

10 Durometers & IRHD Hardness Tester

Durometers show the degree of hardness by value whether a non-rigid material like rubber is soft or hard (hardness gauge for rubber or plastic). Recently, JIS standard and ISO standard have been drastically revised and details of hardness tester of rubber and method of measuring hardness are changed.

As an all embracing manufacturer of non-rigid material hardness tester, Teclock proposes lots of measuring methods of measuring hardness of not only rubber and plastic but many non-rigid materials and elastic materials.



IRHD micro-rubber hardness tester is designed for the purpose of measuring hardness of O ring, small rubber parts and thin rubber sheet.



Pocket type and peak hold with digital durometer.

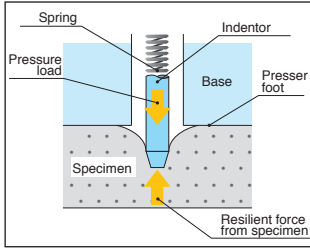


High reproducibility data without individual difference can be obtained by measuring hardness with durometer mounted to automatic measuring stand.



Model Selection of Durometer

As to measured value by durometer (rubber and plastic hardness tester), when the base of durometer and work piece are



cohered each other, the indentor changes shape of work piece by pressurized force caused by spring of durometer and work piece makes force against this force. Force amount of indentor is indicated as hardness when this pressurized force and repulsive force are equivalent.

If repulsive force is weak, it shows low value (soft), on the contrary, if repulsive force is strong, it shows high value (hard). There are various type of durometers of which force of springs and shape of indentors are different. The reason why there are various kinds of durometers, it is for the purpose of showing degree of hardness with higher sensitivity against difference of material characteristics and shape of surface which work pieces have. Select a suitable product referring to the figure in the right.

FO GS-744G	Soft material	•Urethane foam •Shock absorb material for car sheet •Sponge for dish washer •Konjac
OO GS-754G		•Ultra-soft rubber •Foam rubber •OA equipment roll •Chewing gum
E2 GS-743G		•Very soft rubber •Processed cheese •Cloth scroll •Chine clay •Sealant
C GS-701N E GS-721N		•Very soft rubber •Eraser •Film roll •Spinning roll •Foam rubber roll
O GS-753G		•Very soft rubber •Spinning roll •Leather •Cardboard •Polystyrene foam
A GS-719N GS-709N GS-706N	Hard material	•General rubber elastomer soft plastic Tire •Rubber roll•Rubber roll
B GS-750G		•Medium-hard rubber •Unglazed China clay •wood
DO GS-752G		•Medium-hard rubber •Flooring and building •Car handle
C GS-751G GS-703N		•Hard rubber •Golf ball •Brake rubber
D GS-720N GS-702N	•Hard rubber •Plastic •Ebonite	



As to measuring hardness by pushing by hand, durometer to work piece form the top and read value by making pressed surface adhere to durometer.



In order to solve individual difference of measured value, it is clearly mentioned in the standard to measure hardness by mounting durometer to stand.

Measuring hardness with Durometer

1. In case of measuring by pushing by hand, putting pressurized surface of durometer held by hand from the top vertically with a certain speed to the flat face of work piece which is put on the flat face . Then, after adhering it, regard the value measured within the passed time prescribed by standard as "hardness".
 2. In case of measuring hardness by mounting durometer to stand, measuring speed (not more than 3.2mm/sec.), pressurized load (type A, E is 1kgf, type D is 5kgf) and pressurized surface diameter ($\phi 18\text{mm}$) of type A / D durometers including tolerance are standardized.
 3. Measuring point of test piece is to be inside from its edge by 12mm or more and clearance is to be 6mm and more. Thickness is normally 6mm and more, and 10mm and more for type E.
 4. Test environment : Temperature is $23^{\circ}\text{C}\pm 2$, humidity is $50\pm 5\%$ and median or average is applied for measured value. If 50 show in type A case, it is described [A50] .
- These are ruled for each standard.



Compliance with JIS K 6253 standards for Hardness test of vulcanized or thermoplastic rubber

Analog

New JIS compliance

Digital

ISO compliance

This is Durometer to comply with JIS K 6253 (new JIS) standard established in 1993 for the purpose of conforming to ISO (International Standard Organization). Durometers consist of 3 types namely, Type A for medium hardness, Type D for high hardness and Type E for low hardness. Type A tends to indicate higher value by 1~2 points compared with former Type A durometers. Type D is suitable for hard rubber having more than 90 hardness measured by type A durometer and Type E is suitable for soft rubber of which hardness is 20 and below measured by Type A durometers.

