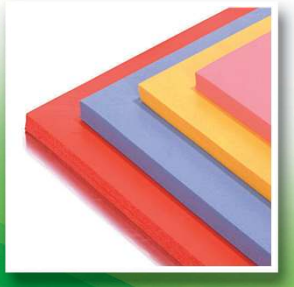
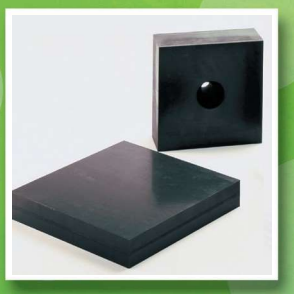
TIGERS POLYMER CORPORATION
タイガースポリマー株式会社



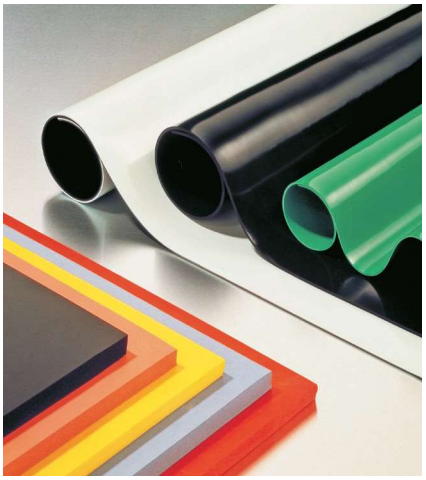


TIGERS RUBBER SHEET CATALOG

TIGERS POLYMER CORPORATION

Usage Precaution

(Read these instructions carefully before using.)



- The data in this catalog are test values and not standard ones. Additionally, the contents are subject to be modified without notice for improvements.
- To ensure the original functionality and safe use, please refer to the catalogs and/or the documents issued by our company.
- The products in this catalog are manufactured for general industrial use and are not intended for special applications, such as medical devices. For use in medical, pharmaceutical, and other safety-conscious applications, please test and verify their safety at your company before use. We do not guarantee their suitability or safety for these applications.
- When cutting and using the products from this catalog as parts, please check the suitability and safety for the intended purpose on the user's side.

Storage

Warning	Fire is strictly prohibited. Please store away from sources of heat such as stoves and/or devices that produce electric sparks.
Precaution	Please store indoors to avoid exposure to direct sunlight, wind, and rain.
Precaution	Please do not bend or deform locally.
Precaution	Please do not drag or pull on the ground.

Processing

Warning	When processing products through polishing, cutting, or other methods, there is a possibility of harm to the human body from smoke and cut dust. Please wear protective glasses and a mask.
Warning	If polishing or cutting dust from products accumulates, there is a risk of spontaneous combustion, which can cause burns and fires. Therefore, please remove the accumulation when it occurs.

Usage

Precaution	These products are not suitable for medical devices or food equipment.
Precaution	These products are not suitable for applications involving prolonged direct contact with the body.
Precaution	The lifespan and safety of these products are greatly influenced by their applications, conditions of use, installation methods, and environment. Please ensure thorough confirmation from the user.
Precaution	When using these products in close contact with other products or components, discoloration or deterioration may occur due to leaching or migration of the contents of these products.
Precaution	Regarding chemical resistance, the technical data provides very general performance information. It is necessary for users to confirm for each individual use.

Disposal

Warning	When scraps generated during use or components after use are incinerated, harmful gases may be produced. please

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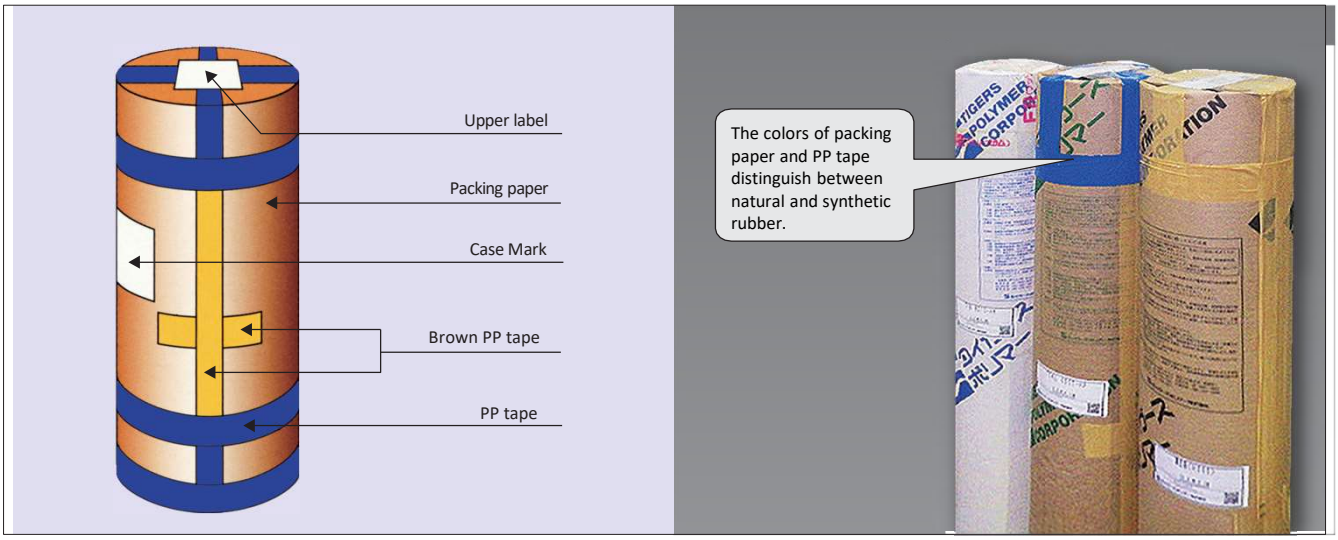
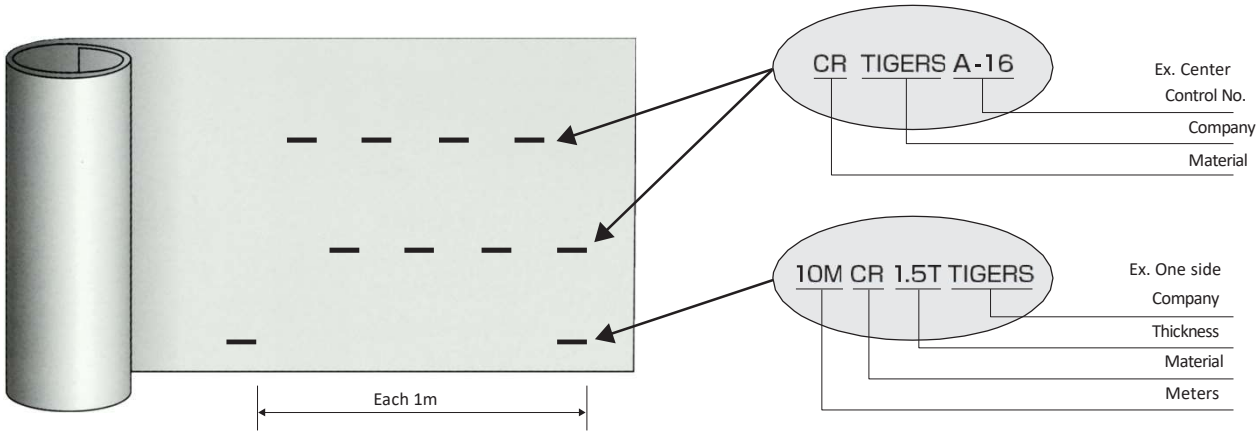
Information of Products

External Specifications of Rubber Sheet Packaging



●One side of the rubber sheet can be printed with length (m), material, thickness, and company name at 1m intervals. Please specify whether you would like printing or not when issuing your order. The printing interval is merely a guideline. Please measure the dimensions when cutting. Printing on silicone rubber, fluoro rubber, and urethane sheets is not available.

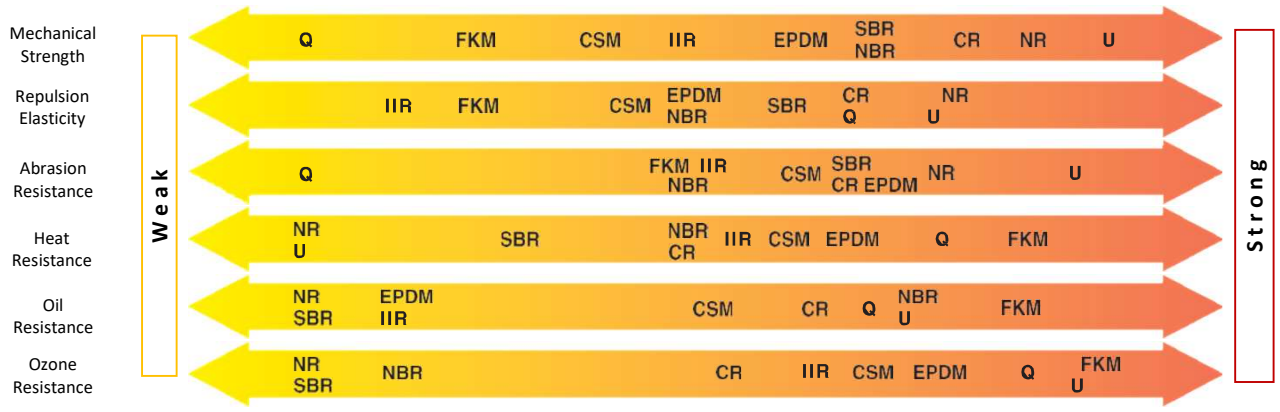
●The material, company name, and control NO. are printed in the center only for the sheets of Black normal<65>, NBR-L<70>, CR-L<65>, EPT-L<70> and EPT-M<65>.



External Specification List of Rubber Sheet Packing

Material	Indication	PP Tape Color	Packing Paper Color ／Character Color
Natural Rubber	**NR**	Brown	Brown ／ Black
Chloroprene Rubber	**CR**	Brown	Brown ／ Green
Acrylonitrile Butadiene Rubber	**NBR**	Brown	Brown ／ Green
Ethylene-Propylene Rubber	**EPT**	Brown	Brown ／ Green
Isobutylene Isoprene Rubber	**IIR**	Brown	Brown ／ Green
Chlorosulfonated Polyethylene Rubber	**CSM**	Brown	Brown ／ Green
Styrene-Butadiene Rubber	**SBR**	Brown	Brown ／ Green
Silicone Rubber	**SR**	Transparent	Brown ／ Navy
Fluoro Rubber	**FR**	Transparent	To be determined when order receipt
Urethane Rubber	—	Brown	To be determined when order receipt

General Property Rankings of Various Types of Rubber Sheet



*These are general physical properties. Please confirm before use.

Note Q: Silicone rubber, **FKM**: Fluoro Rubber, **EPDM**: Ethylene-propylene Rubber, **U**: Urethane Rubber, according to ASTM designation.

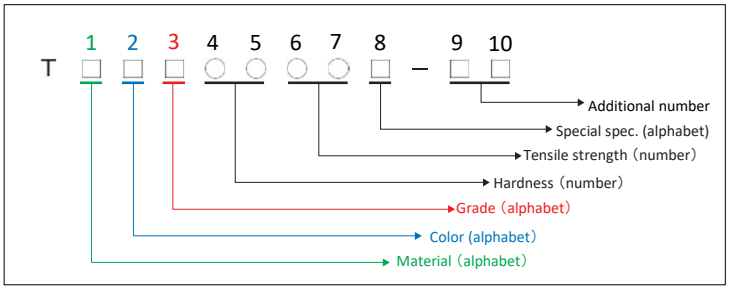
Product Number of Rubber Sheet

Scope of Application

This system of marking is standardized regarding the commodity name of general rubber sheets excluding the case that customers specify.

Contents

Product name is composed of following alphabet and numbers.



Clarification

1・・・shows rubber material
A : Natural rubber
N : NBR
C : CR
E : EPT
H : CSM
I : I IR
S : SBR

2・・・shows rubber color
K : Black
W : White
R : Red
B : Blue
H : Gray
Y : Yellow
M : Green
A : Amber

3・・・shows grade
L : Low Grade
M : Middle Grade
H : High Grade

4･5・・・show hardness

6･7・・・show tensile strength

Indicate as 07 in case that standard value is more than 7 MPa {71kgf/cm2} Indicate as 10 in case that standard value is more than 10 MPa {102kgf/cm2}

8・・・shows special specifications

An alphabetical character is entered when there is a special specifications.
Not entered when there is not any special specification.

i) Constructional Special Specifications	
C	Multilayer
N	Cloth inserted
T	Teflon laminated
H	Cloth laminated

i) Constructional Special Specifications			
A	Heat aging resistance test	K	Adhesion test
B	Compression set resistance test	L	Water absorption test
D	Compression strength test	M	Flame resistance test
E	Oil resistance test	O	Ozone resistance test
F	Low temperature test	P	Contamination test
G	Tear test	R	Electrical insulation test
H	Flexing test	S	Resilience test
J	Abrasion test	Z	Other special requirements

9･10・・・Add numbers if necessary

TIGERS RUBBER SHEET

Product Information

Thickness Tolerance and Thickness Deviation of Rubber Sheet (Applicable to standard products)

Thickness	Natural Rubber		Synthetic Rubber		Synthetic Rubber	
	Tolerance	Deviation	Tolerance	Deviation	Tolerance	Deviation
Less than 1.50	±0.15	0.20	±0.15	0.20	±0.15	0.20
Less than 2.00	±0.25	0.30	±0.20	0.25	±0.15	0.25
Less than 3.00	±0.30	0.40	±0.25	0.35	±0.25	0.35
Less than 4.00	±0.30	0.40	±0.30	0.40	±0.25	0.35
Less than 6.00	±0.40	0.50	±0.40	0.50	±0.35	0.45
Less than 9.00	±0.50	0.70	±0.50	0.70	±0.45	0.45
Less than 10.00	±0.60	0.80	±0.60	0.80	±0.45	0.60
Less than 19.00	+0.90 −0.50	1.00	+0.90 −0.50	1.00	±0.60	0.80
Less than 20.00	+1.00 −0.50	1.20	+1.00 −0.50	1.20	+1.00 −0.50	1.00
Less than 25.00	+1.50 −0.50	1.50	+1.50 −0.50	1.50	+1.50 −0.50	1.50
Less than 30.00	+2.00 −0.50	2.00	+2.00 −0.50	2.00	+2.00 −0.50	2.00
Less than 50.00	+2.50 −0.50	2.50	+2.50 −0.50	2.50	+2.50 −0.50	2.50
Less than 70.00	+2.50 −0.50	3.00	+2.50 −0.50	3.00	+2.50 −0.50	2.50
Less than130.00	+3.50 −0.50	3.50	+3.50 −0.50	3.50	N/A	N/A

(Unit : mm)

1. Rubber Sheet Standard Dimensions (Urethane rubber and sponge sheets are listed in the appended table)

Type	Natural Rubber Synthetic Rubber					Silicone Rubber Fluoro Rubber	
Thickness (mm)	0.5 ～ 0.8	1 ～ 3	4 ～ 10	11 ～ 30	31 ～ 130	0.5 ～ 50	60 ～ 120
Width (m)	1	1	1	1	1	1	1
Length (m)	20	20	10	5	2	2	1

Please contact us for special dimensions and materials.

