

DMR™



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DISC SPRINGS



For 40 years Daemar® Inc. has remained focused on partnering with our customers to deliver precision component solutions that meet their business challenges. Whether the application is a new design or a maintenance requirement, Daemar's global partnerships offer you one of the most complete sources of supply for Disc Springs. To ensure that Daemar® consistently meets or exceeds customer requirements, Daemar® is ISO-9001:2008 registered and most suppliers have either TS16949-2000, QS-9000 or ISO-9001:2000 quality registrations.

Daemar® has developed all of the capabilities required to support your lean manufacturing initiatives – providing JIT

delivery, vendor managed inventories and computer systems integration. Supported by the Daemar® regional warehousing network you experience fast, courteous service throughout the world. All of Daemar's locations are fully stocked and staffed with experienced and knowledgeable sales and service professionals.

We trust that you will find this catalogue a valuable resource for selecting the appropriate Disc Springs for your applications. For further selection assistance, pricing and product availability please contact the Daemar® location nearest you.



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ISO-9001:2008 REGISTERED

To consistently meet and exceed our customers' expectations, Daemar® Inc. is ISO-9001: 2008 registered and most of our suppliers are QS-9000 and/or ISO-9000 quality registered.



DMRTM
ISO 9001:2008
Registered QMS

Daemar offers a complete range of standard disc spring products as per DIN 2093 and DIN 6796. These two German standards are considered as benchmarks for quality of Disc Springs and Belleville Washers worldwide. There are very few companies in the world, which can adhere to these demanding standards and our supplier is one of them. They have developed tooling for all Disc Spring varieties mentioned in DIN 2093 like Group-1 (thickness < 1.25mm), Group-2 (thickness = 1.25mm and 6mm) and Group-3 (thickness > 6mm). Within these groups, all standard size as per Series A, Series B, Series C are available.

STANDARD PRODUCT RANGE

The Standard Product Range of disc springs (sizes to DIN 2093 and Factory Standards) includes 246 sizes with outside diameters between 8 and 250 mm. These springs are manufactured from Ck 67 and 50 CrV 4, and are typically available from stock. The standard corrosion protection is zinc phosphating and oiling.

SPECIAL RANGE

Daemar can provide the following non-standard products:

- Designing of Disc Springs to suit the customized applications.
- Development of complicated tooling within a very short period
- Wide range of materials
- Various surface coating including Epoxy coatings, Mechanical Zinc plating & other special plating requirements.

STANDARD DISC SPRINGS - DIN 2093

- Disc springs to DIN 2093 (Group 1, Group 2, Group 3 .)
- Disc springs to Factory Standards or other as required
- Size range: outside diameter 6.0 mm to 800 mm
- Materials to DIN 2093 (DIN 17 221, DIN 17 222) and special materials

- Disc springs with a thickness of 0.5 mm and greater are shot-peened to improve fatigue life
- Standard corrosion protection is phosphating and oiling. (Other coatings are available)

DISC SPRING STACKS

On request, Daemar can deliver disc springs pre-assembled in stacks or on a guiding device.

Advantages include:

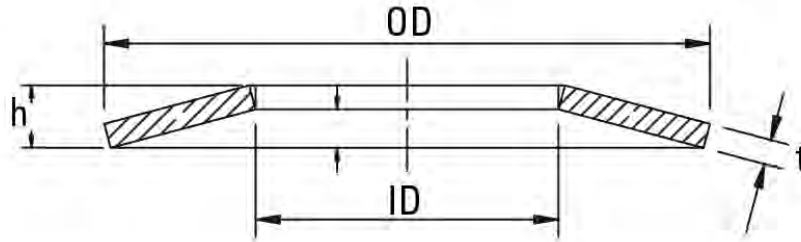
- Ability to provide stack specific load-deflection diagrams
- Small load tolerances possible
- 100% load testing can be used to verify proper stacking
- Assembly is more efficient with preassembled stacks

BELLEVILLE WASHERS - DIN 6796

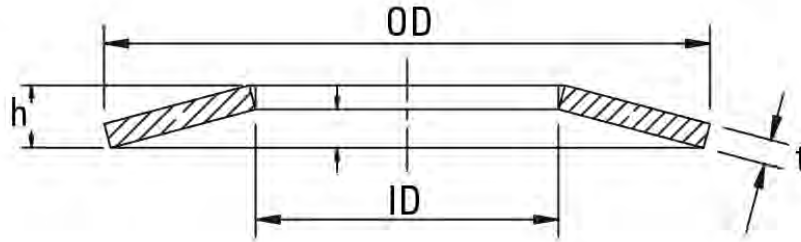
- Heavy Duty Belleville Washers or Conical Washers are manufactured as per DIN 6796 in 50 CrV 4 and Ck 67.
- Belleville washers are designed to preload bolts and are not intended for applications with dynamic loads.
- Disc springs to Factory Standards or other as required
- Size range: for bolts from 2mm(#2) up to 30mm(1-1/8")
- Standard corrosion protection is phosphating and oiling. (Other coatings are available)

TYPICAL APPLICATIONS

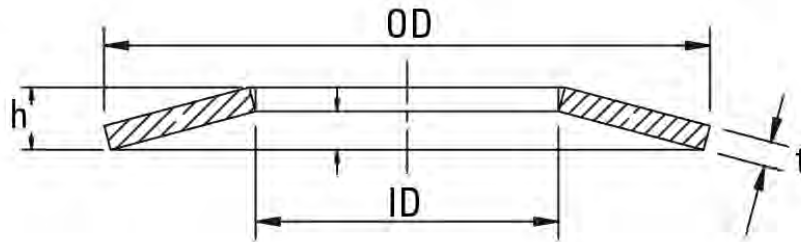
- Disc Springs for Actuators & Ball Valves
- Conical Washers for Switchgear Applications
- Disc Springs for Windmills
- Belleville / Conical Washers for Fasteners
- Conical Seal/ Lock Washers for Earth Moving Equipment



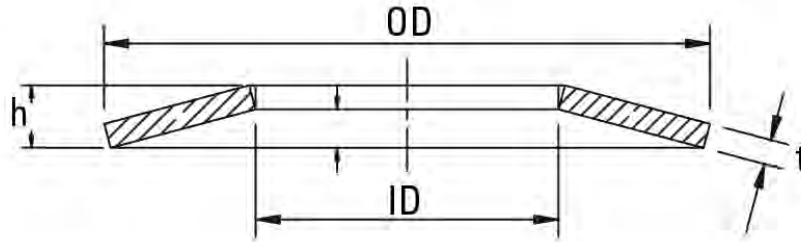
PART NUMBER	BOLT SIZE (MM)	METRIC DIMENSIONS				INCH DIMENSIONS			
		OUTSIDE DIAMETER OD (MM)	INSIDE DIAMETER ID (MM)	THICKNESS t (MM)	OVERALL HEIGHT h (MM)	OUTSIDE DIAMETER OD (IN.)	INSIDE DIAMETER ID (IN.)	THICKNESS t (IN)	OVERALL HEIGHT h (IN)
DS003.2-006-03	3	6.00	3.20	0.30	0.45	0.236	0.126	0.012	0.018
DS003.2-008-02	3	8.00	3.20	0.20	0.41	0.315	0.126	0.008	0.016
DS003.2-008-03	3	8.00	3.20	0.30	0.55	0.315	0.126	0.012	0.022
DS003.2-008-04	3	8.00	3.20	0.40	0.60	0.315	0.126	0.016	0.024
DS003.2-008-05	3	8.00	3.20	0.50	0.70	0.315	0.126	0.020	0.028
DS003.2-010-03	3	10.00	3.20	0.30	0.65	0.394	0.126	0.012	0.026
DS003.2-010-04	3	10.00	3.20	0.40	0.70	0.394	0.126	0.016	0.028
DS003.2-010-05	3	10.00	3.20	0.50	0.75	0.394	0.126	0.020	0.030
DS004.2-008-02	4	8.00	4.20	0.20	0.45	0.315	0.165	0.008	0.018
DS004.2-008-03	4	8.00	4.20	0.30	0.55	0.315	0.165	0.012	0.022
DS004.2-008-04	4	8.00	4.20	0.40	0.60	0.315	0.165	0.016	0.024
DS004.2-008-05	4	8.00	4.20	0.50	0.70	0.315	0.165	0.020	0.028
DS004.2-010-04	4	10.00	4.20	0.40	0.70	0.394	0.165	0.016	0.028
DS004.2-010-05	4	10.00	4.20	0.50	0.75	0.394	0.165	0.020	0.030
DS004.2-010-06	4	10.00	4.20	0.60	0.85	0.394	0.165	0.024	0.033
DS004.2-012-04	4	12.00	4.20	0.40	0.80	0.472	0.165	0.016	0.031
DS004.2-012-05	4	12.00	4.20	0.50	0.85	0.472	0.165	0.020	0.033
DS004.2-012-06	4	12.00	4.20	0.60	1.00	0.472	0.165	0.024	0.039
DS005.2-010-02	5	10.00	5.20	0.25	0.55	0.394	0.205	0.010	0.022
DS005.2-010-04	5	10.00	5.20	0.40	0.70	0.394	0.205	0.016	0.028
DS005.2-010-05	5	10.00	5.20	0.50	0.75	0.394	0.205	0.020	0.030
DS005.2-012-04	5	12.00	5.20	0.40	0.80	0.472	0.205	0.016	0.031
DS005.2-012-05	5	12.00	5.20	0.50	0.90	0.472	0.205	0.020	0.035
DS005.2-012-06	5	12.00	5.20	0.60	0.95	0.472	0.205	0.024	0.037
DS005.2-012-08	5	12.00	5.20	0.80	1.10	0.472	0.205	0.031	0.043
DS005.2-013-05	5	12.50	5.20	0.50	0.85	0.492	0.205	0.020	0.033
DS005.2-015-04	5	15.00	5.20	0.40	0.95	0.590	0.205	0.016	0.037
DS005.2-015-05	5	15.00	5.20	0.50	1.00	0.590	0.205	0.020	0.039
DS005.2-015-06	5	15.00	5.20	0.60	1.05	0.590	0.205	0.024	0.041
DS005.2-015-07	5	15.00	5.20	0.70	1.10	0.590	0.205	0.028	0.043
DS006.2-012-05	6	12.00	6.20	0.50	0.85	0.472	0.244	0.020	0.033
DS006.2-012-06	6	12.00	6.20	0.60	0.95	0.472	0.244	0.024	0.037
DS006.2-012-08	6	12.00	6.20	0.80	1.10	0.472	0.244	0.031	0.043
DS006.2-013-03	6	12.50	6.20	0.35	0.80	0.492	0.244	0.014	0.031
DS006.2-013-05	6	12.50	6.20	0.50	0.85	0.492	0.244	0.020	0.033



