	50	140x140x10	100x100x90	4	M8x30	1529	510
90	101.6	80	190x190x12	150x150x88	4	M8x30	1529	510
100	114.3	80	190x190x12	150x150x88	4	M10x30	3368	1121
125	136.7	100	190x190x12	150x150x88	4	M10x30	3368	1121
150	168.3	100	190x190x12	150x150x88	4	M10x30	3368	1121
200	219.1	150	190x190x12	150x150x88	4	M10x30	3368	1121
250	273	200	300x300x15	260x260x85	6	M10x40	9171	1936
300	323.9	250	300x300x15	260x260x85	6	M10x40	9171	1936
350	355.6	300	350x350x15	310x310x85	6	M10x40	17323	2038
400	406.4	350	400x400x15	360x360x85	6	M12x40	23445	2345
450	457	400	440x440x15	400x400x85	6	M12x40	23445	2345
500	508	450	500x500x15	460x460x85	6	M12x40	23445	2345
600	609	500	600x600x15	560x560x85	6	M12x40	23445	2345

Insulation Equipment – Fig. 470





NPS	Pipe O/D	Stud Ø	A	B	C	Max Load kg		
						Vertical Downward	Vertical Upwards	Lateral
25	33.7	M12	100	10	10	5921	3159	4280
32	42.4	M12	100	10	10	5921	3159	4280
40	48.3	M12	100	10	10	5921	3159	4280
50	60.3	M12	100	10	10	5921	3159	4280
65	76.1	M12	100	10	10	5921	3159	4280
80	88.9	M12	100	10	10	5921	3159	4280
90	101.6	M12	100	10	10	5921	3159	4280
100	114.3	M16	100	10	10	7849	3159	4280
125	136.7	M16	100	10	10	7849	3159	4280
150	168.3	M20	100	12	10	7849	3159	4280
200	219.1	M20	100	12	10	7849	3159	4280
250	273	M24	150	12	10	28542	3159	4280
300	323.9	M24	150	12	10	28542	3159	4280
350	355.6	M24	200	12	10	36391	3159	4280
400	406.4	M24	200	15	10	45872	3159	4280
450	457	M24	250	15	10	45872	3159	4280
500	508	M24	250	15	10	45872	3159	4280
600	609	M30	250	15	10	45872	3159	4280

Fig. 470
Materials:-
Carbon Steel
Insulation: QPlaS

Please Specify:-
- Figure Number:
- NPS:
- Height (H):

Insulation Equipment – Fig. 101A, 101B & Fig. 114

Close-grained hardwood such as oak, iroko or obeche are often used as load bearing insulators on low temperature services.

The woods are kiln dried to ensure an acceptable moisture content and then machined in segments according to pipe dimensions.

An alternative to hardwood blocks is a unique material manufactured from selected beech veneers, which are impregnated under vacuum with thermosetting synthetic resin and then densified under heat and pressure.

The main benefit of both the above products is their high compressive strengths coupled with their obvious machining versatility.

There are numerous applications for both wood block designs and enquiries are welcome.

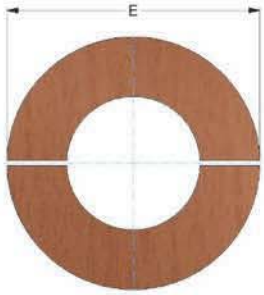


Fig. 101A

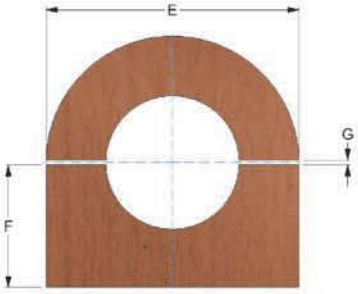


Fig. 101B

Fig. 101A & 101B
Material: Hard Wood

Please Specify:-
- Figure Number:
- Pipe O/D:
- E, F, G & T:

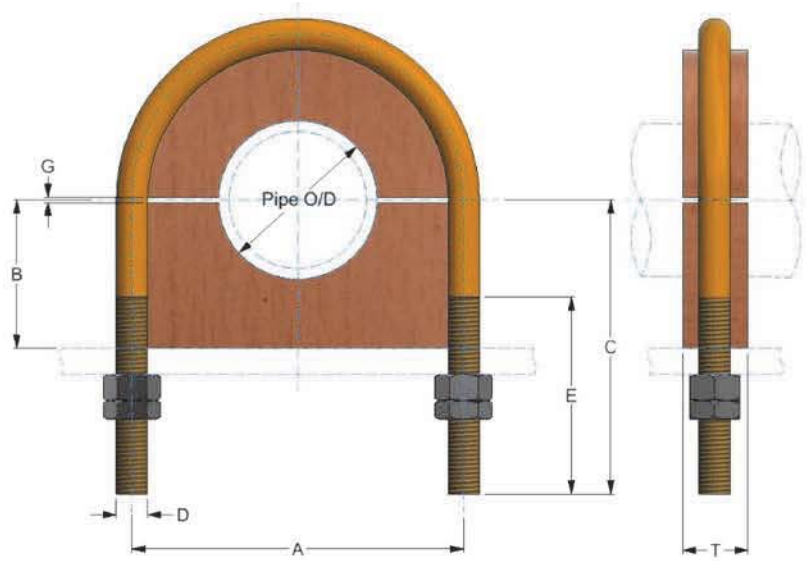
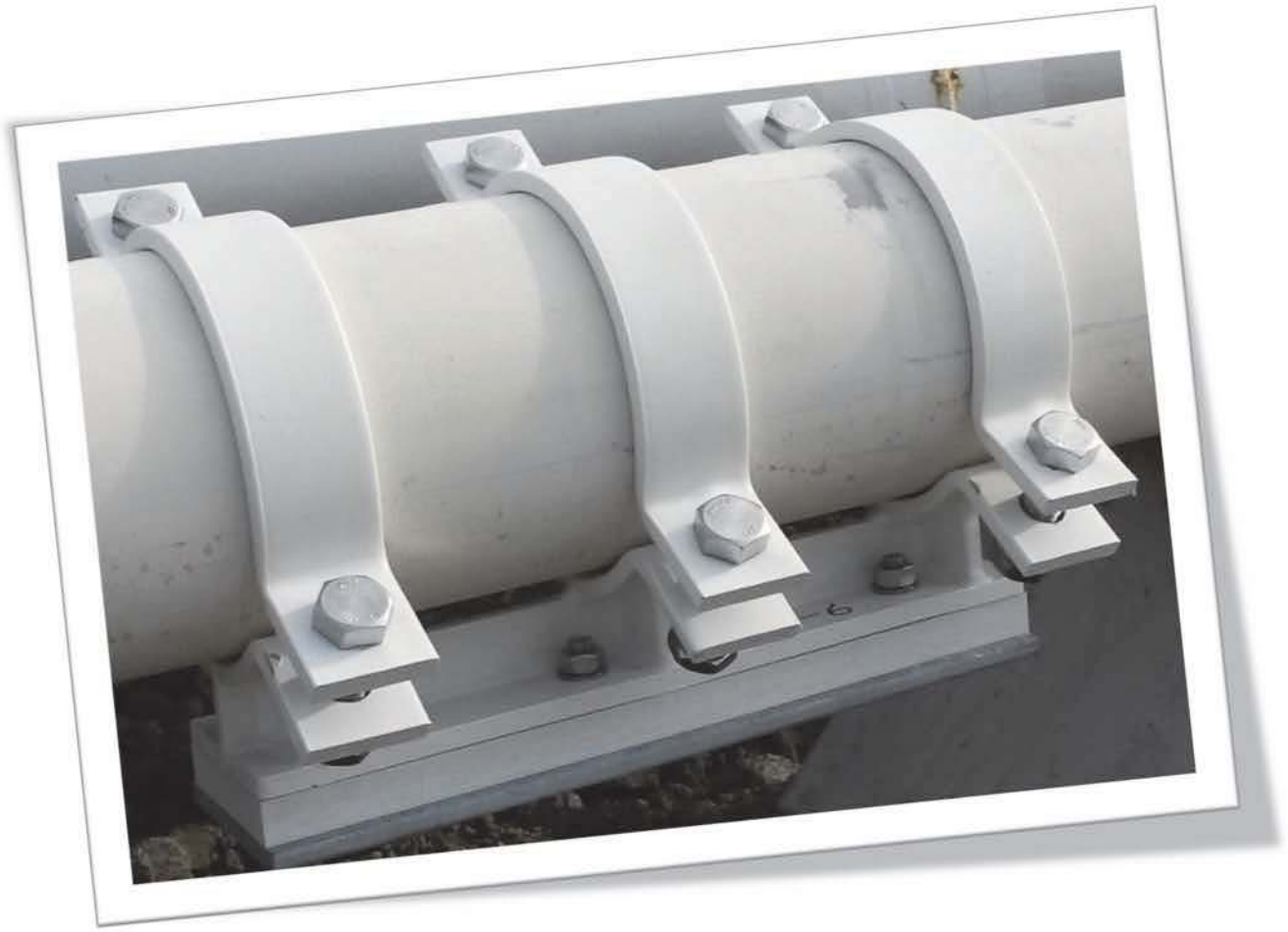


