


Washers

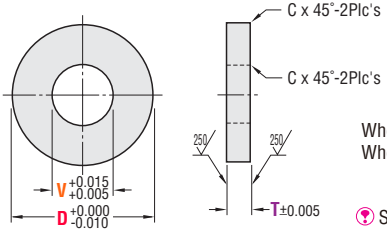


Our Washers can be used in a variety of applications. When choosing a soft steel or aluminum they can work as shaft spacers and when a hardened steel or brass material is selected they can be used as thrust washers. There are two different types of washers available: with selected outside diameter and with configurable O.D. selection, where you specify all of the dimensions from listed ranges.



Material	Surface Treatment	Hardness	Standard	Configurable
1045 Steel	-	-	-	U-FWSSC
	Black Oxide	-	U-WSSB	U-FWSSB
	Electroless Nickel Plating	-	U-WSSM	U-FWSSM
2017 Aluminum	Clear Anodizing	-	-	U-FWSSA
	Black Anodizing	-	-	U-FWSSAB
Brass C36000	-	-	-	U-FWSSBB
304 Stainless Steel	-	-	U-WSSS	U-FWSSS
	-	45-50HRC	-	U-FWSSCH
1045 Steel	Black Oxide	45-50HRC	-	U-FWSSBH
	Electroless Nickel Plating	45-50HRC	-	U-FWSSMH
440C Stainless Steel	-	45-50HRC	-	U-FWSSSH

Material Characteristics P.628, 629



When $D \leq 0.500$, $C = 0.005 - 0.010$
 When $D > 0.500$, $C = 0.020 \text{ max.}$

Surface Roughness: Unless otherwise specified 1000

Standard

Type	Part No.			Selection (Callout)												Selection							
	Callout	Actual	Screw Size	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1"	1-1/4	1-1/2	1-3/4	2"	1/16	5/64	3/32	1/8	3/16	3/8	
U-WSSB	0.11	0.112	#4	0.25													0.063						
	0.11	0.112	#4		0.31	0.38											0.063	0.078					
	0.14	0.138	#6		0.31	0.38	0.44										0.063	0.078					
	0.16	0.164	#8		0.38	0.44	0.50										0.063	0.078	0.125				
U-WSSM	0.19	0.190	#10			0.44	0.50	0.63									0.078	0.094	0.125				
	0.25	0.250	1/4			0.50	0.63	0.75									0.078	0.125	0.188				
	0.31	0.313	5/16			0.63	0.75	0.88									0.094	0.125	0.188				
U-WSSS	0.38	0.375	3/8			0.75	0.88	1.00									0.094	0.125	0.188				
	0.38	0.375	3/8					1.25									0.125	0.188					
	0.50	0.500	1/2					0.88	1.00	1.25	1.50						0.125	0.188					
	0.63	0.625	5/8					1.25	1.50	1.75							0.125	0.188	0.375				
	0.75	0.750	3/4					1.50	1.75	2.00							0.125	0.188	0.375				
1.00	1.000	1"					1.75	2.00								0.125	0.188	0.375					

Order Example

The part number consists only of the fields with blue characters. Please refer to the table below for technical information.

Part No.

Type

Technical Information

Callout	D	
	Nominal	Actual Diameter
0.25	1/4	0.250
0.31	5/16	0.313
0.38	3/8	0.375
0.44	7/16	0.438
0.50	1/2	0.500
0.63	5/8	0.625
0.75	3/4	0.750
0.88	7/8	0.875
1.00	1"	1.000
1.25	1-1/4	1.250
1.50	1-1/2	1.500
1.75	1-3/4	1.750
2.00	2"	2.000