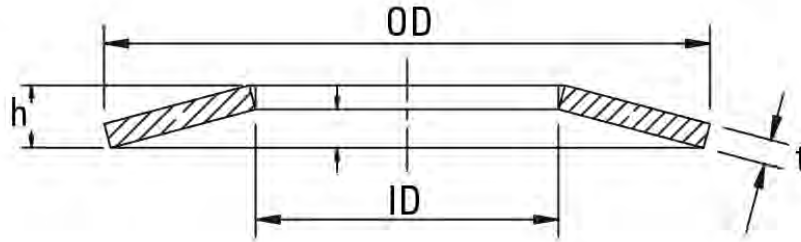
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DS006.2-013-07	6	12.50	6.20	0.70	1.00	0.492	0.244	0.028	0.039
DS006.2-014-09	6	14.00	6.20	0.90	1.25	0.551	0.244	0.035	0.049
DS006.2-015-05	6	15.00	6.20	0.50	1.00	0.590	0.244	0.020	0.039
DS006.2-015-06	6	15.00	6.20	0.60	1.05	0.590	0.244	0.024	0.041
DS006.2-015-07	6	15.00	6.20	0.70	1.10	0.590	0.244	0.028	0.043
DS006.2-018-04	6	18.00	6.20	0.40	1.00	0.709	0.244	0.016	0.039
DS006.2-018-05	6	18.00	6.20	0.50	1.10	0.709	0.244	0.020	0.043
DS006.2-018-06	6	18.00	6.20	0.60	1.20	0.709	0.244	0.024	0.047
DS006.2-018-07	6	18.00	6.20	0.70	1.25	0.709	0.244	0.028	0.049
DS006.2-018-08	6	18.00	6.20	0.80	1.30	0.709	0.244	0.032	0.051
DS007.2-014-03	7	14.00	7.20	0.35	0.80	0.551	0.283	0.014	0.031
DS007.2-014-05	7	14.00	7.20	0.50	0.90	0.551	0.283	0.020	0.035
DS007.2-014-08	7	14.00	7.20	0.80	1.10	0.551	0.283	0.031	0.043
DS008.2-016-04	8	16.00	8.20	0.40	0.90	0.630	0.323	0.016	0.035
DS008.2-016-06	8	16.00	8.20	0.60	1.05	0.630	0.323	0.024	0.041
DS008.2-018-05	8	18.00	8.20	0.50	1.10	0.709	0.323	0.020	0.043
DS008.2-015-07	8	15.00	8.20	0.70	1.10	0.590	0.323	0.028	0.043
DS008.2-015-08	8	15.00	8.20	0.80	1.20	0.590	0.323	0.031	0.047
DS008.2-016-07	8	16.00	8.20	0.70	1.15	0.630	0.323	0.028	0.045
DS008.2-016-08	8	16.00	8.20	0.80	1.20	0.630	0.323	0.031	0.047
DS008.2-016-09	8	16.00	8.20	0.90	1.25	0.630	0.323	0.035	0.049
DS008.2-018-07	8	18.00	8.20	0.70	1.25	0.709	0.323	0.028	0.049
DS008.2-018-08	8	18.00	8.20	0.80	1.30	0.709	0.323	0.031	0.051
DS008.2-018-01	8	18.00	8.20	1.00	1.40	0.709	0.323	0.039	0.055
DS008.2-020-06	8	20.00	8.20	0.60	1.30	0.787	0.323	0.024	0.051
DS008.2-020-07	8	20.00	8.20	0.70	1.35	0.787	0.323	0.028	0.053
DS008.2-020-08	8	20.00	8.20	0.80	1.40	0.787	0.323	0.031	0.055
DS008.2-020-09	8	20.00	8.20	0.90	1.45	0.787	0.323	0.035	0.057
DS008.2-020-01	8	20.00	8.20	1.00	1.55	0.787	0.323	0.039	0.061
DS008.2-023-07	8	23.00	8.20	0.70	1.50	0.906	0.323	0.028	0.059
DS008.2-023-08	8	23.00	8.20	0.80	1.55	0.906	0.323	0.031	0.061
DS008.2-023-09	8	23.00	8.20	0.90	1.60	0.906	0.323	0.035	0.063
DS008.2-023-01	8	23.00	8.20	1.00	1.70	0.906	0.323	0.039	0.067
DS009.2-018-04	9	18.00	9.20	0.45	1.05	0.709	0.362	0.018	0.041
DS009.2-018-07	9	18.00	9.20	0.70	1.20	0.709	0.362	0.028	0.047



