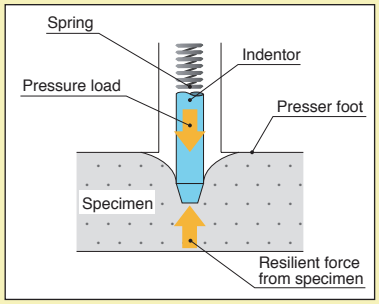
●THE SELECTION OF DUROMETER TYPES

10 types, 43 models of **DUROMETER** are prepared for the various types of materials to be measured hardness. It is required by the standards in each country to provide more accurate measurement results of hardness with more sensitive measurement in accordance with the variation of the material characteristics and surface shape of the specimen. The series of **TECLOCK DUROMETER** fully meets the international standards and possible to meet the wide range of material requirements with some unique models. The type A, D, and E meets JIS K6253 "Hardness testing methods for rubber, vulcanized or thermoplastic" which is newly issued by the purpose of getting matched with ISO.
Referring to the below figures, select the most suitable type.

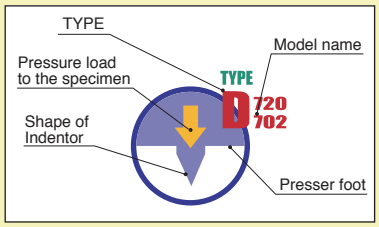
Mechanism of the hardness measurement

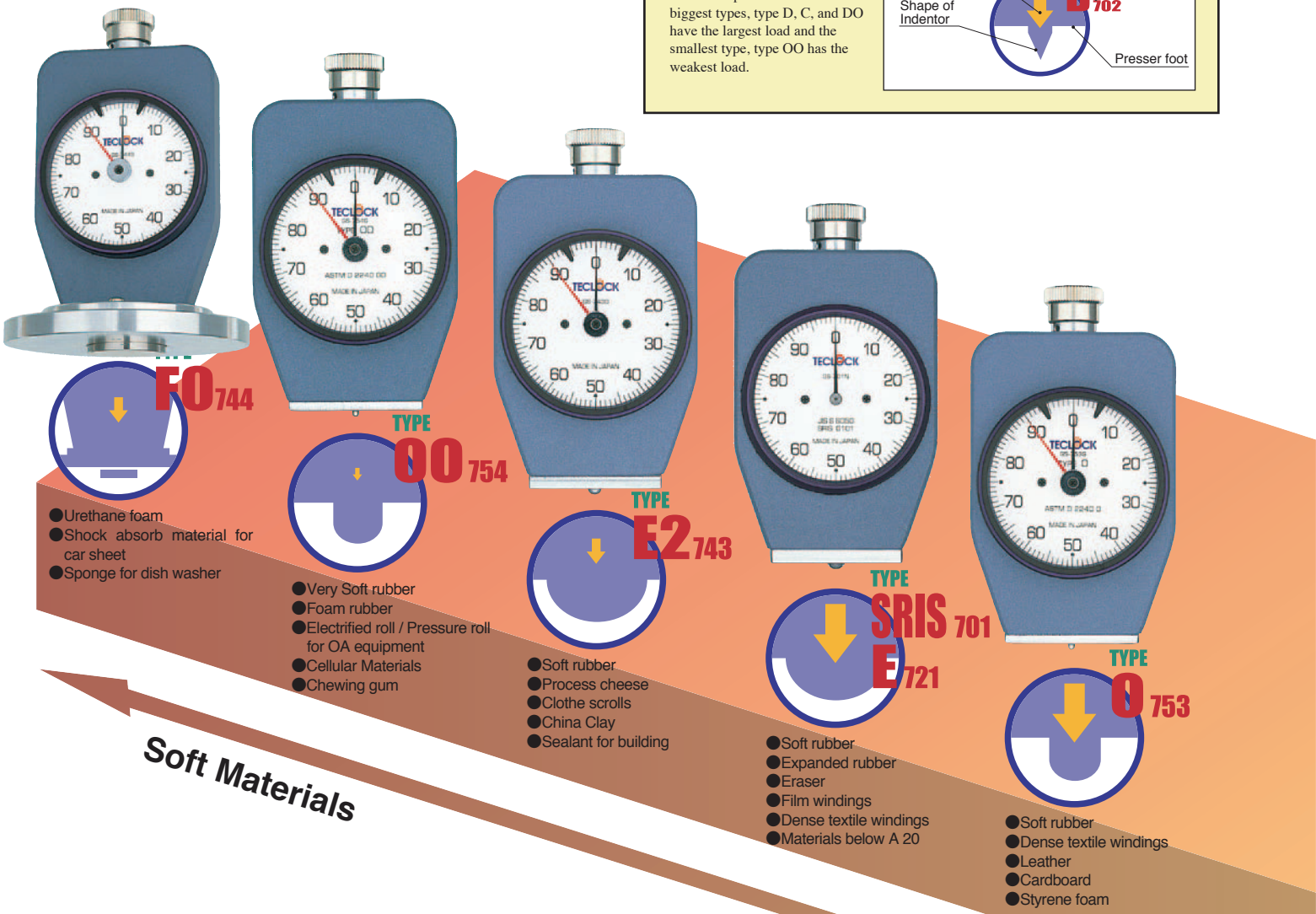
*The indentor gives a distortion onto the surface of specimen with the pressure produced by the spring load.
*The specimen produces a resilient force against the pressure load.
*The "hardness" means the depressed amount of indentor at the time when the resilient force becomes equal to the pressure load. Thus, the value consequently got is a "physical amount" with no unit.



