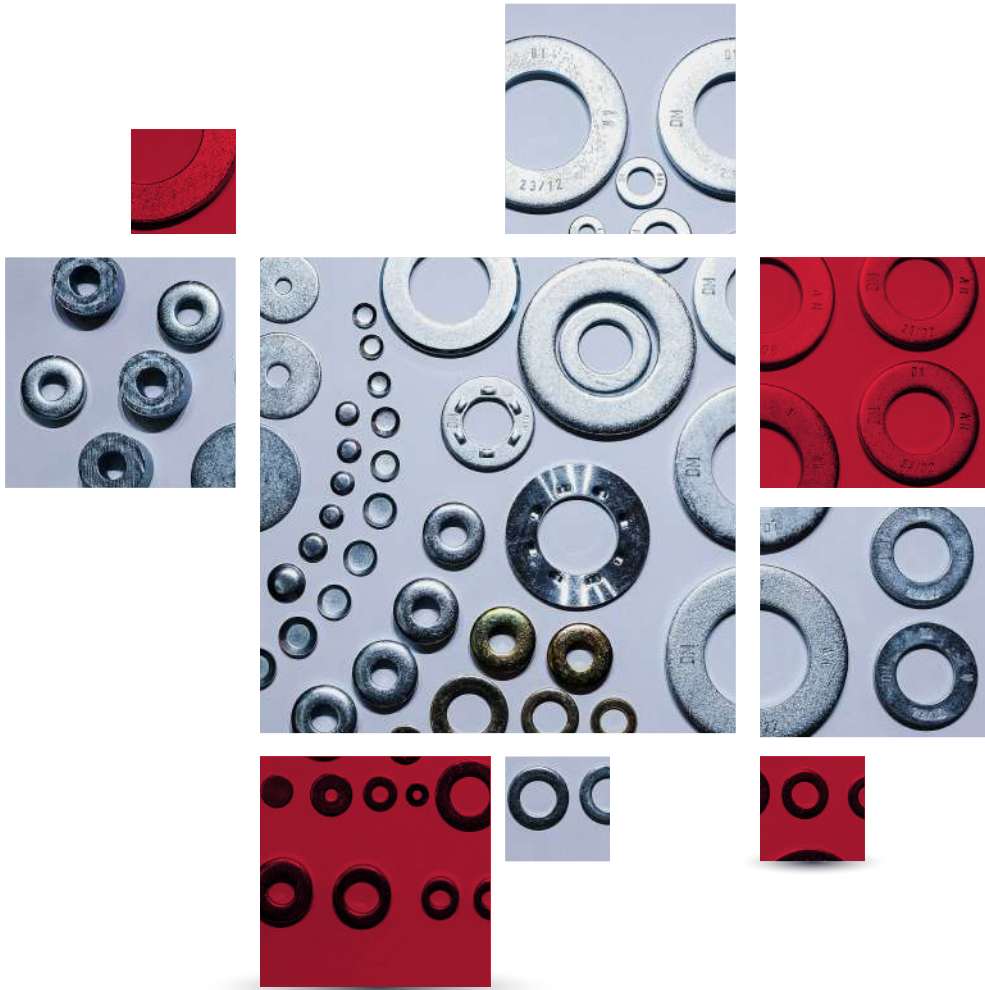




**DEM METAL**  
RONDELA İMALATI & TİCARETİ



# 2024

**PRODUCT CATALOGUE**

# About Us

DEM METAL İMALAT, that is founded in year 2009, operates in fields of wide range such as refineries, petrochemical facilities, power transmission lines, wind and solar power plants, valves, pressure vessel and boilers, airport, bridge and highway constructions while having a strong foot in the field; while also takes and crucial part in several strategic projects in Türkiye.

Our firm offers sustainable solutions to needs of Türkiye in energy and transportation with being in the center of Yeka Wind Power Plant, Yeka Solar Power Plant with its services in mega transportation projects such as Osmangazi and Çanakkale bridges. It has also contributed to Turkish energy safety by its services of products to major companies in energy and petrochemical fields.

Our firm, secured its service and production quality with important quality standards such as ISO-9001:2015, IATF 16949:2016, ISO 45001:2018, ISO 10002:2018, ISO 14001:2015 and CE declaration of conformity with its management and production staff having experience more than 35 years.

Our firm, besides its washer production according to international standards also produces all kinds of custom sized and quality washers.

We offer innovative solutions to the field according to our mission and vision while value our client feedbacks.

We appreciate the the time and deliver your projects on time as promised.

**Address** : Sarıbrahimli Mah. Kızılyaka Küme Evleri 16/A (Cumorsan Antrepoları)  
Akdeniz/MERSİN

**Phone** : [+90 324 454 02 23](tel:+903244540223)

**E-mail** : [info@demmetal.com](mailto:info@demmetal.com)

**Website** : [www.demmetal.com](http://www.demmetal.com)



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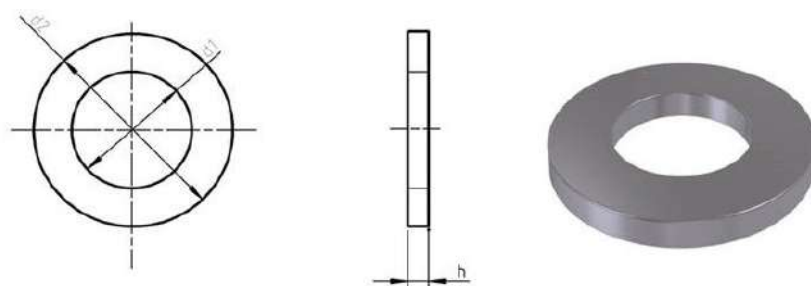
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# DIN 125A

## DIN 125A Flat Washer

Generally used in class 8.8 DIN 931 / DIN 933 hex head bolt and class 8 DIN 934 nuts.

**Material:** Steel (Material choice is of producer choice)



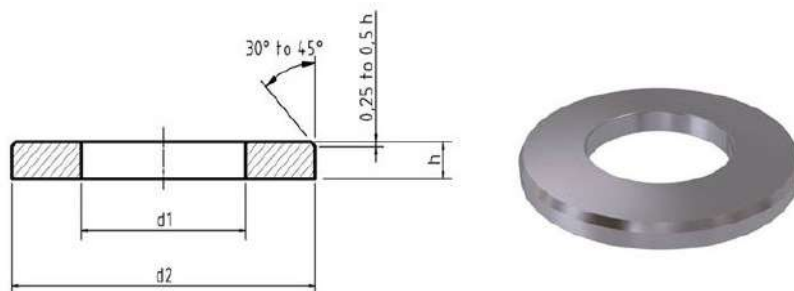
Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Min	Max	Min	Max	
M8	8.40	8.62	15.57	16.0	1.40	1.80	1.830
M10	10.50	10.77	19.48	20.0	1.80	2.20	3.570
M12	13.00	13.27	23.48	24.0	2.30	2.70	6.270
M14	15.00	15.27	27.48	28.0	2.30	2.70	8.620
M16	17.00	17.27	29.48	30.0	2.70	3.30	11.300
M18	19.00	19.33	33.38	34.0	2.70	3.30	14.700
M20	21.00	21.33	36.38	37.0	2.70	3.30	17.200
M22	23.00	23.33	38.38	39.0	2.70	3.30	18.300
M24	25.00	25.33	43.38	44.0	3.70	4.30	32.300
M27	28.00	28.33	49.38	50.0	3.70	4.30	42.300
M30	31.00	31.39	55.26	56.0	3.70	4.30	53.600
M33	34.00	34.62	58.80	60.0	4.40	5.60	75.300
M36	37.00	37.62	64.80	66.0	4.40	5.60	92.100
M39	40.00	40.62	70.80	72.0	5.40	6.60	133.000
M42	43.00	43.62	76.80	78.0	6.00	8.00	183.000
M45	46.00	46.62	83.6	85.0	6.00	8.00	220.00
M48	50.00	50.62	90.6	92.0	7.00	9.00	294.000
M52	54.00	54.74	96.6	98.0	7.00	9.00	330.00
M56	58.00	58.74	103.6	105	8.00	10.00	425.000
M60	62.00	62.74	108.6	110.0	8.00	10.00	458.000
M64	66.00	66.74	113.6	115	8.00	10.00	492.000

# DIN 125B

## DIN 125B Flat Washer

External countersunk washer generally used in 8.8 quality DIN 931 / DIN 933 hex head bolt and 8 quality DIN 934 screws.