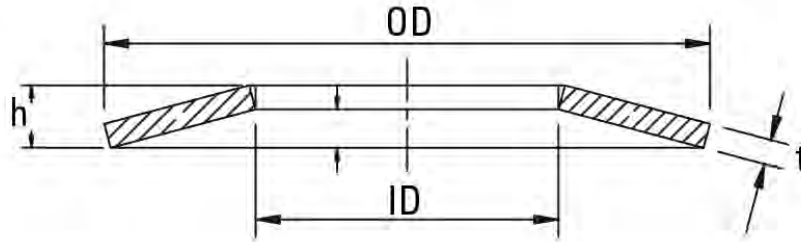
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DS009.2-018-01	9	18.00	9.20	1.00	1.40	0.709	0.362	0.039	0.055
DS010.2-020-05	10	20.00	10.20	0.50	1.15	0.787	0.402	0.020	0.045
DS010.2-020-08	10	20.00	10.20	0.80	1.35	0.787	0.402	0.031	0.053
DS010.2-020-09	10	20.00	10.20	0.90	1.45	0.787	0.402	0.035	0.057
DS010.2-020-01	10	20.00	10.20	1.00	1.55	0.787	0.402	0.039	0.061
DS010.2-020-01.1	10	20.00	10.20	1.10	1.55	0.787	0.402	0.043	0.061
DS010.2-020-01.2	10	20.00	10.20	1.25	1.80	0.787	0.402	0.049	0.071
DS010.2-020-01.5	10	20.00	10.20	1.50	1.80	0.787	0.402	0.059	0.071
DS010.2-022-01	10	22.00	10.20	1.20	1.85	0.866	0.402	0.048	0.072
DS010.2-023-09	10	23.00	10.20	0.90	1.65	0.906	0.402	0.035	0.065
DS010.2-023-01	10	23.00	10.20	1.00	1.70	0.906	0.402	0.039	0.067
DS010.2-023-01.2	10	23.00	10.20	1.25	1.90	0.906	0.402	0.049	0.075
DS010.2-025-01	10	25.00	10.20	1.00	1.75	0.984	0.402	0.039	0.069
DS010.2-028-08	10	28.00	10.20	0.80	1.75	1.100	0.402	0.031	0.069
DS010.2-028-01	10	28.00	10.20	1.00	1.90	1.100	0.402	0.039	0.075
DS010.2-028-01.2	10	28.00	10.20	1.25	2.05	1.100	0.402	0.049	0.081
DS010.2-028-01.5	10	28.00	10.20	1.50	2.20	1.100	0.402	0.059	0.087
DS011.2-022-06	11	22.50	11.20	0.60	1.40	0.886	0.441	0.024	0.055
DS011.2-022-08	11	22.50	11.20	0.80	1.45	0.886	0.441	0.031	0.057
DS011.2-022-01	11	22.50	11.20	1.25	1.75	0.886	0.441	0.049	0.069
DS012.2-022-01	12	22.50	12.20	1.00	2.15	1.240	0.480	0.039	0.084
DS012.2-023-01	12	23.00	12.20	1.00	1.60	0.906	0.480	0.039	0.063
DS012.2-023-01.2	12	23.00	12.20	1.25	1.85	0.906	0.480	0.049	0.073
DS012.2-023-01.5	12	23.00	12.20	1.50	2.10	0.906	0.480	0.059	0.083
DS012.2-025-07	12	25.00	12.20	0.70	1.60	0.984	0.480	0.028	0.063
DS012.2-025-09	12	25.00	12.20	0.90	1.60	0.984	0.480	0.035	0.063
DS012.2-025-01	12	25.00	12.20	1.00	1.80	0.984	0.480	0.039	0.071
DS012.2-025-01.2	12	25.00	12.20	1.25	1.95	0.984	0.480	0.049	0.077
DS012.2-025-01.5	12	25.00	12.20	1.50	2.05	0.984	0.480	0.059	0.081
DS012.2-028-01	12	28.00	12.20	1.00	1.95	1.100	0.480	0.039	0.077
DS012.2-028-01.2	12	28.00	12.20	1.25	2.05	1.100	0.480	0.049	0.081
DS012.2-028-01.5	12	28.00	12.20	1.50	2.25	1.100	0.480	0.059	0.089
DS012.2-032-01.2	12	31.50	12.20	1.25	2.20	1.240	0.480	0.049	0.087
DS012.2-032-01.5	12	31.50	12.20	1.50	2.35	1.240	0.480	0.059	0.093



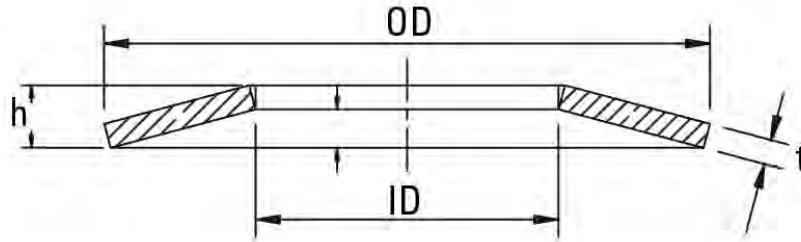
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DS012.3-034-01	12	34.00	12.30	1.00	2.25	1.340	0.484	0.039	0.089
DS012.3-034-01.2	12	34.00	12.30	1.25	2.35	1.340	0.484	0.049	0.093
DS012.3-034-01.5	12	34.00	12.30	1.50	2.50	1.340	0.484	0.059	0.098
DS014.2-028-08	14	28.00	14.20	0.80	1.80	1.100	0.559	0.031	0.071
DS014.2-028-01	14	28.00	14.20	1.00	1.80	1.100	0.559	0.039	0.071
DS014.2-028-01.2	14	28.00	14.20	1.25	2.10	1.100	0.559	0.049	0.083
DS014.2-028-01.5	14	28.00	14.20	1.50	2.15	1.100	0.559	0.059	0.085
DS014.3-034-01.2	14	34.00	14.30	1.25	2.40	1.340	0.563	0.049	0.094
DS014.3-034-01.5	14	34.00	14.30	1.50	2.55	1.340	0.563	0.059	0.100
DS014.3-040-01.2	14	40.00	14.30	1.25	2.65	1.570	0.563	0.049	0.104
DS014.3-040-01.5	14	40.00	14.30	1.50	2.75	1.570	0.563	0.059	0.108
DS014.3-040-02	14	40.00	14.30	2.00	3.05	1.570	0.563	0.079	0.120
DS016.3-032-01.2	16	31.50	16.30	1.25	2.15	1.240	0.642	0.049	0.085
DS016.3-032-01.5	16	31.50	16.30	1.50	2.45	1.240	0.642	0.059	0.096
DS016.3-032-01.7	16	31.50	16.30	1.75	2.45	1.240	0.642	0.069	0.097
DS016.3-032-02	16	31.50	16.30	2.00	2.75	1.240	0.642	0.079	0.108
DS016.3-032-08	16	32.00	16.30	0.80	1.85	1.240	0.642	0.031	0.073
DS016.3-034-01	16	34.00	16.30	1.50	2.55	1.340	0.642	0.059	0.100
DS016.3-034-02	16	34.00	16.30	2.00	2.85	1.340	0.642	0.079	0.112
DS016.3-040-01	16	40.00	16.30	1.50	2.80	1.570	0.642	0.059	0.110
DS016.3-040-02	16	40.00	16.30	2.00	3.10	1.570	0.642	0.079	0.122
DS018.3-036-09	18	36.00	18.30	0.90	2.05	1.400	0.720	0.035	0.081
DS018.3-036-01	18	36.00	18.30	1.25	2.25	1.400	0.720	0.049	0.088
DS018.3-036-02	18	36.00	18.30	2.00	2.80	1.400	0.720	0.079	0.110
DS018.3-040-02	18	40.00	18.30	2.00	3.15	1.570	0.720	0.079	0.124
DS018.4-050-01.2	18	50.00	18.40	1.25	2.85	1.970	0.724	0.049	0.112
DS018.4-050-01.5	18	50.00	18.40	1.50	3.30	1.970	0.724	0.059	0.130
DS018.4-050-02	18	50.00	18.40	2.00	3.50	1.970	0.724	0.079	0.138
DS018.4-050-02.5	18	50.00	18.40	2.50	4.10	1.970	0.724	0.098	0.161
DS018.4-050-03	18	50.00	18.40	3.00	4.40	1.970	0.724	0.118	0.173
DS020.4-040-01	20	40.00	20.40	1.00	2.30	1.570	0.803	0.039	0.090
DS020.4-040-01.5	20	40.00	20.40	1.50	2.65	1.570	0.803	0.059	0.104
DS020.4-040-02	20	40.00	20.40	2.00	3.10	1.570	0.803	0.079	0.122
DS020.4-040-02.2	20	40.00	20.40	2.25	3.15	1.570	0.803	0.089	0.124