Explanation of Terms

Hardness	This numerical value represents the resistance of rubber to indentation by a pressed pin, ball, or other object. It is measured according to JIS K 6253:2006 (Physical Testing Methods for Vulcanized Rubber), with the measurement taken after 3 seconds. However, as the general practice is to measure within 1 second, the 3-second measurement result is indicated in parentheses.
Tensile Strength at Break	Maximum tensile strength which is measured when a test specimen finally breaks after being stretched and is normally expressed by a value which the maximum load is divided by the original cross-section area of the test specimen.
Elongation at Break	This refers to the deformation in the direction of tension that occurs when a test piece is subjected to tension. It is expressed as a percentage of the ratio of the stretched length to the original length. In JIS, "elongation at break" is simply called "elongation".
Compression Set	This refers to the permanent deformation of rubber in the compression direction. It is measured by compressing a test piece to a specific compression ratio, holding it at a specified temperature for a specified time, then removing the load and allowing it to rest for a specified time. The percentage of the decrease in thickness to the thickness of the compression deformation is then expressed as a percentage.
Tension Set	Permanent elongation which is caused when a rubber product is stretched and left for a certain time after the load of stretch is removed.
Tear Resistance	This refers to the strength of the test piece against tearing when subjected to tension. It is expressed as the maximum stress at which the test piece tears when pulled, divided by the thickness of the test piece.
Oil Resistance	This refers to the resistance of rubber to changes in volume or deterioration of physical properties due to contact with oil.
Flame Resistance	Properties which is hard to burn if touched flame and hard to keep burning with flame if ignition is caused.

Environmental Adaptation

Efforts to reduce environmental impact substances with consideration for biodiversity are progressing globally.
In Japan, environmental impact substances are specified by laws, industry associations, and green procurement standards of each company.
In our company, we grasp the raw materials of rubber sheets, and there is no intentional use or inclusion of the 10 substances targeted by the RoHS Directive (RoHS2). Moving forward, we will continue to monitor the trends of regulations, industries, and green procurement of each company, and respond flexibly to changes.

Features

●These products comply with the RoHS Directive (RoHS2) and the ELV Directive (*1).

■The raw materials for our rubber sheets do not contain any intentionally used substances restricted under the RoHS Directive (RoHS2) and the ELV Directive.

■For our rubber sheets, we can provide evidence documentation upon request.

■List of analyzed products (some examples)

Natural Rubber		Synthetic Rubber				Special Rubber	Urethane Rubber
Black Normal	〈65〉	CR-L	〈45〉	EPT-M	〈65〉	SR-50	TR100-90
Black Rubber	〈50〉		〈65〉	White EPT-M	〈65〉	SR-70	TR100-70
White Normal	〈65〉		〈90〉	Butyl	〈65〉	SPO-35R1	TR100-60
Green Ruber	〈70〉	NBR-L	〈70〉	Black CSM	〈70〉	TFB8010	TR100-50
Amber Rubber (40%)	〈50〉		〈90〉	SBR	〈65〉	FR〈HS80〉	TR200-90
Amber Rubber (60%)	〈45〉	EPT-L	〈70〉			FR Sponge	

For products other than those listed above, please contact us.

●Regarding to other regulations

In June 2007, the REACH regulation (*2) was implemented in Europe.

The addition of more regulated substances is considered even in the existing ELV Directive. Each country is also independently strengthening its own regulations, and the list of regulated substances is expected to continue growing. In response, industry associations and each company are working to establish and update their green procurement standards.

We have a detailed understanding of the raw materials used in our rubber sheets, and have been proactively working to reduce, minimize, and manage the chemical substances that are anticipated to be regulated, even before the regulations were put in place.

Our standard rubber sheets do not intentionally use or contain the following chemical substances that are anticipated to be regulated in the future.

PCB : Polychlorinated Biphenyl
PFOA : Perfluorooctanoic acid and its salts
PFOS : Perfluorooctanesulfonic acid and its salts
Asbestos
HBCD : Hexabromocyclododecane
Deca - BDE : Decabromodiphenyl ether

Regarding the REACH regulation Substances of Very High Concern (SVHC), the list is updated approximately every 6 months with additional substances. As a result, we need to investigate the compliance status with each update. Please contact us.

Notes

* 1: RoHS Directive = Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment in EU (RoHS2) (Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment in EU)
ELV Directive = End of Life Vehicles in EU

RoHS Control subjects	Threshold (*3)	RoHS Control subjects	Threshold (*3)
Lead and its compound	: 1,OOOppm	PPBDE (Polybrominated diphenyl ether)	: 1,OOOppm
Mercury and its compound	: 1,OOOppm	DEHP (Diethylhexyl phthalate)	: 1,OOOppm
Cadmium and its compound	: 1OOppm	BBP(Benzyl butyl phthalate)	: 1,OOOppm
Hexavalent chromium compound	: 1,OOOppm	DBP(Dibutyl phthalate)	: 1,OOOppm
PBB (Polybrominated biphenyl)	: 1,OOOppm	DIBP (Diisobutyl Phthalate)	: 1,OOOppm

(1,OOOppm = 0.10%)

* 2 : REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals in EU
* 3 : Threshold = The boundary value
In the case of RoHS Directive (RoHS2), if the content rate is less than the above value, it is considered to be compliant.

Natural Rubber

NR Sheet

Natural Rubber Sheet

NR Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.

●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.

●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Features

◆Excels in workability.

Appricaton

●General packing, gasket material

●Rubber mat

Black Normal Rubber sheet : Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 70℃×72h			Compression set 70℃×24h %	Elastic Modulus in static shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %				
Black Normal Sheet 〈65〉	64(64)	3.4{34.7}	290	+8	+7	- 15	35	0.84	AAH65133	TAKL6503

JIS K 6250

Features

◆Excels in mechanical.
◆Excels in abrasion resistance.
◆Excels in elasticity.

Application

●General packing, gasket material

●Rubber mat

Black Rubber Sheet: Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 70℃×72h			Compression Set 70℃×24h %	Elastic Modulus in static shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %				
Black Rubber Sheet 〈40〉	43(43)	8.2 {83.6}	610	+ 6	+18	+ 2	18		AAH40373	TAKM4007
〈50〉	48(48)	8.9 {90.8}	600	+ 4	+ 2	- 7	19	0.82	AAH50373	TAKM5007
〈60〉	60(60)	8.2 {83.6}	410	+ 7	+19	-12	23		AAH60363	TAKL6007
〈80〉	80(75)	9.7 {98.9}	270	+ 5	- 2	-13	20		AAH80323	TAKL8007
〈90〉	92(89)	10.4 {106.1}	300	+ 2	+ 6	-30	28		AAH90323	TAKL9005

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Colored Rubber Sheet: Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 70℃×72h			Compression Set 70℃×24h %	Elastic Modulus in static shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %				
White Normal Sheet 〈65〉	63(62)	5.4 {55.1}	480	+ 2	0	- 5	34	1.03	AAH65143	TAWL6504
〈85〉	85(81)	5.0 {51.0}	430	+ 5	-20	-22	50		AAH85142	TAWL8504
Red Normal Sheet 〈65〉	63(62)	8.1 {82.6}	640	+ 5	+ 2	-10	30		AAH65253	TARL6504
Green Normal Sheet 〈70〉	68(68)	8.7 {88.7}	570	+ 4	- 5	- 5	29	1.29	AAH70233	TAML7005
Gray Normal Sheet 〈65〉	68(68)	6.8 {69.4}	530	+ 1	- 1	- 8	43		AAH65133	TAHL6504

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Amber Natural Rubber Sheet: Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 70℃×72h			Compression set 70℃×24h %	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %			
Amber Rubber Sheet (40%) 〈50〉	48(47)	11.8 {120.4}	640	+ 3	+ 5	- 7	14	AAH50373	TAAL5007
(60%) 〈45〉	47(47)	19.1 {194.8}	680	+ 2	- 6	- 5	19	AAH45573	TAAH4512

● These items highlighted in this color are our standard products.

JIS K 6250

Synthetic Rubber

NBR Sheet

Acrylonitrile Butadiene Rubber Sheet

NBR Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.

●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.

●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Acrylonitrile butadiene rubber

Features

◆Excels in oil resistance

Applications

●Packing material for fuel

Black Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 100℃×72h		Compression Set 100℃×72h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	Volume Change Rate % ASTM#1	Volume Change Rate % IRM903				
NBR Sheet-L 〈50〉	51(50)	8.1{82.6}	550	+ 11	+ 3	- 34	- 8	+ 34	62		BEH50361	TNKL5005
〈60〉	60(59)	9.4{95.9}	560	+ 11	-15	-44	- 7	+ 32	75		BEH60351	TNKL6005
〈70〉	70(67)	12.2{124.4}	550	+ 6	+ 2	- 43	-13	0	67	1.15	BFH70341	TNKL7007
〈80〉	82(77)	8.4{85.7}	420	+ 6	+ 12	-35	- 7	+ 15	55		BFH80121	TNKL8005
〈90〉	90(87)	8.6{87.7}	360	+ 3	+ 18	- 6	- 4	+ 5	55	1.48	BFH90321	TNKL9007
NBR Sheet-M 〈30〉	33(27)	10.8{110.2}	1030	+ 5	- 9	-16	-14	+ 15	44		BEH30371	TNKM3007
〈40〉	41(37)	12.7{129.5}	800	+ 5	-40	-20	-15	+10	55		BFH40471	TNKM4010
〈50〉	53(48)	12.2{124.4}	710	+ 6	+ 4	-43	-19	+ 1	73		BFH50471	TNKM5010
〈60〉	61(58)	10.8{110.2}	570	+ 7	- 5	-30	- 9	+ 8	55		BFH60461	TNKM6010
NBR Sheet-H 〈50〉	52(51)	14.6{148.9}	610	+ 8	-15	-29	- 8	+ 21	27		BFH50471	TNKH5012
〈60〉	60(56)	11.3{115.3}	430	+ 6	0	-25	-10	- 2	52		BGH60461	TNKH6010
〈70〉	71(70)	16.1{164.2}	410	+ 7	- 5	-34	- 6	+ 4	31		BFH70451	TNKH7012
〈90〉	90(84)	17.8{181.6}	280	+ 5	+ 6	-39	- 5	+ 9	56		BFH90541	TNKH9015
Transformer NBR Sheet 〈70〉	70(65)	17.9{182.6}	470	+ 4	+ 4	-20	-19	+15	20		BFH70551	TNKH7015

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Color Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 100℃×72h		Compression Set 100℃×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	Volume Change Rate % ASTM#1	Volume Change Rate % IRM903				
White NBR Sheet-L 〈50〉	50(47)	11.1{113.2}	690	+ 2	− 27	− 21	− 4	+31	30		BEH50360	TNWL5005
〈60〉	65(63)	8.9{90.8}	710	+ 2	− 23	− 17	+ 3	+36	25	0.84	BEH65350	TNWL6507

JIS K 6250

Gasoline Resistant Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 70℃×72h			Oil Resistance 25℃×72h / 100℃×72h Volume Change Rate % Gasoline	Oil Resistance 25℃×72h / 100℃×72h Volume Change Rate % IRM903	Compression Set 100℃×72h %	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %					
NBR-G 〈70〉	73(71)	18.2{185.6}	280	+ 7	- 3	- 40	+ 9	- 2	34	BGH70451	TNKL7010-E

● These items highlighted in this color are our standard products.

JIS K 6250

Synthetic Rubber

CR Sheet

Chloroprene Rubber Sheet

CR Sheet

- These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
- The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
- The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Chloroprene Rubber

Features

- ◆Excels in weather resistance.
- ◆Excels in oil resistance.
- ◆Heat resistance is better than NR and NBR.

Applications

- ●Outdoor rubber mat.
- ●Flame-retardant sheet.