The way of reading the signs in the figures

*Pressure load to the specimen
The size of the arrow means the size of the pressure load. The biggest types, type D, C, and DO have the largest load and the smallest type, type OO has the weakest load.

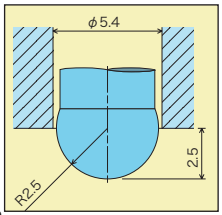




●SHAPE OF INDENTOR OF DUROMETER

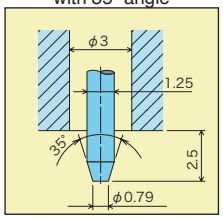
There are 5 types of Indentor prepared on the **DUROMETER** as below. Combining with several types of spring force, the most suitable distortion can be given to the specimen.

Hemisphere of R2.50mm

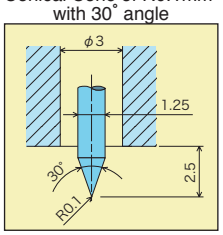


Hemisphere of ϕ 5.08mm is in the same shape.

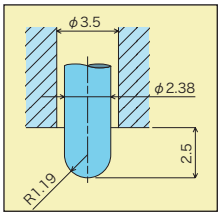
Truncated Cone of ϕ 0.79mm with 35° angle



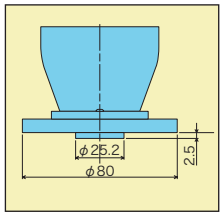
Conical Cone of R0.1mm with 30° angle



Hemisphere of R1.19mm



Cylindrical Cone of ϕ 25.2mm

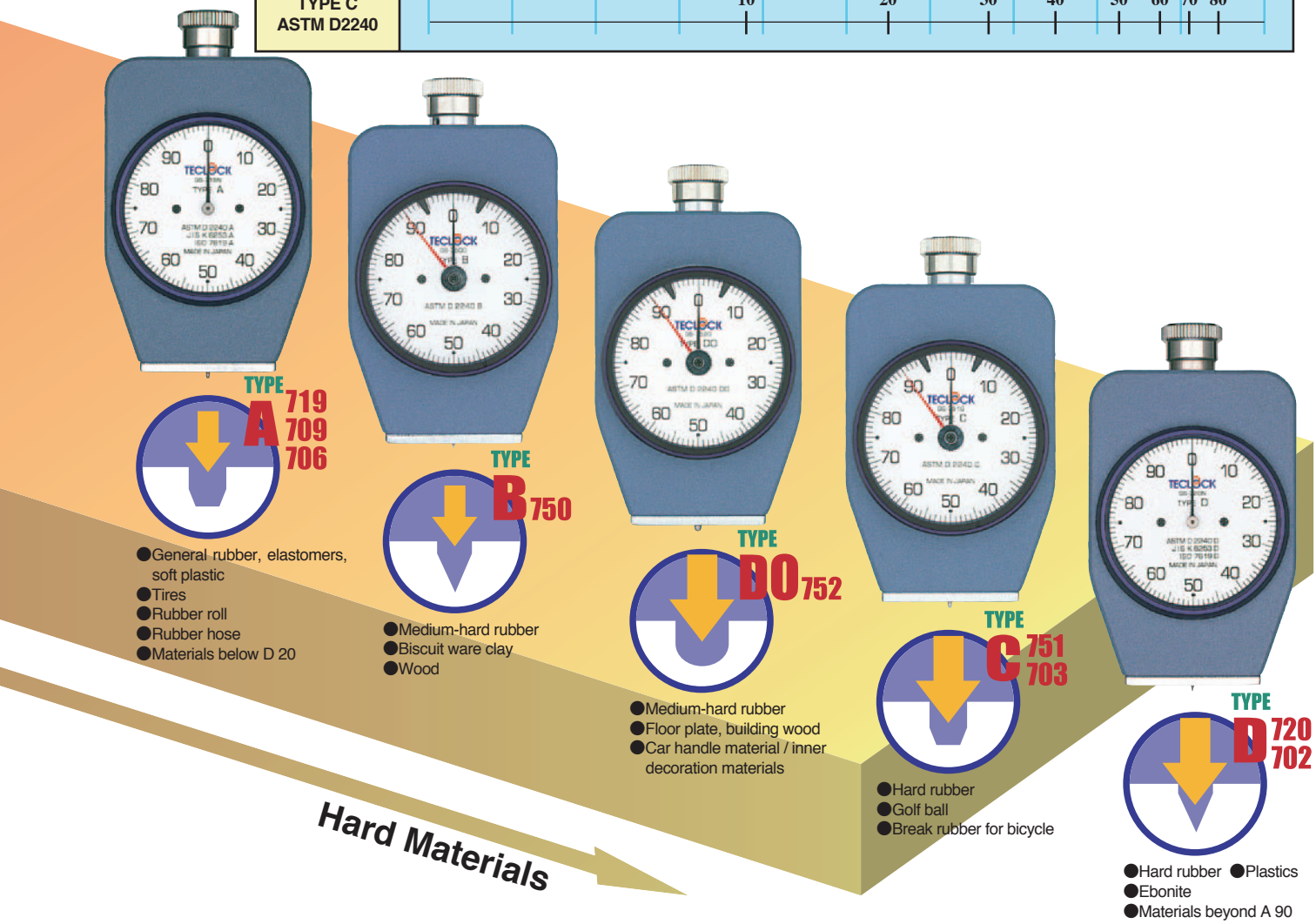


(mm)

●COMPARISON TABLE OF MEASUREMENT DATA

Based on the type A, below is a comparison table of measurement data. It is impossible to prove the exact correlation between the each type-to-type data, since the measured data may be affected by many factors such as temperature, humidity, size and shape at the measurement, and the condition of vulcanization. Use the below table for your reference to concern the equivalency of measurement data from each type of **DUROMETER**.

TYPE A JIS K6253 JIS K7215	0 10 20 30 40 50 60 70 80 90 100
(old A) JIS K6301	10 20 30 40 50 60 70 80 90
TYPE E JIS K6253	20 30 40 50 60 70 80 90
TYPE SRIS SRIS 0101	20 30 40 50 60 70 80 90
TYPE E2 TECLOCK E2	30 40 50 60 70 80 90
TYPE D JIS K6253 JIS K7215	10 20 30 40 50
TYPE DO ASTM D2240	10 20 30 40 50 60 70 80 90
TYPE O ASTM D2240	20 30 40 50 60 70 80
