



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 1 of 13

1. SCOPE

Washers described in this standard are intended for use under high clamping loads to minimize embedding, and to aid in torquing.

2. CONTENTS

TABLE 1: General Dimensions Flat Washers (ANSI Type A)

TABLE 2: General Dimensions Additional Selected Washer Sizes (ANSI Type A)

TABLE 3: General Dimensions Flat Washers (ANSI Type B)

TABLE 4: ANSI Standard Hardened Flat Washers

TABLE 5: Non-ANSI Standard Hardened Flat Washers

3. GENERAL

Washers covered by this standard are normally referred to as "thru hardened" washers as contrasted to the case hardened variety. This standard shall meet the requirements of ANSI B18.22.1 for material and general requirements unless otherwise specified. The washers listed in TABLE 5 are non-standard sizes used only for special applications. These washers will be used only when standard washers do not satisfy design requirements.

4. RELATED DOCUMENTS

4.1 RELATED STANDARDS

ANSI B18.22.1—Plain Washers

MAT0310—Zinc Plating

MAT1017—Spec, Med Carbon And Alloy Steel Hot Rolled Plate

MAT1027—Spec, High Carbon Steel, Cold Rolled Sheet

MAT4050—Spec Quenching And Tempering

STPA020—Fastener Finishes and Material Specifications

4.2 REPLACED DOCUMENTS

Case F-008—Flat Washers – Hardened (General Specifications)

Case F-009—Flat Washers Hardened – Preferred

Case F-010—Flat Washers Hardened – Non Preferred

Case F-011—Flat Washers – Hardened - Non Designated – Non Preferred

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Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 2 of 13

5. REQUIREMENTS

5.1 MATERIAL

Hardened steel washers (HTS) per CNH MAT1027 Grade A through harden and tempered per CNH MAT4050 to 36-42 HRC.

Alternate Material: CNH MAT1017 Grade A or Grade B through harden and tempered per CNH MAT4050 to 36-42 HRC.

Hardened washers will have a Rockwell C hardness of 45-53 if made from coiled product and hardness of 38-45 if stamped as defined in ANSI B18.22.1.

5.2 FINISH

Flat washers will be furnished in accordance with STPA020.

6. CROSS REFERENCE

For cross reference listing of company part numbers, go to [PARTsolutions](#).

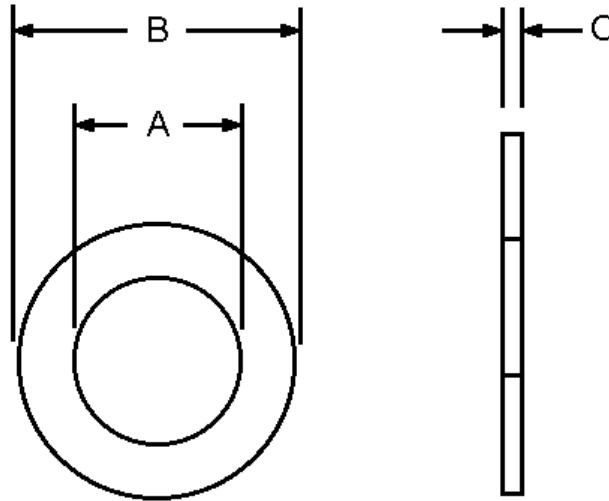


TABLE 1: General Dimensions Flat Washers (ANSI Type A)

Nominal Bolt Size	Series	Inside Diameter A			Outside Diameter B			Thickness C		
		Nominal	Tolerance		Nominal	Tolerance		Nominal	Max	Min
			Plus	Minus		Plus	Minus			
-	-	0.078	0.000	0.005	0.188	0.000	0.005	0.020	0.025	0.016
-	-	0.094	0.000	0.005	0.250	0.000	0.005	0.020	0.025	0.016
-	-	0.125	0.008	0.005	0.312	0.008	0.005	0.032	0.040	0.025
0.138		0.156	0.008	0.005	0.375	0.015	0.005	0.049	0.065	0.036
0.164		0.188	0.008	0.005	0.438	0.015	0.005	0.049	0.065	0.036
0.190		0.219	0.008	0.005	0.500	0.015	0.005	0.049	0.065	0.036
0.188		0.250	0.015	0.005	0.562	0.015	0.005	0.049	0.065	0.036
0.216		0.250	0.015	0.005	0.562	0.015	0.005	0.065	0.080	0.051
0.250	Narrow	0.281	0.015	0.005	0.625	0.015	0.005	0.065	0.080	0.051
0.250	Wide	0.312	0.015	0.005	0.734	0.015	0.007	0.065	0.080	0.051
0.312	Narrow	0.344	0.015	0.005	0.688	0.015	0.007	0.065	0.080	0.051
0.312	Wide	0.375	0.015	0.005	0.875	0.030	0.007	0.083	0.104	0.064
0.375	Narrow	0.406	0.015	0.005	0.812	0.015	0.007	0.065	0.080	0.051
0.375	Wide	0.438	0.015	0.005	1.000	0.030	0.007	0.083	0.104	0.064
0.438	Narrow	0.469	0.015	0.005	0.922	0.015	0.007	0.065	0.080	0.051
0.438	Wide	0.500	0.015	0.005	1.250	0.030	0.007	0.083	0.104	0.064
0.500	Narrow	0.531	0.015	0.005	1.062	0.030	0.007	0.095	0.121	0.074
0.500	Wide	0.562	0.015	0.005	1.375	0.030	0.007	0.109	0.132	0.086
0.562	Narrow	0.594	0.015	0.005	1.156	0.030	0.007	0.095	0.121	0.074
0.562	Wide	0.625	0.015	0.005	1.469	0.030	0.007	0.109	0.132	0.086
0.625	Narrow	0.656	0.030	0.007	1.312	0.030	0.007	0.095	0.121	0.074
0.625	Wide	0.688	0.030	0.007	1.750	0.030	0.007	0.134	0.160	0.108
0.750	Narrow	0.812	0.030	0.007	1.469	0.030	0.007	0.134	0.160	0.108
0.750	Wide	0.812	0.030	0.007	2.000	0.030	0.007	0.148	0.177	0.122