Black Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 100℃×72h		Compression set 100℃×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	Volume Change Rate % ASTM#1	Volume Change Rate % IRM903				
CR Sheet-L 〈30〉	30(29)	7.5{76.5}	670	+ 14	+ 19	-24	+ 4	+133	21		BBH30260	TCKL3005
〈40〉	40(36)	7.9{80.6}	540	+ 15	+ 20	-15	+ 7	+125	20		BBH40260	TCKL4005
〈45〉	44(43)	6.6{67.3}	440	+ 14	+ 11	-41	- 2	+ 86	20	0.52	BCH45160	TCKL4505
〈50〉	50(49)	7.3{74.5}	400	+ 15	+ 21	-23	+ 4	+ 90	16		BCH50260	TCKL5005
〈55〉	56(56)	8.6{87.7}	360	+ 14	+ 3	-28	+ 6	+ 86	16		BCH55260	TCKL5505
〈65〉	65(64)	8.5{86.7}	310	+ 8	-20	-35	+ 18	+ 86	18	1.14	BCH65350	TCKL6507
〈70〉	70(69)	7.2{73.4}	280	+ 15	+ 19	-23	+ 5	+ 44	22		BDH70240	TCKL7005
〈80〉	81(78)	10.8{110.2}	390	+ 8	- 3	-31	+ 18	+ 99	19		BCH80320	TCKL8007
〈90〉	91(88)	10.6{108.1}	190	+ 7	+ 18	-32	+ 1	+ 54	21	1.74	BDH90320	TCKL9007
CR Sheet-M 〈50〉	49(49)	13.9{141.8}	690	+ 12	+ 5	- 3	- 3	+ 105	21		BCH50460	TCKM5010
〈60〉	59(55)	11.5{117.3}	440	+ 12	- 2	-34	- 4	+ 32	14		BEH60460	TCKM6010
〈70〉	72(72)	10.8{110.2}	270	+ 7	+ 4	-31	- 3	+ 30	19		BEH70450	TCKM7010
〈80〉	81(79)	11.8{120.4}	200	+ 6	+ 10	-32	- 3	+ 33	20		BEH80420	TCKM8010
CR Sheet-H 〈50〉	47(44)	14.2{144.8}	400	+ 10	- 1	-22	- 2	+ 85	11		BCH50560	TCKH5014
〈60〉	60(59)	16.1{164.2}	570	+ 8	-12	-28	+ 3	+ 83	17		BCH60560	TCKH6015

JIS K 6250

Color Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil resistance 100℃×72h		Compression set 70℃×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	Volume Change Rate % ASTM#1	Volume Change Rate % IRM903				
White CR Sheet-L 〈50〉	50(49)	10.4 {106.1}	650	+11	−10	−28	+ 3	+86	16		BCH50260	TCWL5005
〈60〉	63(61)	8.0 {81.6}	630	+ 6	−27	−22	+20	+87	23	0.94	BCH60260	TCWL6006
〈80〉	83(78)	8.1 {82.6}	390	+ 5	− 8	−26	+22	+88	35		BCH80220	TCWL8006
Gray CR Sheet-L 〈60〉	60(57)	9.0 {91.8}	590	+ 9	−15	−25	+22	+104	28		BCH80260	TCHL6006
Green CR Sheet-L 〈60〉	58(54)	9.2 {93.8}	640	+ 3	−28	−30	+24	+114	22		BCH60260	TCML6005

JIS K 6250

● These items highlighted in this color are our standard products.

EPT Sheet

Ethylene-Propylene Terpolymer Rubber Sheet

EPT Sheet

- These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
- The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
- The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Ethylene-Propylene Terpolymer Rubber

Features

- ◆Excels in weather resistance.
- ◆Excels in ozone resistance.
- ◆Excels in cold resistance.
- ◆Excels in heat resistance.

Applications

- Seal material for window frame.
- Bulletin Board.

Black Rubber Sheet : Properties

Item Name \ Properties		General Properties			Heat-Resistant Aging 100℃×72h			Compression set 70℃×24h %	Ozone Resistance Ozone500ppb (50pphm)40°C 20% Elongation	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %					
EPT Sheet-L	〈40〉	43(43)	16.6{169.3}	720	+ 6	-22	-16	24	144h No Change		BAH40360	TEKL4007
	〈50〉	50(49)	8.4{85.7}	580	+10	- 5	-26	23	〃		BAH50360	TEKL5007
	〈60〉	61(61)	10.9{111.2}	560	+ 8	- 1	-22	22	〃		BAH60360	TEKL6007
	〈65〉	64(62)	8.4{85.7}	370	+ 9	- 5	-47	20	〃		BAH65360	TEKL6507
	〈70〉	74(72)	9.7{98.9}	480	+ 5	- 4	-32	24	〃	1.19	BAH70340	TEKL7007
	〈80〉	81(79)	12.5{127.5}	370	+ 9	- 8	-32	31	〃		BAH80320	TEKL8010
	〈90〉	89(87)	11.9{121.4}	430	-	-	-	29	〃		BAH90320	TEKL9007
EPT Sheet-M	〈50〉	49(47)	11.7{119.3}	810	+ 5	-25	-40	16	1000h No Change		BAH50470	TEKM5010
	〈60〉	60(59)	12.6{128.5}	560	+ 8	- 3	-32	10	〃		BAH60460	TEKM6010
	〈65〉	62(61)	13.3{135.7}	630	+ 5	- 6	-31	11	〃	0.8	BAH65460	TEKM6510
	〈70〉	70(69)	12.0{122.4}	540	+ 5	+ 9	-30	11	〃		BAH70450	TEKM7010
	〈80〉	77(76)	13.8{140.8}	440	+ 5	+ 9	-22	14	〃		BAH80420	TEKM8010

JIS K 6250

Color Rubber Sheet : Properties

Item Name \ Properties		General Properties			Heat-Resistant Aging 100℃×72h			Compression set 70℃×24h %	Ozone Resistance Ozone500ppb (50pphm)40°C 20% Elongation	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %					
White EPT Sheet-M	〈65〉	66(63)	11.5 {117.3}	650	＋4	−26	−17	35	1000h No Change	1.23	BAH65350	TEWM6507
Gray EPT Sheet-L	〈60〉	59(57)	7.5 {76.5}	810	＋4	−26	−39	35	72h No Change		BAH60360	TEHL6007
Gray EPT Sheet-M	〈60〉	60(58)	11.0 {112.2}	720	＋4	−15	−28	32	1000h No Change		BAH60360	TEHM6007

JIS K 6250

Special Rubber Sheet (Heat-resistant grade) : Properties

Item Name \ Properties		General Properties			Heat-Resistant Aging 125℃×72h			Compression set 70℃×24h %	Ozone Resistance Ozone 500ppb (50pphm)40°C 20% Elongation	JIS K 6380 Corres-Ponding No.	Item Number
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %				
EPT Special Sheet	〈40〉	40(39)	10.3 {105.1}	660	+ 2	+ 4	0	19	1000h No Change	CAH40360	TEKH4007A
	〈50〉	53(50)	11.6 {118.3}	550	+ 2	+ 5	+12	17	〃	CAH50470	TEKH5008A
	〈55〉	56(53)	14.9 {152.0}	460	+ 7	+ 12	- 9	15	〃	CAH55470	TEKH5510A
	〈60〉	60(57)	15.0 {153.0}	530	+ 5	+ 3	-10	26	〃	CAH60360	TEKH6007A
	〈70〉	71(66)	12.7 {129.5}	490	+ 2	0	- 7	16	〃	CAH70450	TEKH7008A
	〈80〉	80(77)	16.3 {166.3}	300	- 3	+ 2	- 9	8	〃	CAH80420	TEKH8010A
	〈90〉	93(91)	14.3 {145.9}	220	+ 2	+ 1	-26	12	〃	CAH90420	TEKH9010A

JIS K 6250

- These items highlighted in this color are our standard products.

Synthetic Rubber

I I R Sheet

Isobutene-Isoprene Rubber Sheet

- These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
- The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
- The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Isobutene-Isoprene : Butyl rubber

Features

- ◆Excels in chemical resistance.
- ◆Excels in gas permeability resistance.
- ◆Excels in heat aging resistance.

Applications

- ●Packing material for air (gas) duct.
- ●Acid resistant packing material.

■Black Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 70℃×72h Volume Change Rate %		Compression Set 100℃×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	ASTM#1	IRM903				
Butyl Sheet 〈50〉	50(48)	7.1 {72.4}	600	+17	+ 9	-35	—	—	67	—	AAH50261	TIKM5005
〈65〉	67(65)	6.7 {68.3}	450	+12	+15	-49	+64	+153	54	0.8	BAH65252	TIKM6505

JIS K 6250

■Color Rubber Sheet : Properties

Item Name \ Properties	General Properties			Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	
White Butyl Sheet 〈65〉	64(63)	9.0 {91.8}	600	TIWL6505

JIS K 6250

●These items highlighted in this color ■ are our standard products.

Synthetic Rubber

CSM Sheet

Chloro-Sulfonated polyethylene Rubber Sheet

Chloro-Sulfonated polyethylene

Features

- ◆Excels in chemical resistance (strong acid).
- ◆Excels in weatherability.
- ◆Excels in ozone resistance.

Applications

- ●Acid resistant packing material.

■Black Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 100℃×72h Volume Change Rate %		Compression set 100℃×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	ASTM#1	IRM903				
Black CSM Sheet 〈70〉	69(65)	17.4 {177.5}	270	+ 6	+ 9	+20	- 3	+56	62	1.03	BAH70451	THKM7010

JIS K 6250

■Color Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat-Resistant Aging 100℃×72h			Oil Resistance 100℃×72h Volume Change Rate %		Compression Set 70℃×24h %	JIS K 6380 Corres-Ponding No.	Item Number
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	ASTM#1	IRM903			
White CSM Sheet 〈60〉	59(57)	14.2 {144.8}	640	+ 6	- 8	-30	-14	+40	40	BAH60460	THWM6010

JIS K 6250

● These items highlighted in this color ■ are our standard products.

Synthetic Rubber

SBR Sheet

Styrene Butadiene Rubber Sheet

SBR Sheet

- These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
- The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
- The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Styrene Butadiene Rubber

Features

- ◆Excels in cold resistance.
- ◆Excels in heat resistance.

Applications

- ●General packing and gasket material.

■ Black Rubber Sheet : Properties

Item Name \ Properties		General Properties			Heat-Resistant Aging 70°C × 72h			Compression Set 70°C×24h %	JIS K 6380 Corres-Ponding No.	Item Number
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %			
SBR Sheet	〈50〉	48（48）	18.1 {184.6}	650	+ 2	-21	-22	24	AAH50455	TSKM5010
	〈60〉	60（60）	8.2 {83.6}	410	+ 7	+19	-12	23	AAH60363	TSKL6007
	〈65〉	66（64）	8.9 {90.8}	340	+ 8	+4	-16	22	AAH65233	TSKL6505
	〈70〉	68（67）	12.8 {130.6}	470	+ 2	0	-2	11	AAH70453	TSKM7010
	〈90〉	92（89）	10.4 {106.1}	300	+ 2	+6	-30	28	AAH90343	TSKL9007

JIS K6250

Specialty Elastomer

SR Sheet

Silicone Rubber Sheet

- Silicone Rubber Sheet
- Ultrathin Silicone Rubber Sheet
- SG Sheet（N Type・F Type）
- FSR-100（0.2）

Silicone Rubber

Silicone Rubber Sheet

Features

◆Excels in ozone resistance and weather resistance.

◆ Usable in wide temperature range of -60～200°C.

◆Excels in insulation resistance.

Applications

●Parts for electronic device.

●Heat resistant packing material.

●Electric isolating sheet.

■ Silicone Rubber Sheet : Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 200°C × 72h			Oil Resistance 150°C×72h	Compression Set 200°C×24h %	Elastic Modulus in Static Shear MPa	JIS K 6380 Corres-Ponding No.	Note
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	Volume Change Rate % IRM903				
SR-30	30(30)	6.9 {70.4}	720	- 5	-24	+ 8	+69	36		FAH30140	—
SR-40	40(40)	8.7 {88.7}	490	0	- 1	- 8	+59	35		FAH40260	—
SR-50	51(51)	10.3 {105.1}	410	+ 1	-24	-27	+49	41	0.7	FAH50250	General
SR-60	61(61)	8.2 {83.6}	310	+ 3	+ 6	-22	+42	20		FAH60240	—
SR-70	70(70)	6.3 {64.3}	240	+ 2	+14	-27	+35	23	1.5	FAH70230	General
Red SR-40	40(40)	8.7 {88.7}	460	+ 1	- 2	- 7	+56	31		FAH40260	—
Red SR-50	50(50)	9.1 {92.8}	390	+ 1	-10	-18	+51	31	0.7	FAH50250	General
Red SR-60	60(60)	8.7 {88.7}	320	+ 1	- 1	-26	+42	24		FAH60240	—
Red SR-70	68(68)	6.9 {70.4}	240	+ 5	+13	-26	+39	24		FAH70230	—
SR-1050	53(53)	9.5 {96.9}	690	+ 3	-14	-13	+60	53		FAH50350	High-strength
SR-151	51(51)	10.8 {110.2}	520	+11	- 1	-20	+57	59		—	—

JIS K 6250

●Please consult us in advance because there is a case even general item might be a custom-made product depending on the size.

● These items highlighted in this color are our standard products.

Ultrathin SR Sheet

Features

◆ Excels in heat resistance.

Applications

● Parts for electronic device.

■ High Precision Ultrathin SR Sheet Black
One side cloth pattern / sandy surface: Properties

Properties / Item Name	General Properties		
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %
Ultrathin SR Sheet Black One side cloth pattern / sandy surface	50	8.5 {86.7}	390

JIS K 6250

■ Specification

Product Dimension (Standard Size)			Color Standard
Thickness mm	Width m	Length m	
0.2	1	2	Black

● Although the standard length is 2M, it can be changed depending on an application.

● Thickness tolerance: ±0.05

Features

◆Excels in flexibility, heat resistance, weather resistance and chemical resistance.

◆Easy to handle by use of PET film as base material and excels in dimensional processability.

Applications

● Parts for electronic device.

■ High Precision Ultrathin SR Sheet :Properties

Properties / Item Name	General Properties		
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %
Ultrathin SR Sheet	47	9.4 {95.9}	460

■ Specification

Product Dimension (Standard Size)			Surface Condition
Thickness m	Width m	Length m	
0.1～0.3	500	10	Mirrored

JIS K 6250

● This product shrinks approx. 2.5% in the case that the laminated PET film is peeled off.

● Thickness tolerance:±0.02 for 0.1t and 0.2t, ±0.03 for 0.3t.

Silicone Rubber Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

SG Sheet (N type・F type)

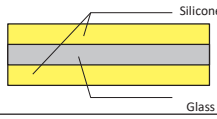
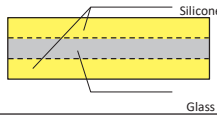
Features

◆Excels in tensile strength.
◆Excels in tear resistance.

Applications

●Parts for electronic device.
●Various type of heat / cold resistant belt.
●Packing material.(dryer and business machine.)
●Cover for heavy industry machine.

■ Structure and types

Item Name	Structure	Product Dimension (Standard Size)			Color Standard
		Thickness mm	Width m	Length m	
N type	 Glass cloth sandwiched between silicone rubber	0.8 1.0 1.2 1.5	1	2	Red
F type	 Glass cloth impregnated with silicone rubber	0.25	1	2	Red

●The standard length is 2m but can be freely changed in accordance with the application.
●Specifying of the color is possible. (Please consult us in advance by reason of the necessity of a certain production lot.)
●For SG sheet (N type) of which thickness is more than 2mm, the product name shall be "SR sheet with glass cloth" and the standard length is 2m.