TYPE OO ASTM D2240	50 60 70 80 90
TYPE B ASTM D2240	10 20 30 40 50 60 70 80 90
TYPE C ASTM D2240	10 20 30 40 50 60 70 80



Analog Digital ISO

Digital/Analog Durometer compliance with ISO, ASTM, DIN and JIS

Methods for determining hardness of vulcanized rubber and thermoplastic rubber

These durometers comply with ISO, ASTM, DIN and JIS K 6253(new JIS). There are three different type of durometers corresponding to different degrees of hardness. Type A, the most common or central durometer,is used to measure medium hardness, while Type D is for high hardness and Type E is for low hardness.Type A, tends to indicate readings 1 to 2 points higher compared to the previous JIS A-type hardness tester.Type D durometer is used to measure super hard rubber that has a reading of more than 90 points when measuring with a Type A durometer. Type E durometer is used to measure soft rubber that has a reading of less than 20 points when measured with a Type A durometer. The Type A GS-719N model has also been designated for use in unbonded capping tests, which is a method for testing concrete compression. Further more, ISO7619 refers to the Type E as the Type AO durometer.

■Standard Type

GS-719N
Type A Durometer
for general rubber

GSD-719J
Type A Digital Durometer
with peak hold function
for general rubber

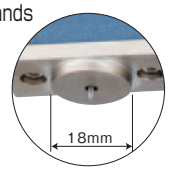
Peak Hold Function(J)

*Model J equipped with "peak hold" function (maintains the peak reading) effective for measuring elastomer and other materials for which obtaining the peak reading is difficult due to stress relaxation and other issues
*Minimum reading of 0.5(1/2 for analog type durometer)
*Connection to SD-763P Printer(Option) allows for easy statistical processing of the measured data.

