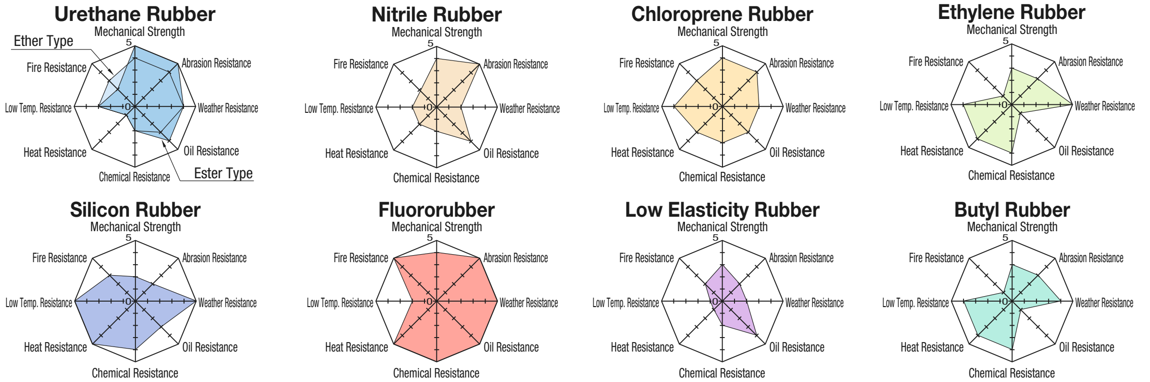
Rubber Properties

Urethane Washers, Rubber Washers

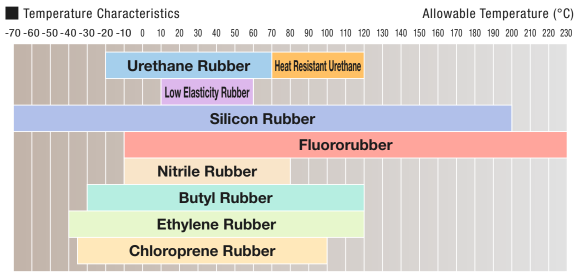
Washer Package

Rubber Properties



Material	Features
Urethane Rubber	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 Hydrolytic. Do not use in humid and wet areas.
Nitrile Rubber (NBR)	Acrylic Nitrile Butadiene Rubber Economical general-purpose rubber excellent in oil resistance. Used for various applications such as O-rings and gaskets.
Chloroprene Rubber (CR)	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.
Ethylene Rubber (EPDM)	Excels in weather, low temperature and chemical resistance. Can be used for general-purpose applications such as gaskets and doorstops.
Silicon Rubber (SI)	Excels in heat resistance and electric property (insulation). Physiologically safe and can be used for medical, food-related and electronic devices which require heat resistance.
Fluororubber (FPM)	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.
Low Elasticity Rubber (Hanenaito®)	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.
Butyl Rubber (IIR)	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	×	×	×-○	◎	◎	×	○	×

◎= Excellent, ○= Good, △= Acceptable, ×= Not Acceptable

Indication of Hardness

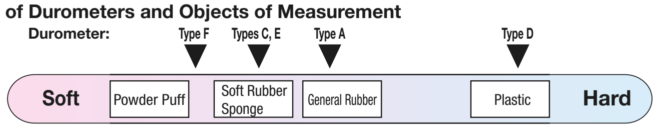
Three hardness categories are used for MISUMI's Urethane, Rubbers and Sponges.

①**Shore A**
Used to describe the hardness of Urethane and Rubbers.
"Shore A 70" means hardness measured by using type-A Durometer in accordance with New JIS Standard K6253.

②**ASKER C**
Used to describe the hardness of Sponges.
"Asker C 25" means hardness measured by using a spring type hardness tester Asker C in accordance with SRIS 0101 (Standard by the Society of Rubber Industry, Japan).
For those two above, larger value indicates harder material.

③**Penetration**
Used to describe the hardness of gel materials.
JIS K 2207 Standardized testing method. 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.)

•Types of Durometers and Objects of Measurement



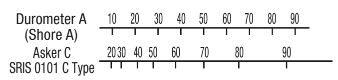
There are various types of durometer instrument as shown above to measure the hardness of a material, depending on the property of the measured material. For urethane and rubber, Type A (Asker Durometer Type A) compliant with JIS K 6253 is most commonly used. Hardness of materials softer than urethane 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.

Hardness Images

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

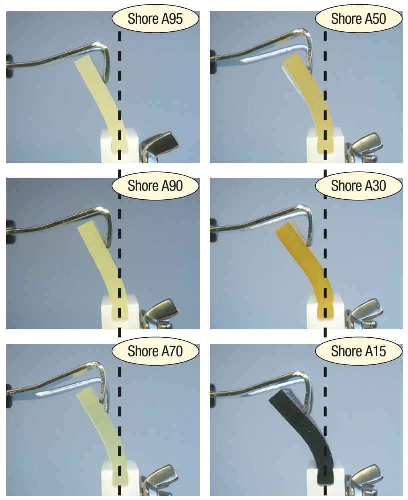
Hard ↕ Soft

•Margin of Error: ±5



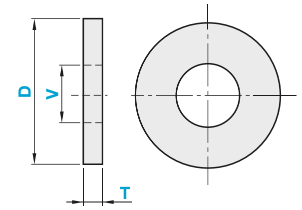
Ref.: Bending Test by Hardness

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



■Offers punching-processed washers at reasonable price.

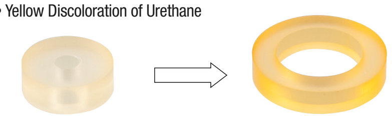
Type	Type	Ⓜ Material	Ⓗ Hardness	Color
Urethane Washers, Rubber Washers - Package No Adhesive	PACK-URWH	Standard Urethane (Ether Polyurethane)	Shore A90	Natural Color
	PACK-URWM		Shore A70	
	PACK-WRBN	Nitrile Rubber	Shore A70	Black
	PACK-WRBC	Chloroprene Rubber	Shore A65	Black



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.
Note that Urethane turns yellow by aging, but physical property or characteristics remain unchanged.

• Yellow Discoloration of Urethane



Part Number		V	T	Tolerance				Pcs. per Package	
Type	D Selection	Selection	Selection	T1, 3		T5		T1, 3	T5
				D	V	D	V		
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 pcs.	50 pcs.
	10	3 4 5 6	1 3 5						
	12	5 6 8	1 3 5	±0.8	0~+0.8	±0.9	0~+0.8		
	15	6 8 10	1 3 5						
	20	8 10 12	3 5	±0.9	0~+0.9	±1.0	0~+1.0		
	25	10 12 16	3 5					50 pcs.	
	30	10 12 16	3 5						

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

Part Number		Unit Price											
Type	D Selection	PACK-URWH (Urethane, Shore A90)			PACK-URWM (Urethane, Shore A70)			PACK-WRBN (Nitrile Rubber, Shore A70)			PACK-WRBC (Chloroprene Rubber, Shore A65)		
		T1	T3	T5	T1	T3	T5	T1	T3	T5	T1	T3	T5
PACK-URWH PACK-URWM PACK-WRBN PACK-WRBC	8			-			-			-			-
	10												
	12												
	15												
	20												
	25	-			-			-			-		
	30												