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 4 of 13

TABLE 1: General Dimensions Flat Washers (ANSI Type A) (Continued)

Nominal Bolt Size	Series	Inside Diameter A			Outside Diameter B			Thickness C		
		Nominal	Tolerance		Nominal	Tolerance		Nominal	Max	Min
			Plus	Minus		Plus	Minus			
0.875	Narrow	0.938	0.030	0.007	1.750	0.030	0.007	0.134	0.160	0.108
0.875	Wide	0.938	0.030	0.007	2.250	0.030	0.007	0.165	0.192	0.136
1.000	Narrow	1.062	0.030	0.007	2.000	0.030	0.007	0.134	0.160	0.108
1.000	Wide	1.062	0.030	0.007	2.500	0.030	0.007	0.165	0.192	0.136
1.125	Narrow	1.250	0.030	0.007	2.250	0.030	0.007	0.134	0.160	0.108
1.125	Wide	1.250	0.030	0.007	2.750	0.030	0.007	0.165	0.192	0.136
1.250	Narrow	1.375	0.030	0.007	2.500	0.030	0.007	0.165	0.192	0.136
1.250	Wide	1.375	0.030	0.007	3.000	0.030	0.007	0.165	0.192	0.136
1.375	Narrow	1.500	0.030	0.007	2.750	0.030	0.007	0.165	0.192	0.136
1.375	Wide	1.500	0.045	0.010	3.250	0.045	0.010	0.180	0.213	0.153
1.500	Narrow	1.625	0.030	0.007	3.000	0.030	0.007	0.165	0.192	0.136
1.500	Wide	1.625	0.045	0.010	3.500	0.045	0.010	0.180	0.213	0.153
1.625		1.750	0.045	0.010	3.750	0.045	0.010	0.180	0.213	0.153
1.750		1.875	0.045	0.010	4.000	0.045	0.010	0.180	0.213	0.153
1.750		2.000	0.045	0.010	4.250	0.045	0.010	0.180	0.213	0.153
2.000		2.125	0.045	0.010	4.500	0.045	0.010	0.180	0.213	0.153
2.250		2.375	0.045	0.010	4.750	0.045	0.010	0.220	0.248	0.193
2.500		2.625	0.045	0.010	5.000	0.045	0.010	0.238	0.280	0.210
2.750		2.875	0.065	0.010	5.250	0.065	0.010	0.259	0.310	0.228
3.000		3.125	0.065	0.010	5.500	0.065	0.010	0.284	0.327	0.249



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 5 of 13

TABLE 1: General Dimensions Additional Selected Washer Sizes (ANSI Type A)

