



Preferred Parts

Number:	F-008
Date Issued:	A-MAR09

ELECTRONIC DOCUMENT IN THE VIEWER IS CONTROLLED. PRINTED COPY IS AN UNCONTROLLED DOCUMENT.

HARDENED WASHERS (Superseded)

This standard has been superseded by CNH Standard Parts, STPF120 (87366986), Flat Washers Inch Hardened Steel. For information on superseded standards refer to ENS0050 (87523699).

The controlled versions of CNH specifications and standards are published on the CNH Intranet site.

The documents are also available on the CNH electronic viewing system (e.g. eViewer). Suppliers are able to access these documents on CSCN (CNH Supplier Communications Network).

The superseded standard remains available for viewing following this page if needed.

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GENERAL SPECIFICATIONS

GENERAL: The product covered by this standard is normally referred to as "thru hardened" washers as contrasted to the case hardened variety.

Type A conforms essentially with the ANSI B18.22.1 Type A (Narrow) designation through 1 inch nominal bolt size. Larger sizes conform to SAE J488 as do the outside diameters of the washers for .562 and .750 inch bolts. Type B is thicker than Type A throughout all sizes and conforms in ID and OD to Type A. Type C is thicker than Type B throughout all sizes and conforms in ID and OD to ANSI Type A (Narrow) from sizes .250 to .438, and to ASTM F436 (Structural Steel Washers) from sizes .500 to 2.000 inches except for the OD of the .750 inch size and the ID of the 1 inch size which conform to SAE J488. In all sizes shown, Type D is the same as Type C with the exception that the OD is proportionately larger throughout all sizes.

Dimensions are shown in decimal inch.

These washers are intended for use in high clamping loads, to minimize embedding, and to aid torqueing. Usage limitations for each washer type is shown in the following table:

Washer Type	Maximum oversized hole to be used with	Maximum oversized in width of slot to be used with
A	thru .062	Not to be used over slots
B	over .062 thru .156	thru .062
C	over .062 thru .156	thru .062
D	over .156	over .062

MISCELLANEOUS DIMENSIONS: The inside and outside diameters shall be concentric within a total indicator reading equivalent to the tolerance permitted on the inside diameter. The tabulated inside dimensions and tolerances apply only to the smallest hole size and not the tapered breakout area. The tapered breakout area and permissible breakout tolerance shall be as shown:



Breakout ID shall not exceed 10% of thickness

All washers shall be flat within a total indicator reading of:

.010 thru 1.75 OD
.015 over 1.75 OD thru 2.50 OD
.020 over 2.50 OD

MATERIAL: Steel, Case MS 353, 1040 to 1065. Through harden and temper per Case Spec P-7 to 36-42 HRC. Hardness of lightly polished surface shall be 82 HR15N maximum.

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FINISHES: Washers shall be furnished plain, plated or coated in accordance with the Case Engineering Materials Specification and class listed below:

Zinc with Chromate (ZND) - MS 201, Class 8A
Phosphate Coating (PHC) - MS 91

The determinant of plating thickness shall be the thickness of plating on the flat surface of the washer approximately midway between the inside and outside diameters.

Plated washers are subjected to hydrogen embrittlement, and shall be suitably treated or baked in such a manner as to obviate such embrittlement.

PREFERRED PARTS POLICY: Preferred parts are so designated to reduce variety of parts and assure maximum availability, interchangeability and cost savings in volume buying.

Nominal Bolt Sizes:	.250, .312, .375, .500, .625, 750, 1.000, 1.250, 1.500, 1.750, and 2.000
Types:	A, B, C, and D
Finishes:	Zinc with Chromate (ZND) and Phosphate Coating (PHC)

WORKMANSHIP: Washers must be free from burrs, sharp edges, loose scale, and all other defects that might affect their serviceability.

NON-DESIGNATED WASHERS

APPLICATION GUIDE: The washers listed (Section F-011) are non-standard sizes used for special applications. These washers should only be used where the design requirement is not satisfied by the preferred washers.

TOLERANCES:

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

O.D.: $\pm .010$ all sizes

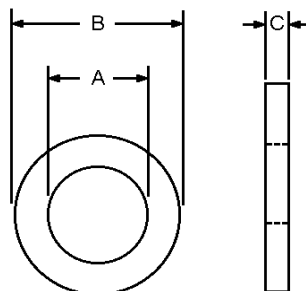
THICKNESS RANGE: Dimensions specified are maximum, minimum manufacturers standard for steel sheets.

Or, maximum, minimum thickness of plain washers per SAE J488.

