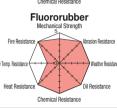
# **Rubber Properties**

# Rubber Properties





# Nitrile Rubber Chemical Resistance











Material	Features
Urethane Rubber	Superior in mechanical strength and abrasion resistance to other nubbers. 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 0-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	0	0	0	×	×	0	△-○	Δ
Water	Δ	0	0	0	0	0	0	Δ
Strong Acid	×	0	0	0	0	0	Δ	Δ
Strong Alkali	×	0	0	0	0	×	0	0
Ether	×	×-△	×-△	0	△•○	×-△	×-△	Δ
Keton	×	×	×-0	0	0	×	0	×
○= Excellen	t, ○= Go	od, △= <i>I</i>	Acceptab	le, ×= No	ot Accep	table		

# Hardness Images

Shore A95 | Golf Ball

Shore A90 Baseball Shore A70

Shore A50 Plastic Eraser Shore A30 Bicycle Tube

Shore A15 Firm Gelatin

•Margin of Error: +5

(Shore A)

Asker C SRIS 0101 C Type

Softball

## Indication of Hardness

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

Chloroprene Rubber

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.

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.

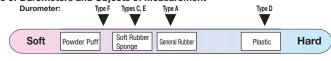
### (3)Penetration

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

The value is one penetration for 1/10mm length. (Larger value indicates softer

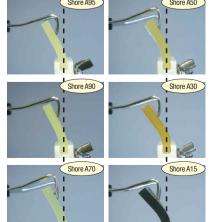
### material.) •Types of Durometers and Objects of Measurement



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.

# 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:



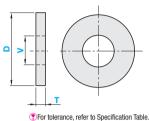
# **Urethane Washers, Rubber Washers**

# **Washer Package**

Offers punching-processed washers at reasonable price.



Urethane Washers, Rubber Washers - Package No Adhesive         PACK-URWH PACK-WRBN         Standard Urethane (Ether Polyurethane)         Shore A90 Shore A70         Natural Color           PACK-WRBN         Nitrile Rubber         Shore A70         Black           PACK-WRBC         Chloroprene Rubber         Shore A65         Black	Type	Туре	Material	Hardness	Color
Rubber Washers - PACK-URWM (Either Polyureurane) Shore A70 Color - Package PACK-WRBN Nitrile Rubber Shore A70 Black	Heathana Washana	PACK-URWH	Standard Urethane	Shore A90	Natural
No Adheeine		PACK-URWM	(Ether Polyurethane)	Shore A70	Natural Color Black
PACK-WRBC Chloroprene Rubber Shore A65 Black		Washers, sahers - PACK-URWM         Standard Urethane (Ether Polyurethane)         Shore A90 Shore A70         Nat Company           PACK-URWM         (Ether Polyurethane)         Shore A70 Shore A70 Black           PACK-WRBN         Nitrile Rubber         Shore A70 Black	Black		
	NO Auriesive	PACK-WRBC	Chloroprene Rubber	Shore A65	Black



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 1 mm.

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





Part Number														Toler	Pcs. per Package			
Tuno	D	V Selection								Sel	T lect	ion	T1	, 3 T5		5	T1, 3	T5
Туре	Selection									-			D	٧	D	V	11,3	13
PACK-URWH	8	3	4							1	3		±0.6	0~+0.6	±0.7	0~+0.7		
(Urethane, Shore A90)	10	3	4	5	6					1	3	5	±0.0	0~+0.0	±0.7	0~+0.7		
PACK-URWM	12			5	6	8				1	3	5	±0.8	0~+0.8	±0.9	0~+0.8	100 pcs.	
(Urethane, Shore A70)	15				6	8	10		П	1	3	5	±0.6	0~+0.0	±0.9	0~+0.0		50 pcs.
PACK-WRBN (Nitrile Rubber, Shore A70)	20					8	10	12	П		3	5						
PACK-WRBC (Chloroprene Rubber, Shore A65)	25						10	12	16		3	5	±0.9	0~+0.9	±1.0	0~+1.0	F0	
	30						10	12	16		3	5					50 pcs.	



Part Number		Unit Price											
Туре	D		CK-UR\ ane, Shor			CK-UR\			CK-WR lubber, Sh		PACK-WRBC (Chloroprene Rubber, Shore A65)		
	Selection	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												