**Material:** Steel (Material choice is of producer choice)



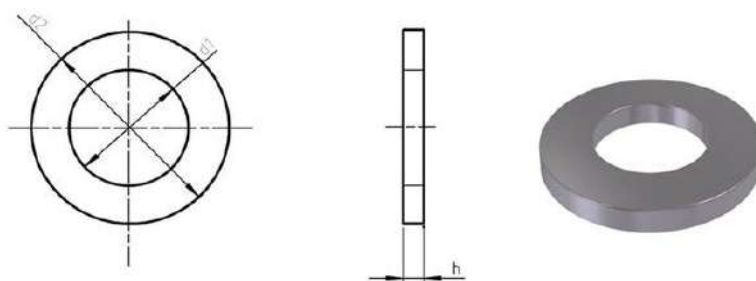
Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Min	Max	Min	Max	
M8	8.40	8.62	15.57	16.0	1.40	1.80	1.830
M10	10.50	10.77	19.48	20.0	1.80	2.20	3.570
M12	13.00	13.27	23.48	24.0	2.30	2.70	6.270
M14	15.00	15.27	27.48	28.0	2.30	2.70	8.620
M16	17.00	17.27	29.48	30.0	2.70	3.30	11.300
M18	19.00	19.33	33.38	34.0	2.70	3.30	14.700
M20	21.00	21.33	36.38	37.0	2.70	3.30	17.200
M22	23.00	23.33	38.38	39.0	2.70	3.30	18.300
M24	25.00	25.33	43.38	44.0	3.70	4.30	32.300
M27	28.00	28.33	49.38	50.0	3.70	4.30	42.300
M30	31.00	31.39	55.26	56.0	3.70	4.30	53.600
M33	34.00	34.62	58.80	60.0	4.40	5.60	75.300
M36	37.00	37.62	64.80	66.0	4.40	5.60	92.100
M39	40.00	40.62	70.80	72.0	5.40	6.60	133.000
M42	43.00	43.62	76.80	78.0	6.00	8.00	183.000
M45	46.00	46.62	83.60	85.0	6.00	8.00	220.000
M48	50.00	50.62	90.60	92.0	7.00	9.00	294.000
M52	54.00	54.74	96.60	98.0	7.00	9.00	330.000
M56	58.00	58.74	103.60	105.0	8.00	10.00	425.000
M60	62.00	62.74	108.60	110.0	8.00	10.00	458.000
M64	66.00	66.74	113.60	115.0	8.00	10.00	492.000

# DIN 126

## DIN 126 Flat Washer

Generally used in class 8.8 DIN 931 / DIN 933 hex head bolt and class 8 DIN 934 nuts.

**Material:** Steel (Material choice is of producer choice)



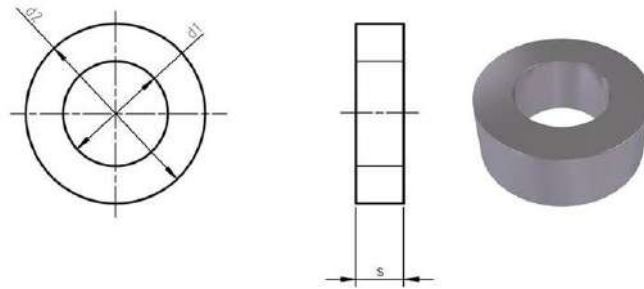
Nominal Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Max	Min	Min	Max	
M8	9.00	9.36	16.00	14.90	1.30	1.90	1.73
M10	11.00	11.43	20.00	18.70	1.70	2.30	3.44
M12	13.50	13.93	24.00	22.70	2.20	2.80	6.07
M14	15.50	15.93	28.00	26.70	2.20	2.80	8.38
M16	17.50	17.93	30.00	28.70	2.40	3.60	11.00
M18	20.00	20.43	34.00	32.40	2.40	3.60	14.00
M20	22.00	22.52	37.00	35.40	2.40	3.60	16.40
M22	24.00	24.52	39.00	37.40	2.40	3.60	17.50
M24	26.00	26.52	44.00	42.40	3.40	4.60	31.10
M27	30.00	30.52	50.00	48.40	4.00	4.60	39.50
M30	33.00	33.62	56.00	54.10	4.00	4.60	50.50
M33	36.00	37.00	60.00	58.10	4.00	6.00	71.00
M36	39.00	40.00	66.00	64.10	4.00	6.00	87.40
M39	42.00	43.00	72.00	70.10	5.00	7.00	127.00
M42	45.00	46.00	78.00	76.10	5.80	8.20	175.00
M45	48.00	49.00	85.00	82.80	5.80	8.20	212.00
M48	52.00	53.20	92.00	89.80	6.80	9.20	284.00
M52	56.00	57.20	98.00	95.80	6.80	9.20	319.00
M56	62.00	63.20	105.00	102.80	7.80	10.20	398.00
M60	66.00	67.20	110.00	107.80	7.80	10.20	430.00
M64	70.00	71.20	115.00	112.80	7.80	10.20	462.00

# DIN 7989

## DIN 7989 Steel Construction Washer

Flat washer that is used in steel constructions.

**Material:** Steel (Material choice is of producer choice)



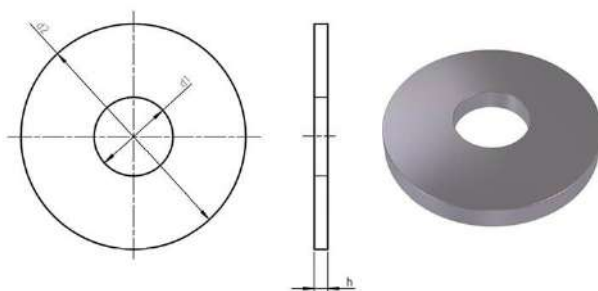
Thread Diameter	d1		d2		NOM	h		Weight Kg/1000pcs
	Min	Max	Max	Min		Min	Max	
M10	11.00	11.43	20.00	19.16	8	7	9	13.8
M12	13.50	13.93	24.00	23.16	8	7	9	19.4
M16	17.50	17.93	30.00	29.16	8	7	9	29.3
M20	22.00	22.52	37.00	36.0	8	7	9	43.7
M24	26.00	26.52	44.00	43.0	8	7	9	62.1
M27	30.00	30.52	50.00	49.0	8	7	9	78.9
M30	33.00	33.62	56.00	54.8	8	7	9	101.0

# DIN 9021

## DIN 9021 Wide Washer

Washer that is used C product class hex head nuts that is up to 6 (including 6) and C product class hexagonal bolt and hex nuts that are up to 6.8 (including 6.8)

**Material:** Steel (Material choice is of producer choice)



Thread Diameter	d1		d2		NOM	h		Weight Kg/1000pcs
	Min	Max	Max	Min		Max	Min	
M8	8.4	8.62	24.0	23.48	2.00	2.20	1.80	6.230
M10	10.5	10.77	30.0	29.48	2.50	2.70	2.30	12.20
M12	13.0	13.27	37.0	36.38	3.00	3.30	2.70	22.20
M14	15.0	15.27	44.0	43.38	3.00	3.30	2.70	31.60
M16	17.0	17.27	50.0	49.38	3.00	3.30	2.70	40.90
M18	20.0	20.52	56.0	54.10	4.00	4.60	3.40	67.40
M20	22.0	22.52	60.0	58.10	4.00	4.60	3.40	76.80
M24	26.0	26.84	72.0	70.10	5.00	6.00	4.00	139.0
M30	33.0	34.00	92.0	89.80	6.00	7.00	5.00	273.0
M36	39.0	40.00	110.0	107.80	8.00	9.20	6.80	522.0

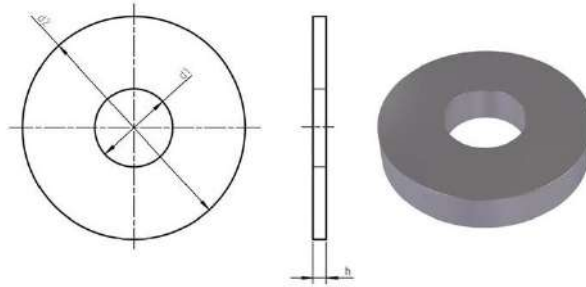


# DIN 7349

## DIN 7349 Thick Flat Washer

Washer that is used for heavy duty. compression sleeve bolts. It is fit for heavy duty compression sleeve bolts since it is particularly thick.