Days to Ship **1** Day

Quantity Discount Rate

Quantity	1-19	20-49	50-99	100-
Rate	-	2%	3%	5%

Price

Quantity	D												
	0.25	0.31	0.38	0.44	0.50	0.63	0.75	0.88	1.00	1.25	1.50	1.75	2.00
U-WSSB	0.60	0.60	0.80	0.80	1.00	1.10	1.20	1.20	1.20	1.20	1.20	1.40	1.80
U-WSSM	0.80	0.80	1.00	1.00	1.10	1.20	1.30	1.40	1.40	1.70	1.90	2.40	2.90
U-WSSS	1.00	1.00	1.10	1.10	1.20	1.30	1.40	1.60	1.60	1.80	2.00	2.60	3.00

Configurable

Part No.	V Choose in 0.001" Increments	D Choose in 0.01" Increments	T Choose in 0.0005" Increments
		0 (No Hole)	0.19 ~ 2.38
U-FWSSC	0.078 ~ 0.250	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
U-FWSBB	0.251 ~ 0.625	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
U-FWSSB	0.626 ~ 1.063	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
U-FWSSM	1.064 ~ 1.438	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
U-FWSSA	1.439 ~ 1.875	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
U-FWSSAB	1.876 ~ 2.250	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
	2.251 ~ 2.750	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000
	2.751 ~ 3.750	2.39 ~ 4.00	0.1875 ~ 0.5000
		0.19 ~ 2.38	0.0465 ~ 0.5000

Selection Criteria: 1: When $D \leq 2.38$, $D \geq V + 0.125$ When $D \geq 2.39$, $D \geq V + 0.250$ 2: $T \geq 0.0940$ for U-FWSSA, U-FWSSAB, and U-FWSBB.

U-FWSSSH (440C stainless type) may be discolored due to the hardening process.

The part number consists only of the fields with blue characters.

Order Example

Part No.

Quantity Discount Rate

Quantity	1-19	20-49	50-99	100-
Rate	-	5%	10%	15%

For larger quantity orders "Days to Ship" may differ from published catalog term. P.29

D	T	\$ Unit Price (Qty. 1-19)										
		U-FWSSC	U-FWSBB	U-FWSSM	U-FWSSA	U-FWSSB	U-FWSBB	U-FWSSS	U-FWSSCH	U-FWSSBH	U-FWSSMH	U-FWSSSH
0.19 ~ 0.38	0.0465 ~ 0.0625	2.50	2.60	2.90	-	-	-	3.80	2.90	3.10	3.10	5.40
	0.0630 ~ 0.2500	3.00	3.40	3.60	3.50	4.40	4.70	4.40	3.60	3.80	3.80	6.40
	0.2505 ~ 0.5000	4.00	4.20	4.60	4.30	6.20	6.40	6.20	4.80	5.00	5.00	8.90
0.39 ~ 0.75	0.0465 ~ 0.0625	4.20	4.40	5.20	-	-	-	6.00	5.00	5.30	5.80	8.00
	0.0630 ~ 0.2500	4.30	4.70	5.50	5.30	6.50	6.60	6.50	5.20	5.50	6.00	8.60
	0.2505 ~ 0.5000	5.40	5.80	6.70	6.40	8.20	8.30	8.20	6.60	7.00	7.40	11.40
0.76 ~ 1.19	0.0465 ~ 0.0625	5.40	5.80	5.80	-	-	-	7.60	6.50	6.80	7.00	10.20
	0.0630 ~ 0.2500	6.00	6.40	6.50	6.60	8.30	8.40	8.30	7.10	7.60	7.70	11.50
	0.2505 ~ 0.5000	7.40	7.80	7.90	7.90	10.60	10.60	10.60	8.90	9.40	9.50	14.90
1.20 ~ 1.56	0.0465 ~ 0.0625	6.60	7.00	7.70	-	-	-	9.50	7.80	8.30	9.10	11.90
	0.0630 ~ 0.2500	7.80	8.30	9.00	9.20	11.30	11.40	11.30	9.50	10.10	10.70	14.00
	0.2505 ~ 0.5000	9.20	9.70	10.40	10.70	13.30	13.30	13.30	11.00	11.80	12.40	17.40
1.57 ~ 2.00	0.0465 ~ 0.0625	10.30	10.90	11.90	-	-	-	14.90	12.40	13.10	14.30	17.40
	0.0630 ~ 0.2500	11.50	12.10	13.10	13.40	16.80	16.90	16.80	13.70	14.50	15.70	20.00
	0.2505 ~ 0.5000	12.80	13.60	14.50	15.00	18.60	18.60	18.60	15.40	16.20	17.40	23.20
2.01 ~ 2.38	0.0465 ~ 0.0625	13.70	14.50	15.50	-	-	-	19.00	15.70	16.70	17.90	21.00
	0.0630 ~ 0.2500	16.10	17.00	18.10	19.30	20.80	20.90	20.80	17.20	18.10	19.30	23.60
	0.2505 ~ 0.5000	17.20	18.10	19.00	20.60	23.40	23.50	23.40	19.20	20.20	21.40	26.60
2.39 ~ 3.00	0.1875 ~ 0.5000	24.20	25.60	26.90	32.00	33.00	33.50	33.00	27.00	28.60	30.20	37.70
	0.1875 ~ 0.5000	29.60	31.20	32.90	40.30	40.30	42.10	40.30	33.10	34.90	37.00	46.10