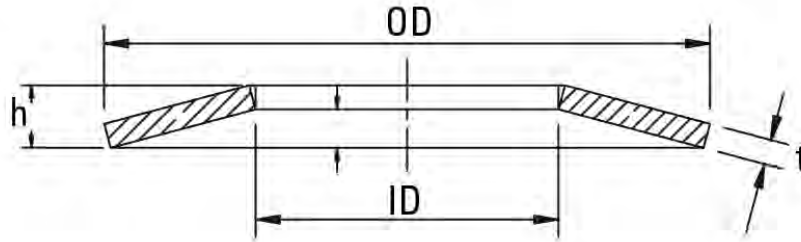
PART NUMBER	BOLT SIZE (MM)	METRIC DIMENSIONS				INCH DIMENSIONS			
		OUTSIDE DIAMETER OD (MM)	INSIDE DIAMETER ID (MM)	THICKNESS t (MM)	OVERALL HEIGHT h (MM)	OUTSIDE DIAMETER OD (IN.)	INSIDE DIAMETER ID (IN.)	THICKNESS t (IN)	OVERALL HEIGHT h (IN)
DS020.4-040-02.5	20	40.00	20.40	2.50	3.45	1.570	0.803	0.098	0.136
DS020.4-050-02	20	50.00	20.40	2.00	3.50	1.970	0.803	0.079	0.138
DS020.4-050-02.5	20	50.00	20.40	2.50	3.85	1.970	0.803	0.098	0.152
DS020.5-060-02	20	60.00	20.50	2.00	4.10	2.360	0.807	0.079	0.161
DS020.5-060-02.5	20	60.00	20.50	2.50	4.30	2.360	0.807	0.098	0.169
DS020.5-060-03	20	60.00	20.50	3.00	4.70	2.360	0.807	0.118	0.185
DS022.4-045-01	22	45.00	22.40	1.25	2.85	1.770	0.882	0.049	0.112
DS022.4-045-01.4	22	45.00	22.40	1.45	2.90	1.770	0.882	0.057	0.114
DS022.4-045-01.7	22	45.00	22.40	1.75	3.05	1.770	0.882	0.069	0.120
DS022.4-045-02.1	22	45.00	22.40	2.15	3.25	1.770	0.882	0.085	0.128
DS022.4-045-02.5	22	45.00	22.40	2.50	3.50	1.770	0.882	0.098	0.138
DS022.4-050-02	22	50.00	22.40	2.00	3.60	1.970	0.882	0.079	0.142
DS022.4-050-02.5	22	50.00	22.40	2.50	3.90	1.970	0.882	0.098	0.154
DS024.4-045-02	24	45.00	24.40	2.20	3.40	1.770	0.961	0.087	0.134
DS025.4-050-01	25	50.00	25.40	1.25	2.85	1.970	1.000	0.049	0.112
DS025.4-050-01.5	25	50.00	25.40	1.50	3.10	1.970	1.000	0.059	0.122
DS025.4-050-02	25	50.00	25.40	2.00	3.40	1.970	1.000	0.079	0.134
DS025.4-050-02.2	25	50.00	25.40	2.25	3.75	1.970	1.000	0.089	0.148
DS025.4-050-02.5	25	50.00	25.40	2.50	3.90	1.970	1.000	0.098	0.154
DS025.4-050-03	25	50.00	25.40	3.00	4.10	1.970	1.000	0.118	0.161
DS025.5-060-02	25	60.00	25.50	2.50	4.40	2.360	1.004	0.098	0.173
DS025.5-060-03	25	60.00	25.50	3.00	4.65	2.360	1.004	0.118	0.183
DS025.5-070-02	25	70.00	25.50	2.00	4.50	2.750	1.004	0.079	0.177
DS028.5-056-01	28	56.00	28.50	1.50	3.45	2.200	1.122	0.059	0.136
DS028.5-056-02	28	56.00	28.50	2.00	3.60	2.200	1.122	0.079	0.142
DS028.5-056-03	28	56.00	28.50	3.00	4.30	2.200	1.122	0.118	0.169
DS030.5-060-02	30	60.00	30.50	2.50	4.50	2.360	1.201	0.098	0.177
DS030.5-060-03	30	60.00	30.50	3.00	4.70	2.360	1.201	0.118	0.185
DS030.5-060-03	30	60.00	30.50	3.50	5.00	2.360	1.201	0.138	0.197
DS030.5-070-02	30	70.00	30.50	2.50	4.90	2.750	1.201	0.098	0.193
DS030.5-070-03	30	70.00	30.50	3.00	5.10	2.750	1.201	0.118	0.201
DS031.0-063-01	30	63.00	31.00	1.80	4.15	2.480	1.220	0.071	0.163
DS031.0-063-02	30	63.00	31.00	2.50	4.25	2.480	1.220	0.098	0.167
DS031.0-063-03	30	63.00	31.00	3.00	4.70	2.480	1.220	0.118	0.185



PART NUMBER	BOLT SIZE (MM)	METRIC DIMENSIONS				INCH DIMENSIONS			
		OUTSIDE DIAMETER OD (MM)	INSIDE DIAMETER ID (MM)	THICKNESS t (MM)	OVERALL HEIGHT h (MM)	OUTSIDE DIAMETER OD (IN.)	INSIDE DIAMETER ID (IN.)	THICKNESS t (IN)	OVERALL HEIGHT h (IN)
DS031.0-063-03.5	30	63.00	31.00	3.50	4.90	2.480	1.220	0.138	0.193
DS031.0-080-02	30	80.00	31.00	2.50	5.30	3.150	1.220	0.098	0.209
DS031.0-080-03	30	80.00	31.00	3.00	5.50	3.150	1.220	0.118	0.217
DS031.0-080-04	30	80.00	31.00	4.00	6.10	3.150	1.220	0.157	0.240
DS035.6-070-03	35	70.00	35.60	3.00	5.10	2.750	1.400	0.118	0.201
DS035.6-070-04	35	70.00	35.60	4.00	5.80	2.750	1.400	0.157	0.228
DS036.1-071-02	35	71.00	36.10	2.00	4.60	2.800	1.420	0.079	0.181
DS036.1-071-02.5	35	71.00	36.10	2.50	4.50	2.800	1.420	0.098	0.177
DS036.1-071-04	35	71.00	36.10	4.00	5.60	2.800	1.420	0.157	0.220
DS036.1-080-03	35	80.00	36.10	3.00	5.70	3.150	1.420	0.118	0.224
DS036.1-080-04	35	80.00	36.10	4.00	6.20	3.150	1.420	0.157	0.244
DS040.5-070-04	40	70.00	40.50	4.00	5.60	2.750	1.595	0.157	0.220
DS040.5-070-05	40	70.00	40.50	5.00	6.20	2.750	1.595	0.197	0.244
DS040.9-125-04	40	125.00	40.90	4.00	8.20	4.920	1.610	0.157	0.323
DS041.0-080-02	40	80.00	41.00	2.25	5.20	3.150	1.615	0.089	0.205
DS041.0-080-03	40	80.00	41.00	3.00	5.30	3.150	1.615	0.118	0.209
DS041.0-080-04	40	80.00	41.00	4.00	6.20	3.150	1.615	0.157	0.244
DS041.0-080-05	40	80.00	41.00	5.00	6.70	3.150	1.615	0.197	0.264
DS041.0-100-04	40	100.00	41.00	4.00	7.20	3.940	1.615	0.157	0.283
DS041.0-100-05	40	100.00	41.00	5.00	7.75	3.940	1.615	0.197	0.305
DS046.0-090-02	45	90.00	46.00	2.50	5.70	3.540	1.810	0.098	0.224
DS046.0-090-03	45	90.00	46.00	3.50	6.00	3.540	1.810	0.138	0.236
DS046.0-090-05	45	90.00	46.00	5.00	7.00	3.540	1.810	0.197	0.276
DS051.0-100-02	50	100.00	51.00	2.70	6.20	3.940	2.010	0.106	0.244
DS051.0-100-03	50	100.00	51.00	3.50	6.30	3.940	2.010	0.138	0.248
DS051.0-100-04	50	100.00	51.00	4.00	7.00	3.940	2.010	0.157	0.276
DS051.0-100-05	50	100.00	51.00	5.00	7.80	3.940	2.010	0.197	0.307
DS051.0-100-06	50	100.00	51.00	6.00	8.20	3.940	2.010	0.236	0.323
DS051.0-125-04	50	125.00	51.00	4.00	8.50	4.920	2.010	0.157	0.335
DS051.0-125-05	50	125.00	51.00	5.00	8.90	4.920	2.010	0.197	0.350
DS051.0-125-06	50	125.00	51.00	6.00	9.40	4.920	2.010	0.236	0.370
DS056.9-112-03	55	112.00	56.90	3.00	6.90	4.410	2.240	0.118	0.272
DS056.9-112-04	55	112.00	56.90	4.00	7.20	4.410	2.240	0.157	0.283
DS056.9-112-06	55	112.00	56.90	6.00	8.50	4.410	2.240	0.236	0.335