**Material:** Material choice is of producer choice.



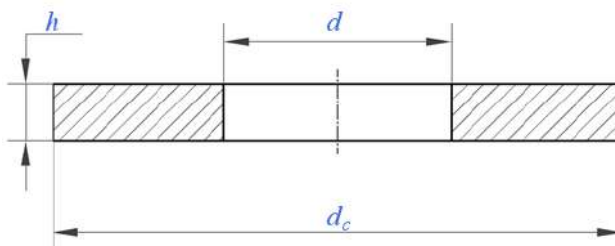
Bolt Diameter	d1		d2		NOM	h		Weight Kg/1000pcs
	Min	Max	Max	Min		Min	Max	
M8	8.4	8.62	21.0	20.48	4.00	3.70	4.30	9.150
M10	10.5	10.77	25.0	24.48	4.00	3.70	4.30	12.70
M12	13.0	13.27	30.0	29.48	6.00	5.40	6.60	27.10
M14	15.0	15.27	36.0	35.38	6.00	5.40	6.60	39.60
M16	17.0	17.27	40.0	39.38	6.00	5.40	6.60	48.50
M18	19.0	19.33	44.0	43.38	8.00	7.00	9.00	77.40
M20	21.0	21.33	44.0	43.38	8.00	7.00	9.00	73.40
M22	23.0	23.33	50.0	49.38	8.00	7.00	9.00	97.10
M24	25.0	25.33	50.0	49.38	10.00	9.00	11.00	116.0
M27	28.0	29.33	60.0	59.26	10.00	9.00	11.00	174.0
M30	31.0	31.39	68.0	67.26	10.00	9.00	11.00	226.0

# DIN 6340

## DIN 6340 Wide and Thick Washer

Washer that is used with clamps stated in DIN 6314, DIN 6315 and DIN 6316

**Material:** Material choice is of producer choice.



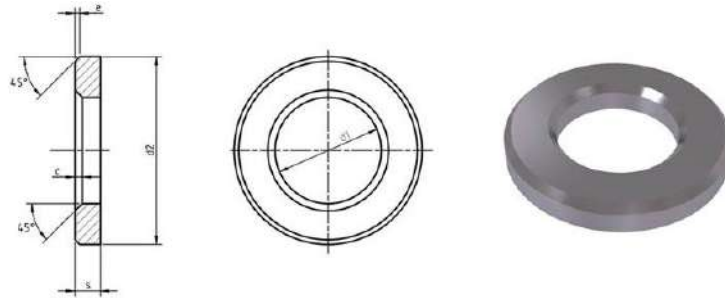
Thread Diameter	d		dc		h	Weight Kg/1000pcs
	Min	Max	Min	Max		
M8	8.4	8.76	22.48	23	4	11.3
M10	10.5	10.93	27.48	28	4	16.6
M12	13	13.43	34.38	35	5	32.5
M16	17	17.43	44.38	45	6	64.3
M20	21	21.52	49.38	50	6	76
M24	25	25.52	59.26	60	8	147
M30	31	31.62	67.26	68	10	226

# DIN 6916

## DIN 6916 Steel Construction Washer

Heat treated, countersunk washer that is used for high strength bolts used in steel construction. Mostly used with DIN 6914 bolt and DIN 6915 nuts.

**Hardness Class:** 295–350 HV10



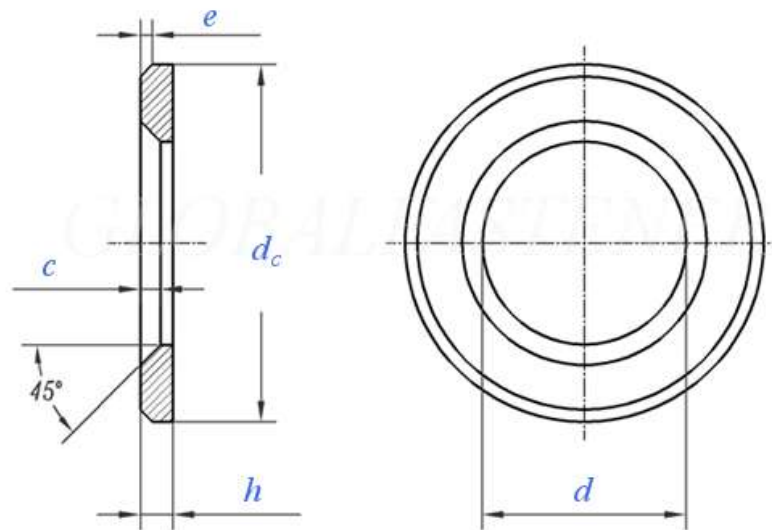
Nominal Diameter	d1		d2		h			c		e		Weight Kg/ 1000pcs
	Min	Max	Min	Max	NOM	Min	Max	Min	Max	Nom	Max	
M12	13.00	13.27	23.48	24.00	3	2.7	3.3	1.60	1.90	0.50	1.00	7.030
M14	15.00	15.27	27.48	28.00	3	2.7	3.3	1.60	1.90	0.50	1.00	11.00
M16	17.00	17.27	29.48	30.00	4	3.7	4.3	1.60	1.90	0.75	1.50	14.60
M18	19.00	19.33	33.38	34.00	4	3.7	4.3	2.00	2.50	0.75	1.50	17.50
M20	21.00	21.33	36.38	37.00	4	3.7	4.3	2.00	2.50	0.75	1.50	19.60
M22	23.00	23.33	38.38	39.00	4	3.7	4.3	2.00	2.50	0.75	1.50	24.30
M24	25.00	25.33	43.38	44.00	4	3.7	4.3	2.00	2.50	0.75	1.50	30.60
M27	28.00	28.52	49.00	50.00	5	4.4	5.6	2.50	3.00	1.00	2.00	50.20
M30	31.00	31.62	54.80	56.00	5	4.4	5.6	2.50	3.00	1.00	2.00	63.20
M33	34.00	34.62	58.80	60.00	5	4.4	5.6	2.50	3.00	1.00	2.00	79.00
M36	37.00	37.62	64.80	66.00	6	5.4	6.6	2.50	3.00	1.25	2.50	102.0

# DAST 021

## DAST021 Steel Construction Washer

Heat treated, countersunk washer that is used for high strength bolts used in steel construction. Mostly used with EN 14399-3 bolt and DIN 14399-4 nuts.

**Hardness Class:** 295–350 HV10



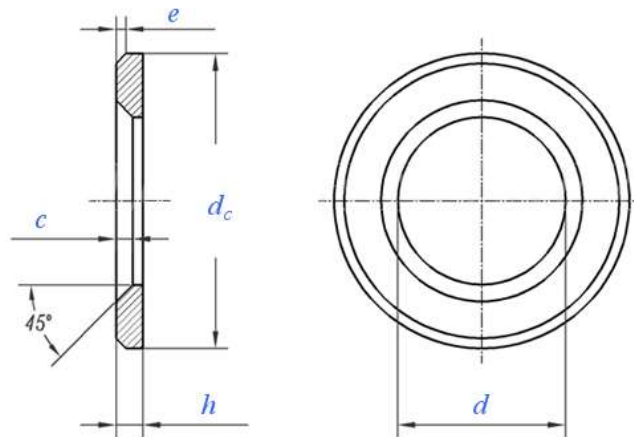
Nominal Thread Diameter	d		dc		h			C		e	
	Min	Max	Min	Max	Nom	Min	Max	Min	Max	Min	Max
M39	40.4	41.02	70.8	72	6	5.4	6.6	3	3.5	1.25	2.5
M42	43.4	44.02	76.8	78	8	6.8	9.2	3	3.5	1.5	3
M45	46.4	47.02	83.6	85	8	6.8	9.2	3.4	4	1.5	3
M48	49.4	50.02	90.6	92	8	6.8	9.2	3.4	4	1.5	3
M56	58	58.74	103.6	105	10	8.8	11.2	4	4.5	2	4
M64	66	66.74	113.3	115	10	8.8	11.2	4.5	5	2	4

# EN 14399-6

## EN 14399-6 Steel Construction Washer

Heat treated, countersunk washer that is used for high strength bolts used in steel construction. Mostly used with EN 14399-3 bolt and DIN 14399-4 nuts.