■φ18mm Presser Foot Durometer

can both used as with Stands and without stands

The presser foot diameters for the Type A and D druometers which can be with measurement stands, is φ18mm surface as stipulated in the ISO and JIS standards. The φ18mm type A(GS-719R) and type D (GS-720R) can both be used without the measurement stands.



GS-719R
Type A Durometer
can both be used with and without stands with Peak pointer

GSD-719J-R
Type D Digital Durometer
can both used as with and without stands with Peak Hold function

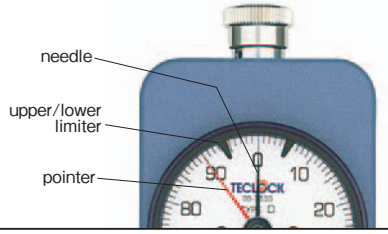
☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter Shape (mm)	Indenter Height (mm)	Weight (g)
Analog	GS-719N	A	General Rubber	JIS K 6253 ISO 7619 ISO 868 ASTM D 2240 DIN 53 505(R type only)	550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	200
	GS-719G	A	General Rubber		550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	208
	GS-719R	A	General Rubber		550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	213
	GS-720N	D	Hard Rubber		0-44450mN (0-4538gf)	R0.1 with 30°angle Conical Cone	2.50	200
	GS-720G	D	Hard Rubber		0-44450mN (0-4538gf)	R0.1 with 30°angle Conical Cone	2.50	208
	GS-720R	D	Hard Rubber		0-44450mN (0-4538gf)	R0.1 with 30°angle Conical Cone	2.50	213
	GS-721N	E(AO)	Soft Rubber	JIS K 6253 ISO 7619 ASTM D 2240	550-8050mN (56.1-821.1gf)	Hemisphere of R2.50	2.50	200
	GS-721G	E	Soft Rubber		550-8050mN (56.1-821.1gf)	Hemisphere with φ0.79	2.50	208
	GS-719P	A	General Rubber	JIS K 6253	550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	125
Digital	GSD-719J	A	General Rubber	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	313
	GSD-720J	D	Hard Rubber		0-44450mN (0-4533gf)	Hemisphere of R2.50	2.50	313
	GSD-721J	E(AO)	Soft Rubber	JIS K 6253, ISO 7619 ASTM D 2240	550-8050mN (56.1-821.1gf)	Hemisphere with φ0.79	2.50	313
	GSD-719J-R	A	General Rubber	JIS K 6253, ISO 7619 ISO 868, ASTM D 2240 DIN 53 505	550-8050mN (56.1-821.1gf)	φ0.79 with 35°angle Truncated Cone	2.50	320
	GSD-720J-R	D	Hard Rubber		0-44450mN (0-4533gf)	Conical with 30° angle	2.50	320

*N: standard *G: with peak pointer *P: Pocket type *R:φ18mm surface type *Indenter Height:2.50mm

Peak Pointer(model numbers ending with G, R, H, L or P)

Sometimes it is difficult to read the peak value immediately after the presser foot makes contact with rubber, elastomer and other soft elastic bodies as creep characteristics and other factors cause the indicated value to decline. Even though the indicator needle continues to indicate the lower value, the pointer stays at the peak value, which greatly improves precision. This feature is also useful in cases where something blocks the view of the display when the measurement is taken, as the pointer remains at the peak value and can be confirmed after taking the measurement.
The peak pointer method is also effective for making common difference assessments of the hardness value as upper and lower limiters are standard.

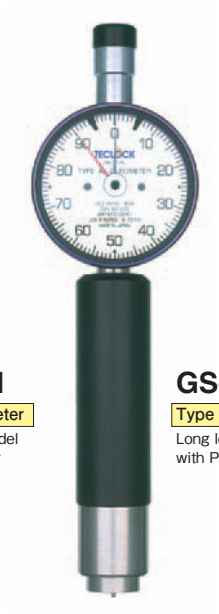


Deep Hole/Long Leg Durometer

Analog Digital

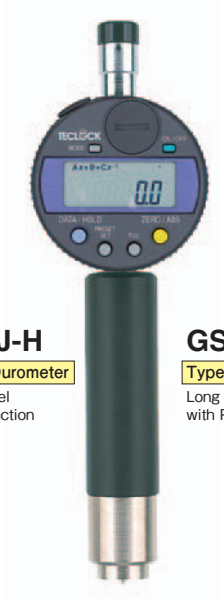
When the measurement surface is uneven, has limited flat areas due to irregular shapes or has deep hallows, good contact with the durometer presser foot and accurate measurements become very difficult. In such cases, measurements are only possible if the presser foot is smaller or has a longer reach, such as with the deep hole(H) and long leg(L) durometer models. Pointers and upper/lower limits are standard for both models.

