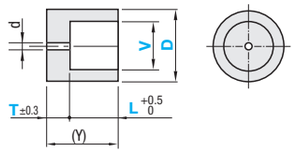
Urethane, Rubbers
Cap Type

■Caps useable for protection of various tips.

Standard	Configurable Type	Material	Hardness	Color
UTCS	UTNS	Ether Polyurethane	Shore A95	Natural Color
UTCH	UTNH		Shore A90	Natural Color
UTCM	UTNM	Ester Polyurethane	Shore A70	Natural Color
UTCL	UTNL		Shore A50	Natural Color
RBCN	RBNN	Nitrile Rubber (NBR)	Shore A70	Black
RBCC	RBNC	Chloroprene Rubber (CR)	Shore A65	Black
RBCU	RBNU	Low Elasticity Rubber	Shore A32	Black
RBCS	RBNS	Silicon Rubber (SI)	Shore A70	Light Gray
RBCA	RBNA		Shore A50	Milky White
RBCF	RBNF	Fluororubber (FPM)	Shore A80	Black



The milky white color of silicone rubber shore A 50 is translucent.
For Urethane Type, I.D. tolerance has been changed.

T Tolerance

T	Urethane	Rubber
30 or Less	±0.2	±0.3
31 ~ 50	±0.3	-

D Tolerance

D	Urethane	Rubber
40 or Less	±0.2	±0.5
41~60	±0.3	±0.6
61~100	±0.4	-

V Tolerance

V	Urethane	Rubber
2~50	-0.2 -0.4	0 -1.0
51~	-0.2 -0.5	0 -1.2

■Standard

Part Number Type	D	V Selection	T Selection	L Selection	d	Unit Price UTCS	UTCH	UTCM	UTCL	RBCN RBCC	RBCU	RBCS RBCA	RBCF
UTCS (Shore A95)	6	2	2 3 4 5	4 5 6 8	1								
UTCH (Shore A90)	8	3 4											
UTCM (Shore A70)	9	3 5	2 5 7	4 5 6 10	1.5								
UTCL (Shore A50)	10	4 6	2 3 5 6	4 8 10 12									
RBCN Nitrile Rubber (NBR)	12	6 8		7 8 9 10									
RBCC Chloroprene Rubber (CR)	15	8 10	2 4 7 8	4 6 8 10									
RBCU Low Elasticity Rubber	20	12 16	2 3 5 10	7 10 15 20	2								
RBCS (Shore A70) Silicon Rubber (SI)	25	15 20	5 6 10 12	10 15 25 30									
RBCA (Shore A50) Silicon Rubber (SI)	30	20 25	2 3 5 10	15 20 30									
RBCF Fluororubber (FPM)													

Ordering Example: Part Number - V - T - L → UTCH8 - 3 - 2 - 4

■Urethane Configurable Type

Part Number	1mm Increment D	V	T	L	d	Unit Price UTNS	UTNH	UTNM	UTNL
UTNS (Shore A95) UTNH (Shore A90)	6~15	2~11	2~30	4~10	1				
				11~25					
				26~40	1.5				
				41~60					
	16~30	12~26		7~10					
				11~25					
				26~40					
				41~60					
UTNM (Shore A70)	31~45	27~41	5~40	7~10					
				11~25					
				26~40					
				41~65					
UTNL (Shore A50)				66~70					
	46~60	42~56	5~50	7~10	2				
				11~25					
				26~40					
				41~65					

(Y)=T+L (Y)V≤D-4
For Urethane Configurable Type, configurable dimension range has been shortened.

Ordering Example: Part Number - D - V - T - L → RBNN - D60 - V50 - T5 - L20

■Rubber Configurable Type

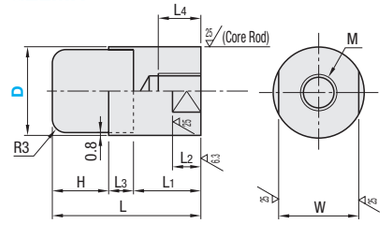
Part Number	1mm Increment D	V	T	L	d	Unit Price RBNN RBNC	RBNU	RBNS RBNA	RBNF
RBNN Nitrile Rubber (NBR)	6~15	2~11	2~10	4~10	1				
RBNC Chloroprene Rubber (CR)				11~20					
				21~28					
				29~48			-		-
RBNU Low Elasticity Rubber	16~30	12~26		7~10	1.5				
				11~20					
				21~28					
				29~48			-		-
RBNS (Shore A70) Silicon Rubber (SI)	31~45	27~41	5~15	7~10					
				11~20					
				21~28					
RBNA (Shore A50) Silicon Rubber (SI)				29~45			-		-
	46~60	42~56		7~10	2				
				11~20					
				21~28					
RBNF Fluororubber (FPM)				29~45			-		-

(Y)=T+L (Y)V≤D-4 (Y)≤50
(Y)≤30 for RBNU, RBNS and RBNF.