**Hardness Class:** 295–350 HV10



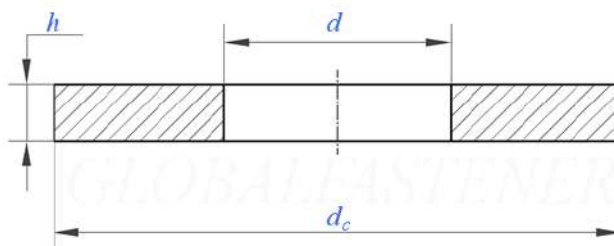
Nominal Thread Diameter	d		d <sub>c</sub>		h		e		c		Weight
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
M12	13	13.27	23.48	24	2.7	3.3	0.5	1	1.6	1.9	7.030
M14	15	15.27	27.48	28	2.7	3.3	0.5	1	1.6	1.9	11.00
M16	17	17.27	29.48	30	3.7	4.3	0.75	1.5	1.6	1.9	14.60
M18	19	19.33	33.38	34	3.7	4.3	0.75	1.5	2	2.5	17.50
M20	21	21.33	36.38	37	3.7	4.3	0.75	1.5	2	2.5	19.60
M22	23	23.33	38.38	39	3.7	4.3	0.75	1.5	2	2.5	24.30
M24	25	25.33	43.38	44	3.7	4.3	0.75	1.5	2	2.5	30.60
M27	28	28.52	49	50	4.4	5.6	1	2	2.5	3	50.20
M30	31	31.62	54.80	56	4.4	5.6	1	2	2.5	3	63.20
M33	34	34.62	58.80	60	4.4	5.6	1	2	2.5	3	79.00
M36	37	37.62	64.80	66	5.4	6.6	1.25	2.5	2.5	3	102.0

# EN 14399-5

## EN 14399-5 Steel Construction Washer

Heat treated, countersunk washer that is used for high strength bolts used in steel construction. Mostly used with EN 14399-3 bolt and DIN 14399-4 nuts.

**Hardness Class:** 295–350 HV10



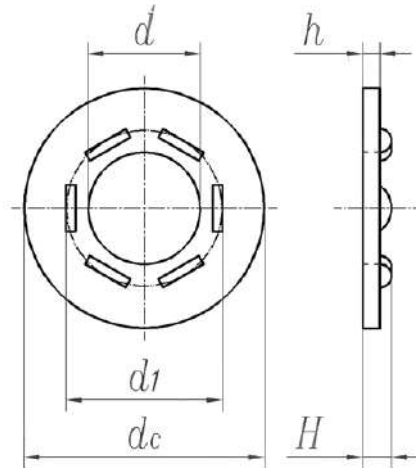
Nominal Thread Diameter	d		dc		Nominal Size	h		Weight
	Min	Max	Min	Max		Min	Max	
M12	13	13.27	23.48	24	3	2.7	3.3	7.030
M14	15	15.27	27.48	28	3	2.7	3.3	11.00
M16	17	17.27	29.48	30	4	3.7	4.3	14.60
M18	19	19.33	33.38	34	4	3.7	4.3	17.50
M20	21	21.33	36.38	37	4	3.7	4.3	19.60
M22	23	23.33	38.38	39	4	3.7	4.3	24.30
M24	25	25.33	43.38	44	4	3.7	4.3	30.60
M27	28	28.52	49	50	5	4.4	5.6	50.20
M30	31	31.52	54.80	56	5	4.4	5.6	63.20
M33	34	34.62	58.80	60	5	4.4	5.6	79.00
M36	37	37.62	64.80	66	6	5.4	6.6	102.00

# EN 14399-9 DTI

## EN 14399-9 DTI

DTI (Direct Tension Indicators), are individual bolt load cells which measures the prestress that occurs during tightening.

**Hardness Class:** 38-45 HRC



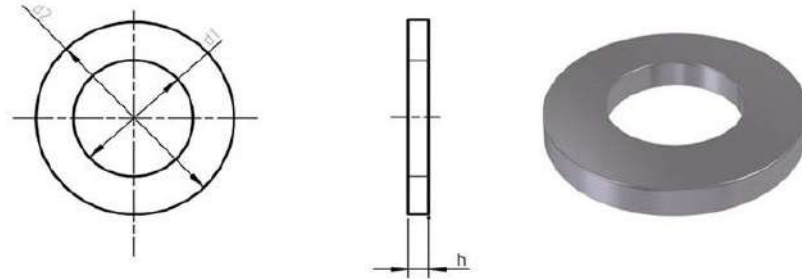
Nominal Thread Diameter	$d$		$d_c$		$h$	
	Min	Max	Min	Max	Min	Max
M12	12.1	12.35	22.7	24	2.7	4.3
M16	16.1	16.35	27.7	29	3.7	4.3
M20	20.1	20.4	34.4	36	3.7	4.3
M22	22.3	22.6	37.4	39	3.7	4.3
M24	24.2	24.5	41.4	43	3.7	4.3
M27	27.2	27.55	46.4	48	4.4	5.6
M30	30.2	30.55	50.1	52	4.4	5.6
M36	36.2	36.55	60.1	62	5.4	6.6

# EN ISO7089

## EN ISO 7089 Plain Washer

Used in class 8.8 and 10.9 hex head bolts and class 8 and 10 nuts.

**Hardness Class:** 200HV and 300HV



Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Max	Min	Min	Max	
M12	13.00	13.27	23.48	24.0	2.30	2.70	6.270
M14	15.00	15.27	27.48	28.0	2.30	2.70	8.620
M16	17.00	17.27	29.48	30.0	2.70	3.30	11.300
M18	19.00	19.33	33.38	34.0	2.70	3.30	14.700
M20	21.00	21.33	36.38	37.0	2.70	3.30	17.200
M22	23.00	23.33	38.38	39.0	2.70	3.30	18.300
M24	25.00	25.33	43.38	44.0	3.70	4.30	32.300
M27	28.00	28.33	49.38	50.0	3.70	4.30	42.300
M30	31.00	31.39	55.26	56.0	3.70	4.30	53.600
M33	34.00	34.62	58.80	60.0	4.40	5.60	75.300
M36	37.00	37.62	64.80	66.0	4.40	5.60	92.100
M39	42.00	42.62	70.80	72.0	5.40	6.60	133.00
M42	45.00	45.62	76.80	78.0	7.00	9.00	183.00
M45	48.00	48.62	83.60	85.0	7.00	9.00	220.00
M48	52.00	52.74	90.60	92.0	7.00	9.00	294.00
M52	56.00	56.74	96.60	98.0	7.00	9.00	330.00
M56	62.00	62.74	105	103.60	9.00	11.00	425.00
M60	66.00	66.74	108.60	110.0	9.00	11.00	458.00
M64	70.00	70.74	115	113.60	9.00	11.00	492.00

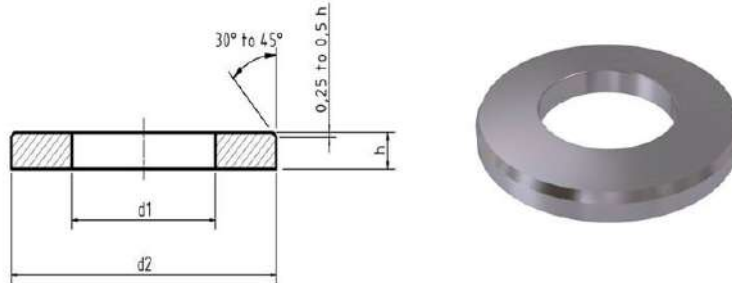


# EN ISO7090

## EN ISO 7090 Flat Washer

External countersunk washer that is used in class 8.8 and 10.9 hex head bolts and 8 and 10 class nuts.

**Hardness Class:** 200HV and 300HV



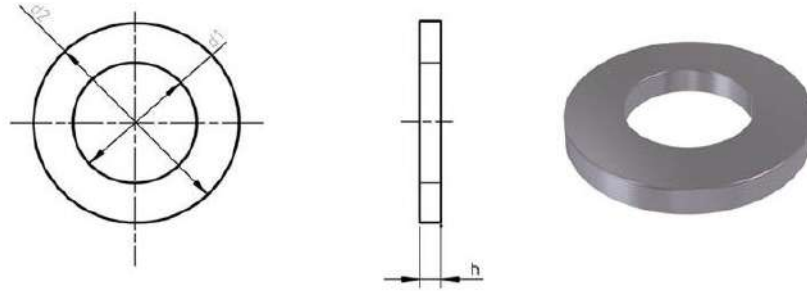
Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Max	Min	Min	Max	
M12	13.00	13.27	23.48	24.0	2.30	2.70	6.270
M14	15.00	15.27	27.48	28.0	2.30	2.70	8.620
M16	17.00	17.27	29.48	30.0	2.70	3.30	11.300
M18	19.00	19.33	33.38	34.0	2.70	3.30	14.700
M20	21.00	21.33	36.38	37.0	2.70	3.30	17.200
M22	23.00	23.33	38.38	39.0	2.70	3.30	18.300
M24	25.00	25.33	43.38	44.0	3.70	4.30	32.300
M27	28.00	28.33	49.38	50.0	3.70	4.30	42.300
M30	31.00	31.39	55.26	56.0	3.70	4.30	53.600
M33	34.00	34.62	58.80	60.0	4.40	5.60	75.300
M36	37.00	37.62	64.80	66.0	4.40	5.60	92.100
M39	42.00	42.62	70.80	72.0	5.40	6.60	133.000
M42	45.00	45.62	76.80	78.0	6.00	8.00	183.000
M45	48.00	48.62	83.60	85.0	6.00	8.00	220.000
M48	52.00	52.74	90.60	92.0	7.00	9.00	294.000
M52	56.00	56.74	96.60	98.0	7.00	9.00	330.000
M56	62.00	62.74	103.60	105.0	9.00	11.00	425.000
M60	66.00	66.74	108.60	110.0	9.00	11.00	458.000
M64	70.00	70.74	113.60	115.0	9.00	11.00	492.000

# EN ISO7091

## EN ISO 7091 Flat Washer

Washer that is used C product class hexagonal nuts that is up to 6 (including 6) and C product class hexagonal bolt and nuts that are up to 6.8 (including 6.8).

