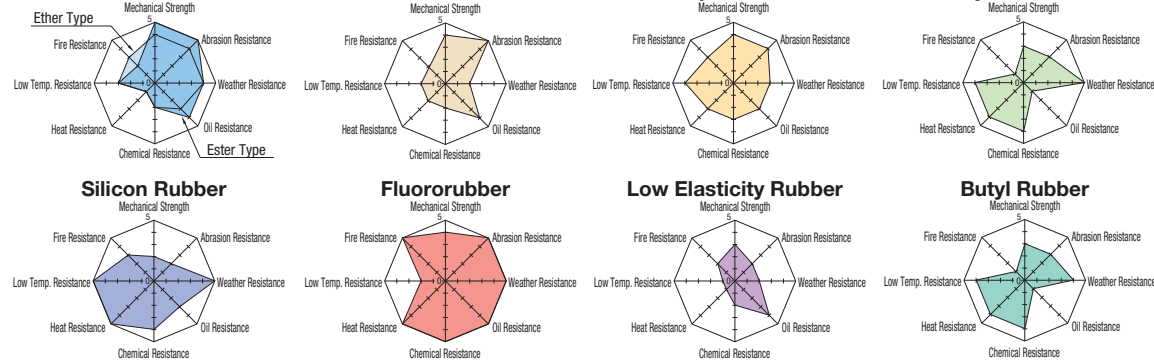


# Rubber Properties

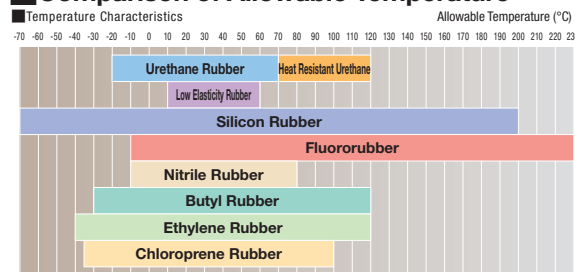
# Urethane Washers / Rubber Washers Washer Package

## Rubber Properties



Material	Feature
<b>Urethane Rubber</b>	Superior in mechanical strength and abrasion resistance to other rubbers. Especially excels in strength in repeat use and shock-absorbing properties. Can be used for applications such as Mechanical Stopper. Excellent in oil resistance but poor in chemical resistance. Ester Type is hydrolysable. Do not use in humid and wet areas.
<b>Nitrile Rubber (NBR Nitrile Rubber)</b>	Acrylic Nitrile Butadiene Rubber Economical general-purpose rubber excellent in oil resistance. Used for various applications such as O-rings and gaskets.
<b>Chloroprene Rubber (CR)</b>	Chloroprene Rubber Well-balanced synthetic rubber excellent in weather, heat, oil and chemical resistance. Non-staining chloroprene rubber which minimizes contamination from contacting materials is also available.
<b>Ethylene Rubber (EPDM Synthetic Rubber)</b>	Excels in weather, low temperature and chemical resistance. Can be used for general-purpose applications such as gaskets and doorstops.
<b>Silicon Rubber (SI)</b>	Excels in heat resistance and electric property (insulation). Physiologically safe and can be used for medical, food-related and electronic devices etc. which requires heat resistance.
<b>Fluororubber (FPM)</b>	Expensive, but widely used with its excellent heat, oil, solvent and chemical resistance. Fluororubber is generally known as Teflon and Viton®. Has the highest resistance to ozone, heat, oil and chemicals in rubbers.
<b>Low Elasticity Rubber (Haneaito™)</b>	Excels in shock and vibration resistance and absorbs energy without rebound. Physical property and durability are equal to general rubbers. Widely used as components for quiet and low-vibration products.
<b>Butyl Rubber (IIR)</b>	Isobutylene Isoprene Rubber Excellent in heat, cold and weather resistance, and good in water and chemical resistance.

## Comparison of Allowable Temperature



## Comparison of Chemical Resistance

	Urethane	Nitrile	Chloroprene	Ethylene	Butyl	Fluorine	Silicon	Low Elasticity
Gasoline Light Oil	○	○	○	×	×	○	△	△
Water	△	○	○	○	○	○	○	△
Strong Acid	×	○	○	○	○	○	△	△
Strong Alkali	×	○	○	○	○	×	○	○
Ether	×	×	×	○	△	×	×	△
Keton	×	×	×	○	○	×	○	×

Legend: ○ = Excellent, ○ = Good, △ = Acceptable, × = Not Acceptable

## Indication of Hardness

Three hardness categories are used for MISUMI's Urethane, Rubbers, Sponges.