GS-720H
Type D Durometer
Deep hole(H) model
with Peak pointer



GS-719L
Type A Durometer
Long leg(L) model
with Peak pointer

GSD-719J-H
Type A Digital Durometer
Deep hole(H) model
with Peak hold function



GSD-719J-L
Type A Digital Durometer
Long leg(L) Model
with Peak hold function

☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter shape	Surface Diameter	Indenter Height (mm)	Weight (g)
Analog	GS-719H	A	General Rubber, deep/small hole	JIS K 6253, ISO 7619 ASTM D 2240	550-8050mN (56.1-821.1gf)	φ0.79 with 35° Truncated Cone	φ12	2.50	120
Analog	GS-719L	A	General Rubber, deep/small hole	JIS K 6253, ISO 7619 ASTM D 2240, DIN 53 505	550-8050mN (56.1-821.1gf)	φ0.79 with 35° Truncated Cone	φ18	2.50	360
Analog	GS-720H	D	Hard rubber, long/large hole	JIS K 6253, ISO 7619 ASTM D 2240	0-44450mN (0-4533gf)	R0.1 with 30° Conical Cone	φ12	2.50	120
Analog	GS-720L	D	Hard rubber, long/large hole	JIS K 6253, ISO 7619 ASTM D 2240, DIN 53 505	0-44450mN (0-4533gf)	R0.1 with 30° Conical Cone	φ18	2.50	360
Digital	GSD-719J-H	A	General rubber, deep/small hole	JIS K 6253, JIS K 7215, ISO 7619, ISO868, ASTM D 2240	550-8050mN (56.1-821.1gf)	φ0.79 with 35° Truncated Cone	φ12	2.50	170
Digital	GSD-719J-L	A	General Rubber, deep/small hole	JIS K 6253, JIS K 7215, ISO 7619, ISO868, ASTM D 2240, DIN 53 505	550-8050mN (56.1-821.1gf)	φ0.79 with 35° Truncated Cone	φ18	2.50	380
Digital	GSD-720J-H	D	Hard rubber, deep/small hole	JIS K 6253, JIS K 7215, ISO 7619, ISO868, ASTM D 2240	0-44450mN (0-4533gf)	φ0.79 with 35° Truncated Cone	φ12	2.50	170
Digital	GSD-720J-L	D	Hard rubber, long/large hole	JIS K 6253, JIS K 7215, ISO 7619, ISO868, ASTM D 2240, DIN 53 505	0-44450mN (0-4533gf)	φ0.79 with 35° Truncated Cone	φ18	2.50	380

*All of above Durometers cannot be used with Stands.

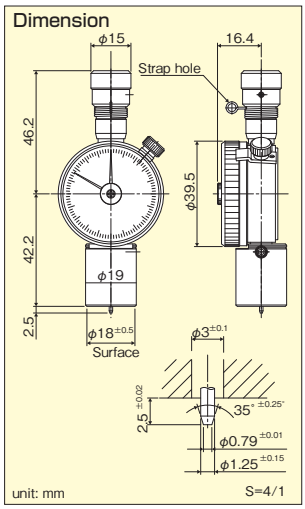
Pocket Durometer

Analog

This is compact and lightweight Durometer, and convenient to use at any places (inside or outside).
Peak Pointer is equipped for accurate measurement.

GS-719P
GS-709P
Type A Durometer
with Peak Pointer

Comparison of Standard type(left) and Pocket type



☐ Specification

Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter shape (mm)	Indenter Height (mm)	Weight(g)
GS-719P	A	General Rubber	JIS K 6253	550-8050mN (56.1-821.1gf)	φ0.79 with 25° Truncated Cone	2.50	125
GS-709P	A	General Rubber Soft Plastic	JIS K 7215	549-8061mN (55-822gf)			

Analog Digital

Digital/Analog Durometer compliance with ISO, ASTM, DIN and JIS

Method for determining hardness of vulcanized rubber and thermoplastic rubber

GS-702N

Type D Durometer

for Plastic/Hard rubber

GS-709N

Type A Durometer

for Soft plastic/general rubber

These durometers comply with ISO, ASTM, DIN and JIS K 7215. These durometers are designed for JIS 7215 standards which are used in Japanese plastic industry. These durometers are basically same with JIS K6253 new JIS standard, and only sphere method of spring is different. Teclock is making as another durometers from point of compartible JIS standard.

☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter shape	Indenter Height (mm)	Weight (g)
Analog	GS-702N	D	Plastic/Hard Rubber	JIS K 7215 ISO 868 ASTM D 2240	0-44483mN (0-4536gf)	R0.1 with 30°angle Conical Cone	2.50	200
Analog	GS-702G	D	Plastic/Hard Rubber		0-44483mN (0-4536gf)	R0.1 with 30°angle Conical Cone	2.50	208
Analog	GS-709N	A	Soft Plastic/General Rubber		549-8061mN (56-822gf)	φ0.79 with 35°angle Truncated Cone	2.50	200
Analog	GS-709G	A	Soft Plastic/General Rubber		549-8061mN (56-822gf)	φ0.79 with 35°angle Truncated Cone	2.50	208
Analog	GS-709P	A	Soft Plastic/General Rubber	JIS K 7215	550-8050mN (56.1-821.1gf	φ0.79 with 35°angle Truncated Cone	2.50	125
Digital	GSD-719J	A,digital	Soft Plastic/General Rubber	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	549-8061mN (55-822gf)	φ0.79 with 35°angle Truncated Cone	2.50	313
Digital	GSD-720J	D,digital	Hard Rubber/Plastic		0-44450mN (0-4533gf)	R0.1 with 30°angle Conical Cone	2.50	313

*N: standard *G: with Peak Pointer *P: Pocket type *J: Peak hold function *Indenter Height: 2.50mm

Digital/Analog Durometer compliance with SIRS and JIS

Analog Digital

GS-701N

Type C(Asker C)

for soft rubber and eraser

These durometer is used according to a regulation of physics testing method for Polyurethane Elastomer formed materials, and comply with JIS K732/JIS S6050 standard. Type A durometer is called as Shore A, and Type D durometer is called as Shore D and Type C for lower hardness is ASKER C. GS-701N(G) is same with ASKER C Durometer and comply with JIS 6050 standard (measurement hardness of eraser). SRIS 0101 standard(Japanese Rubber Association standard) based on above measuring method has been repealing now.

☐ Specification

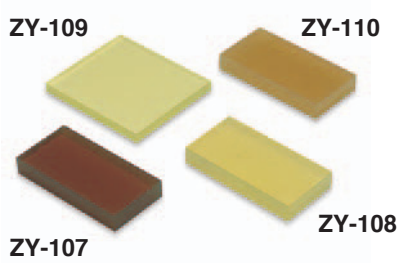
	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter Shape	Indenter Height (mm)	Weight (g)
Analog	GS-701N	C	Soft Rubber, Foam rubber, eraser, Yarn hardness	JIS K 7312 JIS S 6050 SRIS 0101	0.54N-8.39N (55.1-855.5gf)	φ5.08 hemisphere shape	2.54	200
Analog	GS-701G	C			0.54N-8.39N (55.1-855.5gf)	φ5.08 hemisphere shape	2.54	208
Digital	GSD-701J	C			0.54N-8.39N (55.1-855.5gf)	φ5.08 hemisphere shape	2.54	313

*N: Standard *G: Peak Pointer *J: with Peak hold function *Indenter height: 2.54mm

Parts

Test Block (option)

These are rubber test pieces which can simply check whether accuracy of durometer is in the range of standard value . It is absolutely approximate value but accuracy of durometer can be easily controlled in a short period.



☐ Specification

Code No.	type	Dimension (mm)	Applicable Durometer
ZY-107	Durometer A Hardness:50	40×80×12 thickness	GS-719N・GS-719G・GSD-719S Measuring value: nearly 50
ZY-108	Durometer A Hardness:80	40×80×12 thickness	GS9719N・GS-719G・GSD-719S Measuring value: nearly 80
ZY-109	Durometer D Hardness:40	70×80×7 thickness	GS-720N・GS-720G・GSD-720S Measuring value: nearly 40
ZY-110	Durometer E Hardness:80	40×80×12 thickness	GS-721N・GS-721G・GSD-721S Measuring value: nearly 80

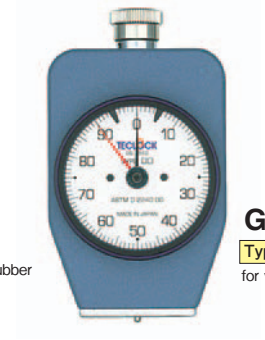
∗Durometers complying with these test pieces are Type A, Type D, Type E, which are compliant with JIS K 6253.
∗Calibration Certificate about test pieces can not be issued.

Digital/Analog Durometer compliance with ASTM D 2240

Analog Digital

Method for determining hardness of vulcanized rubber and thermoplastic rubber

GS-750G
Type B Durometer
for medium hardness rubber



GS-754G
Type OO Durometer
for very soft plastic rubber

These durometers comply with ASTM D 2240. Teclock have a good selection of ASTM Durometers for determing hardness for hard materials to very soft materials. Again Type OOO Durometers are also available on request.

☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter Shape	Indenter Height (mm)	Weight (g)
Analog	GS-750G	B	Medium Hard Rubber	ASTM D 2240	550-8050mN (56.1-821.1gf)	R0.1 with 30°angle Conical Cone	2.50	208
Analog	GS-751G	C	Hard Rubber		0-44450mN (0-4533gf)	φ0.79 with 35°angle Truncated Cone	2.50	208
Analog	GS-752G	DO	Medium Hard Rubber		0-44450mN (0-4533gf)	R1.19 Conical cone	2.50	208
Analog	GS-753G	O	Soft Rubber		550-8050mN (56.1-821.1gf)	R1.19 Conical cone	2.50	208
Analog	GS-754G	OO	Very Soft Rubber		203-1111mN (20.7-113.3gf)	R1.19 Conical cone	2.50	208
Digital	GSD-750J	B	Medium Hard Rubber		550-8050mN (56.1-821.1gf)	R0.1 with 30°angle Conical Cone	2.50	313
Digital	GSD-751J	C	Hard Rubber		0-44450mN (0-4533gf)	φ0.79 with 35°angle Truncated Cone	2.50	313
Digital	GSD-752J	DO	Medium Hard Rubber		0-44450mN (0-4533gf)	R1.19 Conical cone	2.50	313
Digital	GSD-753J	O	Soft Rubber		550-8050mN (56.1-821.1gf)	R1.19 Conical cone	2.50	313
Digital	GSD-754J	OO	Very Soft Rubber		203-1111mN (20.7-113.3gf)	R1.19 Conical cone	2.50	313

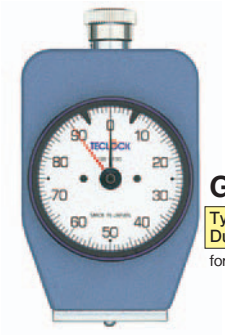
*N: standard *G: with Peak Pointer *P: Pocket type *J: Peak hold function *Indenter Height: 2.50mm
*Type A, D, E Durometer comply with ASTM D2240

Digital/Analog Durometer

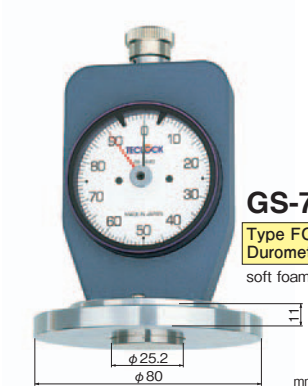
Analog Digital

compliance with TECLOCK Original Standard

This is TECLOCK original standard Durometers. The measurement of hardness for difficult materials (thin rubber sheet etc) can be applied easily now and could secure approximated hardness value of Type A by using a indenter height shortened and weaker spring force. Type E2 Durometer have 1/2 of spring load of Type E Durometer and Type FO is used for measurement of Sponge and foam materials



GS-743G
Type E2 Durometer
for soft rubber



GS-744G
Type FO Durometer
soft foam material

mm

Hardness measurement of sponge sheet with GS-744G.Judge of dispersibility of foam measure

☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter Shape	Indenter Height (mm)	Weight (g)
Analog	GS-743G	E2	Soft Rubber	Teclock E2	550-4300mN (56.1-438.6gf)	R2.5 Hemisphere	2.50	208
Analog	GS-744G	FO	Foam/Sponge	Teclcok FO	550-4300mN (56.1-438.6gf)	φ25.2 Cylindrical	2.50	500
Digital	GSD-743J	E2	Soft Rubber	Teclock E2	550-4300mN (56.1-438.6gf)	R2.5 Hemisphere	2.50	313
Digital	GSD-744J	FO	Foam/Sponge	Teclock FO	550-4300mN (56.1-438.6gf)	φ25.2 Cylindrical	2.50	500

*G: Peak Pointer *J: with Peak hold function *Indenter height: 2.50mm

Digital/Analog Durometer compliance JIS K6301

Analog Digital

GS-703N
Type old JIS C Durometer
for Hard rubber and ebonite

GS-706N
Type old JIS A Durometer
for General rubber

Method for determining hardness of vulcanized rubber and thermoplastic rubber

Since JIS K 6253 was new established, the JIS K 6301 established in 1950 has been abolished in August 1998 due to the reason that JIS K 6301 have not been matching with ISO standard. The durometers compliance JIS 6301 has been used during 60 years and the durometers are still required in the worldwide countries since the data measured by durometer compliance JIS K6301 are still used in the existing market.
Type A(for general rubber) and Type C(for hard rubber) could be continued to supply from Teclock.