Inside Diameter A			Outside Diameter B			Thickness C		
Nominal	Tolerance		Nominal	Tolerance		Nominal	Max	Min
	Plus	Minus		Plus	Minus			
0.094	0.000	0.005	0.219	0.000	0.005	0.020	0.025	0.016
0.125	0.000	0.005	0.250	0.000	0.005	0.022	0.028	0.017
0.156	0.008	0.005	0.312	0.008	0.005	0.035	0.048	0.027
0.172	0.008	0.005	0.406	0.015	0.005	0.049	0.065	0.036
0.188	0.008	0.005	0.375	0.015	0.005	0.049	0.065	0.036
0.203	0.008	0.005	0.469	0.015	0.005	0.049	0.065	0.036
0.219	0.008	0.005	0.438	0.015	0.005	0.049	0.065	0.036
0.234	0.008	0.005	0.531	0.015	0.005	0.049	0.065	0.036
0.250	0.015	0.005	0.500	0.015	0.005	0.049	0.065	0.036
0.266	0.015	0.005	0.625	0.015	0.005	0.049	0.065	0.036
0.312	0.015	0.005	0.875	0.015	0.007	0.065	0.080	0.051
0.375	0.015	0.005	0.734	0.015	0.007	0.065	0.080	0.051
0.375	0.015	0.005	1.125	0.015	0.007	0.065	0.080	0.051
0.438	0.015	0.005	0.875	0.030	0.007	0.083	0.104	0.064
0.438	0.015	0.005	1.375	0.030	0.007	0.083	0.104	0.064
0.500	0.015	0.005	1.125	0.030	0.007	0.083	0.104	0.064
0.500	0.015	0.005	1.625	0.030	0.007	0.083	0.104	0.064
0.562	0.015	0.005	1.250	0.030	0.007	0.109	0.132	0.086
0.562	0.015	0.005	1.875	0.030	0.007	0.109	0.132	0.086
0.625	0.015	0.005	1.375	0.030	0.007	0.109	0.132	0.086
0.625	0.015	0.005	2.125	0.030	0.007	0.134	0.160	0.108
0.688	0.030	0.007	1.469	0.030	0.007	0.134	0.160	0.108
0.688	0.030	0.007	2.375	0.030	0.007	0.165	0.192	0.136
0.812	0.030	0.007	1.750	0.030	0.007	0.148	0.177	0.122
0.812	0.030	0.007	2.875	0.030	0.007	0.165	0.192	0.136
0.938	0.030	0.007	2.000	0.030	0.007	0.165	0.192	0.136
0.938	0.030	0.007	3.375	0.045	0.010	0.180	0.213	0.153
1.062	0.030	0.007	2.250	0.030	0.007	0.165	0.192	0.136
1.062	0.045	0.010	3.875	0.045	0.010	0.238	0.280	0.210
1.250	0.030	0.007	2.500	0.030	0.007	0.165	0.192	0.136
1.375	0.030	0.007	2.750	0.030	0.007	0.165	0.192	0.136
1.500	0.045	0.010	3.000	0.045	0.010	0.180	0.213	0.153
1.625	0.045	0.010	3.250	0.045	0.010	0.180	0.213	0.153
1.688	0.045	0.010	3.500	0.045	0.010	0.180	0.213	0.153
1.812	0.045	0.010	3.750	0.045	0.010	0.180	0.213	0.153
1.938	0.045	0.010	4.000	0.045	0.010	0.180	0.213	0.153
2.062	0.045	0.010	4.250	0.045	0.010	0.180	0.213	0.153



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 6 of 13

TABLE 2: General Dimensions Flat Washers (ANSI Type B)

Nominal Bolt Size	Series	Inside Diameter A			Outside Diameter B			Thickness C		
		Nominal	Tolerance		Nominal	Tolerance		Nominal	Max	Min
			Plus	Minus		Plus	Minus			
#0 (0.060)	Narrow	0.068	0.000	0.005	0.125	0.000	0.005	0.025	0.028	0.022
	Regular	0.068	0.000	0.005	0.188	0.000	0.005	0.025	0.028	0.022
	Wide	0.068	0.000	0.005	0.250	0.000	0.005	0.025	0.028	0.022
#1 (0.073)	Narrow	0.084	0.000	0.005	0.156	0.000	0.005	0.025	0.028	0.022
	Regular	0.084	0.000	0.005	0.219	0.000	0.005	0.025	0.028	0.022
	Wide	0.084	0.000	0.005	0.281	0.000	0.005	0.032	0.036	0.028
#2 (0.086)	Narrow	0.094	0.000	0.005	0.188	0.000	0.005	0.025	0.028	0.022
	Regular	0.094	0.000	0.005	0.250	0.000	0.005	0.032	0.036	0.028
	Wide	0.094	0.000	0.005	0.344	0.000	0.005	0.032	0.036	0.028
#3 (0.099)	Narrow	0.109	0.000	0.005	0.219	0.000	0.005	0.025	0.028	0.022
	Regular	0.109	0.000	0.005	0.312	0.000	0.005	0.032	0.036	0.028
	Wide	0.109	0.008	0.005	0.406	0.008	0.005	0.040	0.045	0.036
#4 (0.112)	Narrow	0.125	0.000	0.005	0.250	0.000	0.005	0.032	0.036	0.028
	Regular	0.125	0.008	0.005	0.375	0.008	0.005	0.040	0.045	0.036
	Wide	0.125	0.008	0.005	0.438	0.008	0.005	0.040	0.045	0.036
#5 (0.125)	Narrow	0.141	0.000	0.005	0.281	0.000	0.005	0.032	0.036	0.028
	Regular	0.141	0.008	0.005	0.406	0.008	0.005	0.040	0.045	0.036
	Wide	0.141	0.008	0.005	0.500	0.008	0.005	0.040	0.045	0.036
#6 (0.138)	Narrow	0.156	0.000	0.005	0.312	0.000	0.005	0.032	0.036	0.028
	Regular	0.156	0.008	0.005	0.438	0.008	0.005	0.040	0.045	0.036
	Wide	0.156	0.008	0.005	0.562	0.008	0.005	0.040	0.045	0.036
#8 (0.164)	Narrow	0.188	0.008	0.005	0.375	0.008	0.005	0.040	0.045	0.036
	Regular	0.188	0.008	0.005	0.500	0.008	0.005	0.040	0.045	0.036
	Wide	0.188	0.008	0.005	0.625	0.015	0.005	0.063	0.071	0.056
#10 (0.190)	Narrow	0.203	0.008	0.005	0.406	0.008	0.005	0.040	0.045	0.036
	Regular	0.203	0.008	0.005	0.562	0.008	0.005	0.040	0.045	0.036
	Wide	0.203	0.008	0.005	0.734	0.015	0.007	0.063	0.071	0.056
#12 (0.216)	Narrow	0.234	0.008	0.005	0.438	0.008	0.005	0.040	0.045	0.036
	Regular	0.234	0.008	0.005	0.625	0.015	0.005	0.063	0.071	0.056
	Wide	0.234	0.008	0.005	0.875	0.015	0.007	0.063	0.071	0.056
1/4 (0.250)	Narrow	0.281	0.015	0.005	0.500	0.015	0.005	0.063	0.071	0.056
	Regular	0.281	0.015	0.005	0.734	0.015	0.007	0.063	0.071	0.056
	Wide	0.281	0.015	0.005	1.000	0.015	0.007	0.063	0.071	0.056
5/16 (0.312)	Narrow	0.344	0.015	0.005	0.625	0.015	0.005	0.063	0.071	0.056
	Regular	0.344	0.015	0.005	0.875	0.015	0.007	0.063	0.071	0.056
	Wide	0.344	0.015	0.005	1.125	0.015	0.007	0.063	0.071	0.056