FSR-100 (0.2)

Composite sheet of Fluoroplastic Film, silicone rubber and reinforcing cloth.

Features

◆Excels in non-tackiness.
◆Excels in chemical resistance.
◆Excels in slipperiness.
◆Excels in heat resistance.

Applications

●Diaphragm
●Cushion

■ Structure Example

Item Name	Structure	Size		
		Thickness mm	Width m	Length m
FSR-100 (0.2)		1.0～3.0	1	2

●Please consult us on sizes other than the above listed.

Specialty Elastomer

Silicone Sponge Sheet

Silicone Sponge Sheet

- Highly Foamed Silicone Rubber Sponge Sheet
- Low Foamed Silicone Rubber Sponge Sheet
- Flame-retardant silicone sponge sheet

Highly Foamed Silicone Rubber Sponge Sheet

Features

◆Excels in heat insulating properties. ◆Closed cell structure.

◆Excels in impact resilience. ◆Expansion ratio: Approximately 4 fold.

◆Generally usable range of -60～+200°C, depending on the degree of compression.

◆Softer and smoother than Low Foamed Silicone Rubber Sponge Sheet and has fine-cell geometry.

Applications

●Various gaskets, packings and etc.

●Heat resistant cushion materials.

●Heat insulating material.

●Electronic parts, electrical parts and automobile parts.

■ Highly Foamed Silicone Rubber Sponge Sheet : Properties

Properties / Item Name	Apparent Density g/cm³	General Properties			Compression set 150°C × 24h %	Heat-Resistant Aging 230°C×72h			Heat Thermal Conductivity W/(m•K)	Color Standard
		Hardness Type E	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %		Hardness Type E	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %		
SR Sponge Sheet E15	0.33	15(15)	1.0 {10.2}	250	8	+ 2	−55	−48	5.5×10^{-2}	Red

JIS K 6250

●Condition of compression set : Measured in 3hrs after removing 40% compression load.
●Please consult us the grades other than listed above.
●Test method of the heat thermal conductivity : Compliant with JIS A 1414-2: 1999 (HFM method)
●Please consult us on colors other than the above mentioned standard color.

■ Dimension : Width × Length : □500mm

Thickness mm	Tolerance mm	Surface Condition	
		Both sides skin	One side skin
1.5	±0.3	×	○
2	±0.4	×	○
3	±0.4	×	○
4	±0.4	○	○
5	±0.5	○	○

Thickness mm	Tolerance mm	Surface Condition	
		Both sides skin	One side skin
6	±0.5	○	○
7	±0.7	○	△
8	±0.8	○	○
10	±1.0	○	○
12	±1.2	○	△

Thickness mm	Tolerance mm	Surface Condition	
		Both sides skin	One side skin
15	±1.5	○	○
20	±2.0	○	×
30	±3.0	○	×

○: Available ×: Unavailable △: Please consult us.
● Please consult us on sizes other than the above listed.

Low Foamed Silicone Rubber Sponge Sheet

Features

◆Excels in heat insulating properties. ◆Semi open cell.

◆Excels in impact resilience. ◆Expansion ratio: Approximately double.

◆Generally usable range of -60～+200°C, depending on the degree of compression.

◆ Larger size is available than Highly Foamed Silicone Rubber Sponge Sheet.

Applications

●Various gaskets, packings and etc.

●Heat resistant cushion materials.

●Heat insulating material.

●Electronic parts, electrical parts and automobile parts.

■ Low Foamed Silicone Rubber Sponge Sheet : Properties

Properties / Item Name	Apparent Density g/cm³	General Properties			Compression set 150°C×24h %	Heat-Resistant Aging 230°C×72h			Heat Thermal Conductivity W/(m•K)	Color Standard
		Hardness Type E	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %		Hardness Type E	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %		
SR Sponge Sheet SP0-35R1	0.54	35(35)	4.9 {50.0}	370	19	−12	−54	−20	1.2×10^{-1}	Red

JIS K 6250

●Condition of compression set : Measured in 30 min. after removing 25% compression load.
●Please consult us on colors other than the above mentioned standard color.
●Please consult us on grades other than listed above.
●Test method of the heat thermal conductivity : Compliant with JIS A 1414-2: 1999 (HFM method)

■ Dimension : Width(1m)×Length(2m) ・ Surface Condition: with both side skin

Thickness mm	Tolerance mm
2	±0.5
3	±0.5
4	±0.5
5	±0.5

Thickness mm	Tolerance mm
6	+0.6 −0.5
7	+0.7 −0.5
8	+0.8 −0.5
10	+1.0 −0.5

Thickness mm	Tolerance mm
11	+1.1 −0.5
12	+1.2 −0.5
15	+1.5 −0.75
20	+2.0 −1.0

●1m×3m is also available as custom made product.
●These items highlighted in this color are our standard products.
●Please consult us on sizes other than listed above.

Silicone Sponge Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Flame-retardant silicone sponge sheet

《Flame-retardant》

2.1mm(t): Equivalent to UL94HBF
5.0mm(t) with both sides skin:
Equivalent to UL94V-O

Features

◆Excels in flame-retardancy.
◆Expansion ratio: Approximately 3.5 fold

Applications

●Various gaskets, packings and etc.
●Heat resistant cushion materials.
●Heat insulating material.
●Electronic parts, electrical parts and automobile parts.

Flame-retardant silicone sponge sheet : Properties

Properties / Item Name	Apparent Density g/cm³	General Properties			Compression set 150℃×24h %	Heat-Resistant Aging 230°C×72h			Heat Thermal Conductivity W/(m•K)	Color Standard
		Hardness Type E	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %		Hardness Type E	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %		
Flame-Retardancy SR Sponge Sheet E20	0.36	20(20)	0.7{7.1}	190	16	+ 2	-30	-45	6.1×10^{-2}	Gray

JIS K 6250

● Condition of compression set : Measured in 3hrs after removing 40% compression load.

Dimension : Width × Length : □500mm

Thickness mm	Tolerance mm	Surface Condition	
		With both side skin	One side skin
1.5	±0.3	×	△
2	±0.4	×	○
3	±0.4	×	○
4	±0.4	○	△
5	±0.5	○	○

Thickness mm	Tolerance mm	Surface Condition	
		With both side skin	One side skin
6	±0.5	△	△
7	±0.7	△	△
8	±0.8	△	△
10	±1.0	○	△
12	±1.0	△	△

Thickness mm	Tolerance mm	Surface Condition	
		With both side skin	One side skin
15	±1.5	○	○
20	±2.0	○	×
30	±3.0	○	×

○: Available ×: Unavailable △: Please consult us.
● Please consult us on sizes other than listed above.

Specialty Elastomer

FR Sheet

Fluoro Rubber Sheet

Fluoro Sheet

- These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
- The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
- The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Fluoro Rubber

Features

- ◆Excels in chemical, oil, and solvent resistance.
- ◆Excels in weather and ozone resistance.
- ◆Excels in heat aging resistance more than silicone rubber.

Applications

- ● Special packing material.
- ● Corrosive-resistant packing material.

Fluoro Rubber Sheet : Properties

Properties / Item Name	General Properties			Heat-Resistant Aging 275°C×72h			Oil resistance 150°C×72h	Compression set 150°C×72h
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	IRM903 Volume Change Rate %	%
TFB 8010	81(76)	16.0 {163.2}	230	+ 7	−13	−39	− 4	20
FRSheet〈HS80〉	78(75)	10.5 {107.1}	360	+ 5	−53	−51	+ 3	47
TFB 6007	62(60)	9.3 {94.9}	320	+ 4	+13	−15	+ 7	12

JIS K 6250

- ●These items highlighted in this color are our standard products.
- ●TFB 8010 is not an electric isolating type.
- ●Please consult us about the thickness tolerance of TFB6007.

Specialty Elastomer

Aflas® Rubber Sheet

(Aflas® : Trade name of fluoro rubber of Asahi Glass Co., Ltd.)

Features

- ◆ Excels in inorganic chemical resistance.
- ◆ Excels in heat aging resistance.
- ◆ Excels in steam resistance.

Applications

- ● Packing material for steam ducting.
- ● Heat resistant and non-contaminating packing material.

Aflas®Rubber Sheet : Properties

Properties / Item Name	General Properties			Heat-Resistant Aging260°C × 10day			Oil resistance 150°C×72h	Compression set 150°C×72h	Note
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	IRM903 Volume Change Rate	%	
Aflas® Rubber Sheet	82(75)	17.6 {179.5}	210	0	-50	- 4	+ 7	27	Special order product

JIS K 6250

Specialty Elastomer

Fluoro Rubber Sponge Sheet

Fluoro Sponge Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Fluoro Rubber

Features

◆Excels in heat resistance.
◆Excels in solvent resistance.
(Particularly highly-polar solvent.)
◆Excels in acid, alkali, alcohol, and oil resistance.
◆Excels in weather and ozone resistance.
◆Expansion ratio: Approximately 4.5 fold.
◆Closed cell.

Applications

●Electronic parts and electrical parts.
●Various packing materials.
●Heat resistant cushion materials.

Fluoro Sponge Sheet : Properties

Properties / Item Name	Apparent Density g/cm³	General Properties			Tension Set %	Impact Resilience %	Color Standard
		Hardness Type E	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %			
FR Sponge Sheet	0.42	36(36)	2.7 {27.5}	270	9	16	Black

JIS K 6250

Dimension

Thickness mm	Tolerance mm	Width × Length mm	Surface Condition		
			Both sides skin	One side skin	Without skin
2	±0.4		×	○	
3	±0.4		×	○	
4	±0.4		○	△	△
5	±0.5	□300	×	○	
6	±0.5		○	△	
7	±0.7		○	△	
10	±1.0		○	×	×
2	±0.4		×	○	
5	±0.5	□500	○	○	△
6	±0.5		○	△	
10	±1.0		○	×	×
2	±0.5		×	×	○
3	±0.5	M×M	×	×	○
5	±0.5		×	○	×
10	+1.5 −1.0		○	×	×

○: Available ×: Unavailable △: Contact us
● Please consult us on sizes other than the above listed.

Compression Set

Test Condition	%
20℃×24h	6
70℃×24h	73
100℃×24h	81

JIS K 6250

● Condition of compression set : Measured in 3hrs after removing 40% compression load.

Heat Thermal Conductivity

Heat Thermal Conductivity W/(m・k)
5.9×10^{-2}

● Test Method : Compliant with JIS A 1414-2: 1999 (HFM method)

Heat Resistant Aging

Test Condition	Hardness Type E	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %
150℃×72h	+ 4	+11	−19
200℃×72h	+ 5	+15	−11
250℃×72h	+ 5	− 6	+ 7

JIS K 6250

Polyurethane Rubber

Urethane Rubber Sheet (Ti-Prene Sheet)

Urethane Rubber Sheet

●These products should not be incinerated wherever possible because harmful gas to humans might be generated if they are improperly burned.
●The user is requested to confirm degree of discoloration and contamination by using sample in the case of use contacting with the other items.
●The life of these products at actual use are greatly affected by condition of the use. The user is requested to confirm it by using sample in the case of use under severe condition.

Ti-Prene®

About Urethane Rubber Sheet (Ti-Prene Sheet)

Rubber-like elastic bodies obtained by the reaction of polyester or polyether with isocyanate are collectively called urethane rubber. Ti-Prene® is a trademark of our urethane rubber.

Features

Mechanical Strength
Due to its chemical structure, it has a strong secondary bond between molecules, so it has the highest strength among elastic bodies, and because of its high modulus, it is to be less deformed and can withstand heavy loads even with small objects. Due to its high hardness and high elongation, it is to be less susceptible to damage due to impact.

Abrasion Resistance
It has more than 10 times more abrasion resistance than natural rubber. It is to be superior to metal in some conditions of use.

Oil Resistance
It has excellent resistance to most oils, including petroleum-based oils. Especially excellent for mineral oil (only for use at room temperature)

Heat Resistance
The using limit temperature is 70 ℃.
Avoid using continuously at 70 ℃ or more.

Cold Resistance
It has rubber elasticity and mechanical strength even at -25 ℃ or less.

Water Resistance
Please avoid using it in a hot and humid environment because it has the property of being easily hydrolyzed.

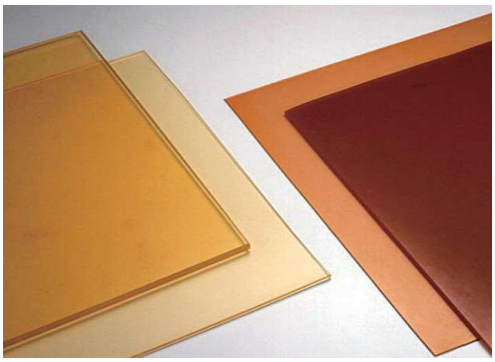
Ozone Resistance
It is hardly affected by ozone because it does not contain unsaturated parts in its molecular structure.

Weather Resistance
Please be noted that when used outdoors for a long period of time, the effects of water, humidity, light, etc. may cause deterioration of physical properties and discoloration.

● May cause deterioration of physical properties and discoloration.

Applications

- ●General packing, gasket material.
- ●Cushion material.
- ● Coupling.
- ● Bush.
- ● Scraper.
- ● Base material for rollers.
- ● Spring, dice.



Urethane Rubber Sheet : Properties

Properties / Item Name	General Properties			Tensile Stress M300 MPa{kgf/㎠}	Tear Resistance kN/m {kgf/cm}	Compression Set 70℃×24h %	Abrasion Loss cc/1000 time	Impact Resilience %	Note
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %						
TR100-90	91(89)	52.1 {531.4}	430	21.2 {216.2}	90.3 {92.1}	27	0.080	34	Standard material (Polyester basis)
TR100-70	70(69)	27.7 {282.5}	630	3.6 {36.7}	36.4 {37.1}	28	0.200	50	
TR100-60	60(60)	23.7 {241.7}	740	3.2 {32.6}	36.6 {37.3}	37	0.300	40	
TR100-50	50(50)	26.6 {271.3}	610	2.5 {25.5}	28.6 {29.2}	10	0.100	31	
TR200-90	91(89)	35.1 {358.0}	430	21.7 {221.3}	86.8 {88.5}	30	0.370	37	Standard material (Polyether basis)
TR1000-90	90(90)	42.0 {428.4}	450	16.0 {163.2}	74.7 {76.2}	24	0.080	50	Special grade (Polyether basis)

JIS K 6250

● Abrasion loss is by Akron abrasion test.
● Please consult us about various grades other than listed above.

