

# GN 6339

## Heavy duty washers

### • Material

- Execution **BT**: case hardened black oxide steel, material-no. 1.7227, fine machined and fine ground, tensile strength  $R_m = 1220 - 1400 \text{ N/mm}^2$ .
- Execution **GO**: case hardened steel treated GEOMET 500, material-no. 1.7227, fine machined and fine ground, tensile strength  $R_m = 1220 - 1400 \text{ N/mm}^2$ .

### Features and applications

The influence of a washer on the quality of the screwed connection is very often underestimated. With washers GN 6339, high quality preloaded screwed connections can be established. A high static clamping force can be reached avoiding loss of tension.

At a specified preloaded clamping force it is often possible to use thinner bolts. This can result in a better ratio between clamping distance and bolt diameter to minimise the danger of failure.

The case hardened smooth bolt head/screw contact face leads to a lower and more constant friction coefficient even when continuous clamping and releasing operations are required.

Washers GN 6339 are only suitable for machine construction bolts of classes 8.8 / 10.9 / 12.9, and not for steel bolts DIN 6916.

### Outside diameter D

The outside diameter D of the lower refers to washers DIN 125 / ISO 7089, and the higher type to washers DIN 7349.

### Chamfer face diameter $d_2$

This dimension is, together with the chamfer angle  $\alpha 70^\circ$  and the inside diameter  $d_1$ , the most important dimension of these heavy duty washers. Diameter  $d_2$  is actually, even in the lower tolerance range, larger than the max. contact under head diameter on a bolt. This will ensure that the chamfer of  $d_2$  of the hardened washer will not be pressed into the underhead radius causing an indentation on the bolt which would damage the bolt.

### Inside diameter $d_1$

The inside diameter  $d_1$  is kept as small as possible ensuring that the bolt is inserted centrally into the washer. The choice of a matching pair of bolt and washer with least radial clearance is important in order to avoid a mismatch between chamfer diameter  $d_2$  and the max. contact area diameter of the bolt head.

### Chamfer angle $\alpha = 70^\circ \pm 2^\circ$

This relatively large angle is necessary when using hexagon headed bolts, which usually have a tapered transfer from shank to head (the so-called trumpet) to avoid fouling of the washer.

### Chamfer edge F

The extended chamfer side F as seen from  $d_2$  creates with  $d_1$  an edge the so-called trumpet of the transfer from shank to head of the bolt, so that the smallest radial clearance prevails. Even with the smallest angle of  $68^\circ$  and the lower dimension of  $d_2$  and  $d_1$  the radial clearance of all bolts to DIN EN is still sufficient.

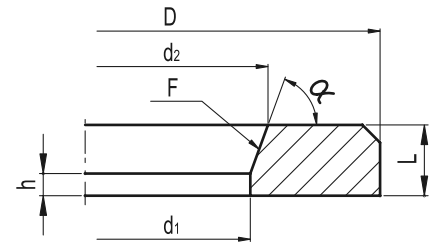
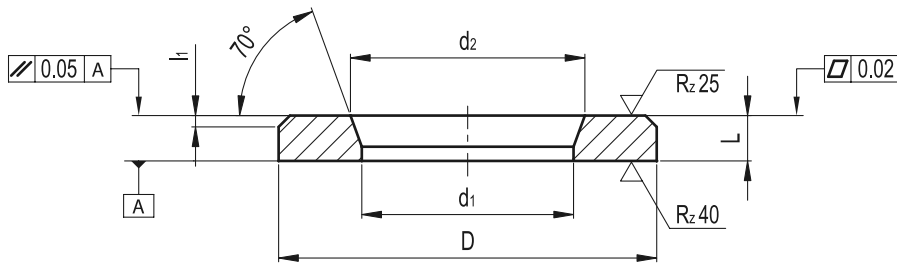
### Lead height $h_2$

This is the height of the cylindrical part of the internal diameter  $d_1$ ,  $h_2$  should be as high as possible in relation to the pitch of the thread of the bolt.

### Washer thickness L

Washers GN 6339 are higher when compared with DIN washers (exception: DIN 7439 which is equal to the high type). A larger thickness leads to a stronger washer. As a result, bearing in mind the chamfer  $d_2$ , a minimum height is established which ensures that the bolt thread will not be damaged when the bolt is tightened.





