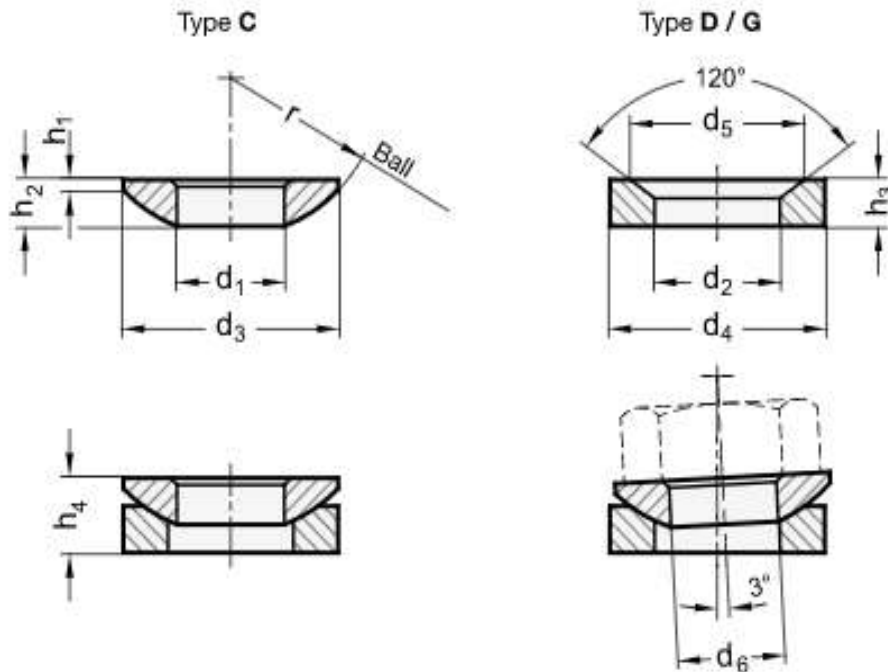


Metric DIN 6319 Spherical Washers

Visit our [online store](#) for product availability



Types

Type **C** – Male

Type **D** - Female with $d_4 = d_3$

Type **G** - Female with $d_4 > d_3$

Dimensions of Metric DIN 6319 Spherical Washers

Thread size d6	d ₁ /d ₂	Type	d ₃ / d ₄	d ₅	h ₁	h ₂	h ₃	h ₄	r	Transferable Static Bolt Force in kN max.	Weight (kg)
M6	6.4	C	12	11	0.7	2.3	2.8	~	9	9	0.001
M6	7.1	D	12	11	0.7	2.3	2.8	4.2	9	9	0.002
M6	7.1	G	17	11	0.7	2.3	4	~	9	9	0.006
M8	8.4	C	17	14.5	0.6	3.2	3.5	~	12	17	0.003
M8	9.6	D	17	14.5	0.6	3.2	3.5	5.6	12	17	0.004
M8	9.6	G	24	14.5	0.6	3.2	5	~	12	17	0.015
M10	10.5	C	21	18.5	0.8	4	4.2	~	15	26	0.006
M10	12	D	21	18.5	0.8	4	4.2	6.5	15	26	0.006
M10	12	G	30	18.5	0.8	4	5	~	15	26	0.02
M12	13	C	24	20	1.1	4.6	5	~	17	38	0.002
M12	14.2	D	24	20	1.1	4.6	5	8	17	38	0.01
M12	14.2	G	36	20	1.1	4.6	6	~	17	38	0.039
M14	15	C	28	24.8	1.2	5	5.6	~	22	53	0.01
M14	16.5	D	28	24.8	1.2	5	5.6	8.5	22	53	0.014
M16	17	C	30	26	1.3	5.3	6.2	~	22	73	0.012
M16	19	D	30	26	1.3	5.3	6.2	9.6	22	73	0.017
M16	19	G	44	26	1.3	5.3	7	~	22	73	0.065
M20	21	C	36	31	2	6.3	7.5	~	27	117	0.022
M20	23.2	D	36	31	2	6.3	7.5	11.7	27	117	0.031
M20	23.2	G	50	31	2	6.3	8	~	27	117	0.09
M24	25	C	44	37	2.4	8.2	9.5	~	32	168	0.045
M24	28	D	44	37	2.4	8.2	9.5	15.2	32	168	0.061
M24	28	G	60	37	2.4	8.2	10	~	32	168	0.162
M30	31	C	56	49	3.6	11.2	12	~	41	269	0.107
M30	35	D	56	49	3.6	11.2	12	19.2	41	269	0.12
M30	35	G	68	49	3.6	11.2	12	~	41	269	0.235
M36	37	C	68	60	4.6	14	15	~	50	394	0.18
M36	42	D	68	60	4.6	14	15	23.5	50	394	0.25
M42	43	C	78	70	6.5	17	18	~	58	542	0.318
M42	49	D	78	70	6.5	17	18	29	58	542	0.36
M48	50	C	92	82	8	21	22	~	67	714	0.54
M48	56	D	92	82	8	21	22	35.5	67	714	0.64