Fig. 114 – U Bolt c/w Insulation							
Pipe O/D	A	B	C	D	E	G	T
21.3	50	34	85	8	58	3	25
26.9	68	38	90	8	60	3	25
33.7	68	40	88	8	60	6	25
42.4	84	44	93	8	58	6	25
48.3	86	62	120	10	76	6	50
60.3	100	68	130	10	76	10	50
76.1	130	76	138	16	76	10	50
88.9	156	84	140	16	80	10	50
114.3	186	105	160	16	80	10	75
168.3	240	130	225	20	120	10	75
219.1	344	160	250	20	120	12	75

Fig. 114
Material: Carbon Steel
Block: Cork / Rubber / Hardwood

2 x Full Nuts
2 x Locknuts

Please Specify:-
- Figure Number:
- Pipe O/D:



FABRICATED STEELWORK

Fabricated Steelwork

Overview
As well as providing standard supports like spring hangers, clamps, shoes, u-bolts, etc. QPS also undertakes a wide variety of secondary steelwork fabrication. This could simply be a pedestal to raise a standard support or complicated structures for carrying multiple supports at various heights. This type of work is manufactured from client's specific drawings for unique locations on site.

Materials
All structural steel used is of high quality. QPS offer a wide range of steel including carbon steel, alloy steel, stainless steel and low temperature steels. All steels have mechanical and chemical test certificates and full traceability when requested.

Finishes
All standard surface preparations and finishes are available to steelwork. Shot blasting is carried out to Swedish standard SA 2.5. We offer a large range of painting systems to suit all types of environments.

Quality Assurance
Our fully documented quality management system is accredited to BS EN ISO 9001. This ensures the stringent quality requirements demanded by our clients are met and adhered to in all sectors of our work each and every time.

We maintain full traceability of materials and consumables, with full certification and records of manufacturing, providing document packages for projects on demand.

Key skills are constantly monitored and maintained for our coded welders, NDT Inspection along with qualified in-house welding and painting inspectors.

We also hold full CE Marking accreditation in accordance with EN1090-2.

In our efforts to be the best pipe support company for all your needs, both now and in the future, QPS has decided to go on a journey of continuous improvement both in our health & safety and environmental policy. We believe in a safe environment for our workforce and visitors alike and have a strong commitment to help the community and local suppliers as well as lowering our environmental impact as much as possible.
As such we are pleased to announce that we have acquired BSI certification for ISO 14001 & OHSAS 18001 to add to our already impressive 20+ year history of being certified ISO 9001 and many years of supplying EN 1090 products.