Standard Type



GS-719N
Type A Durometer
General rubber



GSD-719K
Type A Durometer
Digital type
with peak detection

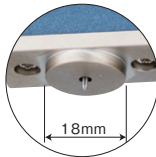
Digital Durometer with Peak Hold Function

This is the model for which peak hold (Maximum value is held) function is mounted.

This is effective to measure hardness of Elastomer of which maximum value is unreadable due to relaxation phenomenon. Minimum read value is 0.5 and it is a half of analog type. Measured data can be treated as statistics by connecting with optional printer SD-763P.

Pressurized Face $\phi 18\text{mm}$ Durometer mounted to Stand

Pressurized face diameter of type A and type D durometer mounted to a stand is defined 18mm by JIS standard and ISO standard. $\phi 18\text{mm}$ type A(GS-719R) and type D (GS-720R) can be used as they are for measuring by pushing by hand.



GS-719R
Type A Durometer
Stand mounting compatible type
Peak pointer type



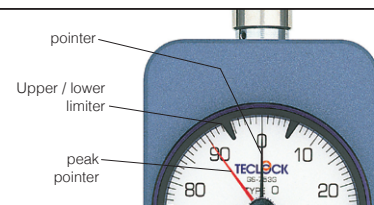
GS-719K-R
Type A Durometer
Digital type
Stand mounting compatible type
Peak pointer type

Specifications

Model	Type	Application / Materials	Conform standards	Spring load value	Indenter shape (mm)	Indenter height (mm)	Weight (g)
GS-719N	Type A	General rubber (Medium hardness)	JIS K 6253	550-8050mN (56.1-821.1gf)	Truncated Cone of $\phi 0.79$ with 35° angle	2.50	200
GS-719G	Type A(Peak Pointer Type)	General rubber (Medium hardness)		550-8050mN (56.1-821.1gf)	Truncated Cone of $\phi 0.79$ with 35° angle	2.50	208
GS-719R	Type A $\phi 18\text{mm}$ / stand combined	General rubber (Medium hardness)	ISO 7619	550-8050mN (56.1-821.1gf)	Truncated Cone of $\phi 0.79$ with 35° angle	2.50	213
GS-720N	Type D	Hard rubber (High hardness)	ISO 868	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	2.50	200
GS-720G	Type D(Peak Pointer Type)	Hard rubber (High hardness)	ASTM D 2240	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	2.50	208
GS-720R	Type A $\phi 18\text{mm}$ / stand combined	Hard rubber (High hardness)		0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	2.50	213
GS-721N	Type E (AO)	(High hardness) Soft rubber	JIS K 6253	550-8050mN (56.1-821.1gf)	Hemisphere of SR2.50	2.50	200
GS-721G	Type A(Peak Pointer Type)	(High hardness) Soft rubber	ISO 7619	550-8050mN (56.1-821.1gf)	Hemisphere of SR2.50	2.50	208
GS-721P	Type A(Pocket Type)	General rubber (Medium hardness)	ASTM D 2240	550-8050mN (56.1-821.1gf)	Hemisphere of SR2.50	2.50	125
GSD-719K	Type A	General rubber, soft plastic	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	550-8050mN (56.1-821.1gf)	Truncated Cone of $\phi 0.79$ with 35° angle	2.50	313
GSD-720K	Type D	Hard rubber, Plastic		0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	2.50	313
GSD-721K	Type E (AO)	Very soft rubber	JIS K 6253, ISO 7619	550-8050mN (56.1-821.1gf)	Hemisphere of SR2.50	2.50	313
GSD-719K-R	Type A $\phi 18\text{mm}$ / stand combined	General rubber (Medium hardness)	ASTM D 2240	550-8050mN (56.1-821.1gf)	Truncated Cone of $\phi 0.79$ with 35° angle	2.50	320
GSD-720K-R	Type A $\phi 18\text{mm}$ / stand combined	Hard rubber (High hardness)	JIS K 6253, ISO 7619	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	2.50	320

Peak Pointer Type

Some of Rubbers, Elastomer' elastic body is not easily read the maximum value after firm contacting with a presser foot of durometer, due to the stress relaxation. The pointer indicates the descendent value but the peak pointer is holding the maximum measured value. The peak pointer type can easily read the maximum value efficiently. In case the pointer cannot be read directly due to some obstacles although the measuring can be done, the measured value can be confirmed from peak pointer after measuring. The upper / lower limiters equipped will be effectively used in tolerance judgment.