**Material:** Steel (Material choice is of producer choice)



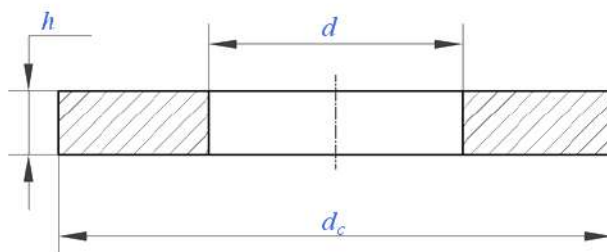
Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Min	Max	Max	Min	Min	Max	
M8	9.00	9.36	16.00	14.9	1.30	1.90	1.73
M10	11.00	11.43	20.00	18.7	1.70	2.30	3.44
M12	13.50	13.93	24.00	22.7	2.20	2.80	6.07
M14	15.50	15.93	28.00	26.7	2.80	2.20	8.38
M16	17.50	17.93	30.00	28.7	2.40	3.60	11.00
M18	20.00	20.52	34.00	32.4	2.40	3.60	14.00
M20	22.00	22.52	37.00	35.4	2.40	3.60	16.40
M22	24.00	24.52	39.00	37.4	2.40	3.60	17.50
M24	26.00	26.52	44.00	42.4	3.40	4.60	31.10
M27	30.00	30.52	50.00	48.4	4.00	4.60	39.50
M30	33.00	33.62	56.00	54.1	4.00	4.60	50.50
M33	36.00	37.00	60.00	58.1	4.00	6.00	71.00
M36	39.00	40.00	66.00	64.1	4.00	6.00	87.40
M39	42.00	43.00	72.00	70.1	5.00	7.00	127.00
M42	45.00	46.00	78.00	76.1	5.80	8.20	175.00
M45	48.00	49.00	85.00	82.8	5.80	8.20	212.00
M48	52.00	53.20	92.00	89.8	6.80	9.20	284.00
M52	56.00	57.20	98.00	95.8	6.80	9.20	319.00
M56	62.00	63.20	105.00	102.8	7.80	10.20	398.00
M60	66.00	67.20	110.00	107.8	7.80	10.20	430.00
M64	70.00	71.20	115.00	112.8	7.80	10.20	462.00

# EN ISO7092

## ISO 7092 Wide Flat Washer

Used in bolts and nuts up to 250 HV of hardness.

**Material:** Steel (Material choice is of producer choice)



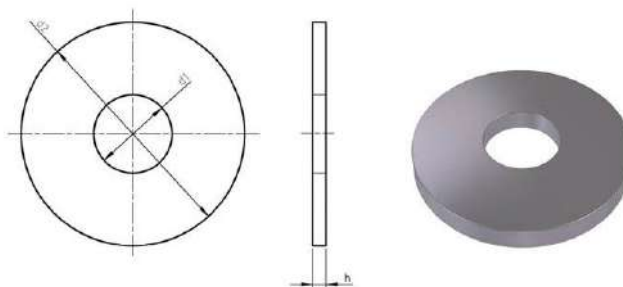
Nominal Diameter	d		dc		Nominal Size	h	
	Min	Max	Min	Max		Min	Max
M8	8.4	8.62	14.57	15	1.6	1.4	1.8
M10	10.5	10.77	17.57	18	1.6	1.4	1.8
M12	13	13.27	19.48	20	2	1.8	2.2
M14	15	15.27	23.48	24	2.5	2.3	2.7
M16	17	17.27	27.48	28	2.5	2.3	2.7
M18	19	19.33	29.48	30	3	2.7	3.3
M20	21	21.33	33.38	34	3	2.7	3.3
M22	23	23.33	36.38	37	3	2.7	3.3
M24	25	25.33	38.38	39	4	3.7	4.3
M27	28	28.33	43.38	44	4	3.7	4.3
M30	31	31.39	49.38	50	4	3.7	4.3
M33	34	34.62	54.8	56	5	4.4	5.6
M36	37	37.62	58.8	60	5	4.4	5.6

# EN ISO7093

## EN ISO 7093 Wide Washer

Washer that is used C product class hexagonal nuts that is up to 6 (including 6) and C product class hexagonal bolt and nuts that are up to 6.8 (including 6.8)

**Material:** Steel (Material choice is of producer choice)



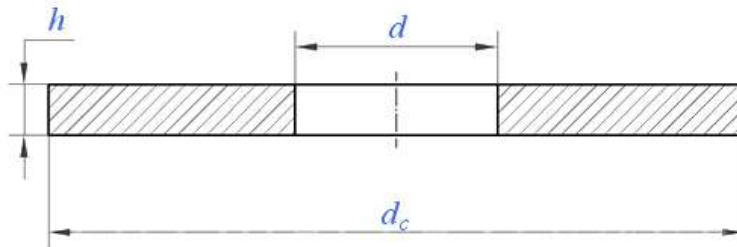
Thread Diameter	d1		d2		NOM	h		Weight Kg/1000pcs
	Min	Max	Max	Min		Min	Max	
M8	8.4	8.62	24.0	23.48	2.00	1.80	2.20	6.230
M10	10.5	10.77	30.0	29.48	2.50	2.30	2.70	12.20
M12	13.0	13.27	37.0	36.38	3.00	2.70	3.30	22.20
M14	15.0	15.27	44.0	43.38	3.00	2.70	3.30	31.60
M16	17.0	17.27	50.0	49.38	3.00	2.70	3.30	40.90
M18	19	19.33	56	55.26	4.00	3.70	4.30	68.40
M20	21	21.33	60.0	59.26	4.00	3.70	4.30	77.90
M24	25	25.52	72.0	70.80	5.00	4.40	5.60	141
M30	33.0	33.62	92.0	90.60	6.00	5.40	6.60	273.0
M36	39.0	39.62	110.0	108.60	8.00	7.00	9.00	520

# EN ISO7094

## ISO 7094 Flat Washer

Washer that is used C product class hexagonal nuts that is up to 6 (including 6) and C product class hexagonal bolt and nuts that are up to 6.8 (including 6.8).

**Material: Steel** (Material choice is of producer choice)



Nominal Diameter	d		dc		h	
	Min	Max	Min	Max	Min	Max
M8	9	9.36	26.7	28	2.4	3.6
M10	11	11.43	32.4	34	2.4	3.6
M12	13.5	13.93	42.4	44	3.4	4.6
M14	15.5	15.93	48.1	50	3.4	4.6
M16	17.5	18.2	54.1	56	4	6
M18	20	20.84	58.1	60	4	6
M20	22	22.84	70.1	72	5	7
M22	24	24.84	78.1	80	5	7
M24	26	26.84	82.8	85	5	7
M27	30	30.84	95.8	98	5	7
M30	33	34	102.8	105	5	7
M33	36	37	112.8	115	6.8	9.2
M36	39	40	122.5	125	6.8	9.2

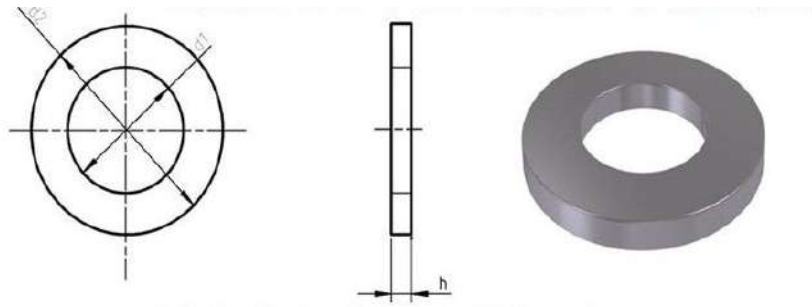
# ASTM F436

## ASTM F436 High Quality Washer

ASTM F436, covers the chemical and mechanical requirements for hardened washers. These heat treated washers are intended for general purpose and construction use.