Ti-Prene® Sheet

Dimension

Thickness mm	Tolerance m	Thickness Deviation mm	Width m	Length m	TR200-90	TR100-90	TR100-70	TR100-60	TR100-50
1	+0.15 −0.1	0.2			○	○	○	○	○
1.5	+0.15 −0.1	0.2			○	○	○	○	○
2	+0.2 −0.1	0.2			○	○	○	○	○
3	±0.2	0.2			○	○	○	○	○
4	±0.2	0.2			○	○	○	○	○
5	+0.3 −0.2	0.3			○	○	○	○	○
6	+0.3 −0.2	0.3			○	○	○	○	○
7	±0.3	0.3			○	○	○	○	○
8	±0.3	0.3			○	○	○	○	○
9	±0.3	0.3	1	2	○	○	○	○	○
10	±0.3	0.3			○	○	○	○	○
12	±0.4	0.4			○	○	○	○	○
15	±0.5	0.5			○	○	○	○	○
20	+1.5 0	0.8			○	○	○	○	○
25	+1.5 0	0.8			○	○	○	○	○
30	+1.5 0	0.8			○	○	○	○	○
35	+2.0 0	1.0			○	○	○	△	△
40	+2.0 0	1.0			○	○	○	○	○
45	+2.5 0	1.5			○	○	○	△	△
50	+2.5 0	1.5			○	○	○	○	○
55	+2.5 0	1.5			○	△	△	△	△
60	+2.5 0	1.5			○	○	△	△	△
70	+2.5 0	1.5	1	1	○	○	△	△	△
80	+3.0 0	2.0			○	△	△	△	△
90	+3.0 0	2.0			○	△	△	△	△
100	+3.5 0	2.0			○	△	△	△	△

○: Available △: Please consult us.

● Please consult us on grades and sizes other than listed above.

Antistatic Urethan Rubber (Ti-Prene®)

This urethane rubber has antistatic properties, unlike conventional general-purpose urethane rubber.

Properties / Item Name	General Properties			Tensile Stress M300 MPa{kgf/cm²}	Tear Resistance kN/m {kgf/cm}	Compression Set 70℃ × 24h %	Abrasion Loss cc/1000 time	Impact Resilience %	Note
	Hardness Type A	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %						
Black TR200-90E	89 (88)	31.3 {319.3}	510	14.0 {142.8}	77.4 {78.9}	32	0.400	36	Special Grade (polyether)

JIS K 6250

Properties / Item Name	Volume Intrinsic Resistivity Ω・cm
Black TR200-90E	3.8×10^{9}

※TR200-90 Volume Intrinsic Resistivity : $5.5X10^{13}$

Function, rubber sheet according to a use

Conductive Rubber Sheet

- EP Sheet (EP-2 Type、EP-5 Type)
- EC Sheet
- ECC-8 Sheet
- EC-8N (with cloth) Sheet
- EC-8H Sheet

EP Sheet (EP-2 Type・EP-5 Type)

Type

EP-2	**Resistivity Value 102Ω•cm Type** (Material : 3 types : Natural rubber, CR system, NBR system)
EP-5	**Resistivity Value 105Ω•cm Type** (Material : 3 types : Natural rubber, CR system, NBR system)

EP Sheet : Properties

Properties \ Item Name		Unit	EP-2			EP-5		
			REP-2 Natural Black Rubber	CEP-2 CR Black Rubber	NEP-2 NBR Black Rubber	REP-5 Natural Black Rubber	CEP-5 CR Black Rubber	NEP-5 NBR Black Rubber
General Properties	Hardness	Type A	65(65)	62(60)	72(69)	72(72)	72(71)	73(71)
	Tensile Strength at Break	MPa{kgf/㎠}	15.7 {160.1}	12.5{127.5}	21.3{217.3}	16.2{165.2}	12.0{122.4}	9.9{101.0}
	Elongation at Break	%	410	310	430	310	230	250
Heat Aging Resistance	–	Test Condition	70℃×72h	100℃×72h	100℃×72h	70℃×72h	100℃×72h	100℃×72h
	Hardness Change	Type A	+ 6	+18	+ 8	+3	+16	+10
	Change Rate of Tensile Strength at Break	%	-15	-10	- 4	- 5	- 2	+ 6
	Change Rate of Elongation at break	%	-33	-40	-32	-24	-49	-42
Compression Set		Test Condition	70℃×24h	100℃×72h	100℃×72h	70℃×24h	100℃×72h	100℃×72h
		%	20	35	34	13	35	47
Oil Resistance	–	Test Condition	70℃ × 24h	100℃×72h	100℃×72h	–	100℃×72h	100℃×72h
	ASTM #1Volume Change Rate	%	–	+13	- 3	–	+19	- 1
	IRM903Volume Change Rate	%	–	+92	+28	–	+95	+29
Volume Intrinsic Resistivity	Before Heat Aging	Ω·cm	0.9×10^{2}	1.2×10^{2}	1.2×10^{2}	5.1×10^{4}	1.4×10^{4}	8.6×10^{4}
	After Heat Aging	Test Condition	70℃×24h	100℃×72h	100℃×72h	–	–	–
		Ω·cm	1.2×10^{2}	0.5×10^{2}	1.7×10^{2}	–	–	–

- Thickness of the product is 1-5mm.
- Please consult us for a conductivity depends on its usage.

JIS K 6250

EC Sheet (One Color)

ECC-8 Sheet (Consists of laminate of colored sheet (1mm) and black

Structure

EC Sheet / ECC-8Sheet : Properties

Properties \ Item Name		Unit	EC-8(ECC-8)
Hardness		Type A	70(62)
Oil Resistance	ASTM # 1 Volume Change Rate	%	+ 1
	IRM903 Volume Change Rate	%	+35
Volume Intrinsic Resistivity	Before Heat Aging	Ω·cm	7.9×10^{8}
	After Heat Aging 70℃×72h	Ω·cm	2.5×10^{8}

- Please refer to P.23 for Volume Intrinsic Resistivity.

Dimension

Item Name	Thickness mm	Width m	Length m	Color Standard
EC	1～3	1	10	Green
ECC	2～3	1	10	Green

- Please consult us on sizes other than the above listed.

EC-8N (Cloth-inserted) Sheet

Resistivity Value $10^8\Omega$•cm Type

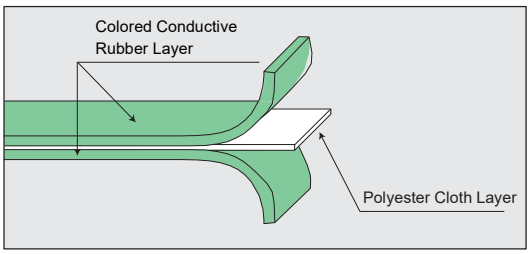
Features

◆Construction without back or front making it free of "distortion" and "warpage" caused by prolonged use.

◆In addition to the high surface hardness, polyester cloth is filled in the middle making the movement of asters and trucks smooth.

◆ NBR formulation makes it excellent in oil resistance and chemical resistance.

■ Structure



■ Dimension

Item Name	Thickness (mm)	Width (m)	Length (m)	Color Standard
EC-8N	2	1	10	Green
	3	1	10	Green

● Please consult us on sizes other than the above listed.

EC-8H Sheet

Features

◆ Optimum hardness against writing instrument pressure.

◆ EC-8H Sheet is a colored type with white as standard.

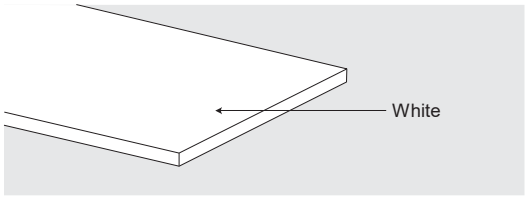
◆ EC-8H Sheet is a colored type with white as standard.

Applications

● Automatic drafting machine drawing board

● Suitable for tables used for writing characters, etc.

■ Structure



■ EC-8H properties

Properties / Item Name	General Properties			Volume Intrinsic Resistivity Ω·cm
	Hardness Type A	Tensile strength at Break MPa{kgf/cm²}	Elongation at Break %	
EC-8H	95 (93)	9.4{95.9}	160	6×10^9

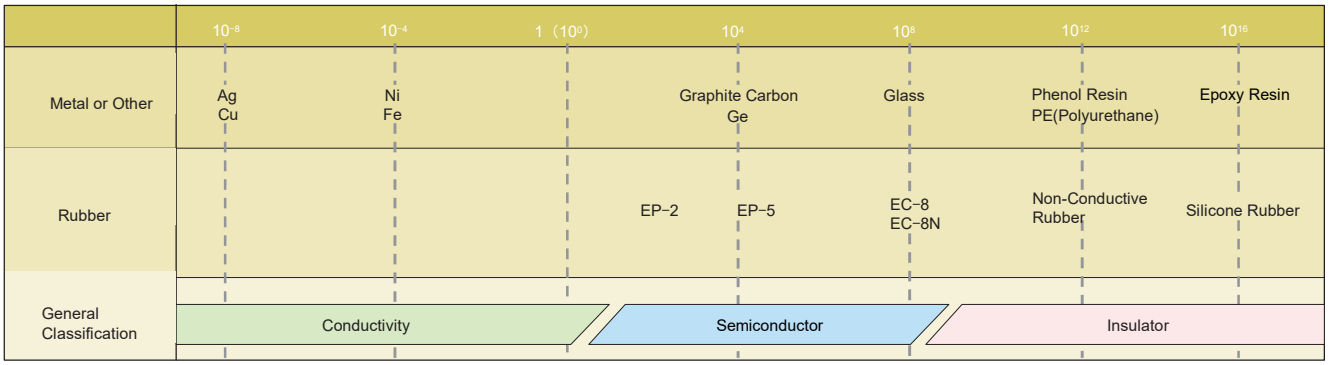
JIS K 6250

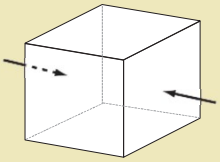
■ Dimension

Item Name	Thickness (mm)	Width (m)	Length (m)	Color Standard
EC-8H	1～3	1	10	White

● Please consult us on sizes other than the above listed.

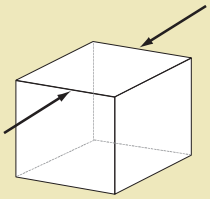
Volume Intrinsic Resistivity





Volume Intrinsic Resistivity

Resistance which depends on object type at carrying an electric current through inside of the object. Defined with resistance between facing sides of cubic.
Unit: Ω•cm



Surface Intrinsic Resistivity

Resistance which depends on object type and surface condition at carrying an electric current through a surface of the object. Defined with resistance between facing sides of square.
Unit: Ω

Measurement Test Result of Leak Resistance of Work Floor

■Test Type

Conductive property test of antistatic conductive mat (Measurement of leak resistance)

■Test Sample

Name: Conductive Mat

Item: ECC−8

Size: Thickness 2.0mm, Width 1,020mm, Length 10,400mm

■Test Method

According to 7.5, "Antistatic product structural criteria (1984 Revised ver.)", Engineering guideline of National Institute of Industrial Safety of Department of Labor (RIIS-TR-84-1)
Technology Institution of Industrial Safety

■Test Result of Leak Resistance

(The largest value of the leakage resistance among 5 measurement locations: Rmaximum)

Rmaximum=4.8×10^{6}(Ω)

(Applied voltage100V D.C.)

■Leak Resistance of Each Position of Conductive Mat

Leak resistance between the earth terminal and each measurement location

Measurement Location	Leak Resistance（Ω）
①	3.1×10^{6}
②	3.6×10^{6}
③	4.0×10^{6}
④	3.6×10^{6}
⑤	4.8×10^{6}

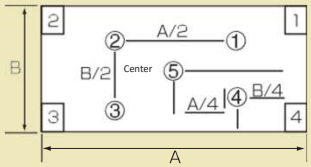
(Applied voltage100V D.C.)

■Others

1) Test sample size
Length A＝10,400mm, Width B=1,020mm
Thickness t＝2.0mm

2) Earth terminal location 3

3) Measurement locations



4）Electrode (Metal cylinder)
Major axis 60mm, Weight10kgf, Material SUS304

5）Test temperature and humidity
24℃, RH60%

Function, rubber sheet according to a use

Non-Conductive Rubber Sheet

Features

◆Excels in high-voltage resistance.

Applications

●For high-voltage equipment.

■Non-Conductive Rubber Sheet : Properties

Item Name \ Properties	General Properties			Breakdown Voltage kV/mm	Material
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %		
Black N/C Sheet（M）	60(60)	11.1 {113.2}	530	22.6	NR（Black）
Amber Rubber Sheet (60%) 〈45〉	47(47)	19.1 {194.8}	680	18.6	NR（Amber）
TAB 6007 SO_2	60(58)	14.3 {145.9}	650	22.0	W/R NR（Black）
N/C EPT Sheet 〈40〉	40(39)	10.3 {105.1}	660	15.0	EPT（Black）
〈50〉	51(48)	11.9 {121.4}	560	21.2	EPT（Black）
〈65〉	61(60)	10.0 {102.0}	600	22.1	EPT（Black）
TNB 9012 S	90(88)	15.0 {153.0}	340	7.4	NBR（Black）
SR-50 〈50〉	51(51)	10.3 {105.1}	410	16.7	SR（Natural）
FR Sheet 〈80〉	78(75)	10.5 {107.1}	360	2.2	FR（Black）

JIS K 6250

● Allowable voltage should be regarded approx. 1/3 of the breakdown voltage only as a guide.
● The above mentioned FR Sheet <80> is not "TBF8010", but non-conductive FR sheet.

Function, rubber sheet according to a use

Food Grade (Raw Material) Rubber Sheet

Features

◆We have confirmed that the raw materials conform to the food hygiene test.
(The conformity has been confirmed by a third-party organization.)