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 7 of 13

TABLE 3: General Dimensions Flat Washers (ANSI Type B) (Continued)

Nominal Bolt Size	Series	Inside Diameter A			Outside Diameter B			Thickness C		
		Nomin al	Tolerance		Nominal	Tolerance		Nominal	Max	Min
			Plus	Minus		Plus	Minus			
3/8 (0.375)	Narrow	0.406	0.015	0.005	0.734	0.015	0.007	0.063	0.071	0.056
	Regular	0.406	0.015	0.005	1.000	0.015	0.007	0.063	0.071	0.056
	Wide	0.406	0.015	0.005	1.250	0.030	0.007	0.100	0.112	0.090
7/16 (0.4375)	Narrow	0.469	0.015	0.005	0.875	0.015	0.007	0.063	0.071	0.056
	Regular	0.469	0.015	0.005	1.125	0.015	0.007	0.063	0.071	0.056
	Wide	0.469	0.015	0.005	1.469	0.030	0.007	0.100	0.112	0.090
1/2 (0.500)	Narrow	0.531	0.015	0.005	1.000	0.015	0.007	0.063	0.071	0.056
	Regular	0.531	0.015	0.005	1.250	0.030	0.007	0.100	0.112	0.090
	Wide	0.531	0.015	0.005	1.750	0.030	0.007	0.100	0.112	0.090
9/16 (0.562)	Narrow	0.594	0.015	0.005	1.125	0.015	0.007	0.063	0.071	0.056
	Regular	0.594	0.015	0.005	1.469	0.030	0.007	0.100	0.112	0.090
	Wide	0.594	0.015	0.005	2.000	0.030	0.007	0.100	0.112	0.090
5/8 (0.625)	Narrow	0.656	0.030	0.007	1.250	0.030	0.007	0.100	0.112	0.090
	Regular	0.656	0.030	0.007	1.750	0.030	0.007	0.100	0.112	0.090
	Wide	0.656	0.030	0.007	2.250	0.030	0.007	0.160	0.174	0.146
3/4 (0.750)	Narrow	0.812	0.030	0.007	1.375	0.030	0.007	0.100	0.112	0.090
	Regular	0.812	0.030	0.007	2.000	0.030	0.007	0.100	0.112	0.090
	Wide	0.812	0.030	0.007	2.500	0.030	0.007	0.160	0.174	0.146
7/8 (0.875)	Narrow	0.938	0.030	0.007	1.469	0.030	0.007	0.100	0.112	0.090
	Regular	0.938	0.030	0.007	2.250	0.030	0.007	0.160	0.174	0.146
	Wide	0.938	0.030	0.007	2.750	0.030	0.007	0.160	0.174	0.146
1 (1.000)	Narrow	1.062	0.030	0.007	1.750	0.030	0.007	0.100	0.112	0.090
	Regular	1.062	0.030	0.007	2.500	0.030	0.007	0.160	0.174	0.146
	Wide	1.062	0.030	0.007	3.000	0.030	0.007	0.160	0.174	0.146
1-1/8 (1.125)	Narrow	1.188	0.030	0.007	2.000	0.030	0.007	0.100	0.112	0.090
	Regular	1.188	0.030	0.007	2.750	0.030	0.007	0.160	0.174	0.146
	Wide	1.188	0.030	0.007	3.250	0.030	0.007	0.160	0.174	0.146
1-1/4 (1.250)	Narrow	1.312	0.030	0.007	2.250	0.030	0.007	0.160	0.174	0.146
	Regular	1.312	0.030	0.007	3.000	0.030	0.007	0.160	0.174	0.146
	Wide	1.312	0.030	0.010	3.500	0.045	0.010	0.250	0.266	0.234
1-3/8 (1.375)	Narrow	1.438	0.030	0.007	2.500	0.030	0.007	0.160	0.174	0.146
	Regular	1.438	0.030	0.007	3.250	0.030	0.007	0.160	0.174	0.146
	Wide	1.438	0.045	0.010	3.750	0.045	0.010	0.250	0.266	0.234