Standard Elements	Main dimensions					for threaded bolts
	Description	d1 H13	D H13	L ±0.2	d2 H13	
GN 6339-6.3-12-2.5-BT	6.3	12	2.5	7	0.6	M6
GN 6339-6.3-17-3-BT	6.3	17	3	7	1	M6
GN 6339-8.4-16-2.5-BT	8.4	16	2.5	9.5	0.75	M8
GN 6339-8.4-21-4-BT	8.4	21	4	9.5	1.5	M8
GN 6339-10.4-20-3-BT	10.4	20	3	11.5	0.75	M10
GN 6339-10.4-25-4-BT	10.4	25	4	11.5	1.5	M10
GN 6339-12.5-24-3.5-BT	12.5	24	3.5	14	1	M12
GN 6339-12.5-30-6-BT	12.5	30	6	14	2	M12
GN 6339-14.5-28-3.5-BT	14.5	28	3.5	16	1	M14
GN 6339-14.5-36-6-BT	14.5	36	6	16	2	M14
GN 6339-16.5-30-4-BT	16.5	30	4	18	1	M16
GN 6339-16.5-40-6-BT	16.5	40	6	18	2	M16
GN 6339-18.5-34-5-BT	18.5	34	5	21	1.5	M18
GN 6339-18.5-44-8-BT	18.5	44	8	21	2.5	M18
GN 6339-20.5-37-5-BT	20.5	37	5	23	1.5	M20
GN 6339-20.5-44-8-BT	20.5	44	8	23	2.5	M20
GN 6339-22.5-40-5-BT	22.5	40	5	25	1.5	M22
GN 6339-22.5-50-8-BT	22.5	50	8	25	2.5	M22
GN 6339-24.5-44-5-BT	24.5	44	5	27	1.5	M24
GN 6339-24.5-50-10-BT	24.5	50	10	27	3.5	M24
GN 6339-28-50-6-BT	28	50	6	31	1.5	M27
GN 6339-28-60-10-BT	28	60	10	31	3.5	M27
GN 6339-31-56-6-BT	31	56	6	34	1.5	M30
GN 6339-31-68-10-BT	31	68	10	34	3.5	M30
GN 6339-37-66-7-BT	37	66	7	40	2	M36
GN 6339-6.3-12-2.5-GO	6.3	12	2.5	7	0.6	M6
GN 6339-6.3-17-3-GO	6.3	17	3	7	1	M6
GN 6339-8.4-16-2.5-GO	8.4	16	2.5	9.5	0.75	M8
GN 6339-8.4-21-4-GO	8.4	21	4	9.5	1.5	M8
GN 6339-10.4-20-3-GO	10.4	20	3	11.5	0.75	M10
GN 6339-10.4-25-4-GO	10.4	25	4	11.5	1.5	M10
GN 6339-12.5-24-3.5-GO	12.5	24	3.5	14	1	M12
GN 6339-12.5-30-6-GO	12.5	30	6	14	2	M12
GN 6339-14.5-28-3.5-GO	14.5	28	3.5	16	1	M14
GN 6339-14.5-36-6-GO	14.5	36	6	16	2	M14
GN 6339-16.5-30-4-GO	16.5	30	4	18	1	M16
GN 6339-16.5-40-6-GO	16.5	40	6	18	2	M16
GN 6339-18.5-34-5-GO	18.5	34	5	21	1.5	M18
GN 6339-18.5-44-8-GO	18.5	44	8	21	2.5	M18
GN 6339-20.5-37-5-GO	20.5	37	5	23	1.5	M20
GN 6339-20.5-44-8-GO	20.5	44	8	23	2.5	M20
GN 6339-22.5-40-5-GO	22.5	40	5	25	1.5	M22
GN 6339-22.5-50-8-GO	22.5	50	8	25	2.5	M22
GN 6339-24.5-44-5-GO	24.5	44	5	27	1.5	M24
GN 6339-24.5-50-10-GO	24.5	50	10	27	3.5	M24
GN 6339-28-50-6-GO	28	50	6	31	1.5	M27
GN 6339-28-60-10-GO	28	60	10	31	3.5	M27
GN 6339-31-56-6-GO	31	56	6	34	1.5	M30
GN 6339-31-68-10-GO	31	68	10	34	3.5	M30
GN 6339-37-66-7-GO	37	66	7	40	2	M36