


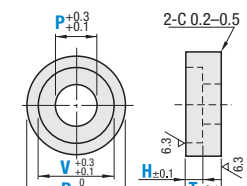
# Metal Washers

## Counterbored

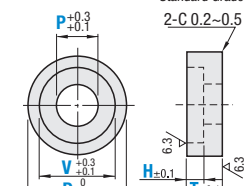
Metal Washers – Counterbored	Standard Grade T Tolerance ±0.1			Precision Grade T Tolerance ±0.01		Material	Surface Treatment	Hardness
	T Dimension Selectable	T Dimension Configurable	Dimension Configurable	T Dimension Configurable	Dimension Configurable			
	—	—	FWZASS	—	—	1018 Carbon Steel or Equivalent	—	—
	—	—	FWZAC	—	FWZSC	1045 Carbon Steel or Equivalent	—	—
	WZAB	TWZAB	FWZAB	TWZSB	FWZSB		Black Oxide	
	WZAM	TWZAM	FWZAM	TWZSM	FWZSM		Electroless Nickel Plating	
	—	—	FWZAA	—	—	2017 Aluminum Alloy	Clear Anodize	—
	—	—	FWZAAB	—	—		Black Anodize	
	WZAS	TWZAS	FWZAS	TWZSS	FWZSS	304 Stainless Steel	—	—
	—	—	FWZACH	—	—	1045 Carbon Steel or Equivalent	—	45–50 HRC min.
	WZABH	—	FWZABH	—	—		Black Oxide	
	WZAMH	—	FWZAMH	—	—		Electroless Nickel Plating	
	—	—	FWZASK	—	—	01 Tool Steel	—	55 HRC min.
	—	—	FWZASKB	—	—		Black Oxide	
	—	—	FWZASKM	—	—		Electroless Nickel Plating	
	WZASH	—	FWZASH	—	—	440C or 420 Stainless Steel	—	45–50 HRC min.

Ⓢ Depending on thickness and length, 1045 Carbon Steel or Equivalent Hardened Type may be less than 45 HRC min.  
 Ⓢ Stainless Steel Hardened Type (WZASH, FWZASH) may be discolored by hardening.

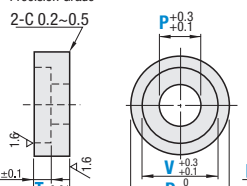
T Selectable



T Dimension Configurable Type



Dimension Configurable Type



### Fixed T-Dimension

Part Number	D	H	T Selection		V	P
WZAB	10	4	6	8	6	3.5
WZAM	12	5	8	10	8	4.5
WZAS	14	6	8	10	10	5.5
WZABH	15	8	10	12	11	6.5
WZAMH	20	8	10	12	15	—
WZASH	30	10	12	15	14	9
	40	12	15	20	18	11
	50	12	15	20	—	—
	60	12	15	20	—	—

### Configurable T-Dimension

Part Number	D	H	T	V	P
Standard Grade	10	1.0–18.0	3.0–20.0	6	3.5
TWZAB	12			8	4.5
TWZAM	14			10	5.5
TWZAS	15			11	6.5
Precision Grade	20			14	9
TWZSB	30			18	11

Ⓢ Machining Conditions: H+2≤T≤Px8

### Part Number Example

**T Selectable**  
 Part Number - T  
 WZAS15 - 10

**T Dimension Configurable**  
 Part Number - H - T  
 TWZAB10 - 3.5 - 10.0

# Metal Washers

## Counterbored, continued

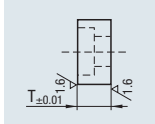
### Configurable Dimensions

Part Number	D	0.5 mm Increment			
		V	P	H	T
Standard Grade FWZASS FWZAC FWZAB FWZAM FWZAA FWZAAB FWZAS	10.0–20.0 0.5 mm Increment	5.0–90.0	3.0–88.0	1.0–48.0	3.0–50.0
	21–30 1 mm Increment				
	31–40 1 mm Increment				
FWZACH FWZABH FWZAMH FWZASK FWZASKB FWZASKM FWZASH	41–50 1 mm Increment	5.0–90.0	3.0–88.0	1.0–48.0	3.0–50.0
	51–60 1 mm Increment				
	61–80* 1 mm Increment				
Precision Grade FWZSC FWZSB FWZSM FWZSS	81–100* 1 mm Increment				

Ⓢ \* Not available for Precision Grade FWZSC, FWZSB, FWZSM, and FWZSS.

**Part Number Example**  
 Part Number - D - V - P - H - T  
 FWZASS - D25 - V12.0 - P6.0 - H5.5 - T10.5  
 FWZSC - D20 - V10.0 - P5.0 - H5.5 - T15.0

**Part Number Alterations**  
 Part Number - D - V - P - H - T - (TKC)  
 FWZASH - D15.0 - V10.5 - P6.5 - H12.5 - T18.5 - TKC

Alteration	Code	Spec.
	TKC	Changes T dimension tolerance. Ordering Code: TKC T±0.1 → ±0.01 Ⓢ FWZAA, FWZAS and FWZASH are not available for D=61–100. Ⓢ Applicable only to Dimension Configurable Type, Standard Class (except FWZAAB).

### Machining Conditions

D	V	P
When 10–60	V≤D-2	P≤V-2
When 61–100	V≤D-4	P≤V-4

Ⓢ 2≤(T-H)≤Px8 The shaft diameter is 2mm or more and Px8 or less.

### Machining Conditions of Material 01 Tool Steel (FWZASK, FWZASKB and FWZASKM)

D	V	P
When 10	V≤D-2	P≤V-2
When 10.5–30	V≤D-4	
When 31–60	V≤D-6	
When 61–80	V≤D-8	P≤V-4
When 81–100	V≤D-10	

Ⓢ No specification available for sizes without declaration of value.