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 8 of 13

TABLE 3: General Dimensions Flat Washers (ANSI Type B) (Continued)

Nominal Bolt Size	Series	Inside Diameter A			Outside Diameter B			Thickness C		
		Nominal	Tolerance		Nominal	Tolerance		Nominal	Max	Min
			Plus	Minus		Plus	Minus			
1-1/2 (1.500)	Narrow Regular Wide	1.562	0.030	0.007	2.750	0.030	0.007	0.160	0.174	0.146
		1.562	0.045	0.010	3.500	0.045	0.010	0.250	0.266	0.234
		1.562	0.045	0.010	4.000	0.045	0.010	0.250	0.266	0.234
1-5/8 (1.625)	Narrow Regular Wide	1.750	0.030	0.007	3.000	0.030	0.007	0.160	0.174	0.146
		1.750	0.045	0.010	3.750	0.045	0.010	0.250	0.266	0.234
		1.750	0.045	0.010	4.250	0.045	0.010	0.250	0.266	0.234
1-3/4 (1.750)	Narrow Regular Wide	1.875	0.030	0.007	3.250	0.030	0.007	0.160	0.174	0.146
		1.875	0.045	0.010	4.000	0.045	0.010	0.250	0.266	0.234
		1.875	0.045	0.010	4.500	0.045	0.010	0.250	0.266	0.234
1-7/8 (1.875)	Narrow Regular Wide	2.000	0.045	0.010	3.500	0.045	0.010	0.250	0.266	0.234
		2.000	0.045	0.010	4.250	0.045	0.010	0.250	0.266	0.234
		2.000	0.045	0.010	4.750	0.045	0.010	0.250	0.266	0.234
2 (2.000)	Narrow Regular Wide	2.125	0.045	0.010	3.750	0.045	0.010	0.250	0.266	0.234
		2.125	0.045	0.010	4.500	0.045	0.010	0.250	0.266	0.234
		2.125	0.045	0.010	5.000	0.045	0.010	0.250	0.266	0.234
2-1/4 (2.250)	Narrow Regular Wide	2.375	0.045	0.010	4.000	0.045	0.010	0.250	0.266	0.234
		2.375	0.045	0.010	5.000	0.045	0.010	0.250	0.266	0.234
		2.375	0.065	0.010	5.500	0.065	0.010	0.375	0.393	0.357
2-1/2 (2.500)	Narrow Regular Wide	2.625	0.045	0.010	4.500	0.045	0.010	0.250	0.266	0.234
		2.625	0.065	0.010	5.500	0.065	0.010	0.375	0.393	0.357
		2.625	0.065	0.010	6.000	0.065	0.010	0.375	0.393	0.357
2-3/4 (2.750)	Narrow Regular Wide	2.875	0.045	0.010	5.000	0.045	0.010	0.250	0.266	0.234
		2.875	0.065	0.010	6.000	0.065	0.010	0.375	0.393	0.357
		2.875	0.065	0.010	6.500	0.065	0.010	0.375	0.393	0.357
3 (3.000)	Narrow Regular Wide	3.125	0.065	0.010	5.500	0.065	0.010	0.375	0.393	0.357
		3.125	0.065	0.010	6.500	0.065	0.010	0.375	0.393	0.357
		3.125	0.065	0.010	7.000	0.065	0.010	0.375	0.393	0.357



Standard Part

Flat Washers Inch Hardened Steel

STPF120**87366986**

Rev AY

Page 9 of 13

TABLE 3: ANSI Standard Hardened Flat Washers

Washer Size	ID	OD	Thickness	Finish	Part Number
1/4 (0.25)	0.281	0.625	0.065	DOR	87529236
1/4 (0.25)	0.281	0.625	0.065	ZND	86632587
5/16 (0.3125)	0.344	0.688	0.065	ZND	87016603
3/8 (0.375)	0.406	0.812	0.065	DOR	87529237
3/8 (0.375)	0.406	0.812	0.065	ZND	86632588
7/16 (0.4375)	0.469	0.922	0.065	ZND	86637952
1/2 (0.5)	0.531	1.062	0.095	DAC	90332779
1/2 (0.5)	0.531	1.062	0.095	ZND	86632589
1-3/4 (1.75)	1.875	3.250	0.160	ZND	90478349
2 (2.000)	2.125	3.750	0.250	ZND	92048452
3	3.125	6.5	0.375	ZND	87742339



Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 10 of 13

TABLE 4: Non-ANSI Standard Hardened Flat Washers

Washer Size	ID	OD	Thickness			Finish	Part Number
			Nominal	Max	Min		
1/4 (0.25)	0.281	0.625	0.075	0.084	0.066	ZND	87318948
1/4 (0.25)	0.281	0.875	0.098	0.11	0.086	PHC	86625237
5/16 (0.3125)	0.344	0.688	0.089	0.1	0.078	DOR	87529232
5/16 (0.3125)	0.344	0.688	0.089	0.1	0.078	PHC	87613281
5/16 (0.3125)	0.344	0.688	0.089	0.1	0.078	ZND	86637953
5/16 (0.3125)	0.344	0.75	0.088	0.099	0.077	ZND	252687
5/16 (0.3125)	0.344	0.75	0.088	0.099	0.077	DAC	90499726
5/16 (0.3125)	0.344	1	0.098	0.11	0.086	BZN	51496106
5/16 (0.3125)	0.344	1	0.098	0.11	0.086	PHC	87613287
5/16 (0.3125)	0.344	1	0.098	0.11	0.086	ZND	87613295
5/16 (0.3125)	0.344	1.125	0.063	0.071	0.056	ZND	92844403
5/16 (0.3125)	0.375	0.875	0.084	0.104	0.064	DAC	90332820
3/8 (0.375)	0.406	0.75	0.22	0.247	0.193	ZND	86637956
3/8 (0.375)	0.41	0.75	0.095	0.105	0.085	ZND	83908991
3/8 (0.375)	0.406	0.781	0.105	0.113	0.097	ZND	9618968
3/8 (0.375)	0.406	0.812	0.089	0.1	0.078	DOR	87529233
3/8 (0.375)	0.406	0.812	0.089	0.1	0.078	PHC	87613282
3/8 (0.375)	0.406	0.812	0.089	0.1	0.078	ZND	86625241
3/8 (0.375)	0.406	0.812	0.134	0.16	0.108	PHC	87613284
3/8 (0.375)	0.406	0.812	0.134	0.16	0.108	ZND	87039401
3/8 (0.375)	0.406	1.062	0.095	0.107	0.083	ZND	87613301
3/8 (0.375)	0.406	1.125	0.134	0.16	0.108	DOR	87529239
3/8 (0.375)	0.406	1.125	0.134	0.16	0.108	PHC	87613288
3/8 (0.375)	0.406	1.125	0.134	0.16	0.108	ZND	86624186
3/8 (0.375)	0.406	1.125	0.134	0.16	0.108	DAC	90479207
3/8 (0.375)	0.406	1.25	0.134	0.16	0.108	ZND	86636827
3/8 (0.375)	0.406	1.25	0.134	0.16	0.108	DAC	90499725
3/8 (0.375)	0.438	0.688	0.109			ZND	70930370
7/16 (0.4375)	0.469	0.922	0.105	0.118	0.092	PHC	87613297
7/16 (0.4375)	0.469	1	0.105	0.118	0.092	DOR	87529248
7/16 (0.4375)	0.469	1	0.105	0.118	0.092	ZND	86625244
7/16 (0.4375)	0.469	1.25	0.134	0.16	0.108	PHC	84238747
7/16 (0.4375)	0.469	1.25	0.134	0.16	0.108	ZND	84278119
7/16 (0.4375)	0.521	2	0.16	0.179	0.141	ZND	86625245
1/2 (0.5)	0.531	1.062	0.134	0.16	0.108	DOR	87529240
1/2 (0.5)	0.531	1.062	0.134	0.16	0.108	PHC	86624187
1/2 (0.5)	0.531	1.062	0.134	0.16	0.108	ZND	86624188
1/2 (0.5)	0.531	1.062	0.134	0.16	0.108	DAC	90499727
1/2 (0.5)	0.531	1.062	0.137	0.154	0.12	ZND	705541
1/2 (0.5)	0.531	1.062	0.188	0.199	0.177	PHC	87613285

Tolerance Note: I.D.: $\pm .005$ up to and including .219 I.D.
 $\pm .010$ over .219 I.D.
O.D.: $\pm .010$ all sizes

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Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 11 of 13

TABLE 5: Non-ANSI Standard Hardened Flat Washers (Continued)