*Please check the adequacy and safety of these items for the intended applications before use.

■ Food Grade (Raw material) Rubber Sheet : Properties

Item Name \ Properties	General Properties			Material
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	
TEB 6510 Z	60(57)	12.8 {130.6}	730	EPT
White Butyl Sheet 〈65〉	64(63)	9.0 {91.8}	600	I I R
White EPT Sheet 〈65〉	66(63)	11.5 {117.3}	650	EPT
SR-50	50(50)	8.5 {86.7}	320	SR
SR-70	70(70)	7.1 {72.4}	290	SR

JIS K 6250

Function, rubber sheet according to a use

Rubber Sheet for Waterworks

Features

◆ Complies with the standard of rubber sheet for waterworks specified in JIS K 6353.

Applications

● Various packing material for waterworks.

Please check the adequacy and safety of these items for the intended applications before use

■Rubber Sheet for Waterworks: Properties

Item Name \ Properties	General Properties			Heat aging resistance 70℃×96h			Compression Set 70℃×22h %	Material	Note
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %			
S-0360	60(59)	12.9 {131.6}	400	+ 4	+ 5	−20	11	SBR	Complies with 60, class 3
S-0375	73(72)	20.9 {213.2}	430	+ 5	+ 1	−27	15	SBR	Complies with 60, class 3
C-0360	62(62)	18.4 {187.7}	510	+ 2	−13	−15	11	CR	Complies with 60, class 3
E-0375	74(73)	13.6 {138.7}	480	+ 1	+ 3	− 3	12	EPT	Complies with 60, class 3

JIS K 6353

● Please refer to P.37 for waterworks specified

Function, rubber sheet according to a use

Conforming Sheet of Expressway Standard

Features

◆ Complies with each standard.

■ Conforming Sheet of Expressway Standard : Properties

Item Name \ Properties	General Properties			Heat Aging Resistance 70℃ × 168h			Ozone Resistance 1000ppb(100pphm) 40°C×40% Elongation
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %	
Gray EPT Sheet （HS60）	60（58）	11.0 {112.2}	720	+ 4	7.0 {71}	570	96h No Change

JIS K 6250

■ Conforming Sheet of NEXCO structural guidelines : Properties

Item Name \ Properties	Elastic Modulus in Static Shear MPa {kgf/cm2}	General Properties			Heat Aging Resistance 100℃ × 72h		Compression Set 70℃ × 24h %	Ozone Resistance 2000ppb(200pphm) 40°C×80% Elongation
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	25%Elongation Stress Change Rate %	Change Rate of Elongation at Break %		
Vibration Isolation Rubber (C-8)	0.78 {8.0}	53（53）	17.1 {174.4}	510	+29	+ 1	8	408h No Change
Vibration Isolation Rubber (C-10)	0.98 {10.0}	61（57）	16.2 {165.2}	500	+35	- 7	15	408h No Change

JIS K 6250

■ NEXCO Structure construction management procedure For menase hinges : Properties

Item Name \ Properties	Elastic Modulus in Static Shear MPa {kgf/cm2}	General Properties			Heat Aging Resistance 70℃ x 72h		Compression Set 70°C×24h %	Ozone Resistance 500ppb(50pphm) 40°C×20% Elongation
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	25%Elongation Stress Change Rate %	Change Rate of Elongation at Break %		
SBR Sheet	1.18 {12}	66（62）	6.5 {66.3}	390	+25	-14	27	96h No Change

JIS K 6250

Function, rubber sheet according to a use

Vibration Isolation Rubber Sheet

Features

◆Complies with JIS standard for vibration isolation rubber.

■ Vibration Isolation Rubber Sheet: Properties

Item Name \ Properties	Elastic Modulus in Static Shear MPa {kgf/cm2}	General Properties			Oil Resistance 100℃ × 72h IRM903 Volume Change Rate %	Heat Aging Resistance 100℃ × 72h		Compression Set 100°C×24h %	Ozone Resistance 500ppb(50pphm) 40°C×20% Elongation
		Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %		25%Elongation Stress Change Rate %	Change Rate of Elongation at Break %		
Vibration Isolation Rubber Sheet （C-06）	0.52 {5.3}	43（42）	9.7 {98.9}	530	+109	+46	-24	22	72h No Change
（C-08）	0.78 {8.0}	53（53）	17.1 {174.4}	510	+ 74	+72	-23	13	72h No Change
（C-10）	0.97 {9.9}	61（59）	9.8 {100.0}	370	+ 98	+77	-40	35	72h No Change

JIS K 6250

Function, rubber sheet according to a use

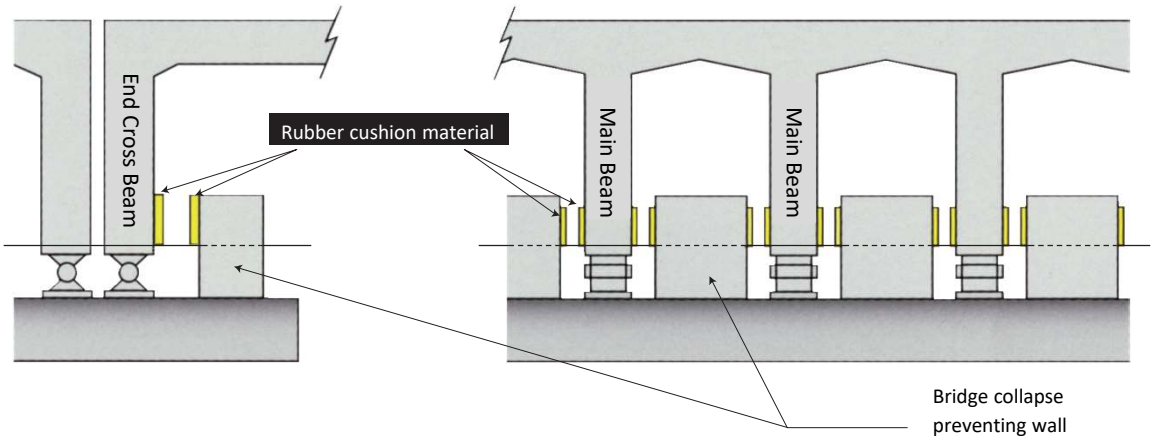
Bridge Collapse Preventing Cushion Rubber

Features

◆Chloroprene rubber cushion material of bridge collapse protection (Bridge collapse protective wall, PC cable, etc.) with property value comply with the reference of Japan Road Association.。

■Bridge Collapse Preventing Cushion Rubber : Properties

Hardness Type A	Allowable bearing stress MPa{kgf/㎠}	Material
55±5	11.8 or more {120 or more}	Chloroprene rubber



Function, rubber sheet according to a use

Abrasion Resistant Rubber Sheet

Features

◆Excels in abrasion resistance compared to natural rubber (NR) or general synthetic rubbers.
◆Excels in cushioning resistance.

Applications

●Rubber mat.
●Gravel conveying belt.

Abrasion Resistant Rubber Sheet : Properties

Item Name \ Properties		General Properties: Hardness Type A	General Properties: Tensile strength at Break MPa{kgf/㎠}	General Properties: Elongation at Break %	Heat-Resistant Aging 70°C×72h: Hardness Change Type A	Heat-Resistant Aging 70°C×72h: Change Rate of Tensile Strength %	Heat-Resistant Aging 70°C×72h: Change Rate of Elongation at Break %	Compression Set 70°C×24h %	Abrasion Loss cc/1000times
Abrasion Resistant L Sheet-L	〈50〉	48(45)	11.7 {119.3}	640	+ 4	-10	-23	18	0.363
	〈65〉	66(65)	16.1 {164.2}	430	+ 4	- 6	-17	25	0.450
	〈80〉	82(80)	14.6 {148.9}	440	+ 4	0	-16	20	0.357
Abrasion Resistant L Sheet--H	〈60〉	61(61)	24.8 {253.0}	580	0	- 8	-17	16	0.050
Abrasion Resistant L Sheet--LK	〈65〉	67(66)	22.1 {225.4}	460	+ 5	- 1	-13	17	0.130

JIS K 6250

● Abrasion loss shall be measured by Akron Abrasion Tester.
● These items highlighted in this color are our standard products.
※ Abrasion comparison data : Black normal sheet 〈65〉 1.130
NBR Sheet-L〈70〉0.743
CR Sheet-L 〈65〉0.620

Function, rubber sheet according to a use

Ti-Hanenon®

Shock absorbing rubber sheet

（Ti-Hanenon ® is a registered trademark of our low repulsion foam rubber）

Features

◆Excels in shock absorbency and vibration insulation.
◆The impact resilience is 6 ~ 7%. (Measured Value.)

Applications

●Damping material: Protection of conveying equipment, stopper for precision positioning of conveyed goods, replacement of shock absorber.
●Floor material: Prevention of scattering and loss of dropped goods.
●Resonance reducing material for audio equipment: Insulation of player unit from external vibrations.
● Various vibration absorbing rubbers and cushioning material. (gasket, packing.)

Ti-Hanenon® : Properties

Item Name \ Properties		General Properties: Hardness Type A	General Properties: Tensile strength at Break MPa{kgf/㎠}	General Properties: Elongation at Break %	Heat-Resistant Aging 100°C×72h: Hardness Change Type A	Heat-Resistant Aging 100°C×72h: Change Rate of Tensile Strength %	Heat-Resistant Aging 100°C×72h: Change Rate of Elongation at Break %	Oil Resistance100°C×72h: Volume Change Rate ASTM # 1 %	Oil Resistance100°C×72h: Volume Change Rate IRM903 %	Ozone Resistance 500ppb(50pphm) 40°C×20% Elongnation×72h	Impact Resilience %
Ti-Hanenon®	〈65〉	62(49)	3.6 {36.7}	840	+ 3	+11	- 8	- 3	+13	No Change	7
	〈35〉	35(25)	6.2 {63.2} ※1	1000 or more ※1	+10	10.3 ※2	820 ※2	-11	+27	C-4	6

JIS K 6250

*1)The maximum value was indicated because the test piece was extended more than measurement limit.
*2)Change rate was not able to be calculated because the measurement result of TB and EB could not be obtained. Therefore, each measured value was indicated.
●The above mentioned values are not standard values, but measured values.

Specifications	Product Dimension (Standard Size)		
	Thickness (mm)	Width (m)	Length (m)
With embossed pattern on both surfaces	2～10t	1	2

● Please consult us on thickness and surface specification other than the above listed.

Function, rubber sheet according to a use

Cloth Inserted Rubber Sheet

Penetration leakage might be caused at cloth part depending on the use condition in the case of use for waterproof packing. Please check the applications before use.

Features

◆Elongation can be suppressed to a small value by inserted cloth making it suited for seal packings of parts with the possibility of dimensional changes such as swelling caused by heat and chemicals.

◆Furthermore, the thickness of the rubber between layers is a minimum of 1mm.

One to several plies of the cloth of the table below is/are inserted between various rubber sheets in accordance with the specification of customers.

Type	Item Name	Yarn Count (Warp×Weft)	Thread Count (Warp×Weft per 5cm)	Thickness mm	Tensile Strength kgf/3cm	Elongation %
Cotton	Thick texture 22C	10/3×10/3	45×47	0.85	45	25
Polyester	—	30/1×30/1	90×88	0.15	32	11
Glass-Cloth	—	—	84×64	0.18	164	—

● Please consult us for thickness, cloth type, cloth layer.

Function, rubber sheet according to a use

Vibration Isolation Rubber Sheet

Features

◆Complies with JIS standard for vibration isolation rubber.

Applications

●Seal material for resin molding.

Vibration Isolation Rubber Sheet : Properties

Item Name \ Properties	General Properties			Heat aging resistance 100℃×72h			Compression Set 70℃×24h %	Material
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	Hardness Change Type A	Change Rate of Tensile Strength %	Change Rate of Elongation at Break %		
EPT-S 〈40〉	40(39)	10.3 {105.1}	660	+ 1	- 3	- 2	19	EPT
〈50〉	52(48)	11.9 {121.4}	680	+ 3	+ 5	- 8	15	EPT
〈60〉	60(56)	11.7 {119.3}	670	+ 3	+ 7	- 3	17	EPT
〈70〉	70(68)	11.5 {117.3}	480	+ 5	+ 1	- 3	9	EPT
〈80〉	83(80)	13.4 {136.7}	250	+ 2	+ 3	+ 4	10	EPT
〈90〉	93(91)	14.6 {148.9}	220	+ 1	+ 4	0	12	EPT
TCB 607 OP	60(57)	8.3 {84.7}	490	+17	-20	-27	21	CR

JIS K 6250

Function, rubber sheet according to a use

Flame Retardant Rubber Sheet

Features

◆Rubber sheet of UL specifications which are globally recognized for safety testing in flame retardancy.

Applications

- Barrier enclosure of electronic device.
- Insulated cover bush and gasket for charging device.
- Packing cushion materials and seal materials for vehicles or ships.
- Rubber parts for housing device.

Flame Retardant Rubber Sheet: Properties

Test items	Material / Unit	CR			SR
		ULCR0160	CR(M) Flexible Flame Retardant <HS50>	CR Flame Retardant <HS65>	SR-50
Hardness	Type A	63(61)	50(50)	65(64)	51(51)
Tensile Strength at Break	MPa{kgf/cm²}	9.5 {96.9}	16.5 {168.3}	9.8 {100.0}	10.3 {105.1}
Elongation at Break	%	550	680	510	410
Tear Resistance	kN/m	25.7	32	21.3	24.7
Compression Set (70℃×24h)	%	-	18	28	41 ※1
Compression Set (100℃×72h)	%	49	-	-	-
Heat Aging Resistance (100℃×72h) Hardness Change	Type A	+4	+10	+18	+1 ※2
Change Rate of Tensile Strength at Break	%	-15	-19	-2	-24
Change Rate of Elongation at Break	%	-19	-29	-40	-27
Ozone Resistance 500ppb×40℃× 20% Elongnation×72h	-	※3 C-1	72h No Change	72h No Change	72h No Change
UL Standards: Ignition class	-	V-0	-	-	-
UL Standards: Minimum thickness	mm	0.305	-	-	-
UL Standards: Registration File No.	-	E60836	-	-	-
Flame retardant tests for railway vehicles 【Domestic railroad in Japan】	-	○	○	○	○

●The data are tested values and not standard ones. The specifications can be altered without any notification.
○ : Applicable

*1 : The condition is to be exposed at 200 degrees Celsius and for 24 hours.