Our standard supports are designed and manufactured in accordance with a number of international standards, including:-

- BSEN 13480-3
- MSS.SP-58
- MSS.SP-69
- ASME B31.1
- ASME B31.3
- ASME BPVC Code Section 3
- RCC-M

Examples of Fabrication

Example of tunnel wall racking designed & manufactured by QPS

Example of tunnel wall roller guide designed & manufactured by QPS

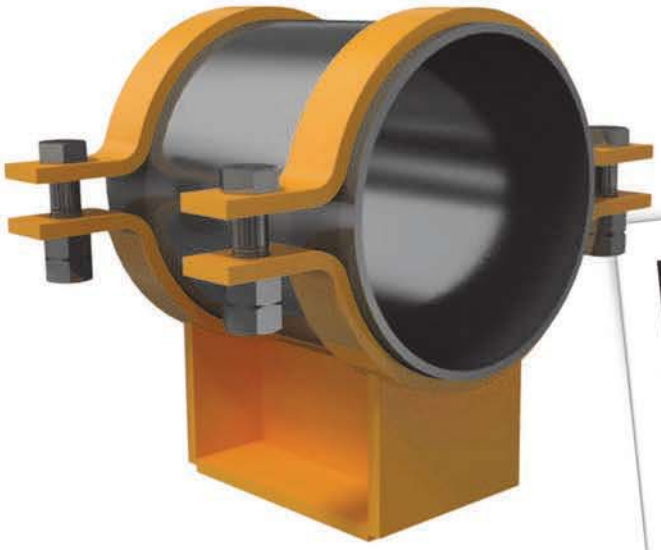
Examples of Fabrication

Example of a Stainless Steel Large Bore Saddle designed & manufactured by QPS

Example of an insulation clamped shoe designed & manufactured by QPS

Examples of Fabrication

Example of Special Large Bore Shoes designed & manufactured by QPS



Example of a Trapeze Beam designed & manufactured by QPS

ON-SITE SERVICES

On-site Field Services

Site Services Engineering
QPS has an experienced and knowledgeable engineering team to assist and support clients in not only their pipe support design requirements but also to assess and undertake site surveys and inspections. By using this service our clients are able to collaborate with our team to achieve innovative and practical support solutions to a wide range of pipework configurations.

Plant Surveys and Pipe Support Inspections.
All pipe supports need to comply with changing operating and environmental conditions following many years of service. In order to ensure this takes place the supports not only have to be manufactured to a high quality level, but they must be installed in the correct manner in the first place to ensure their functionality. Defective or corroded supports in piping systems can result in additional stress problems which can lead to long term damage to the piping and even failure, especially at critical connection points.

Inspections for Operational Integrity
If no pipe support inspections take place then the condition and functioning of the support cannot be detected. If this situation continues then long term costly damage (or even failure) to the supports and pipework is inevitable. Therefore regular inspections and surveys by our trained personnel are highly recommended. By checking the integrity and condition of the supports, any potential problems can be eliminated and ensure no over-stress conditions take place.

Possible Support Defects
The following list provides some examples of on-site faults that are often found in pipe supports:

- Incorrect support installation.
- Faulty load settings in both constant and variable spring units.
- Incorrect travel settings in both constant and variable spring units.
- Corroded supports.
- Broken or bent hanger rods.
- Increased friction due to corrosion.
- Deformed or broken pipe clamps.
- Errors in support design.

Inspection Check Lists undertaken by our engineers

- General overview inspection of the pipe supports.
- Load and travel checks for constant and variable spring supports.
- Inspection to ensure unrestricted freedom of movement for the pipework.
- Visual inspection to detect any faulty functioning.
- Assessment of the complete support assembly for integrity.

On-site Support Installation and Commissioning

- Pipe support material inventory check.
- Checking pre-assembly and arrangement of the support assembly.
- Overview of pre-assembly prior to installation.
- Overview of support installation at tag number positions.
- Technical assistance with support installation.
- Inspection of the piping systems for correct support assembly with the client drawings.
- Unblocking of the constant and variable spring units.
- Pipework line balancing utilising spring unit integral adjustments.

On-site Field Services

Reports
All inspection survey results are documented, and if required, recommendations are provided for the elimination of any defects. A comprehensive report is compiled and forward to the client with any corrective actions that may be required. Following consultation with the client, any urgent modifications can then be manufactured within our well-equipped workshops within a short time period.

Summary
Extensive knowledge of the industry allows QPS to provide comprehensive “on-site” support to clients for installation and operation of the complete range of pipe support products.