Washer Size	ID	OD	Thickness			Finish	Part Number
			Nominal	Max	Min		
1/2 (0.5)	0.531	1.062	0.188	0.199	0.177	ZND	87613293
1/2 (0.5)	0.531	1.25	0.134	0.16	0.108	ZND	87613265
1/2 (0.5)	0.531	1.25	0.188	0.199	0.177	DAC	90332813
1/2 (0.5)	0.531	1.25	0.188	0.199	0.177	DOR	87529234
1/2 (0.5)	0.531	1.25	0.188	0.199	0.177	ZND	84158486
1/2 (0.5)	0.531	1.25	0.188	0.199	0.177	PHC	87393626
1/2 (0.5)	0.531	1.5	0.188	0.199	0.177	ZND	86624149
1/2 (0.5)	0.531	1.5	0.250			ZND	70930850
1/2 (0.5)	0.531	1.625	0.25	0.280	0.220	ZND	86622619
1/2 (0.5)	0.531	2.0	0.25	0.280	0.220	DOR	92778704
1/2 (0.5)	0.531	2.5	0.188	0.199	0.177	ZND	87639792
1/2 (0.5)	0.557	1.25	0.134	0.16	0.108	PLN	34945
1/2 (0.5)	0.557	1.25	0.134	0.16	0.108	ZND	14408
1/2 (0.5)	0.572	1.25	0.134	0.16	0.108	ZND	143479
9/16 (0.5625)	0.593	1.093	.036			PLN	11158
9/16 (0.5625)	0.64	1.047	0.134	0.16	0.108	DOR	87529241
9/16 (0.5625)	0.64	1.047	0.134	0.16	0.108	ZND	87023159
9/16 (0.5625)	0.64	1.09	0.020			PLN	773427
5/8 (0.625)	0.656	1.25	0.239	0.254	0.224	ZND	86637955
5/8 (0.625)	0.656	1.312	0.095	0.107	0.083	ZND	86632590
5/8 (0.625)	0.656	1.312	0.12	0.134	0.105	ZND	51468601
5/8 (0.625)	0.656	1.312	0.15	0.168	0.132	DOR	87310650
5/8 (0.625)	0.656	1.312	0.15	0.168	0.132	PHC	87613283
5/8 (0.625)	0.656	1.312	0.15	0.168	0.132	PLN	87034833
5/8 (0.625)	0.656	1.312	0.15	0.168	0.132	ZND	86624189
5/8 (0.625)	0.656	1.312	0.188	0.199	0.177	PHC	87016602
5/8 (0.625)	0.656	1.5	0.188	0.199	0.177	PHC	87613289
5/8 (0.625)	0.656	1.5	0.188	0.199	0.177	ZND	86624156
5/8 (0.625)	0.687	1.75	0.12			DOR	87639783
5/8 (0.625)	0.656	2.5	0.188	0.199	0.177	DAC	90430245
5/8 (0.625)	0.656	2.5	0.188	0.199	0.177	ZND	87032338
5/8 (0.625)	0.656	2.5	0.188	0.199	0.177	DOR	84218887
5/8 (0.625)	0.656	3	0.179	0.194	0.164	ZND	87630175
5/8 (0.625)	0.656	3	0.179	0.194	0.164	ZNM	47395221
5/8 (0.625)	0.66	1.12	0.15	0.166	0.135	ZND	83918288
3/4 (0.75)	0.781	1.25	0.18			ZND	70928914
3/4 (0.75)	0.781	1.375	0.134	0.16	0.108	ZND	86625248
3/4 (0.75)	0.798	1.25	0.135			ZND	9706679
3/4 (0.75)	0.812	1.5	0.134	0.16	0.108	DAC	90332792

Tolerance Note:

I.D.: $\pm .005$ up to and including .219 I.D. $\pm .010$ over .219 I.D.O.D.: $\pm .010$ all sizes

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Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 12 of 13

TABLE 5: Non-ANSI Standard Hardened Flat Washers (Continued)