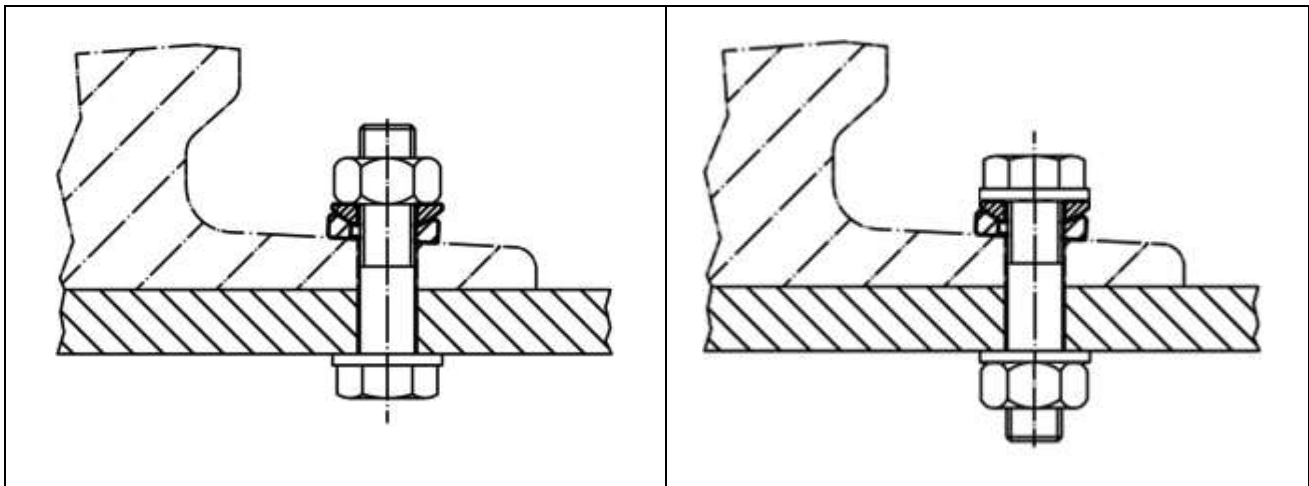
All measurements are in mm

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Metric DIN 6319 are Spherical Washers (Type C), and conical seat washers (Type D) also known as Spherical Washer Sets, Self-Aligning Washers or Equalizing Washers. They can be used individually but most often as an assembly for applications where clamping surfaces are not lying parallel to one another or on uneven surfaces. The washer assembly consists of a "top" half that is convex (male) and a "bottom" half that is concave (female). The top washer has a slightly narrower ID than the bottom washer while both have the same radius. This enables a bolt or screw to pass through both washers and automatically adjust / self-align to compensate for any angular deviation between the clamping surfaces. The spherical washer sets are designed to allow for an approximately 3 degree angle of correction. Any slight angular deviations can be equalized when used together with DIN 6330 hex nut with spherical setting. In this case, the male washer (Type C) is redundant. Aspen Fasteners offers over 500.000 unique fastener products from stock in inch and metric standard in a variety of materials and finishes. The following sizes metric DIN 5406 External Tooth Shaft Lock Washer with Tab are available for immediate shipping from stock: Diameters range from M6 to M48 in plain steel. View parts by clicking on the following link: [Metric DIN 6319 Spherical Washers](#).

Examples of Arrangements for Metric DIN 6319 Spherical Washers



DIN (Deutsches Institut für Normung - German Institute for Standardization) standards are issued for a variety of components including industrial fasteners as metric DIN 6319 Spherical Washers. The DIN standards remain common in Germany, Europe and globally even though the transition to ISO standards is taking place. DIN standards continue to be used for parts which do not have ISO equivalents or for which there is no need for standardization.