F436 washers, are suitable to use with various fasteners including B7, B16, L7, A325, A490, A449, A354, A193, A320 and F1554 construction bolts.

**Hardness Class:** 38–45 HRC



Size	d		Nominal Boyut	dc		h		n
	Min	Max		Min	Max	Min	Max	
1/2	0.531	0.5623	1.063	1.0317	1.0943	0.097	0.177	0.438
5/8	0.688	0.7193	1.313	1.2817	1.3443	0.122	0.177	0.547
3/4	0.813	0.8443	1.469	1.4377	1.5003	0.122	0.177	0.656
7/8	0.938	0.9693	1.75	1.7187	1.7813	0.136	0.177	0.766
1	1.125	1.1563	2	1.9687	2.0313	0.136	0.177	0.875
1-1/8	1.25	1.2813	2.25	2.2187	2.2813	0.136	0.177	0.984
1-1/4	1.375	1.4063	2.5	2.4687	2.5313	0.136	0.177	1.094
1-3/8	1.5	1.5313	2.75	2.7187	2.7813	0.136	0.177	1.203
1-1/2	1.625	1.6563	3	2.9687	3.0313	0.136	0.177	1.313

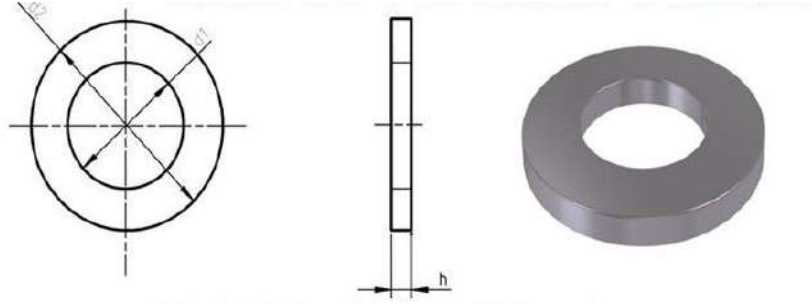
# ASTM F436M

## ASTM F436 High Quality Washer

ASTM F436, covers the chemical and mechanical requirements for hardened washers. These heat treated washers are intended for general purpose and construction use.

F436 washers, are suitable to use with various fasteners including B7, B16, L7, A325, A490, A449, A354, A193, A320 and F1554 construction bolts.

**Hardness Class:** 38-45 HRC



Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Max	Min	Max	Min	Max	Min	
M12	14.40	14.00	27.00	25.70	3.10	4.60	14.70
M14	16.40	16.00	30.00	28.70	3.10	4.60	17.8
M16	18.40	18.00	34.00	32.40	3.10	4.60	19.6
M20	22.50	22.00	42.00	40.40	3.10	4.60	29.4
M22	24.50	24.00	44.00	42.40	3.40	3.60	30.3
M24	26.50	26.00	50.00	48.40	3.40	4.60	43.4
M27	30.50	30.00	56.00	54.10	3.40	4.60	52.6
M30	33.60	33.00	60.00	58.10	3.40	4.60	58.8
M33	36.60	36.00	66.00	64.10	3.40	4.60	70.0
M36	39.60	39.00	72.00	70.10	3.40	4.60	102.4
M39	42.60	42.00	78.00	76.10	3.40	4.60	121.0
M42	45.60	45.00	84.00	81.80	4.60	7.20	150.2
M45	48.60	48.00	90.00	87.80	4.60	7.20	176.7
M48	52.70	52.00	95.00	92.80	4.60	7.20	192.4
M52	56.70	56.00	102.00	99.80	4.60	7.20	210.0
M56	62.70	62.00	107.00	104.80	6.10	8.70	403.0
M64	70.70	70.00	118.00	115.80	6.10	8.70	478.5
M72	78.70	78.00	130.00	127.50	6.10	8.70	573.9
M80	86.90	86.00	142.00	139.50	6.10	8.70	676.2

Thread Diameter	d1		d2		h		Weight Kg/1000pcs
	Max	Min	Max	Min	Max	Min	
M90	96.90	96.00	159.00	156.50	6.10	8.70	851.9
M100	107.90	107.00	176.00	173.50	6.10	8.70	1.036.5

**NOT:** Remaining part of ASTM F436 table.

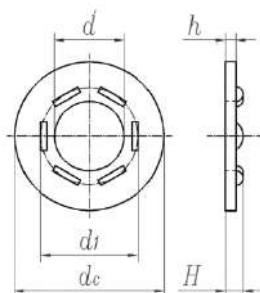


# ASTM F959 DTI

## ASTM F959 DTI

DTI (Direct Tension Indicators), are individual bolt load cells which measures the prestress that occurs during tightening.

**Hardness Class:** 38-45 HRC



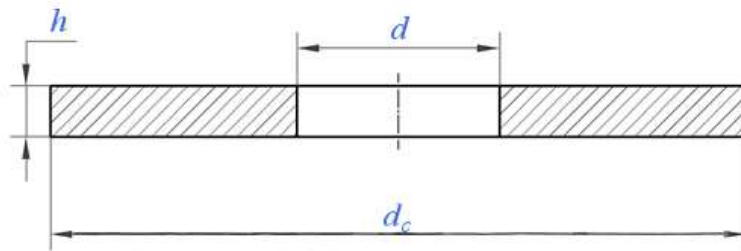
Nominal Diameter	d		dl Protrusion Tangential Diameter	dc				n Number of Protrusions		h		H	
	Min	Max		Tip A325		Tip A490		Tip A325	Tip A490	Tip A325	Tip A490	Max	
			Min	Max	Min	Max	Tip A325					Tip A490	
1/2	0.523	0.527	0.788	1.167	1.187	1.355	1.375	4	5	0.104	0.104	0.180	0.180
5/8	0.654	0.658	0.956	1.355	1.375	1.605	1.625	4	5	0.126	0.126	0.220	0.220
3/4	0.786	0.790	1.125	1.605	1.625	1.730	1.750	5	6	0.126	0.142	0.230	0.240
7/8	0.917	0.921	1.294	1.855	1.875	1.980	2.000	5	6	0.142	0.158	0.240	0.260
1	1.048	1.052	1.463	1.980	2.000	2.230	2.250	6	7	0.158	0.158	0.270	0.270
1-1/8	1.179	1.183	1.631	2.230	2.250	2.480	2.500	6	7	0.158	0.158	0.270	0.280
1-1/4	1.311	1.315	1.800	2.480	2.500	2.730	2.750	7	8	0.158	0.158	0.270	0.280
1-3/4	1.442	1.446	1.969	2.730	2.750	2.980	3.000	7	8	0.158	0.158	0.270	0.280
1-1/2	1.573	1.577	2.138	2.980	3.000	3.230	3.250	8	9	0.158	0.158	0.270	0.280

# DIN 134

## DIN 134 Flat Washer

Generally used in class 8.8 DIN 931 / DIN 933 hex head bolt and class 8 DIN 934 nuts.

**Material:** Steel (Material choice is of producer choice)



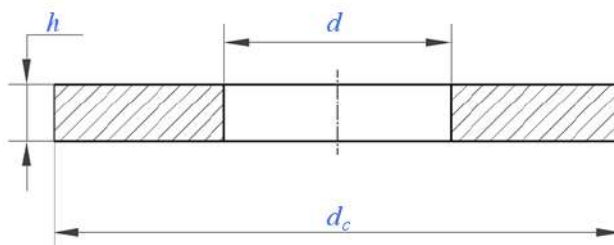
Nominal Diameter	d		dc		Nominal Size	h	
	Min	Max	Min	Max		Min	Max
M8	8.4	8.62	17.57	18	2	1.8	2.2
M10	10.5	10.77	21.48	22	2.5	2.3	2.7
M12	13	13.27	27.48	28	3	2.7	3.3
M14	15	15.27	27.48	28	3	2.7	3.3
M16	17	17.27	33.38	34	3	2.7	3.3
M18	19	19.33	39.38	40	4	3.7	4.3
M20	21	21.33	39.38	40	4	3.7	4.3

# DIN 433-1

## DIN 433-1 Flat Washer

Used in bolts and nuts up to 250 HV of hardness.