1045 Steel, 304 Stainless Steel, Brass, 440C Stainless Steel

6 Days Non-Returnable P.30

Express 4 Days (Specify Express A) \$2.00/piece P.30

A flat charge of \$5.40 for 3 or more identical pieces.



Optional Modifications Part No. (Ordering Code: SC, WSC, KC)

1045 Steel, 304 Stainless Steel, Brass, 440C Stainless Steel 6 Days Non-Returnable P.30

Modifications are only available for "Configurable". Express Option is not available

Optional Modifications	Ordering Code	Details	\$Price Adder																																
	KC	Adds an internal notch. Example: KC $D \geq D_{min}$ Only applicable for V equaling values in table below. D2.39-4.00 not available.	3.00																																
		<table border="1"> <thead> <tr> <th>V</th> <th>b</th> <th>t</th> <th>D min</th> </tr> </thead> <tbody> <tr><td>0.500</td><td>0.156</td><td>0.078</td><td>0.81</td></tr> <tr><td>0.925</td><td>0.219</td><td>0.109</td><td>1.00</td></tr> <tr><td>0.750</td><td>0.219</td><td>0.109</td><td>1.12</td></tr> <tr><td>0.875</td><td>0.219</td><td>0.109</td><td>1.25</td></tr> <tr><td>1.000</td><td>0.281</td><td>0.141</td><td>1.44</td></tr> <tr><td>1.250</td><td>0.281</td><td>0.141</td><td>1.69</td></tr> <tr><td>1.500</td><td>0.406</td><td>0.203</td><td>2.06</td></tr> </tbody> </table>	V	b	t	D min	0.500	0.156	0.078	0.81	0.925	0.219	0.109	1.00	0.750	0.219	0.109	1.12	0.875	0.219	0.109	1.25	1.000	0.281	0.141	1.44	1.250	0.281	0.141	1.69	1.500	0.406	0.203	2.06	
V	b	t	D min																																
0.500	0.156	0.078	0.81																																
0.925	0.219	0.109	1.00																																
0.750	0.219	0.109	1.12																																
0.875	0.219	0.109	1.25																																
1.000	0.281	0.141	1.44																																
1.250	0.281	0.141	1.69																																
1.500	0.406	0.203	2.06																																



2017 Aluminum Standard

8 Days Non-Returnable P.30

Express 6 Days (Specify Express B) \$2.00/piece P.30

A flat charge of \$5.40 for 3 or more identical pieces.

Optional Modifications	Ordering Code	Details	\$Price Adder
	SC	Adds a machined flat. Example: SC $SC = 0.01"$ Increments $SC \geq V/2 + 0.10$ D0.19-0.38 not available.	2.00
	WSC	Adds two flats. Example: WSC 0.25 $WSC = 0.01"$ Increments $WSC \geq V + 0.20$ D0.19-0.38 not available.	4.00

When using Optional Modifications, add the "Price Adder" to the standard "Unit Price".