1) Mechanical properties of stainless steel for metric DIN 6319 Spherical Washers

Stainless steels can be divided into three groups of steel - austenitic, ferritic and martensitic. Austenitic steel is by far the most common type (>90% of commercial fasteners). The steel groups and strength classes are designated by a four-digit sequence of letters and numbers (eg A2-70) as shown in the following table. DIN EN ISO 3506 governs screws and nuts made from stainless steel.

Steel group	Steel grade	Strength class	Screws, Nuts and Bolts			
			Tensile strength N/mm ²	Tensile strength PSI	Dia range	Nut Load N/mm ²
Austenitic	A2 and A4	50	500	70.000	<=M39	500
		70	700	100.000	<=M20	700
		80	800	118.000	<=M20	800

The tensile stress is calculated with reference to the tensile stress area (see DIN EN ISO 3506-1979). Nuts to be paired with same grade of stainless steel screws

Steel group	Property Strength class	Made From	Characteristics
Austenitic	50	A1, A2	Soft; cold worked, turned and soft pressed fasteners
	70	A2, A4	Cold worked, normal strength formed fasteners
	80	A2, A4	Extreme cold worked, high strength, special applications

2) Chemical composition of stainless steel metric DIN 6319 Spherical Washers

Grade	USA Grade	Material designation	Material no.	C %	Si ≤ %	Mn ≤ %	Cr %	Mo %	Ni %
A 2	304	X 5Cr Ni 1810	1.4301	≤ 0.07	1.0	2.0	17.5 to 19.5	-	8.0 to 10.5
		X 2 Cr Ni 1811	1.4306	≤ 0.03	1.0	2.0	18.0 to 20.0	-	10 to 12.0
		X 8 Cr Ni 19/10	1.4303	≤ 0.07	1.0	2.0	17.0 to 19.0	-	11.0 to 13.0
A 4	316	X 5 Cr Ni Mo 1712	1.4401	≤ 0.07	1.0	2.0	16.5 to 18.5	2.0 to 2.5	10.0 to 13.0
		X 2 Cr Ni Mo 1712	1.4404	≤ 0.03	1.0	2.0	16.5 to 18.5	2.0 to 2.5	10 to 13

3) Chemical composition of steel metric DIN 6319 Spherical Washers

PROPERTY CLASS	MATERIAL AND TREATMENT	CHEMICAL COMPOSITION LIMITS %				TEMPERING TEMP °C MIN.
		C		P	S	
		min.	max.	max.	max.	
4.6. 4.8. 5.8. 6.8	Low or medium carbon steel	-	0.55	0.05	0.06	-
8.8	Medium carbon steel quenched. tempered	0.25	0.55	0.04	0.05	425
9.8	Medium carbon steel quenched. tempered	0.25	0.55	0.04	0.05	425
10.9	Medium carbon steel additives e.g. boron. Mn. Cr or Alloy steel - quenched. tempered	0.20	0.55	0.04	0.05	425
12.9	Alloy steel - quenched. tempered	0.20	0.50	0.035	0.035	380

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4) Mechanical properties of steel for metric DIN 6319 Spherical Washers

MECHANICAL PROPERTY		PROPERTY CLASS								
		4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9
						Up to M 16	Over M 16			
Tensile Strength (Rm. N/mm ²)	nom.	400	500		600	800		900	1000	1200
	min.	420	500	520	600	800	830	900	1040	1220
Vickers Hardness	min.	130	155	160	190	250	255	290	320	385
	max.	250				320	336	360	380	435
Brinell Hardness	min.	124	147	152	181	319	242	266	295	353
	max.	238				385	319	342	363	412
Rockwell Hardness	min. HR	71	79	82	89	-				
	HRC	-	-	-	-	20	23	28	32	39
	HR	95			99	-				
	max. HRC	-	-	-	-	32	34	37	39	44
Yield Stress ReL. N/mm ²	nom.	320	300	400	480	-				
	min.	340	300	420	480	-				
Stress at permanent set limit N/mm ²	nom.	-				640		720	900	1080
	min.	-				640	660	720	940	1100

Disclaimer

Dimensional data and technical information for metric DIN 6319 Spherical Washers was obtained from publicly available sources and not DIN 980 All Metal Prevailing Torque Type Hex Lock Nut acquired through standards agencies. It has been completed and compiled for reference purposes only; where discrepancies are found they are subject to change without notice. Aspen Fasteners makes no warranties or representations regarding the accuracy and validity of the compiled information and data. Contact the relevant standards authorities for accurate and detailed information.