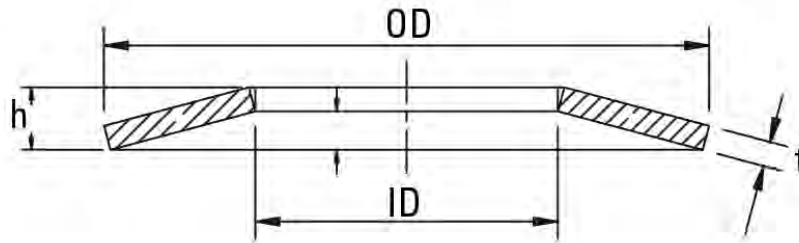


PART NUMBER	BOLT SIZE (MM)	METRIC DIMENSIONS				INCH DIMENSIONS			
		OUTSIDE DIAMETER OD (MM)	INSIDE DIAMETER ID (MM)	THICKNESS t (MM)	OVERALL HEIGHT h (MM)	OUTSIDE DIAMETER OD (IN.)	INSIDE DIAMETER ID (IN.)	THICKNESS t (IN)	OVERALL HEIGHT h (IN)
DS061.0-125-05	60	125.00	61.00	5.00	9.00	4.920	2.400	0.197	0.354
DS061.0-125-06	60	125.00	61.00	6.00	9.60	4.920	2.400	0.236	0.378
DS061.0-125-07	60	125.00	61.00	7.50	10.90	4.920	2.400	0.295	0.429
DS061.0-150-05	60	150.00	61.00	5.00	10.30	5.900	2.400	0.197	0.406
DS061.0-150-06	60	150.00	61.00	6.00	10.80	5.900	2.400	0.236	0.425
DS064.0-125-03	60	125.00	64.00	3.50	8.00	4.920	2.520	0.138	0.315
DS064.0-125-05	60	125.00	64.00	5.00	8.50	4.920	2.520	0.197	0.335
DS064.0-125-07	60	125.00	64.00	7.50	10.60	4.920	2.520	0.295	0.417
DS071.1-125-06	70	125.00	71.10	6.00	9.30	4.920	2.800	0.236	0.366
DS071.1-125-07	70	125.00	71.10	7.40	10.40	4.920	2.800	0.291	0.409
DS071.1-125-09	70	125.00	71.10	9.20	11.80	4.920	2.800	0.362	0.465
DS071.1-150-06	70	150.00	71.10	6.00	10.80	5.900	2.800	0.236	0.425
DS071.1-150-07	70	150.00	71.10	7.50	12.00	5.900	2.800	0.295	0.472
DS072.1-140-04	70	140.00	72.10	4.00	8.40	5.500	2.840	0.157	0.330
DS072.1-140-05	70	140.00	72.10	5.00	9.00	5.500	2.840	0.197	0.354
DS072.1-140-07	70	140.00	72.10	7.50	11.20	5.500	2.840	0.295	0.441
DS081.3-150-07	80	150.00	81.30	7.50	11.70	5.900	3.200	0.295	0.461
DS081.3-150-09	80	150.00	81.30	9.30	13.00	5.900	3.200	0.366	0.512
DS082.0-160-04	80	160.00	82.00	4.30	9.90	6.300	3.230	0.169	0.390
DS082.0-160-06	80	160.00	82.00	6.00	10.50	6.300	3.230	0.236	0.413
DS082.0-160-09	80	160.00	82.00	9.40	13.50	6.300	3.230	0.370	0.532
DS082.0-200-07	80	200.00	82.00	7.60	14.20	7.870	3.230	0.299	0.559
DS082.0-200-09	80	200.00	82.00	9.60	15.50	7.870	3.230	0.378	0.610
DS082.0-200-11	80	200.00	82.00	11.50	16.60	7.870	3.230	0.453	0.654
DS092.0-180-04	90	180.00	92.00	4.80	11.00	7.090	3.620	0.189	0.433



PART NUMBER	BOLT SIZE (MM)	METRIC DIMENSIONS				INCH DIMENSIONS			
		OUTSIDE DIAMETER OD (MM)	INSIDE DIAMETER ID (MM)	THICKNESS t (MM)	OVERALL HEIGHT h (MM)	OUTSIDE DIAMETER OD (IN.)	INSIDE DIAMETER ID (IN.)	THICKNESS t (IN)	OVERALL HEIGHT h (IN)
DS092.0-180-06	90	180.00	92.00	6.00	11.10	7.090	3.620	0.236	0.437
DS092.0-180-09	90	180.00	92.00	9.40	14.00	7.090	3.620	0.370	0.551
DS092.0-200-09	90	200.00	92.00	9.50	15.60	7.870	3.620	0.374	0.614
DS092.0-200-11	90	200.00	92.00	11.40	16.80	7.870	3.620	0.449	0.661
DS092.0-200-13	90	200.00	92.00	13.10	18.10	7.870	3.620	0.516	0.713
DS102.1-200-05	100	200.00	102.10	5.50	12.50	7.870	4.020	0.217	0.492
DS102.1-200-07	100	200.00	102.10	7.50	13.60	7.870	4.020	0.295	0.535
DS102.1-200-09	100	200.00	102.10	9.40	15.60	7.870	4.020	0.370	0.614
DS102.1-200-11	100	200.00	102.10	11.25	16.20	7.870	4.020	0.443	0.638
DS102.1-200-13	100	200.00	102.10	13.10	18.20	7.870	4.020	0.516	0.717
DS102.1-250-09	100	250.00	102.10	9.60	18.00	9.840	4.020	0.378	0.709
DS102.1-250-11	100	250.00	102.10	11.50	19.00	9.840	4.020	0.453	0.748
DS112.0-200-11	110	200.00	112.00	11.10	16.20	7.870	4.410	0.437	0.638
DS112.0-200-12	110	200.00	112.00	12.90	17.50	7.870	4.410	0.508	0.689
DS112.0-200-14	110	200.00	112.00	14.80	18.80	7.870	4.410	0.583	0.740
DS112.0-225-06	110	225.00	112.00	6.20	13.60	8.860	4.410	0.244	0.535
DS112.0-225-07	110	225.00	112.00	7.50	14.50	8.860	4.410	0.295	0.571
DS112.0-225-11	110	225.00	112.00	11.25	17.00	8.860	4.410	0.443	0.669
DS127.0-250-06	125	250.00	127.00	6.70	14.80	9.840	5.000	0.264	0.583
DS127.0-250-09	125	250.00	127.00	9.40	17.00	9.840	5.000	0.370	0.669
DS127.0-250-11	125	250.00	127.00	11.25	19.30	9.840	5.000	0.443	0.760
DS127.0-250-13	125	250.00	127.00	13.10	19.60	9.840	5.000	0.516	0.772
DS127.0-250-15	125	250.00	127.00	15.00	21.80	9.840	5.000	0.591	0.858

Heavy Duty Belleville Washers or Conical Washers are manufactured as per DIN 6796 in 50 CrV 4 and Ck 67. They are designed to preload bolts and are not intended for applications with dynamic loads.