☐ Specification

	Model	Type	Application	Applicable Standards	Spring Load Hardness 0-100	Indenter Shape	Indenter Height (mm)	Weight (g)
Analog	GS-703N	old JIS C	Hard Rubber	JIS K 6301 Spring Type C	980-44100mN (100-4500gf)	φ0.79 with 30°angle Truncated Cone	2.54	200
Analog	GS-703G	old Type C	Hard Rubber	JIS K 6301 Spring Type C	980-44100mN (100-4500gf)	φ0.79 with 30°angle Truncated Cone	2.54	208
Analog	GS-706N	old JIS A	General Rubber	JIS K 6301 Spring Type A	539-8385mN (55-855gf)	φ0.79 with 30°angle Truncated Cone	2.54	200
Analog	GS-706G	old Type A	General Rubber	JIS K 6301 Spring Type A	539-8385mN (55-855gf)	φ0.79 with 30°angle Truncated Cone	2.54	208
Digital	GSD-706J	old Type A	General Rubber	JIS K 6301 Spring Type A	539-8385mN (55-855gf)	φ0.79 with 30°angle Truncated Cone	2.54	313

*N: standard *G: with Peak Pointer *J: Peak hold function *Indenter Height: 2.54mm

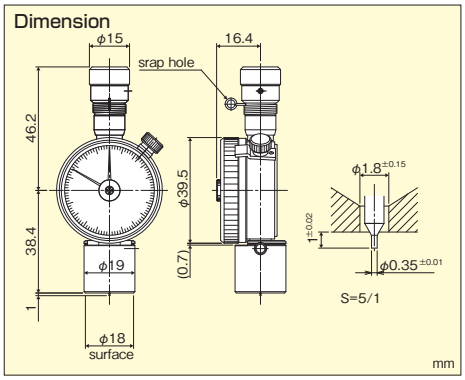
Analog Pocket Durometer

Analog

These durometer is used for hardness measurement of thin sheets of Elastomer and rubber.
The Indenter height is shortened(1mm of 1/2.5) and these durometer is suitable for sheets hardness measurement of relative comparison and dispersion. This is Teclock original standard but the pocket durometer is designed for obtaining approximate value of Type A.

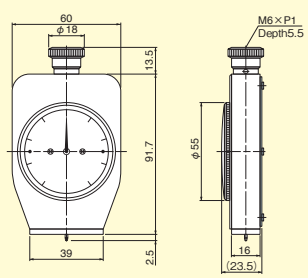
GS-779G
weight: 125g
with Peak pointer

Dimension

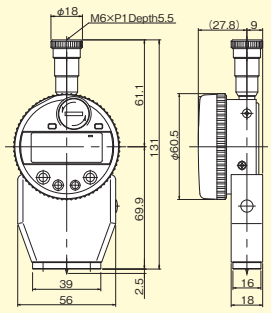


●Dimension of Durometers

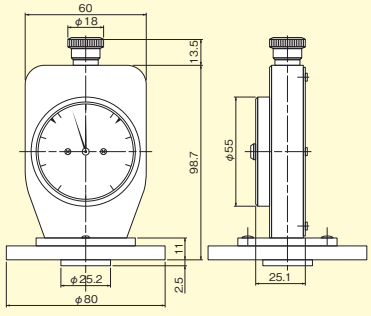
Analog Type



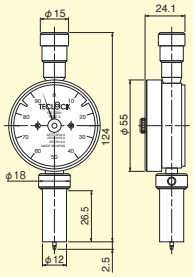
Digital Type



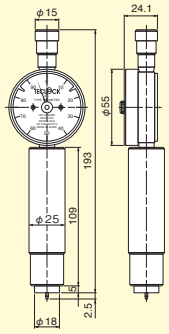
Type D(744G)



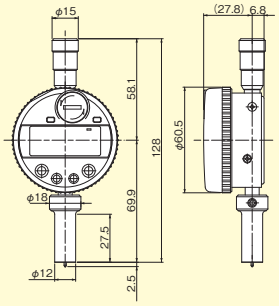
Deep hole type(Analog)



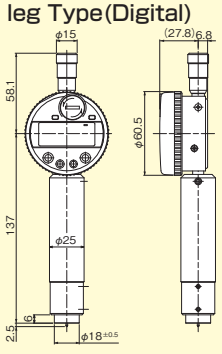
Long leg type(Analog)



Deep hole Type(Digital)



Long leg Type(Digital)



mm