Reverse engineering is also available to provide “like for like” replacements of competitor supports and hardware.

Contact Information
We are always available to help with any specific requirements and to provide practical advice.
Please contact us for further information on our site survey Inspections.

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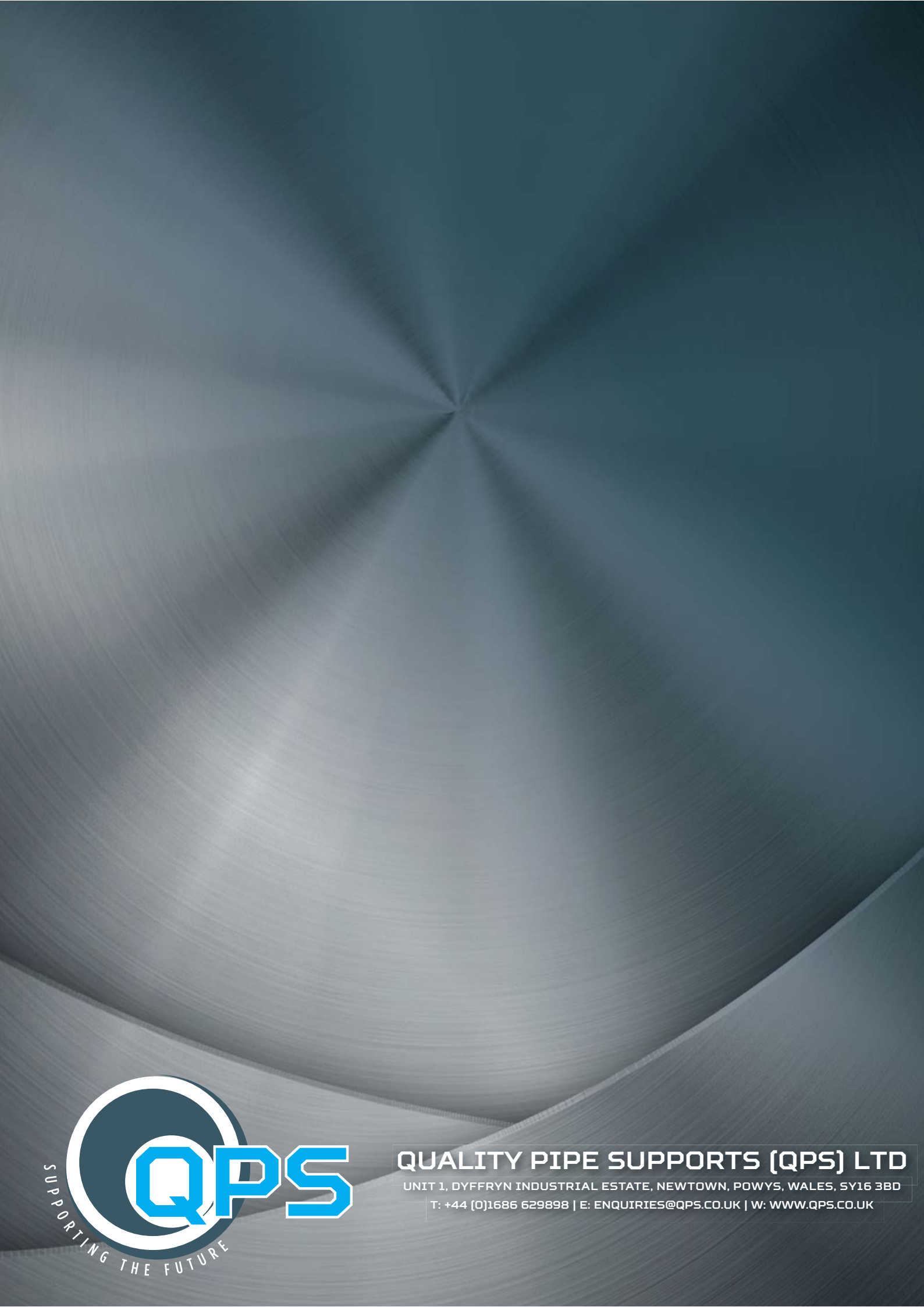

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