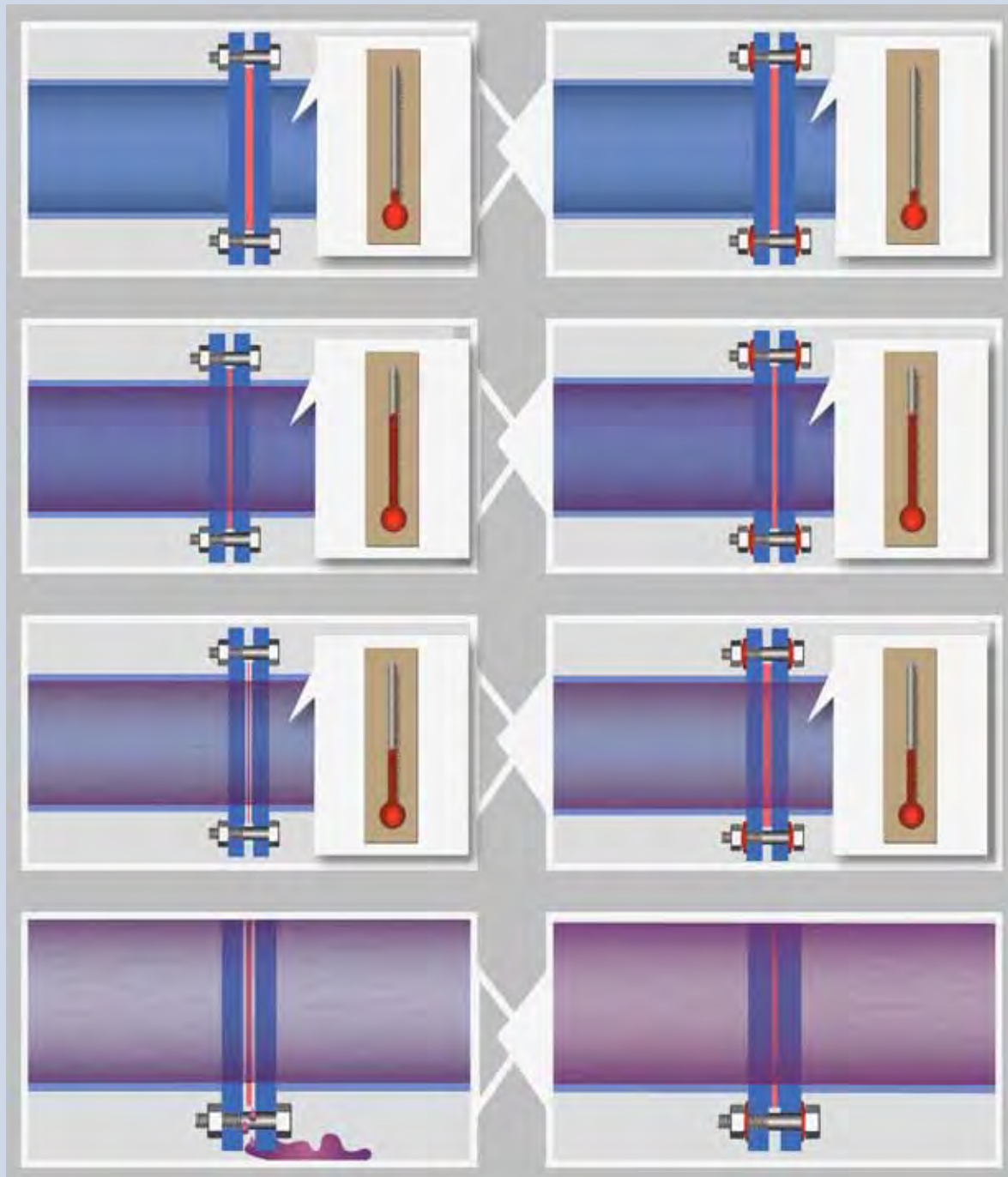


PART NUMBER	METRIC DIMENSIONS					INCH DIMENSIONS				
	BOLT SIZE (MM)	OD (MM)	ID (MM)	t (MM)	h (MM)	BOLT SIZE (IN.)	OD (IN.)	ID (IN.)	t (IN.)	h (IN.)
DS6796-M02	2	5.00	2.21	0.41	0.61	#2	0.197	0.087	0.016	0.024
DS6796-M02.5	2.5	6.00	2.69	0.51	0.71	#4	0.236	0.106	0.020	0.028
DS6796-M03	3	7.01	3.20	0.61	0.84	#5	0.276	0.126	0.024	0.033
DS6796-M04	4	8.99	4.32	1.02	1.30	#8	0.354	0.170	0.040	0.051
DS6796-M05	5	11.00	5.33	1.19	1.55	#10	0.433	0.210	0.047	0.061
DS6796-M06	6	13.97	6.48	1.52	2.01	1/4"	0.550	0.255	0.060	0.079
DS6796-M08	8	18.03	8.38	2.03	2.59	5/16"	0.710	0.330	0.080	0.102
DS6796-M10	10	23.11	10.54	2.54	3.20	3/8"	0.910	0.415	0.100	0.126
DS6796-M12	12	28.96	12.95	3.05	3.96	1/2"	1.140	0.510	0.120	0.156
DS6796-M16	16	38.86	17.02	4.06	5.26	5/8"	1.530	0.670	0.160	0.207
DS6796-M20	20	44.96	21.08	5.08	6.40	3/4"	1.770	0.830	0.200	0.252
DS6796-M22	22	49.02	23.11	5.59	7.06	7/8"	1.930	0.910	0.220	0.278
DS6796-M24	24	55.88	24.89	6.10	7.75	15/16"	2.200	0.980	0.240	0.305
DS6796-M27	27	59.94	27.94	6.60	8.36	1"	2.360	1.100	0.260	0.329
DS6796-M30	30	69.85	30.99	7.11	9.19	1-1/8"	2.750	1.220	0.280	0.362

DMR Belleville springs are designed to produce high loads when deflected to their flat position. The deflection of DMR Belleville springs significantly reduces the spring rate of the bolted system, reducing the change in preloaded of the bolt, thus avoiding leakage through the joint.

Without Belleville Springs

With Belleville Springs



BELLEVILLE SPRING MATERIAL COMPOSITION														
MATERIAL NAME	MATERIAL NO.	STANDARD	CHEMICAL ANALYSIS IN%										THICKNESS RANGE MM	
			C	SI	MN	P _{MAX}	S _{MAX}	CR	V	MO	NI	N		
H11	1.234		0.33-0.43	0.8-1.2	0.2-0.5	0.03 max	0.03 max	4.75-5.5	0.3-0.6	1.1-1.6				Up to 25 mm
H13	1.234		0.37-0.42	0.8-1.2	0.2-0.5	0.03 max	0.03 max	5-5.5	0.8-1.2	1.1-1.75				Up to 25 mm
17/7 Ph	1.457	DIN EN 10151	0.09 max	1.0 max	1.0 max	0.045 max	0.030 max	16.0-18.0			6.5-7.75			Up to 10 mm
SS301	1.431	DIN EN 10151	0.05-0.15	2.0 max	2.0 max	0.045 max	0.015	16.0-19.0		0.8 max	6.0-9.5			Up to 2.5 mm
SS304	1.430	DIN EN 10151	0.07 max	1.0 max	2.0 max	0.045 max	0.015	17.0-19.5			8.0-10.5	0.11 Max		Up to 1.6 mm
			Ni	Cr	Co	Ti	Al	C	Si	Mn	Fe	P _{max}	S _{max}	Mo
INCONEL X750	2.467	70.0 min	14-17	1.0 max	2.25-2.75	0.40-1.0	0.08 max	0.50 max	1.0 max	5.0 max	0.02 max	0.015 max		Up to 6.35 mm
INCONEL 718	2.467	50-55	17-21	1.0 max	0.70-1.15	0.3-0.7	0.02-0.08	0.35 max	0.35 max	Balance	0.015 max	0.015 max	2.8-3.3	Up to 6.35 mm

BELLEVILLE SPRING MATERIAL PROPERTIES											
MATERIAL NAME	PHYSICAL & MECHANICAL PROPERTIES									SUITABLE APPLICATION AREA	
	DENSITY KG/DM3	E-MODULES IN KN/MM2							WORKING TEMP °C		TENSILE STRENGTH N/MM2
		AT RT	100 °C	200 °C	300 °C	400 °C	500 °C	600 °C			
H11	7.8	202	190	184	180	175	160	154	0-600	1650-1900	Involving highly stressed structural parts, resistance to softening and retention of good toughness with high strength at elevated temperatures to 1000 F to maintain high degree of dimensional accuracy and avoid fracture failure.
H13	7.85	202	190	184	180	175	160	154	0-600	1650-1900	Involving high hardenability, excellent wear resistance, hot toughness, good thermal resistance, greater homogeneity and fine structure with high temperature tensile strength.
17/7 Ph	7.9	200	195	190	185				-200. to 300	1150-1700	Involving combined advantages of high strength and corrosion resistance, cryogenic applications and used for intricate parts due to its low distortion in heat treatment.
SS301	7.9	190	186	180					-200 to 200	1150-1500	Involving high corrosion resistance, indoor and outdoor services, resistance to high temperature, wear, abrasion, chemical and organic materials, good creep resistance and oxidation resistance at elevated temperatures as well cryogenic applications.
SS304	7.95	185	179	171					-200 to 200	1000-1500	
INCONEL X750	8.28	214	207	198	190	179	170	158	-200 to 700	≥ 1170	Involving good strength under high temperatures, corrosive environment, wide temperature range, high endurance and fatigue strength , excellent resistance to oxidation at elevated temperatures.
INCONEL 718	8.19	199	195	190	185	179	174	167	-200 to 600	≥ 1240	

** All above values are for references only. For further details you may contact Daemar Inc.

FLANGE BOLTING SERIES STANDARD SIZES

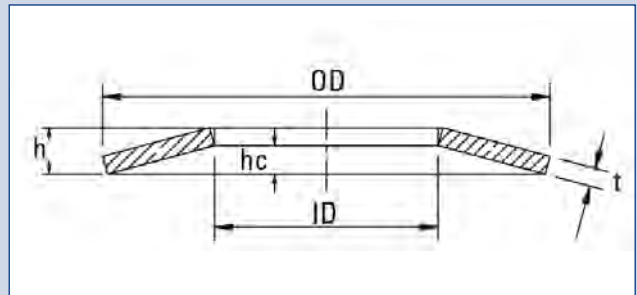
(REFINING AND CHEMICAL FLANGE BOLTING)

Bolts: b-7 b-16

Bolt stress: 30,000 lbs.