**Material:** Steel (Material choice is of producer choice)



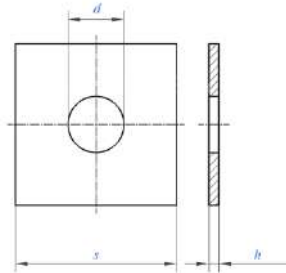
Nominal Thread Diameter	d		dc		NOM	h		Weight Kg/1000pcs
	Min	Max	Min	Max		Min	Max	
M8	8.4	8.62	14.57	15	1.6	1.4	1.8	1.52
M10	10.5	10.77	17.57	18	1.6	1.4	1.8	2.11
M12	13	13.27	19.48	20	2	1.8	2.2	2.85
M14	15	15.27	23.48	24	2.5	2.3	2.7	5.41
M16	17	17.27	27.48	28	2.5	2.3	2.7	7.63
M18	19	19.33	29.48	30	2.5	2.3	2.7	8.31
M20	21	21.33	33.38	34	3	2.7	3.3	13.2
M24	25	25.33	38.38	39	4	3.7	4.3	22.1
M30	31	31.39	49.38	50	4	3.7	4.3	38.0
M36	37	37.62	56.8	58	5	4.4	5.6	61.5

# DIN 436

## DIN 436 Square Washer

Washer used in wooden constructions.

**Material: Steel** (Material choice is of producer choice)



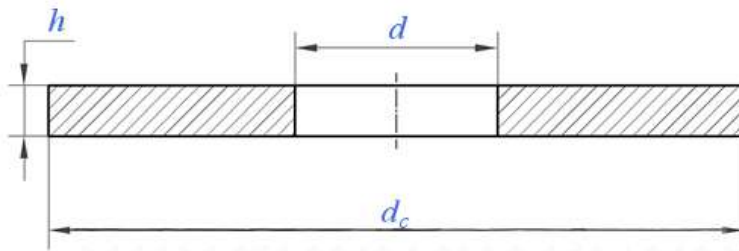
Thread Diameter	d		s		Nominal Size	h		Weight Kg/1000pcs
	Min	Max	Min	Max		Min	Max	
M10	11	11.43	28.7	30	3	2.4	3.6	20
M12	13.5	13.93	38.4	40	4	3.4	4.6	45.7
M16	17.5	18.2	48.4	50	5	4	6	88.7
M20	22	22.84	58.1	60	5	4	6	126
M22	24	24.84	68.1	70	6	5	7	209
M24	26	26.84	78.1	80	6	5	7	275
M27	30	30.84	87.8	90	6	5	7	348
M30	33	34	92.8	95	6	5	7	385
M33	36	37	97.8	100	6	5	7	423
M36	39	40	107.8	110	8	6.8	9.2	685
M39	42	43	122.5	125	8	6.8	9.2	895
M42	45	46	132.5	135	8	6.8	9.2	1050
M45	48	49	137.5	140	8	6.8	9.2	1120
M48	52	53.2	147.5	150	10	8.8	11.2	1600
M52	56	56.2	157.5	160	10	8.8	11.2	1820

# DIN 440

## DIN 440 Flat Washer

Washer that is used C product class hexagonal nuts that is up to 6 (including 6) and C product class hexagonal bolt and nuts that are up to 6.8 (including 6.8)

**Material:** Steel (Material choice is of producer choice)



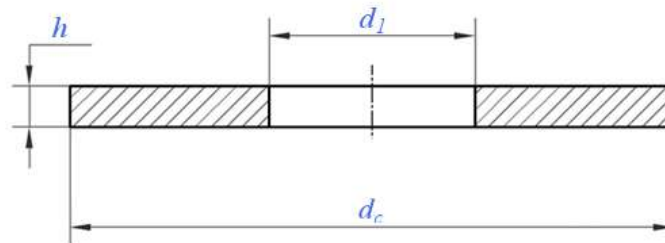
Nominal Thread Diameter	d		dc		Nominal Size	h		Weight Kg/1000pcs
	Max	Min	Max	Min		Max	Min	
M8	9.36	9	28	26.7	3	3.6	2.4	13.0
M10	11.43	11	34	32.4	3	3.6	2.4	19.1
M12	13.93	13.5	44	42.4	4	4.6	3.4	43.3
M14	15.93	15.5	50	48.4	4	4.6	3.4	55.7
M16	18.2	17.5	56	54.1	5	6	4	87.2
M20	22.84	22	72	70.1	6	7	5	174
M22	24.84	24	80	78.1	6	7	5	215
M24	26.84	26	85	82.8	6	7	5	242
M27	30.84	30	98	95.8	6	7	5	322
M30	34	33	105	102.8	6	7	5	368
M33	37	36	112	109.8	6	7	5	416
M36	40	39	125	122.5	8	9.2	6.8	695
M39	43	42	140	137.5	8	9.2	6.8	881
M42	46	45	150	147.5	8	9.2	6.8	1010
M45	49	48	160	157.5	8	9.2	6.8	1150
M48	53.2	52	170	167.5	10	11.2	8.8	1620
M52	57.2	56	180	177.5	10	11.2	8.8	1800

# DIN 1052

## DIN 1052 Chassis Washer

Washer used in wooden constructions.

**Material: Steel** (Material choice is of producer choice)



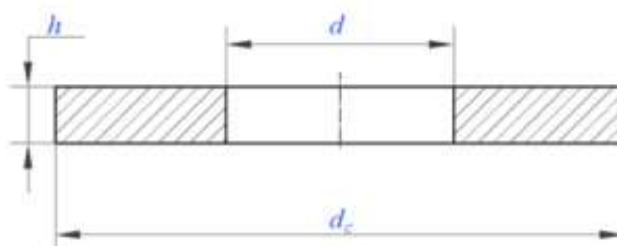
Nominal Thread Diameter	$d_1$	$d_c$	$h$
M12	14	58	6
M16	18	68	6
M20	22	80	8
M22	25	92	8
M24	27	105	8

# DIN 1440

## DIN 1440 Flat Washer

Washer that is used with cotter pins.

**Material:** Material choice is of producer choice.



Nominal Diameter	d		d <sub>c</sub>	h	Weight Kg/1000pcs
	Min	Max			
M8	8	8.09	16	2	2.22
M10	10	10.09	20	2.5	4.56
M12	12	12.11	25	3	8.99
M13	13	13.11	25	3	8.36
M14	14	14.11	28	3	10.8
M16	16	16.11	28	3	9.68
M18	18	18.11	30	4	13.8
M20	20	20.13	32	4	15
M22	22	22.13	34	4	16.2
M23	23	23.13	36	4	18.5
M24	24	24.13	38	4	21.4
M25	25	25.13	40	4	23.6
M26	26	26.13	40	5	28.5
M27	27	27.13	40	5	26.5
M28	28	28.13	42	5	29.7
M30	30	30.13	45	5	34.2
M32	32	32.16	50	5	44.8
M33	33	33.16	50	5	43.3
M35	35	35.16	52	6	52.8
M36	36	36.16	52	6	49.5

Nominal Diameter	d		dc	h	Weight Kg/1000pcs
	Min	Max			
M40	40	40.16	58	6	63.7
M45	45	45.16	62	7	76.8
M50	50	50.16	68	8	101
M55	55	55.19	75	9	141
M60	60	60.19	80	9	151
M65	65	65.19	90	9	211
M70	70	70.19	95	10	250
M75	75	75.19	100	10	265
M80	80	80.19	110	12	313
M85	85	85.22	110	12	371
M90	90	90.22	115	12	370
M95	95	95.22	120	12	387
M100	100	100.22	125	14	472

**NOT:** Remaining part of DIN 1440 table.

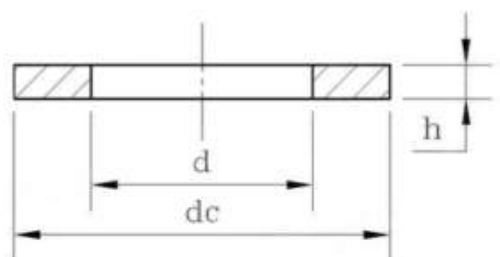


# DIN 1441

## DIN 1441 Flat Washer

Washer that is used with cotter pins.

**Material:** Material choice is of producer choice.



For Bolt Diameter	Nominal Diameter	dc	h	Weight
M8	9	16	2	2.16
M10	11	20	2.5	4.3
M12	13	25	3	8.43
M13	14	25	3	7.94
M14	15	28	3	10.3
M16	17	28	3	9.16
M18	19	30	4	13.3
M20	21	32	4	14.4
M22	23	34	4	15.5
M23	24	36	4	17.8
M24	25	38	4	20
M25	26	40	4	22.8
M26	27	40	5	26.9
M27	28	40	5	25
M28	29	42	5	28.5
M30	31	45	5	32.8
M32 - 33	34	50	5	43.5
M35 - 36	37	52	6	49.4

For Bolt Diameter	Nominal Diameter	dc	h	Weight
M40	41	58	6	59.2
M45	46	62	7	70.6
M50	51	68	8	94.7
M55	56	75	9	138
M60	62	80	9	142
M65	68	90	9	193
M70	72	95	10	237
M75	78	100	10	241
M80	82	110	12	398
M85	86	110	12	348
M90	92	115	12	352
M95	98	120	12	355
M100	102	125	14	451

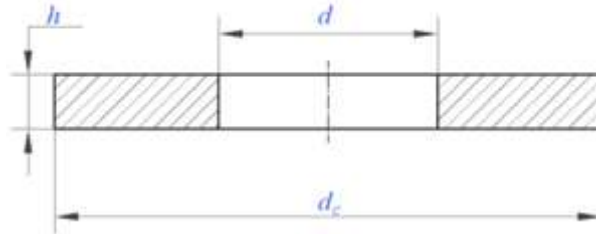
**NOT:** Remaining part of DIN 1441 table.