*2 : The condition is to be exposed at 200 degrees Celsius and for 72 hours.

*3 : The condition is to be exposed at the density of 500ppb, 40 degrees Celsius, with 10% elongation and for 24 hours.

Note)For flame-retardant tests for railroad vehicles, it is necessary to determine whether or not they are compatible with each thickness, so please consult us separately.

UL

Underwriters Laboratories Inc. (UL), which has over 100 years of history, is the independent test and certification organization established in 1894 in the USA for the purpose of contribution to the public safety. Our core activities include the development of various product standards and the provision of product testing and certification services in accordance with those standards, contributing to the safety of a wide range of products. Also, UL develops safety standard and about 70% of the standard is certified by ANSI (American National Standards Institute) and adopted as national standard in the USA

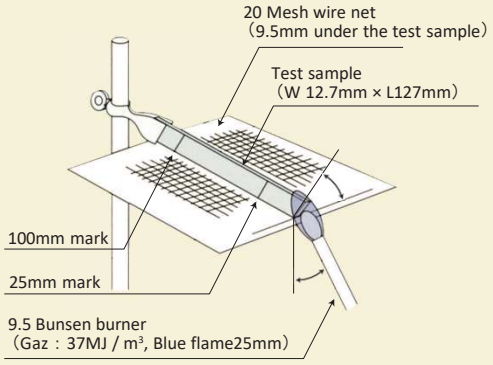
.

UL94

UL94 is a standard in flame retardancy for high-polymer material (rubber/plastic). There are two test methods. One is that the test specimen is burned horizontally and the other is that burned vertically. It is classified depending on a degree of burning. The most flame-retardant class is V-0, the second is V-1, the third is V-2, and HB class is for goods which have slow-burning nature. It is defined in the USA what class of materials should be used for electric home appliances depending on usages of the parts.

UL94 Horizontal Burn Test

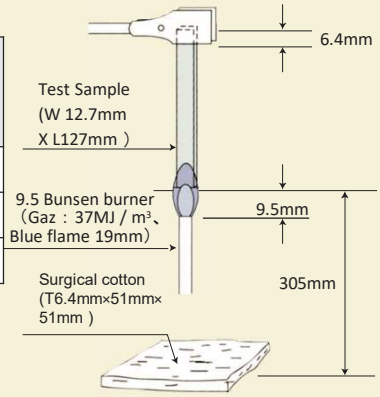
Class	Test Sample Thickness mm	Test Sample Quantity	Burning Time sec	Acceptance Criteria
UL94HB	3.0 ～13.0	3	30	Burning speed should not over 40mm/min in 75mm section or burned out before reaching 100mm mark.
	Less than 3.0	〃	〃	Burning speed should not over 40mm/min in 75mm section or burned out before reaching 100mm mark.



UL94Vertical Burn Test

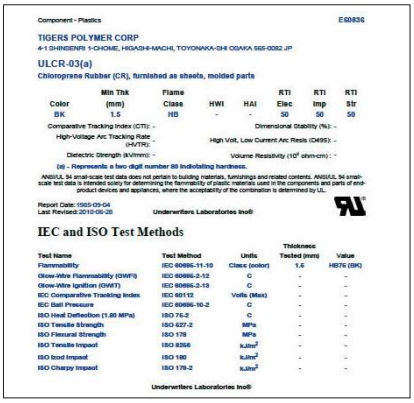
Class	Test Sample Thickness mm	Test Sample Q'ty	Burning Time (sec)	Flame-out Time (sec)※ 1st Burning	Flame-out Time (sec)※ 2nd Burning	Flame-out Time (sec)※ Total	Glowing time off 2nd test sec	Dropping to surgical cotton
UL94V－0	12.7 or less Optional	5	10	Within 10	Within 10	Within 50	Within 30	No ignition
UL94V－1		〃	〃	Within 30	Within 30	Within 250	Within 60	〃
UL94V－2		〃	〃	〃	〃	〃	〃	Not ignition heavily

Immediately after the first burn-out, ignite it for the second time.
1st & 2nd burn out time for each 5 pieces of test sample shall be counted as the total.



●Yellow Card

Yellow card as the following picture is issued for a material which passed UL burn test, and UL certifies the registered matters.


Component - Plastics E60836

TIGERS POLYMER CORP
4-1 SHINSENRI 1-CHOME, HIGASHI-MACHI, TOYONAKA-SHI OSAKA 565-0082 JP

ULCR-03(a)
Chloroprene Rubber (CR), furnished as sheets, molded parts

Color	Min Thk (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str
BK	1.5	HB	-	-	50	50	50

Comparative Tracking Index (CTI): -
High-Voltage Arc Tracking Rate (HVTR): -
Dielectric Strength (kV/mm): -
Dimensional Stability (%): -
High Volt, Low Current Arc Resis (D495): -
Volume Resistivity (10^{x} ohm-cm): -

(a) - Represents a two digit number 80 Indicating hardness.

ANSI/UL 94 small-scale test data does not pertain to building materials, furnishings and related contents. ANSI/UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by UL.

Report Date: 1993-09-04
Last Revised: 2010-06-28
Underwriters Laboratories Inc®

IEC and ISO Test Methods

Test Name	Test Method	Units	Thickness Tested (mm)	Value
Flammability	IEC 60695-11-10	Class (color)	1.6	HB76 (BK)
Glow-Wire Flammability (GWFI)	IEC 60695-2-12	C	-	-
Glow-Wire Ignition (GWIT)	IEC 60695-2-13	C	-	-
IEC Comparative Tracking Index	IEC 60112	Volts (Max)	-	-
IEC Ball Pressure	IEC 60695-10-2	C	-	-
ISO Heat Deflection (1.80 MPa)	ISO 75-2	C	-	-
ISO Tensile Strength	ISO 527-2	MPa	-	-
ISO Flexural Strength	ISO 178	MPa	-	-
ISO Tensile Impact	ISO 8256	kJ/m²	-	-
ISO Izod Impact	ISO 180	kJ/m²	-	-
ISO Charpy Impact	ISO 179-2	kJ/m²	-	-

Underwriters Laboratories Inc®

●Follow Up

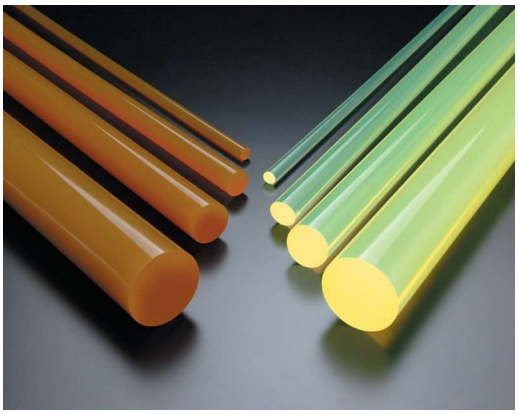
UL inspector irregularly visits a plant four times a year to inspect each process and verifies whether the registered product is produced in accordance with the standard.

Urethane Rubber Mold Product

Ti-Prene Round Rod / Pipe

■Round Rod

Diameter mm	Length m	Grade
10,15,20,25 30,35,40,45,50, 60,70,80,90,100	1	TR200-90 TR100-90 TR100-70 TR100-60 TR100-50



■Pipe

Outer Diameter mm	Innar Diameter mm	Length m	Grade
30,40,50, 60,70,80,100	10～60	0.5	TR200-90 TR100-90 TR100-70

• Please consult us on grades and sizes other than listed above.

Ti-Prene® Molded Product

• Please contact us.

Rubber Mold Product

Silicone Rubber / Fluoro Rubber

Fluoro Rubber Plug

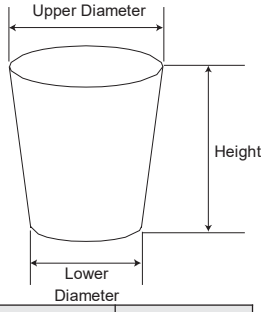
Features

◆Excels in heat resistance.

◆Excels in chemical, oil, and solvent resistance.

Applications

●Test tube, flask etc.



■ Properties

Properties / Item Name	General Properties			Standard Color
	Hardness Type A	Tensile strength at Break MPa{kgf/㎠}	Elongation at Break %	
FR70	73(71)	8.8 {89.7}	250	Black

JIS K 6250

■ Dimension

Dimension / No.	Upper Diameter mm	Lower Diameter mm	Height mm
0	12	9	18
1	15	12	22
2	16	14	22.5
3	17	15	22.5
4	20	17.5	24.5
5	21	18	26.5
6	23	20	26.5
7	24.5	20.5	30.5
8	26.5	23	31
9	29.5	24	31.5
10	32	27	34
11	34	30	35
12	35	32	35.5
13	38	34	38
14	41	38	40
15	44	41	41

Dimension / 呼称 No.	Upper Diameter mm	Lower Diameter mm	Height mm
16	47.5	41.5	42
17	50.5	43.5	45
18	50.5	47.5	45.5
19	54	47	52
20	56.5	51	48
21	63.5	57	48
22	65	61.5	46.5
23	71	63	48.5
24	72	66	47
25	76	69	47
26	81	74	45.5
27	83	76	45
28	86.5	80	45
29	88	82	46.5
30	92	86	46

Relation between Load and Strain of Rubber Material

1. Relational expression between load (W) and apparent Young's Modulus

$W = Eap \times A_L \times A(\varepsilon)$

W : Load (N)
Eap : Apparent Young's modulus (MPa)
A_L : Area of load (cm^2)
A(ε) : Modulus

2. Apparent Young's modulus (Eap)

Cylinder $Eap = Gs(3+4.94S^2)$
Quadratic prism $Eap = Gs(3+6.58S^2)$
Infinite quadratic prism $Eap = Gs(4+3.29S^2)$

●Infinite quadratic prism : This refers to a quadratic prism (a > b) where the condition a > 3b is satisfied.

Gs : Elastic Modulus in Static Shear (kgf/cm2), or (kgf/cm2)
S : Shape factor

3. Shape Factor

$S = \text{Area of load } (A_L) / \text{Free area } (A_F)$

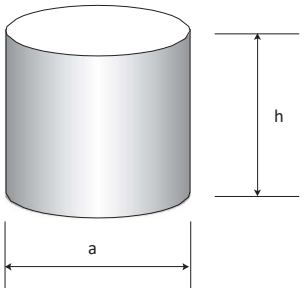
●Area : m^2 or cm^2

(Note) Area of load (A_L) : The total area that receives the load.
For the following figures, it shall be the one side's area of upper and lower side.

Free area (A_F) : Total area where deformable under load.
For the following figures, it shall be the area other than total area of upper side and lower side, which means the total area of lateral side(s).

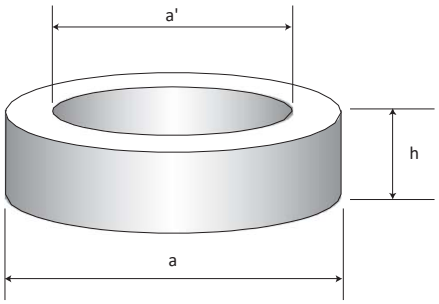
[Cyinder]

$S = a / 4h$



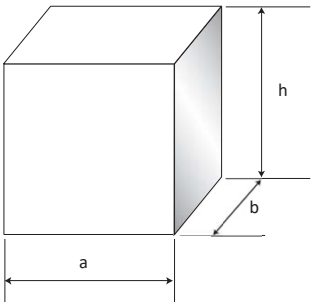
[Tubular]

$S = (a - a') / 4h$



[Quadratic Prism]

$S = ab / 2h(a+b)$

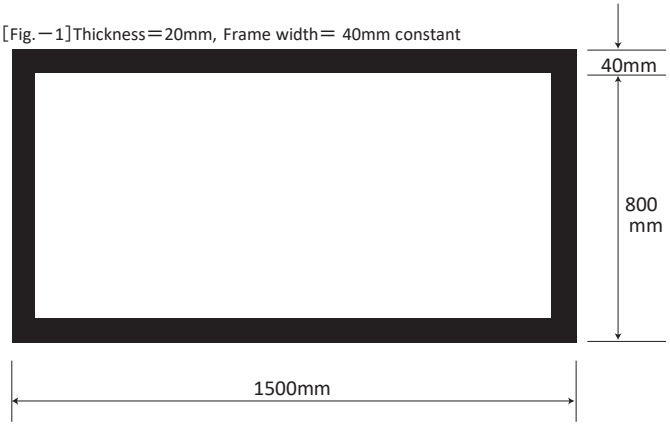


【Calculation Example】

Calculate a strain amount of frame gasket tightened by 9800N. The frame gasket is made by NBR (L)<Hs70> shown in Figure 1.

〈Conditions〉 : Tightening force shall be equal at every location on a gasket. Elastic Modulus in Static Shear of NBR (L) <Hs70> shall be 1.3Mpa (Quoted from Catalog). Elastic Modulus in Static Shear listed in this catalog is not a measured value but calculated one.

[Fig.－1]Thickness＝20mm, Frame width＝ 40mm constant



Step.1 Calculate the shape factor of frame gasket. In this case, calculate it according to shape factor formula.

$$S = \text{Area of load / Free area}$$

$$= \frac{(1.5 \times 0.84) - (1.42 \times 0.76)}{2 \times 0.02 \times (1.5+0.84+1.42+0.76)}$$

$$= 1.0$$

Step.2 Calculate the apparent Young's modulus as infinite quadratic prism in this case.

$$Eap = Gs(4+3.29S^2)$$

$$= 1.15 \times (4+3.29 \times 1^2)$$

$$= 8.384\,(MPa)$$

Step.3 Calculate the gasket strain :ε by relational expression between load (W) and apparent Young's Modulus.

$W = Eap \times A_L \times A(\varepsilon)$

W(Load)＝9800(N)

A_L(Area of load)＝(1.5×0.84)－(1.42×0.76)≒0.18(m^2)

$9800\,(N) = 8.384\,(MPa) \times 0.18\,(m^2) \times A(\varepsilon)$

$A(\varepsilon) \fallingdotseq 0.0064$

Read out from Table 1.