Washer Size	ID	OD	Thickness			Finish	Part Number
			Nominal	Max	Min		
3/4 (0.75)	0.812	1.5	0.134	0.16	0.108	DOR	47410125
3/4 (0.75)	0.812	1.5	0.134	0.16	0.108	ZND	86632591
3/4 (0.75)	0.812	1.5	0.179	0.194	0.164	ZND	86624162
3/4 (0.75)	0.812	1.5	0.219	0.233	0.205	PHC	86637816
3/4 (0.75)	0.812	1.5	0.219	0.233	0.205	ZND	86624163
3/4 (0.75)	0.812	1.75	0.15	0.122	0.177	ZND	83990370
3/4 (0.75)	0.812	1.75	0.219	0.233	0.205	PHC	87613290
3/4 (0.75)	0.812	1.75	0.219	0.233	0.205	ZND	87326714
3/4 (0.75)	0.83	1.44	0.134	0.146	0.122	ZND	81845770
7/8 (0.875)	0.906	1.5	0.12	0.134	0.105	ZND	87629039
7/8 (0.875)	0.938	1.75	0.18	0.191	0.168	ZND	87613300
7/8 (0.875)	0.938	1.75	0.219	0.233	0.205	PHC	87613298
7/8 (0.875)	0.938	1.75	0.219	0.233	0.205	ZND	87016604
7/8 (0.875)	0.938	2.25	0.219	0.233	0.205	PHC	87613299
7/8 (0.875)	1.01	1.90	0.14	0.15	0.13	DAC	51557998
7/8 (0.875)	1.01	1.90	0.14	0.15	0.13	ZND	81873789
7/8 (0.875)	1.01	1.90	0.14	0.15	0.13	PLN	83949265
1	1.031	1.5	0.12	0.134	0.105	ZND	47576425
1	1.031	1.625	0.028			ZND	70915978
1	1.062	1.75	0.094			ZND	70928189
1	1.062	2	0.134	0.16	0.108	DAC	90332784
1	1.062	2	0.134	0.16	0.108	DOR	87529238
1	1.062	2	0.134	0.16	0.108	ZND	86632592
1	1.062	2	0.134	0.16	0.108	PHC	84156980
1	1.062	2	0.209	0.234	0.184	DAC	90332787
1	1.062	2	0.209	0.234	0.184	DOR	87529235
1	1.062	2	0.209	0.234	0.184	ZND	86637954
1	1.062	2	0.219	0.233	0.205	ZND	87036175
1	1.062	2.25		0.250		ZND	70928370
1	1.062	2.5	0.312	0.302	0.342	ZND	87571140
1-1/8 (1.125)	1.11	1.57	0.28			PLN	83954373
1-1/8 (1.125)	1.131	2.5	0.156	0.175	0.137	DOR	87528987
1-1/8 (1.125)	1.188	2.05	0.156	0.175	0.137	DOR	87528988
1-1/8 (1.125)	1.188	2.25	0.134	0.16	0.108	PHC	87613296
1-1/8 (1.125)	1.188	2.25	0.134	0.16	0.108	ZND	86632593
1-1/8 (1.125)	1.25	2.25	0.156	0.177	0.136	ZND	87387718
1-1/8 (1.125)	1.25	2.25	0.25	0.27	0.23	PHC	87530628
1-1/8 (1.125)	1.265	2.375	0.134	0.16	0.108	PLN	86562336
1-1/4 (1.25)	1.312	1.984	0.18	0.202	0.158	ZND	87613302

Tolerance Note:

I.D.: ± .005 up to and including .219 I.D.

± .010 over .219 I.D.

O.D.: ± .010 all sizes

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Standard Part

Flat Washers Inch Hardened Steel

STPF120

87366986

Rev AY

Page 13 of 13

TABLE 5: Non-ANSI Standard Hardened Flat Washers (Continued)

Washer Size	ID	OD	Thickness			Finish	Part Number
			Nominal	Max	Min		
1-1/4 (1.25)	1.312	2	0.067	0.08	0.054	ZND	87032459
1-1/4 (1.25)	1.312	2.250	0.250			ZND	70929276
1-1/4 (1.25)	1.312	2.375	0.25	0.27	0.23	ZND	84405133
1-1/4 (1.25)	1.312	2.5	0.15	0.168	0.132	PHC	86637815
1-1/4 (1.25)	1.312	2.5	0.15	0.168	0.132	ZND	87023158
1-1/4 (1.25)	1.312	2.625	0.25	0.27	0.23	ZND	84281211
1-1/4 (1.25)	1.344	2	0.12	0.134	0.105	ZND	87629040
1-1/4 (1.25)	1.375	2.5	0.156	0.175	0.137	ZND	87016392
1-1/4 (1.25)	1.375	2.5	0.25	0.27	0.23	PHC	87613286
1-5/8 (1.625)	1.656	2.5	0.06	0.067	0.054	ZND	87313981
1-1/4 (1.25)	1.375	2.5	0.25	0.27	0.23	ZND	87301675
1-1/4 (1.25)	1.375	3	0.25	0.27	0.23	PHC	87613291
1-1/4 (1.25)	1.375	3	0.25	0.27	0.23	ZND	87584287
1-1/2 (1.5)	1.625	3	0.25	0.27	0.23	ZND	87571141
1-1/2 (1.5)	1.531	3	0.25	0.31	0.22	ZND	84156982
1-5/8 (1.625)	1.763	2.75	0.25	0.27	0.23	ZND	86637642
1-3/4 (1.75)	1.812	2.75	0.375			ZND	70927662
1-3/4 (1.75)	1.875	3.375	0.187			ZND	84359104
2	2.031	2.75	0.075	0.09	0.067	ZND	87690482
2	2.031	2.75	0.12	0.134	0.105	ZND	87690483
2-1/4 (2.25)	2.3125	3.5	0.25	0.27	0.23	ZND	87698859

Tolerance Note:

- I.D.: $\pm .005$ up to and including .219 I.D.
 $\pm .010$ over .219 I.D.
O.D.: $\pm .010$ all sizes