Deep Hole / Long Leg Type

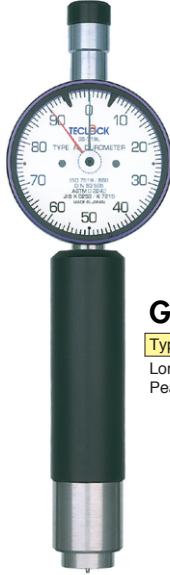
Analog

Digital

In some cases, such as the measurement surface of uneven or with a narrow flat area and the bottom of deep hollow, it may be impossible to achieve the proper results because of the difficult contact of the presser foot. The Deep Hole (H) type and the Long Leg (L) type make such measurements possible with a small or long presser foot. Both are supplied with Peak Pointer and the upper/lower limiters. The Long Leg type meets also to DIN 53505 standard.



GS-720H
Type D Durometer
Deep hole type
Peak pointer type



GS-719L
Type A Durometer
Long leg type
Peak pointer type



GSD-719K-H
Type A Durometer
Digital type
Deep hole type
with peak detection



GSD-719K-L
Type A Durometer
Digital type
Long leg type
with peak detection

Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Presser Foot Diameter (mm)	Indenter height(mm)	Weight (g)
Analog	GS-719H	Type A	General rubber / Deep hole type (narrow hole)	JIS K 6253, ISO 7619 ASTM D 2240	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	ϕ 12	2.50	120
	GS-719L	Type A	General rubber / Long leg type (thick hole)	JIS K 6253, ISO 7619 ASTM D 2240, DIN 53 505	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	ϕ 18	2.50	360
	GS-720H	Type D	Hard rubber / Deep hole type (narrow hole)	JIS K 6253, ISO 7619 ASTM D 2240	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	ϕ 12	2.50	120
	GS-720L	Type D	Hard rubber / Long leg type (thick hole)	JIS K 6253, ISO 7619 ASTM D 2240, DIN 53 505	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	ϕ 18	2.50	360
Digital	GSD-719J-H	Type A	General rubber / Deep hole type (narrow hole)	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	ϕ 12	2.50	170
	GSD-719J-L	Type A	General rubber / Long leg type (thick hole)	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240, DIN 53 505	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	ϕ 18	2.50	380
	GSD-720J-H	Type D	Hard rubber / Deep hole type (narrow hole)	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	ϕ 12	2.50	170
	GSD-720J-L	Type D	Hard rubber / Long leg type (thick hole)	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240, DIN 53 505	0-44450mN (0-4533gf)	Conical Cone of R0.1 with 30° angle	ϕ 18	2.50	380

Mounting impossible to stand with all varieties.

Pocket Type

Analog

New JIS compliance

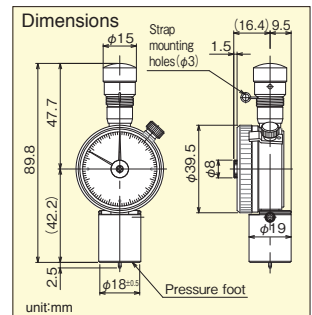
Durometer of pocket type it is convenient to carry.



GS-719P
GS-709P
Type A Durometer
Peak pointer type



Comparison with standard type. (Left)



※ Dimensions of the GS-755 is 000 pages.
※ Dimensions of the GS-779G.

Specifications

Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height(mm)	Weight (g)
GS-719P	Type A	General rubber (Medium hardness)	JIS K 6253	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.50	100
GS-709P	Type A	Soft plastic, General rubber	JIS K 7215	549-8061mN (55-822gf)			100
GS-755	Type 000	Ultra soft rubber	ASTM D 2240	203-1111mN (20.7-113.3gf)	Hemisphere of SR6.35		125
GS-779G	Type A approximate	Thin Sheet Hardness	—	388-1288mN (9-131gf)	ϕ 0.35	1	100



Analog

Digital

Compliance with JIS K 7215 standards Durometers for hardness test of plastic

This standard is prescribed by plastic industry in Japan apart from testing method of hardness of rubber. This is basically equal to Durometer of JIS K 6253, as only its round up method of spring load value etc. is different. But we distinguish model name as another Durometer according to the view of conformity to standard.