- Shore A**  
Used for Urethane and Rubbers.  
"Shore A 70" means a hardness measured by using type-A Durometer in accordance with New JIS Standard K6253.
- ASKER C**  
Used to describe the hardness of Sponges.  
"Asker C 25" means a hardness measured by using a spring type hardness tester Asker C in accordance with SRIS 0101 (Standard by the Society of Rubber Industry, Japan).
- Penetration**  
Used to describe the hardness of gel materials.  
Penetration is standardized by JIS K2207. It indicates hardness by the penetrated length that a pin of specified weight penetrates in a sample perpendicularly.  
The value is one penetration for 1/10mm length. (Larger value indicates softer material.)

## Hardness Reference

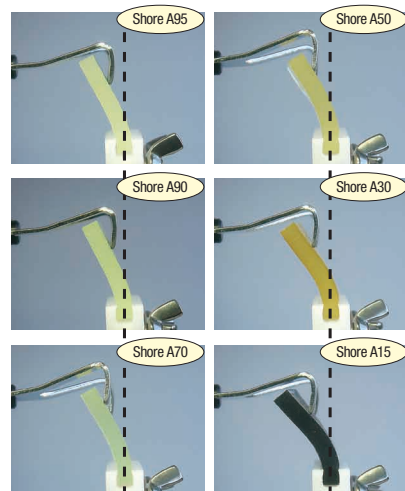
Shore A95	Golf Ball
Shore A90	Baseball
Shore A70	Softball
Shore A50	Plastic Eraser
Shore A30	Bicycle Tube
Shore A15	Firm Gelatin

Margin of Error: ±5

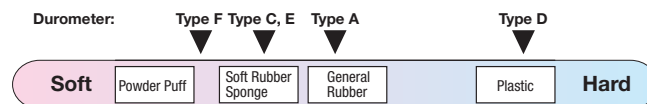
Durometer A (Shore A) 10 20 30 40 50 60 70 80 90  
Asker C SRIS 0101 C Type 20 30 40 50 60 70 80 90

## Ref.: Bending Test by Hardness

Test Conditions: General Urethane, Thickness 5mm, Width 30mm, Length 40mm  
When pulled by push-pull gauge with the load 5N:



## Types of Durometers and Objects of Measurement



There are various types of durometer, instrument to measure the hardness of a material, depending on the property of the measured material. For urethane and rubber, Type A (Asker Durometer Type A) compliant with JIS K 6253 is most commonly used. Hardness of materials softer than urethane and rubber is measured by Asker Type C or Type E. Shock absorbing gel is soft and super flexible material whose hardness is measured by Asker Type F.

Offers punching-processed washers at reasonable price.

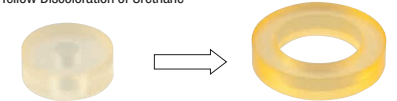
Type	Type	Material	Hardness	Color
Urethane Washers / Rubber Washers Package No Adhesive	PACK-URWH	General Urethane (Ether Polyurethane)	Shore A90	Natural Color
	PACK-URWM		Shore A70	
	PACK-WRBN	Nitrile Rubber	Shore A70	Black
	PACK-WRBC	Chloroprene Rubber	Shore A65	Black

For tolerance, refer to Specification Table.

## Notes

Blanking (Punching) may cause concave on the O.D. For T dimension 3~5mm, the center of the washer may deform into dented shape while it hardly deforms for T dimension 1mm.  
Urethane turns yellow by aging, but physical property or characteristics remain unchanged.

Yellow Discoloration of Urethane



Part Number	Type	D	V	T	Tolerance				Pcs. per Package	
					T1 or 3		T5		T1 or 3	T5
PACK-URWH (Urethane Shore A90) PACK-URWM (Urethane Shore A70) PACK-WRBN (Nitrile Rubber Shore A70) PACK-WRBC (Chloroprene Rubber Shore A65)		8	3 4	1 3	±0.6	0~+0.6	±0.7	0~+0.7	100	50
		10	3 4 5 6	1 3 5	±0.8	0~+0.8	±0.9	0~+0.8		
		15	5 6 8	1 3 5	±0.9	0~+0.9	±1.0	0~+1.0		
		20	6 8 10	3 5					50	
		25	8 10 12	3 5						
	30	10 12 16	3 5							



Ordering Example: Part Number - V - T  
PACK-URWH20 - 10 - 5



Price [Configure Online](#)



Days to Ship [Configure Online](#)

Part Number	Type	D	Unit Price																			
			PACK-URWH (Urethane Shore A90)			PACK-URWM (Urethane Shore A70)			PACK-WRBN (Nitrile Rubber Shore A70)			PACK-WRBC (Chloroprene Rubber Shore A65)										
		8																				
		10																				
		12																				
		15																				
		20																				
		25																				
		30																				