Material: h11/h13

Working temperatures to 1000 (f) depending upon material used



PART NO.	BOLT SIZE IN.	THREADED ROOT AREA	BOLT TENSION CALCULATED FLAT LOAD	OD		ID		t		hc		TORQUE FT. LBS.	
				IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
BS-30-0.500	1/2	0.1415	4,214	1.011	25.68	0.531	13.49	0.117	2.97	0.014	0.356	30	30
BS-30-0.625	5/8	0.226	6,557	1.148	29.16	0.64	16.26	0.143	3.63	0.015	0.381	60	60
BS-30-0.750	3/4	0.334	9,724	1.37	34.80	0.762	19.35	0.176	4.47	0.017	0.432	100	100
BS-30-0.875	7/8	0.462	13,012	1.59	40.39	0.891	22.63	0.204	5.18	0.02	0.508	160	160
BS-30-1.000	1	0.606	17,764	1.81	45.97	1.02	25.91	0.233	5.92	0.023	0.584	245	245
BS-30-1.125	1 1/8	0.79	23,433	2.025	51.44	1.145	29.08	0.266	6.76	0.025	0.635	355	355
BS-30-1.250	1 1/4	1	30,000	2.31	58.67	1.27	32.26	0.301	7.65	0.029	0.737	500	500
BS-30-1.375	1 3/8	1.233	35,954	2.47	62.74	1.399	35.53	0.331	8.41	0.0303	0.7696	680	680
BS-30-1.500	1 1/2	1.492	44,655	2.679	68.05	1.524	38.71	0.365	9.27	0.032	0.813	800	800
BS-30-1.625	1 5/8	1.78	52,750	2.952	74.98	1.649	41.88	0.398	10.11	0.036	0.914	1,100	1,100
BS-30-1.750	1 3/4	2.08	61,586	3.171	80.54	1.774	45.06	0.432	10.97	0.038	0.965	1,500	1,500
BS-30-1.875	1 7/8	2.41	71,391	3.389	86.08	1.9	48.26	0.466	11.84	0.041	1.041	2,000	2,000
BS-30-2.000	2	2.77	82,553	3.6	91.44	2.024	51.41	0.495	12.57	0.043	1.092	2,200	2,200
BS-30-2.250	2 1/4	3.56	106,309	4.04	102.62	2.28	57.91	0.56	14.22	0.048	1.219	3,180	3,180
BS-30-2.500	2 1/2	4.44	131,435	4.483	113.87	2.528	64.21	0.625	15.88	0.053	1.346	4,400	4,400
BS-30-2.750	2 3/4	5.43	163,982	4.92	124.97	2.78	70.61	0.695	17.65	0.057	1.448	5,920	5,920
BS-30-3.000	3	6.51	193,428	5.36	136.14	3.03	76.96	0.759	19.28	0.062	1.575	7,720	7,720

All above springs can be manufactured with 17-7 ph & Inconel material. However the same bolt size & torque value, only t & hc will be different

FLANGE BOLTING SERIES STANDARD SIZES

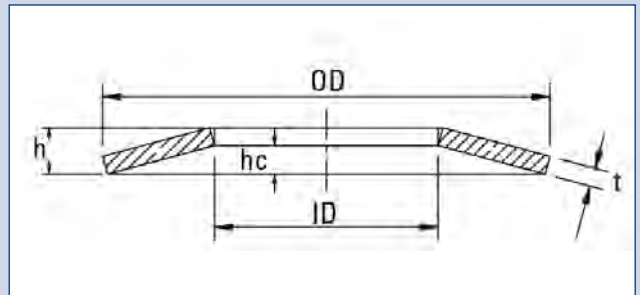
(REFINING AND CHEMICAL FLANGE BOLTING)

Bolts: b-7 b-16

Bolt stress: 30,000 lbs.

Material: h11/h13

Working temperatures to 1000 (f) depending upon material used



PART NO.	BOLT SIZE IN.	THREADED ROOT AREA	BOLT TENSION CALCULATED FLAT LOAD	OD		ID		t		hc		TORQUE FT. LBS.	
				IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
BS-45-0.500	1/2	0.1415	6,219	1.011	25.68	0.531	13.49	0.141	3.58	0.012	0.305	45	45
BS-45-0.625	5/8	0.226	9,982	1.148	29.16	0.64	16.26	0.176	4.47	0.012	0.305	90	90
BS-45-0.750	3/4	0.334	14,708	1.37	34.80	0.762	19.35	0.215	5.46	0.014	0.356	150	150
BS-45-0.875	7/8	0.462	19,709	1.59	40.39	0.891	22.63	0.247	6.27	0.017	0.432	240	240
BS-45-1.000	1	0.606	26,884	1.81	45.97	1.028	26.11	0.283	7.19	0.019	0.483	368	368
BS-45-1.125	1 1/8	0.79	35,332	2.025	51.44	1.145	29.08	0.323	8.20	0.021	0.533	533	533
BS-45-1.250	1 1/4	1	44,498	2.31	58.67	1.27	32.26	0.368	9.35	0.024	0.610	750	750
BS-45-1.375	1 3/8	1.233	55,1452	2.47	62.74	1.399	35.53	0.403	10.24	0.025	0.635	1,020	1,020
BS-45-1.500	1 1/2	1.492	66,334	2.679	68.05	1.524	38.71	0.441	11.20	0.027	0.686	1,200	1,200
BS-45-1.625	1 5/8	1.78	79,560	2.952	74.98	1.649	41.88	0.486	12.34	0.03	0.762	1,650	1,650
BS-45-1.750	1 3/4	2.08	91,884	3.171	80.54	1.774	45.06	0.524	13.31	0.032	0.813	2,250	2,250
BS-45-1.875	1 7/8	2.41	106,880	3.389	86.08	1.9	48.26	0.563	14.30	0.034	0.864	3,000	3,000
BS-45-2.000	2	2.77	122,358	3.6	91.44	2.024	51.41	0.607	15.42	0.035	0.889	3,300	3,300
BS-45-2.250	2 1/4	3.56	154,812	4.04	102.62	2.28	57.91	0.687	17.45	0.039	0.991	4,770	4,770
BS-45-2.500	2 1/2	4.44	196,724	4.483	113.87	2.528	64.21	0.767	19.48	0.043	1.092	6,600	6,600
BS-45-2.750	2 3/4	5.43	241,103	4.92	124.97	2.78	70.61	0.847	21.51	0.047	1.194	8,800	8,800
BS-45-3.000	3	6.51	289,026	5.36	136.14	3.03	76.96	0.927	23.55	0.051	1.295	11,580	11,580

All above springs can be manufactured with 17-7 ph & Inconel material. However the same bolt size & torque value, only t & hc will be different

FLANGE BOLTING SERIES STANDARD SIZES

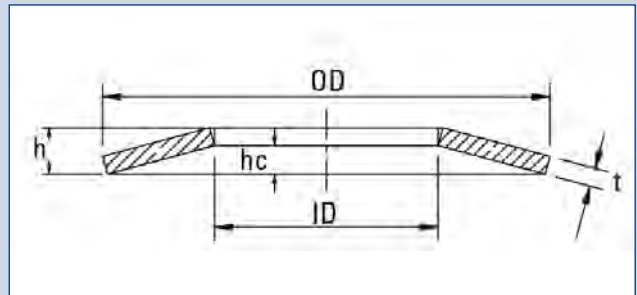
(REFINING AND CHEMICAL FLANGE BOLTING)

Bolts: b-7 b-16

Bolt stress: 30,000 lbs.

Material: h11/h13

Working temperatures to 1000 (f) depending upon material used



PART NO.	BOLT SIZE IN.	THREADED ROOT AREA	BOLT TENSION CALCULATED FLAT LOAD	OD		ID		t		hc		TORQUE FT. LBS.	
				IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
BS-60-0.500	1/2	0.1415	8,514	1.011	25.68	0.5312	13.49	0.14	3.56	0.014	0.356	60	60
BS-60-0.625	5/8	0.226	13,560	1.148	29.16	0.64	16.26	0.187	4.75	0.012	0.305	120	120
BS-60-0.750	3/4	0.334	20,040	1.37	34.80	0.762	19.35	0.22	5.59	0.015	0.381	200	200
BS-60-0.875	7/8	0.462	27,720	1.59	40.39	0.891	22.63	0.28	7.11	0.015	0.381	320	320
BS-60-1.000	1	0.606	36,360	1.81	45.97	1.02	26.11	0.316	8.03	0.018	0.457	490	490
BS-60-1.125	1 1/8	0.79	47,400	2.025	51.44	1.145	29.08	0.37	9.40	0.018	0.457	710	710
BS-60-1.250	1 1/4	1	60,000	2.31	58.67	1.27	32.26	0.405	10.29	0.023	0.584	1,000	1,000
BS-60-1.375	1 3/8	1.233	73,980	2.47	62.74	1.399	35.53	0.446	11.33	0.024	0.610	1,360	1,360
BS-60-1.500	1 1/2	1.492	89,520	2.679	68.05	1.524	38.71	0.503	12.78	0.024	0.610	1,600	1,600
BS-60-1.625	1 5/8	1.78	106,800	2.952	74.98	1.649	41.88	0.542	13.77	0.028	0.711	2,200	2,200
BS-60-1.750	1 3/4	2.08	124,800	3.171	80.54	1.774	45.06	0.593	15.06	0.029	0.737	3,000	3,000
BS-60-1.875	1 7/8	2.41	*128,000	3.389	86.08	1.9	48.26	0.585	14.86	0.033	0.838	4,000	4,000
BS-60-2.000	2	2.77	*132,000	3.6	91.44	2.024	51.41	0.62	15.75	0.035	0.889	4,400	4,400
BS-60-2.250	2 1/4	3.56	*169,100	4.04	102.62	2.28	57.91	0.7	17.78	0.039	0.991	6,360	6,360
BS-60-2.500	2 1/2	4.44	*210,910	4.483	113.87	2.528	64.21	0.783	19.89	0.043	1.092	8,800	8,800
BS-60-2.750	2 3/4	5.43	*257,925	4.92	124.97	2.78	70.61	0.869	22.07	0.046	1.168	11,840	11,840
BS-60-3.000	3	6.51	*309,225	5.36	136.14	3.03	76.96	0.95	24.13	0.05	1.270	15,440	15,440