GS-702N

Type D Durometer

Plastics
Hard rubber



GS-709N

Type A Durometer

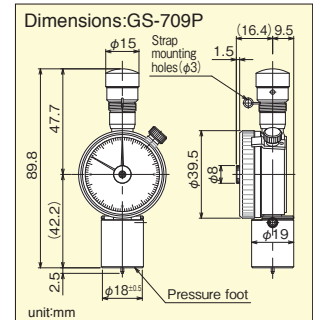
General rubber
Soft plastic



GS-709P

Type A Durometer

Peak pointer type
Pocket type



Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height(mm)	Weight (g)
Analog	GS-702N	Type D	Plastics / Hard rubber	JIS K 7215	0-44483mN (0-4536gf)	Conical Cone of R0.1 with 35° angle	2.50	200
	GS-702G	Type D (Peak pointer type)	Plastics / Hard rubber		0-44483mN (0-4536gf)	Conical Cone of R0.1 with 35° angle	2.50	208
	GS-709N	Type A	Soft plastic / General rubber	ASTM D 2240	549-8061mN (56-822gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.50	200
	GS-709G	Type A (Peak pointer type)	Soft plastic / General rubber		549-8061mN (56-822gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.50	208
	GS-709P	Type A (Pocket type)	Soft plastic / General rubber	JIS K 7215	550-8050mN (56.1-821.1gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.50	125
Digital	GSD-719K	Type A	Soft plastic / General rubber	JIS K 6253, JIS K 7215, ISO 7619, ISO 868, ASTM D 2240	549-8061mN (55-822gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.50	313
	GSD-720K	Type D	Plastics / Hard rubber		0-44450mN (0-4533gf)	Conical Cone of R0.1 with 35° angle	2.50	313

Compliance with JIS K 7312 standards Thermosetting Poly urethane Estolamer Moldings Physical Test

Analog

Digital



GS-701N

タイプC (アスカ-C)

・軟質ゴム
糸巻き硬さ用

Standard about physical test method of polyurethane Elastomer. One of the test items is hardness test and rubber industry generally calls type A durometer "shore-A" and type D durometer "shore- D". In addition, type C for low hardness range is called ASKER and GS-701N(G) is the same product ASKER-C. It complies with hardness test of JIS S 6050 "Plastic eraser". Furthermore, SRIS 0101 (ex Society of Rubber Industry, Japan standard of Measure) which was the base of these standard was already discontinued, but only type name is remained.

Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height(mm)	Weight (g)
Analog	GS-701N	Type C	Soft rubber, Foam rubber	JIS K 7312	539-8385mN (55-855gf)	Hemisphere of SR5.08	2.54	200
	GS-701G	Type C (Peak pointer type)			539-8385mN (55-855gf)	Hemisphere of SR5.08	2.54	208
Digital	GSD-701K	Type C	Eraser, Windings yarn	JIS S 6050	539-8385mN (55-855gf)	Hemisphere of SR5.08	2.54	313



Compliance with ASTM D 2240 standards Durometers for hardness test of rubber characteristic

Analog

Digital

ASTM (American Society for Testing and Materials) is historically old and various types of durometers are prescribed. Teclock provides all of this ASTM durometers for the usage of hard material application to ultra soft material application in our line up.



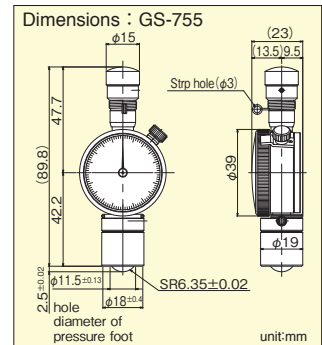
GS-750G
Type B Durometer
Medium-hard rubber



GS-754G
Type OO Durometer
Very soft rubber



GS-755
Type OOO Durometer



Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height (mm)	Weight (g)
Analog	GS-750G	Type B (Peak Pointer type)	Medium-hard rubber	ASTM D 2240	550-8050mN (56.1-821.1gf)	Conical corn of R 0.1 with 30° angle	2.50	208
	GS-751G	Type C (Peak Pointer type)	Hard rubber		0-44450mN (0-4533gf)	Truncated cone of φ 0.79 with 35° angle	2.50	208
	GS-752G	Type DO (Peak Pointer type)	Medium-hard rubber		0-44450mN (0-4533gf)	Hemisphere of SR 1.19	2.50	208
	GS-753G	Type O (Peak Pointer type)	Soft rubber		550-8050mN (56.1-821.1gf)	Hemisphere of SR 1.19	2.50	208
	GS-754G	Type OO (Peak Pointer type)	Very soft rubber		203-1111mN (20.7-113.3gf)	Hemisphere of SR 1.19	2.50	208
	GS-755	Type OOO	Very soft rubber		203-1111mN (20.7-113.3gf)	Hemisphere of SR 6.35	2.50	125
Digital	GSD-750J	Type B	Medium-hard rubber		550-8050mN (56.1-821.1gf)	Conical corn of R 0.1 with 30° angle	2.50	313
	GSD-751J	Type C	Hard rubber		0-44450mN (0-4533gf)	Truncated cone of φ 0.79 with 35° angle	2.50	313
	GSD-752J	Type DO	Medium-hard rubber		0-44450mN (0-4533gf)	Hemisphere of SR 1.19	2.50	313
	GSD-753J	Type O	Soft rubber		550-8050mN (56.1-821.1gf)	Hemisphere of SR 1.19	2.50	313
	GSD-754J	Type OO	Very soft rubber	203-1111mN (20.7-113.3gf)	Hemisphere of SR 1.19	2.50	313	