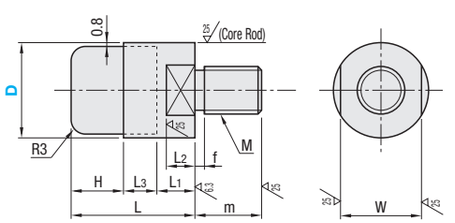
Shock Absorbing Bumpers
Tapped, Threaded

■New bumpers provided with shock and sound absorbing effect, made of soft shock-absorbing gel. For material properties, see P.389

Tapped **GELMR**



Threaded **GELMF**



Gel: M Material: Viscoelastic Elastomer (Gray); H Hardness: Asker F75 (Two-layered; F98 for Outer Layer)
Core Rod: M Material: EN 1.4301 Equiv.

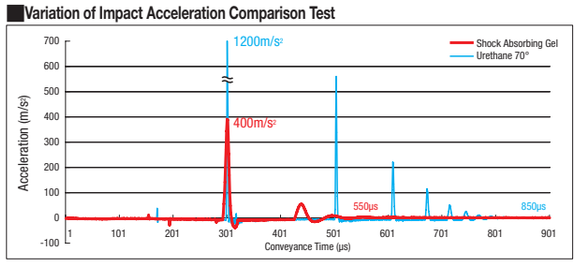
Part Number Type	D	H	L	L_1	L_2	L_3	L_4	M	W	Unit Price
Tapped GELMR	12	8	22	11	4	3	7	M5x0.8	10	
	16	10	28	14	5	4	11	M6x1.0	14	
	16A		31	17			14	M8x1.25		
	20	13	35	17	6	5	14	M8x1.25	17	
	20A		39	21			16	M10x1.25 (Fine)		
	30	15	44	24	8	5	20	M12x1.75	27	
	30A		46	26			22	M14x1.5 (Fine)		

Part Number Type	D	H	L	L_1	L_2	L_3	M	W	m	f	Unit Price
Threaded GELMF	12	8	16	5	4	3	M5x0.8	10	8	1.5	
	16	10	20	6	5	4	M6x1.0	14	10	2	
	20	13	26	8	6	5	M8x1.25	17	12	2	
	30	15	30	10	8	5	M10x1.5	27	14	2.5	

Ordering Example: Part Number → GELMR16A

■Precaution for Use
- Do not stick or cut with sharpened objects.
- Do not tear or twist.
- Insert it only from the vertical direction.
- Keep away from fire.
- Do not use detergents for cleaning.
- Replace it when broken.

■Variation of Impact Acceleration Comparison Test



	Max. Impact Acceleration (m/s²)	Conveyance Time (μs)
Shock Absorbing Gel	400	550
Urethane 70 deg.	1200	850
Urethane 50 deg.	836	1273
Extra Low Hardness Urethane 15 deg.	450	1660
Low Rebound Urethane	1750	450
Nitrile Rubber	1050	670
Low Rebound Rubber	1580	400

* Convergence time is defined as the time until acceleration falls below 10m/s².

• From Test Results
Peak acceleration of the shock absorbing gel is lower at around 30% of other materials and deceleration dampening is higher.
(Extra low hardness urethane has a low peak value as well, but takes three times longer to converge.)
This is because the material transmits energy dispersing in multiple directions, while absorbing impact force.
From these characteristics, effects such as impact absorption and noise reduction can be expected.
(Effects vary depending on operation environment.)

• Test Conditions
Measuring Method: Measured with accelerometer secured on the hammer dropped on the test materials.
Size of Test Material: ø30, Height 20mm
Measuring Instruments:
Hammer: Weight 958g, Drop Height 255mm
Length from Fulcrum to Barycenter: 255mm

Equipments:
Acceleration Pickup (Brüel & Kjær Type 4507B001)
Data Logger (Keyence NR-500, NR-HA08)
PC, Sensor Amplifier (Ono Sokki SR-2200)
Measurement Condition: Temperature 18°C, Humidity 40%

■Elasticity of Shock Absorbing Gel

• Shock Absorbing Gel **• Urethane, Shore A50**

Normal State / When Applied Force / Normal State / When Applied Force

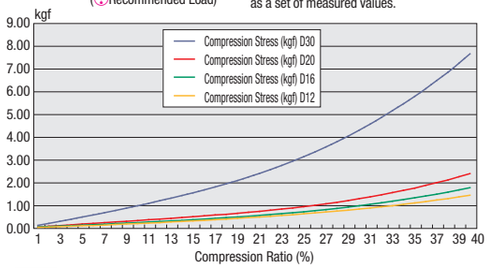
A major characteristic is the three-dimensional slow recovery, the function to recover after compression slowly and in multiple directions. Pressed as thin as shown in the photo and recovers to the original shape gradually after being released from pressure.
* The double-layer structure of the gel part reduces stickiness.

■(40%) Compressive Load Test Results

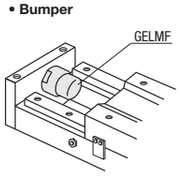
D	12	16	20	30
40% Compression Load Average (kgf)	1.4	1.8	2.4	7.7

(Recommended Load)

• Test Conditions
A static compression load measurement test causing the 60% thickness is repeated 3 times. Below are the mean values of three measurement results.
These are not guaranteed values but an example as a set of measured values.



Example
• Bumper



• Shaft Attachment