* 47,500 lbs. Bolt Stress

All above springs can be manufactured with 17-7 ph & Inconel material. However the same bolt size & torque value, only t & hc will be different

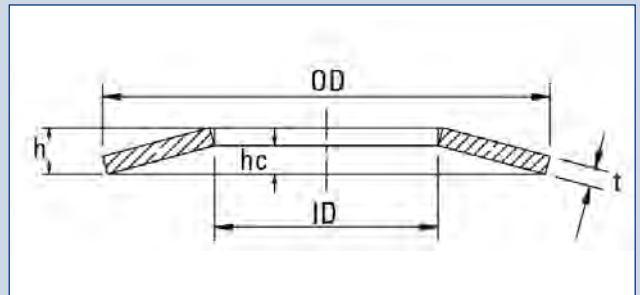
FLANGE BOLTING SERIES STANDARD SIZES

(REFINING AND CHEMICAL FLANGE BOLTING)

Bolts: b-7 b-16

Material: 17-7PH

Working temperatures to 500 (f) depending upon material used



PART NO.	BOLT SIZE	OD		ID		t		hc		h	
		IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
BS-PH-0.375	3/8	0.71	18.03	0.39	9.91	0.078	1.98	0.008	0.203	0.086	2.184
BS-PH-0.438	7/16	0.882	20.83	0.452	11.48	0.08	2.03	0.012	0.305	0.092	2.337
BS-PH-0.500	1/2	0.9	22.86	0.515	13.08	0.089	2.26	0.011	0.279	0.1	2.540
BS-PH-0.625	5/8	1.145	29.08	0.656	16.66	0.112	2.84	0.018	0.457	0.13	3.302
BS-PH-0.750	3/4	1.365	34.67	0.781	19.84	0.131	3.33	0.019	0.483	0.15	3.810
BS-PH-0.875	7/8	1.585	40.26	0.906	23.01	0.15	3.81	0.02	0.508	0.17	4.318
BS-PH-1.000	1	1.805	45.85	1.032	26.21	0.168	4.27	0.027	0.686	0.195	4.953
BS-PH-1.125	1 1/8	2.02	51.31	1.156	29.36	0.187	4.75	0.03	0.762	0.217	5.512
BS-PH-1.250	1 1/4	2.24	56.90	1.281	32.54	0.206	5.23	0.035	0.889	0.241	6.121
BS-PH-1.375	1 3/8	2.45	62.23	1.406	35.71	0.225	5.72	0.039	0.991	0.264	6.706
BS-PH-1.500	1 1/2	2.68	68.07	1.531	38.89	0.244	6.20	0.041	1.041	0.285	7.239
BS-PH-1.625	1 5/8	2.955	75.06	1.687	42.85	0.282	7.16	0.045	1.143	0.307	7.798
BS-PH-1.750	1 3/4	3.17	80.52	1.812	46.02	0.281	7.14	0.048	1.219	0.329	8.357
BS-PH-1.875	1 7/8	3.38	85.85	1.937	49.20	0.3	7.62	0.053	1.346	0.363	9.220
BS-PH-2.000	2	3.6	91.44	2.062	52.37	0.318	8.08	0.057	1.448	0.375	9.525
BS-PH-2.250	2 1/4	4.04	102.62	2.312	58.72	0.356	9.04	0.062	1.575	0.418	10.617
BS-PH-2.500	2 1/2	4.483	113.87	2.58	65.53	0.394	10.01	0.07	1.778	0.484	12.294
METRIC BOLT SIZES											
BS-PH-M8	M8	0.591	15.01	0.331	8.41	0.049	1.24	0.01	0.254	0.059	1.499
BS-PH-M10	M10	0.709	18.01	0.409	10.39	0.079	2.01	0.01	0.254	0.089	2.261
BS-PH-M12	M12	0.866	22.00	0.488	12.4	0.091	2.31	0.011	0.279	0.102	2.591
BS-PH-M14	M14	0.984	24.99	0.567	14.4	0.098	2.49	0.015	0.381	0.113	2.870
BS-PH-M20	M20	1.417	35.99	0.819	20.8	0.157	3.99	0.019	0.483	0.176	4.470
BS-PH-M24	M24	1.693	43.00	0.976	24.79	0.157	3.99	0.027	0.686	0.184	4.674
BS-PH-M27	M27	1.929	49.00	1.094	27.79	0.169	4.29	0.028	0.711	0.197	5.004
BS-PH-M30	M30	2.126	54.00	1.213	30.81	0.189	4.80	0.031	0.787	0.22	5.588
BS-PH-M36	M36	2.677	68.00	1.449	36.80	0.252	6.40	0.043	1.092	0.295	7.493
BS-PH-M39	M39	2.759	70.00	1.567	39.80	0.252	6.40	0.043	1.09	0.295	7.493

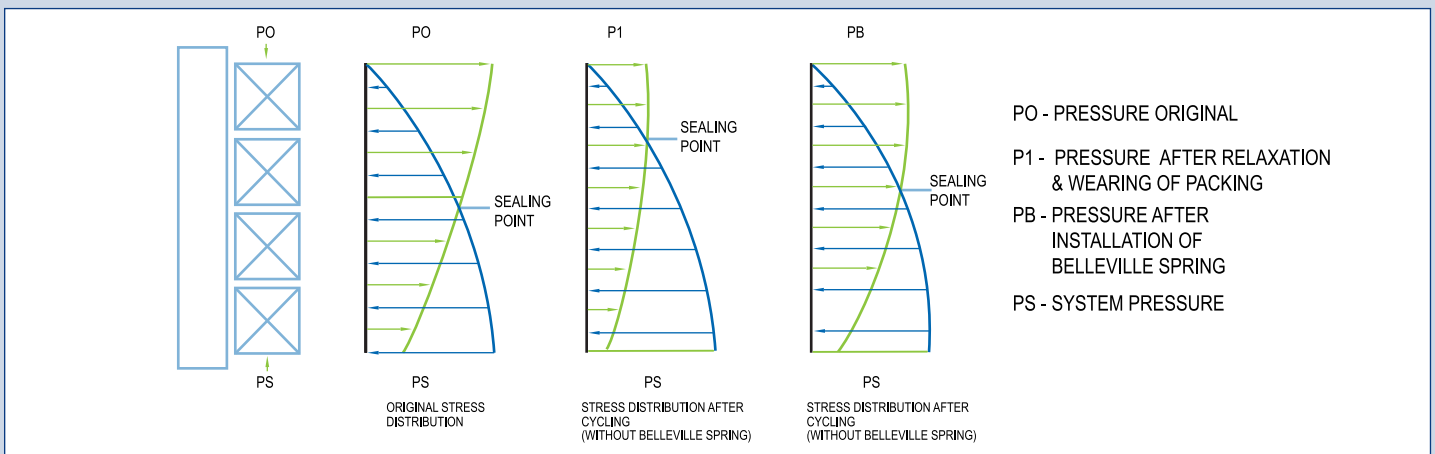
17-7 Steel is subject to spontaneous fracture when stressed and exposed to some corrosive environments.

Live Loading of Valve Stem Packing Glands

In order to prevent leakage through the valve stem packing, a minimum seal pressure needs to be maintained on them through the gland follower. However, as the packing relaxes, wears or after sometime, the preload on the fastening studs of the gland follower decrease and the seal pressure on the packing reduces below the minimum required value, leading to leakage through packing. A Belleville Spring between the gland follower, fastening studs and nuts ensures that the pre-load on the fastening stud is maintained and hence the seal pressure on the packing does not go below the minimum required value ensuring no leakage through packing.

Effect of Belleville Springs

Without Belleville spring, the sealing point moves towards the gland region very fast, ultimately resulting in leakage. With Belleville Spring, the gland is under constant pressure. Over a period of time, when the deflection of the Belleville springs reduces, the pressure it applies on the gland decreases and the sealing point moves towards the gland region but this movement is very slow. Hence for a long time the leakage can be avoided.



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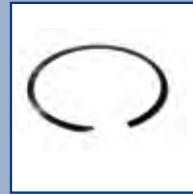
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O-Ring Kits



Caps



Spirolox®



Slotted Shim



Linear Motion



DMR Bearing Isolators



Plugs



Ring Masters®



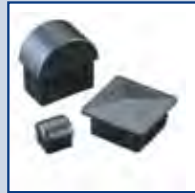
Slotted Shim Kits



Powdered Metal



V-Rings



Finishing



Rotor Clamp®



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