# DIN 8738

## DIN 8738 Flat Washer

Washer that is used with cotter pins.

**Material:** Material choice is of producer choice.



Nominal Diameter	d		dc		Nominal Size	h	
	Min	Max	Min	Max		Min	Max
M8	8	8.22	14.57	15	2	1.8	2.2
M10	10	10.22	17.57	18	2.5	2.3	2.7
M12	12	12.27	19.48	20	3	2.7	3.3
M14	14	14.27	21.48	22	3	2.7	3.3
M16	16	16.27	23.48	24	3	2.7	3.3
M18	18	18.27	27.48	28	4	3.7	4.3
M20	20	20.33	29.48	30	4	3.7	4.3
M22	22	22.33	33.38	34	4	3.7	4.3
M24	24	24.33	36.38	37	4	3.7	4.3
M27	27	27.52	38	39	5	4.4	5.6
M30	30	30.52	43	44	5	4.4	5.6
M33	33	33.62	46	47	5	4.4	5.6
M36	36	36.62	49	50	6	5.4	6.6
M40	40	40.62	54.8	56	6	5.4	6.6
M45	45	45.62	58.8	60	6	5.4	6.6
M50	50	50.62	64.8	66	8	7	9
M55	55	55.74	70.8	72	8	7	9
M60	60	60.74	76.8	78	10	9	11
M70	70	70.74	90.6	92	10	9	11

Nominal Diameter	d		dc		Nominal Size	h	
	Min	Max	Min	Max		Min	Max
M80	80	80.74	96.6	98	12	10.8	13.2
M90	90	90.87	108.6	110	12	10.8	13.2
M100	100	100.87	118.6	120	12	10.8	13.2

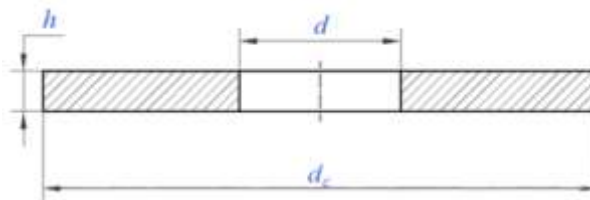
**NOT:** Remaining part of DIN 8738 table.

# BS3410

## BS3410 Flat Washer

Used in bolts and nuts up to 250 HV of hardness.

**Material:** Steel (Material choice is of producer choice)



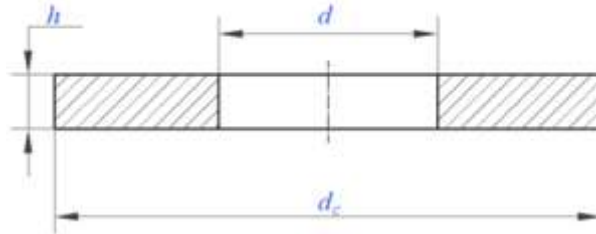
Nominal Thread Diameter	d 0, +1/32	dc	h
1/2	9/16	1-1/4	0.104
9/16	5/8	1-3/8	0.128
5/8	11/16	1-1/2	0.128
3/4	13/16	1-3/4	0.144
7/8	15/16	2	0.16
1	1-1/16	2-1/4	0.176
1-1/8	1-3/16	2-1/2	0.176
1-1/4	1-3/8	2-3/4	0.192
1-3/8	1-1/2	3	0.192
1-1/2	1-5/8	3-1/4	0.192
1-5/8	1-3/4	3-1/2	0.212
1-3/4	1-7/8	3-3/4	0.212
1-7/8	2	4	0.212
2	2-1/8	4-1/4	0.212

# BS4320

## BS4320 Flat Washer

Generally used in class 8.8 DIN 931 / DIN 933 hex head bolt and class 8 DIN 934 nuts.

**Material:** Steel (Material choice is of producer choice)



Size	d			dc			h		
	Nominal Size	Min	Max	Nominal Size	Min	Max	Nominal Size	Min	Max
M8	9	9.0	9.4	17	16.2	17	1.6	1.3	1.9
M10	11	11.0	11.5	21	20.2	21	2.0	1.7	2.3
M12	14	14	14.5	24	23.2	24	2.5	2.2	2.8
M14	16	16	16.5	28	27.2	28	2.5	2.2	2.8
M16	18	18	18.5	30	29.2	30	3.0	2.4	3.6
M18	20	20	20.6	34	32.8	34	3.0	2.4	3.6
M20	22	22	22.6	37	35.8	37	3.0	2.4	3.6
M22	24	24	24.6	39	37.8	39	3.0	2.4	3.6
M24	26	26	26.6	44	42.8	44	4	3.4	4.6
M27	30	30	30.6	50	48.8	50	4	3.4	4.6
M30	33	33	33.8	56	54.5	56	4	3.4	4.6
M33	36	36	36.8	60	58.5	60	5	4.0	6.0
M36	39	39	39.8	66	64.5	66	5	4.0	6.0
M39	42	42	42.8	72	70.5	72	6	5.0	7.0
M42	45	45	45.8	78	76.5	78	7	5.8	8.2
M45	48	48	48.8	85	83	85	7	5.8	8.2
M48	52	52	53	92	90	92	8	6.8	9.2
M52	56	56	57	98	96	98	8	6.8	9.2
M56	62	62	63	105	103	105	9	7.8	10.2
M60	66	66	67	110	108	110	9	7.8	10.2

Size	d			dc			h		
	Nominal Size	Min	Max	Nominal Size	Min	Max	Nominal Size	Min	Max
M64	70	70	71	115	113	115	9	7.8	10.2
M68	74	74	75	120	118	120	10	8.8	11.2

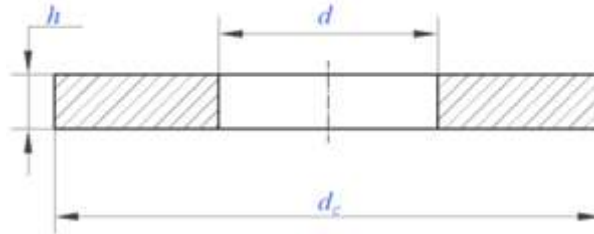
**NOT:** Remaining part of BS4320 table.

# NFE25513

## NFE25513- Flat Washer

Generally used in class 8.8 DIN 931 / DIN 933 hex head bolt and class 8 DIN 934 nuts.

**Material: Steel** (Material choice is of producer choice)



Nominal Diameter	d		dc		Nominal Size	h		Weight kg/pcs
	Min	Max	Min	Max		Min	Max	
M8	8.40	8.62	21.48	22	1.50	1.35	1.65	3.82
M10	10.50	10.77	26.48	27	2.00	1.80	2.20	7.62
M12	13.00	13.27	31.38	32	2.50	2.25	2.75	13.1
M14	15.00	15.27	35.38	36	2.50	2.25	2.75	16.5
M16	17.00	17.27	39.38	40	3.00	2.70	3.30	24.2
M18	19.00	19.33	44.38	45	3.00	2.70	3.30	30.7
M20	21.00	21.33	49.38	50	3.00	2.70	3.30	38
M22	23.00	23.33	54.26	55	3.00	2.70	3.30	46.1
M24	25.00	25.33	59.26	60	4.00	3.60	4.40	73.3
M27	28.00	28.33	64.26	65	4.00	3.60	4.40	84.8
M30	31.00	31.39	69.26	70	4.00	3.60	4.40	97.1



## **Custom Washer**

We provide washer production compatible with technical drawing and specifications having an outer diameter between 13mm and 250mm. According to our clients' demands, we produce washers from high quality materials and test them delicately. We provide quick and effective solutions with our wide range of products and flexible production process. Each of our products are designed and produced delicately to meet our clients' expectations.

As your trusted business partner, we are at your service with us valuing customer satisfaction and product quality.

Technical properties of custom sized washers are defined by buyer.