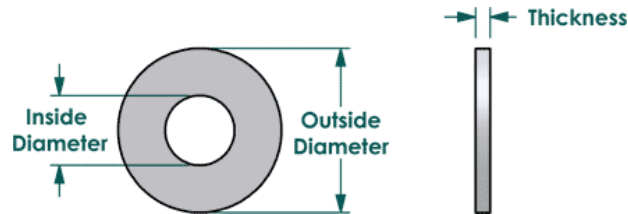


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SAE Flat Washers – Inch Series

1.0 Dimensions: As Per ASME B18.21.1 Type A Narrow



Nominal Washer Size	Inside Diameter (ID)			Outside Diameter (OD)			Thickness		
	Basic	Max	Min	Basic	Max	Min	Basic	Max	Min
#2	0.094	0.094	0.089	0.250	0.250	0.245	0.020	0.025	0.016
#4	0.125	0.133	0.120	0.312	0.320	0.307	0.032	0.040	0.025
#6	0.156	0.164	0.151	0.375	0.390	0.370	0.049	0.065	0.036
# 8	0.188	0.196	0.183	0.438	0.453	0.433	0.049	0.065	0.036
#10	0.219	0.227	0.214	0.500	0.515	0.495	0.049	0.065	0.036
3/16	0.250	0.265	0.245	0.562	0.577	0.557	0.049	0.065	0.036
# 12	0.250	0.265	0.245	0.562	0.577	0.557	0.065	0.080	0.051
1/4	0.281	0.296	0.276	0.625	0.640	0.620	0.065	0.080	0.051
5/16	0.344	0.359	0.339	0.688	0.703	0.681	0.065	0.080	0.051
3/8	0.406	0.421	0.401	0.812	0.827	0.805	0.065	0.080	0.051
7/16	0.469	0.484	0.464	0.922	0.937	0.915	0.065	0.080	0.051
1/2	0.531	0.546	0.526	1.062	1.092	1.055	0.095	0.121	0.074
9/16	0.594	0.609	0.589	1.156	1.186	1.149	0.095	0.121	0.074
5/8	0.656	0.686	0.649	1.312	1.342	1.305	0.095	0.121	0.074
3/4	0.812	0.842	0.805	1.469	1.499	1.462	0.134	0.160	0.108
7/8	0.938	0.968	0.931	1.750	1.780	1.743	0.134	0.160	0.108
1	1.062	1.092	1.055	2.000	2.030	1.993	0.134	0.160	0.108
1-1/8	1.250	1.280	1.243	2.250	2.280	2.243	0.134	0.160	0.108
1-1/4	1.375	1.405	1.368	2.500	2.530	2.493	0.165	0.192	0.136
1-3/8	1.500	1.530	1.493	2.750	2.780	2.743	0.165	0.192	0.136
1-1/2	1.625	1.655	1.618	3.000	3.030	2.993	0.165	0.192	0.136

Notes :

- 1) Type A Narrow is called SAE Washers and Type A Wide is called USS washers.
- 2) ASME B18.21.1 does not provide the dimensions separately for SAE & USS washers (Type A Narrow & Type A Wide) for sizes less than 1/4 " and above 1 -1/2". It provides only one dimensions for these sizes, without mentioning whether it is SAE (Type A Narrow) or USS (Type A Wide). BBI is following the industry convention of all smaller sizes # 2 to # 12 being designated only as SAE washers and bigger sizes 1 5/8 to 3 " only as USS washers.

Disclaimer: The above is a compilation of data, from various industry standards. BBI has taken every effort to present the data accurately. However BBI cannot be held liable for any claim traceable to any errors typographical or otherwise contained herein.



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SAE Flat Washers – Inch Series

2.0 Mechanical Properties:

2.1 Steel: SAE steel washers are available in unhardened (non-heat treated) and hardened (heat treated) conditions.

2.2 Unhardened SAE steel washers: No mechanical properties are required to be met by unhardened USS washers. No marking required (as washers with any marking will be mistaken as hardened washers. See Section 2.3 below). Material or lot traceability are not required, as they are mostly manufactured from scrap material.

2.3 Hardened SAE steel washers: Mechanical properties as per ASTM F436. Hardness 38 to 45 HRC, except for hot dip galvanized washers the hardness is maintained at 26 to 45 HRC. Washers have to be marked without fail. Marking can be any symbol or any distinguishing mark to identify the manufacturer or private label distributor as appropriate. Marking should be depressed on one side of the washer.

3.0 Surface Finish:

Properties	Zinc	Zinc Yellow	Hot Dip Galvanized
Type	Trivalent (Cr+3)	Hexavalent (Cr+6)	RoHS Compliant
Color	Clear	Yellow	
Minimum Coating Thickness	0.0001"/3 Microns or 0.0002"/5 Microns	0.0001"/3 Microns or 0.0002"/5 Microns	Washers under 3/16 inch in thickness : minimum 0.0017" (43 microns) and washers 3/16 inch & 1/4 inch thickness minimum 0.0020" (50 microns)
Specification	ASTM F1941/F1941M Fe/Zn 3AN or Fe/Zn 5AN ASTM B633 SC1 (0.0002" or 5 microns) Type III	ASTM F1941/F1941M Fe/Zn 3C or Fe/Zn 5C ASTM B633 SC1 (0.0002" or 5 microns) Type II	ASTM F2329/F2329M or ASTM A153/A153M