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HARDENED WASHERS (Superseded)



TYPE A

All dimensions are in inches

Nominal Bolt Size	A Inside Diameter			B Outside Dia. ± .020	C Thickness		
	Basic	Max.	Min.		Basic	Max.	Min.
.250	.281	.296	.276	.625	.065	.080	.051
.312	.344	.359	.339	.688	.065	.080	.051
.375	.406	.421	.401	.812	.065	.080	.051
.438	.469	.484	.464	.922	.065	.080	.051
.500	.531	.546	.526	1.062	.095	.121	.074
.562	.594	.609	.589	1.188	.095	.121	.074
.625	.656	.686	.649	1.312	.095	.121	.074
.750	.812	.842	.805	1.500	.134	.160	.108
.875	.938	.968	.931	1.750	.134	.160	.108
1.000	1.062	1.092	1.055	2.000	.134	.160	.108
1.125	1.188	1.203	1.178	2.250	.134	.160	.108
1.250	1.312	1.328	1.303	2.500	.150	.177	.122
1.375	1.438	1.453	1.428	2.750	.150	.177	.122
1.500	1.562	1.590	1.533	3.000	.150	.177	.122

TYPE B

.250	.281	.296	.276	.625	.075	.085	.065
.312	.344	.359	.339	.688	.089	.099	.079
.375	.406	.421	.401	.812	.089	.099	.079
.438	.469	.484	.464	.922	.105	.115	.095
.500	.531	.546	.526	1.062	.134	.146	.122
.562	.594	.609	.589	1.188	.134	.146	.122
.625	.656	.686	.649	1.312	.150	.162	.138
.750	.812	.842	.805	1.500	.179	.191	.168
.875	.938	.968	.931	1.750	.179	.191	.168
1.000	1.062	1.092	1.055	2.000	.209	.224	.184
1.125	1.188	1.203	1.178	2.250	.209	.224	.184

*Non-Preferred Size

For General Specifications, see F-008 Page 1.

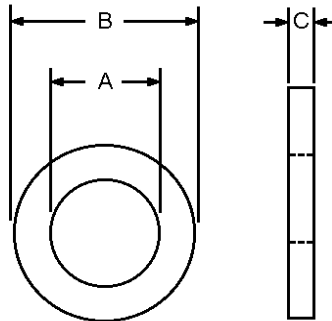


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HARDENED WASHERS (Superseded)



TYPE C

All dimensions are in inches

Nomina l Bolt Size	A Inside Diameter			B Outside Dia. ± .020	C Thickness		
	Basic	Max.	Min.		Basic	Max.	Min.
.250	.281	.296	.276	.625	.098	.122	.074
.312	.344	.359	.339	.688	.985	.122	.074
.375	.406	.421	.401	.812	.134	.160	.108
*.438	.469	.484	.464	.922	.134	.160	.108
.500	.531	.546	.526	1.062	.188	.199	.177
*†.562	.594	.609	.589	1.188	.188	.199	.177
.625	.656	.686	.649	1.312	.188	.199	.177
.750	.812	.842	.805	1.500**	.219	.233	.205
*.875	.938	.968	.931	1.750	.219	.233	.205
1.000	1.062**	1.092	1.055	2.000	.219	.233	.205
*1.125	1.250	1.265	1.240	2.250	.250	.270	.230
1.250	1.375	1.390	1.365	2.500	.250	.270	.230
*1.375	1.500	1.517	1.490	2.750	.250	.270	.230
1.500	1.625	1.642	1.615	3.000	.250	.270	.230
1.750	1.875	1.892	1.865	3.375	.312	.332	.292
2.000	2.125	2.142	2.115	3.750	.312	.332	.292

*Non-Preferred Size

**These dimensions are per SAE J488 and ANSI B18.22.1

†Size not listed in ASTM F436

For General Specifications, see F-008 Page 1.

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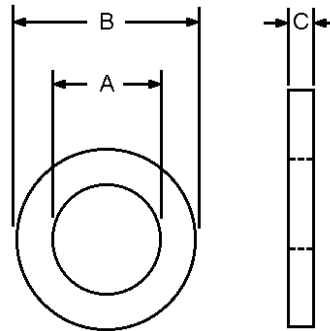
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HARDENED WASHERS (Superseded)



TYPE D

All dimensions are in inches

Nomina l Bolt Size	A Inside Diameter			B Outside Dia. $\pm .020$	C Thickness		
	Basic	Max.	Min.		Basic	Max.	Min.
.250	.281	.296	.276	.875	.098	.122	.074
.312	.344	.359	.339	1.000	.098	.122	.074
.375	.406	.421	.401	1.125	.134	.160	.108
*.438	.469	.484	.464	1.250	.134	.160	.108
.500	.531	.546	.526	1.250	.188	.199	.177
*†.562	.594	.609	.589	1.312	.188	.199	.177
.625	.656	.686	.649	1.500	.188	.199	.177
.750	.812	.842	.805	1.750	.219	.233	.205
*.875	.938	.968	.931	2.250	.219	.233	.205
1.000	1.062**	1.092	1.055	2.500	.219	.233	.205
*1.125	1.250	1.265	1.240	2.750	.250	.270	.230
1.250	1.375	1.390	1.365	3.000	.250	.270	.230
*1.375	1.500	1.517	1.490	3.250	.250	.270	.230
1.500	1.625	1.642	1.615	3.500	.250	.270	.230
1.750	1.875	1.892	1.865	4.000	.312	.332	.292
2.000	2.125	2.142	2.115	4.500	.312	.332	.292

*Non-Preferred Size

**These dimensions are per SAE J488 and ANSI B18.22.1

†Size not listed in ASTM F436

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