ε〈0.65% So, the strain is 20(mm)×0.0064=0.13(mm)

Result The above frame gasket strains appox. 0.13mm.
This calculation shows that rubber sheet materials, such as following described, possess the required static shear modulus Gs.

- CR rubber: Rubber sheet material harder than CR(L)〈Hs65〉
- NBR: Rubber sheet material harder than NBR(L)〈Hs70〉
- EPDM: Rubber sheet material harder than EPT(M)〈Hs65〉
- Natural Rubber: Black rubber shet 〈Hs65〉etc.

Rubber sheet shall be selected from the above listed sheets in consideration of the use environment or required properties such as oil resistance, ozone resistance etc.

Table 1. Chart of relation between strain :ε and modulus: A (ε)

Strain : −ε%	−A (ε)
0	0.000000
0.5	0.005050
0.65	0.006565
1	0.010101
3	0.030937
5	0.052678
10	0.111520
15	0.178030
20	0.254170

●These are just calculated values on strain.
They might be different in some degree depending on environment, temperature etc. from measured one.

Technical Notes

Standard of Rubber Packing Material JIS K 6380 (Excerpt from the standard)

●Scope of Application

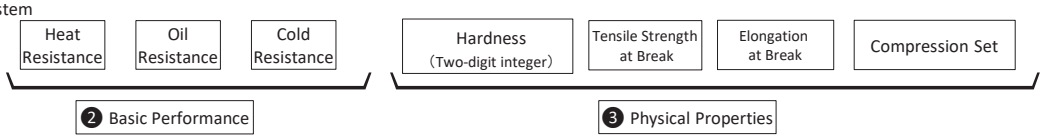
This standard specifies the classification based on performance of vulcanized rubber materials (hereinafter referred to as rubber packing materials) used for rubber packing materials, gasket materials, and similar rubber products.

●Performance Classification

① Classification System

To specify rubber packing materials, the classification must include seven performance criteria as shown in Figure 1. Each rubber packing material is classified by the basic performance specified in ❷ and the physical properties specified in ❸. However, when it is necessary to change some of the basic performance or physical properties shown in Figure 1, or to add another performance, the additional performance a) can be indicated by adding a code, a test method classification number, and a test temperature classification number by agreement between the parties involved in the delivery.

Fig.1. Classification System



② Basic Performance

1) Heat Resistance

The heat resistance classification of rubber packing materials shall be in accordance with Table 1.

The heat resistance classifications A to K are determined by the upper limit of the test temperature that satisfies the specifications shown in Table 1 when subjected to continuous heat aging for 72+0/-2 hours using a forced circulation type heat aging tester (also known as a gear type aging tester) according to JIS K 6257 accelerated aging test method A, AA-2 (horizontal wind type).

Table 1. Heat Resistance Classification

Class	Temperature℃ ※1	Heat Resistance		
		Tensile Strength at Break Change Rate	Elongation at Break Change Rate	Hardness Change
A	70	Less than ±30%	Less than −50 %	Less than ±15
B	100			
C	125			
D	150			
E	175			
F	200			
G	225			
H	250			
J	275	Test Method JIS K 6251	Test Method JIS K 6251	Test Method JIS K 6253-2,-3
K	300			

※1：The test temperature refers to the temperature during the accelerated aging test and does not necessarily indicate the temperature that the material can withstand in actual use. When selecting rubber packing materials for actual use, a comprehensive judgment considering the application, usage environment, and equipment used is necessary.

2) Oil Resistance

The oil resistance classification of rubber packing materials shall be in accordance with Table 2.

The oil resistance classifications A to G are determined based on the volume change rate after immersion in test lubricating oil No. 3 for 720 hours at a test temperature of 100±1℃, according to the method specified in JIS K 6258.

Table 2. Oil Resistance Classification

Class	Volume Change Rate Range※2 %
A	More than 140 (or Not specified)
B	121～140
C	81～120
D	41～80
E	21～40
F	0～20
G	Less than 0 (Negative volume change rate)

※2：The volume change rate range includes swelling due to oil absorption or shrinkage due to oil extraction.

3) Cold Resistance

The cold resistance classification of rubber packing materials shall be in accordance with Table 3.

The cold resistance classifications A to H are determined based on the 50% embrittlement temperature specified in JIS K 6261.

Table 3. Cold Resistance Classification

Class	50% embrittlement temperature※3 ℃
A	0
B	−10
C	−25
D	−40
E	−55
F	−70
G	−85
H	Not specified

※3：Regarding the impact embrittlement limit temperature, it can be specified as an additional performance with the symbol "F" by agreement between the parties involved in the delivery.

❸ Physical Properties

The method for indicating and classifying the physical properties of rubber packing materials is as follows:

a) Method for Indicating the Physical Properties

The physical properties of rubber packing materials are represented by a 5-digit indication number (see Figure 2). An example is shown in Figure 3.

1) The first and second digits indicate the design value (2-digit integer) of hardness [Type A durometer or IRHD (N method)].

2) The third digit indicates the minimum value of tensile strength at break(MPa).

3) The fourth digit indicates the minimum value of elongation at break (%).

4) The fifth digit indicates the maximum value of compression set (%) at the test temperature specified in ❷ 1) heat resistance.

Note that the hardness test method is using a Type A durometer. However, when using IRHD (N method), add "[IRHD (N method)]" at the end.

Figure2. Method for indicating

Hardness (Two-digit integer)	Tensile strength at break	Elongation at break	Compression set

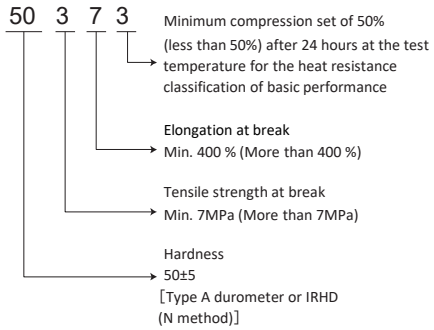
b) Classification of physical properties

The classification for physical properties is indicated in Table 4.

Table 4. Classification of indication number

Hardness		Tensile strength at break		Elongation at break		Compression set※4	
No.	Tolerance for Type A durometer or IRHD (N method)	No.	(Min.) MPa	No.	(Min.) %	No.	(Min.) %
(Design value 2-digit integer)	Less than ±5	0	Not specified	0	Not specified	0	Not specified
		1	3	1	50	1	80
		2	5	2	100	2	60
		3	7	3	150	3	50
		4	10	4	200	4	40
		5	14	5	250	5	30
		6	17	6	300	6	25
		7	20	7	400	7	20
		8	25	8	500	8	10
		9	35	9	600	9	5
Test method JIS K 6253-2,-3		Test method JIS K 6251		Test method JIS K 6251		Test method JIS K 6262	

Fig. 3. Indication example of physical properties

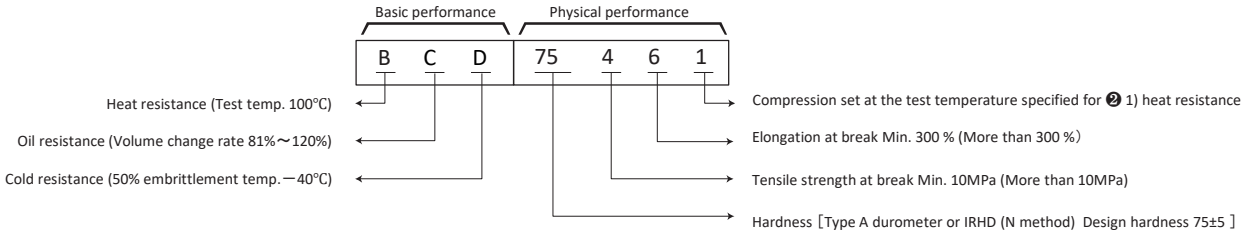


※4 : The test conditions for the compression set test are measured after 24 hours at the test temperature specified in ❷ 1) heat resistance.

❹ Example of performance classification for rubber packing materials

The indication example of performance classification for rubber packing materials is indicated in figure 4.

Fig. 4. Indication example of performance classification for rubber packing material



Appendix A (Reference) - Method for Indicating Additional Performance

Additional Performance : Additional performance refers to specifying test conditions using additional codes, test method classification numbers, and test temperature classification numbers when there are required characteristics beyond the basic performance and physical property test items. The characteristic values under additional performance test conditions are exchanged between the parties involved in the delivery.

Table A.1 - Classification of additional codes for additional performance

Code		Performance	Code	Performance
A		Heat resistance (heat aging)	H	Flex resistance
B		Compression set, tension set	J	Abrasion resistance
C		Ozone resistance (static and dynamic)	K	Abrasion properties
D		Compressive stress relaxation	L	Gas permeability
※5 E	EO	Oil resistance (lubricant)	O	Electrical properties
	EF	Oil resistance (fuel)	P	Staining properties, contact properties
	EA	Water resistance	R	Impact resilience
	EN※6	Chemical resistance	S	Dynamic properties
F		Cold resistance	T	Static tensile properties
G		Tear resistance	U	Leachability

※5 : The initial "E" in the additional code indicates that the test includes liquids that cause physical changes due to swelling.

※6 : The additional code "EN" indicates that the test includes liquids that cause both physical and chemical changes due to swelling.

Technical Notes

JIS K 6353 Standard of Rubber Material for Waterworks

Table1. Quality (Properties)

Class		Durometer Hardness H_A (Type A)	Durometer Hardness Tolerance	Tensile Test: Elongation % under 7.0MPa {71.4kgf/cm²} or less	Tensile Test: Tensile Strength Mpa {kgf/cm²} or more	Tensile Test: Elongation % or more	Aging Test: Change rate of Tensile Strength % or less	Aging Test: Change Ratio of Elongation % or less	Aging Test: Change of Durometer Hardness H_A	Compression set % or less	Application (Ref.)
1 ※3	A	70	± 5	200	18 {184} ※2	300	−20	+10 −20	+ 7 0	20	●Rubber ring used at pipe joint [Cast iron pipe, steel pipe, rigid PVC pipe, prestressed concrete pipe (pressure tube)] ●Rubber for butterfly valve seat
		65	± 5	250	18 {184} ※2	400	−20	+10 −30	+ 7 0	20	
		60	± 5	300	18 {184} ※2	400	−20	+10 −30	+ 7 0	20	
		55	± 5	350	18 {184} ※2	400	−20	+10 −30	+ 7 0	20	
		50	± 5	400	18 {184} ※2	400	−20	+10 −30	+ 7 0	20	
	B	65	± 5	—	18 {184} ※2	450	−40 ※1	+10 ※1 −40	+ 5 ※1 0	20	●Valve part of rubber ring for push-on joint of cast iron pipe
		50	± 5	—	18 {184} ※2	450	−40 ※1	+10 ※1 −40	+ 5 ※1 0	20	
2		70	± 5	200	16 {163} ※2	300	−20	+10 −30	+ 7 0	30	●Rubber for use in the gland of a sluice valve and rubber for the seat of a butterfly valve.
		65	± 5	250	16 {163} ※2	300	−20	+10 −30	+ 7 0	30	
		60	± 5	300	16 {163} ※2	300	−20	+10 −30	+ 7 0	30	
		55	± 5	350	16 {163} ※2	300	−20	+10 −30	+ 7 0	30	
		50	± 5	400	16 {163} ※2	300	−20	+10 −30	+ 7 0	30	
3		80	± 5	—	12 {122}	280	−25 ※4	+10 ※4 −30	+ 5 ※1 0	30 ※4	●Sheet rubber for use on flange faces, conical rubber for use in air valves ●Circular disc rubber ●Rubber ring heels for cast iron pipe push-on joints
		75	± 5	—	12 {122}	300	−25	+10 ※4 −30	+ 7 ※4 0	30 ※4	
		65	± 5	250	12 {122}	300	−25	+10 −30	+ 7 0	30	
		60	± 5	300	12 {122}	300	−25	+10 ※2 −30	+ 7 ※4 0	30 ※4	
4		50	± 5	—	9 {91.8}	400	−25	+10 −30	+ 7 0	30	●Rubber ring for concrete pipe

※1 : These values were measured in accordance with JIS K 6257, 7 (pressurized oxygen heat aging test).

※2 : Tensile strength of ethylene-propylene rubber (EPDM) is 14 MPa {143kgf/cm2} or more for class I, and 12MPa {122kgf/cm2} or more for class II.

※3 : Tensile strength of acrylonitrile butadiene rubber (NBR) and Chloroprene rubber (CR) of class I shall be 16 MPa {163 kgf/cm2} or more.

※4 : These tests can be partly skipped depending on the applications by mutual consultation between the parties involved in the delivery.

●Remark : Rubber materials which are used for water works products shall be determined according to JIS standard for waterworks or by mutual consultation between the parties involved in the delivery.

■Type Rubber materials are classified depending on quality to Class I-A, Class I-B, Class II, Class III, and Class IV as listed above.

Table 2. Quality (Leachability)

Test Item		Quality		
Rubber Type		SBR	NBR	EPDM
Common Items	Turbidity ※5	0.5 degree or less	0.5 degree or less	0.5 degree or less
	Chromaticity ※5	1 degree or less	1 degree or less	1 degree or less
	Potassium permanganate consumption ※5	2mg/ℓ or less	2mg/ℓ or less	2mg/ℓ or less
	Reduced amount of chlorine residual ※5	0.7 mg/ℓ or less	0.7 mg/ℓ or less	0.7 mg/ℓ or less
	Odor	Not abnormal	Not abnormal	Not abnormal
	Taste	Not abnormal	Not abnormal	Not abnormal
Selection item	Zinc	1.0 mg/ℓ or less	1.0 mg/ℓ or less	1.0 mg/ℓ or less
	Phenols	—	0.005mg/ℓ or less as phenol	

※5 : Values of turbidity, chromaticity, potassium permanganate consumption and reduced amount of chlorine residual shall be got by difference from those measured by blank test.

■ Quality a) The appearance of rubber materials should be a uniform texture, and the surface should be smooth.
No grossly visible breakage, crack, bubble, porosity, contamination and other harmful defects in use allowed.
b) Rubber properties are shown in Table 1.
c) Rubber leachability is shown in Table 2.

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