Analog

Digital

TECLOCK Original Standard Durometers

This is available as TECLOCK original standard based on customers' requirement, even though they are not prescribed in JIS or ISO. Type E 2 durometer for soft rubber with around half of spring load value of Type E, and Type FO to measure hardness of polystyrene sponge for the level of sponge for washing dishes are available.



GS-743G
Type E2 Durometer
Soft rubber



GS-744G
Type FO Durometer
Soft styrene foam



Hardness is measured by placing GS-744G on the sponge sheet. Dispersion of polystyrene level can be judged.

Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height (mm)	Weight (g)
Analog	GS-743G	Type E2 (Peak Pointer type)	Soft rubber	TECLOCK E2	550-4300mN (56.1-438.6gf)	Hemisphere of SR2.50	2.50	208
	GS-744G	Type FO (Peak Pointer type)	Soft styrene foam	TECLOCK FO	550-4300mN (56.1-438.6gf)	Cylindrical cone of φ 25.2	2.50	500
Digital	GSD-743J	Type E2	Soft rubber	TECLOCK E2	550-4300mN (56.1-438.6gf)	Hemisphere of SR2.50	2.50	313
	GSD-744J	Type FO	Soft styrene foam	TECLOCK FO	550-4300mN (56.1-438.6gf)	Cylindrical cone of φ 25.2	2.50	500



Analog

Digital

Compliance with JIS K 6301 standards Vulcanized Rubber Physical Test (discontinued in 1998 August)



GS-703N
JIS C (old type)
Hard rubber
Ebonite



GS-706N
JIS A (old type)
General rubber

JIS K 6301 was established in 1950 and had sustained base of rubber industry of our country but was discontinued in 1998 because it did not comply with ISO and also JIS K 6253 was prescribed on its behalf. However, It had been used for 60 years as "Rubber hardness tester" and even now it is used as test data between certain parties in charge with mutual consensus although movement to new JIS has progressed and standard is discontinued. There are 2 models such as Spring type A and type C for hard rubber.

Specifications

	Model	Type	Application / Materials	Conform standards	Spring load value 0-100	Indenter shape (mm)	Indenter height(mm)	Weight (g)
Analog	GS-703N	JIS C(old type)	Hard rubber	JIS K 6301	980-44100mN (100-4500gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.54	200
	GS-703G	Type C(old type) Peak Pointer type	Hard rubber	JIS K 6301	980-44100mN (100-4500gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.54	208
	GS-706N	JIS A(old type)	General rubber	JIS K 6301	539-8385mN (55-855gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.54	200
	GS-706G	Type A(old type) Peak Pointer type	General rubber	JIS K 6301	539-8385mN (55-855gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.54	208
Digital	GSD-706J	Type A(old type)	General rubber	JIS K 6301	539-8385mN (55-855gf)	Truncated Cone of ϕ 0.79 with 35° angle	2.54	313

Simplified Micro-Hardness Tester for Thin Sheet Hardness

Analog

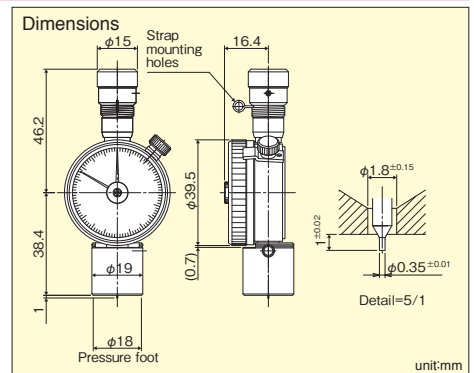


GS-779G
Peak pointer type

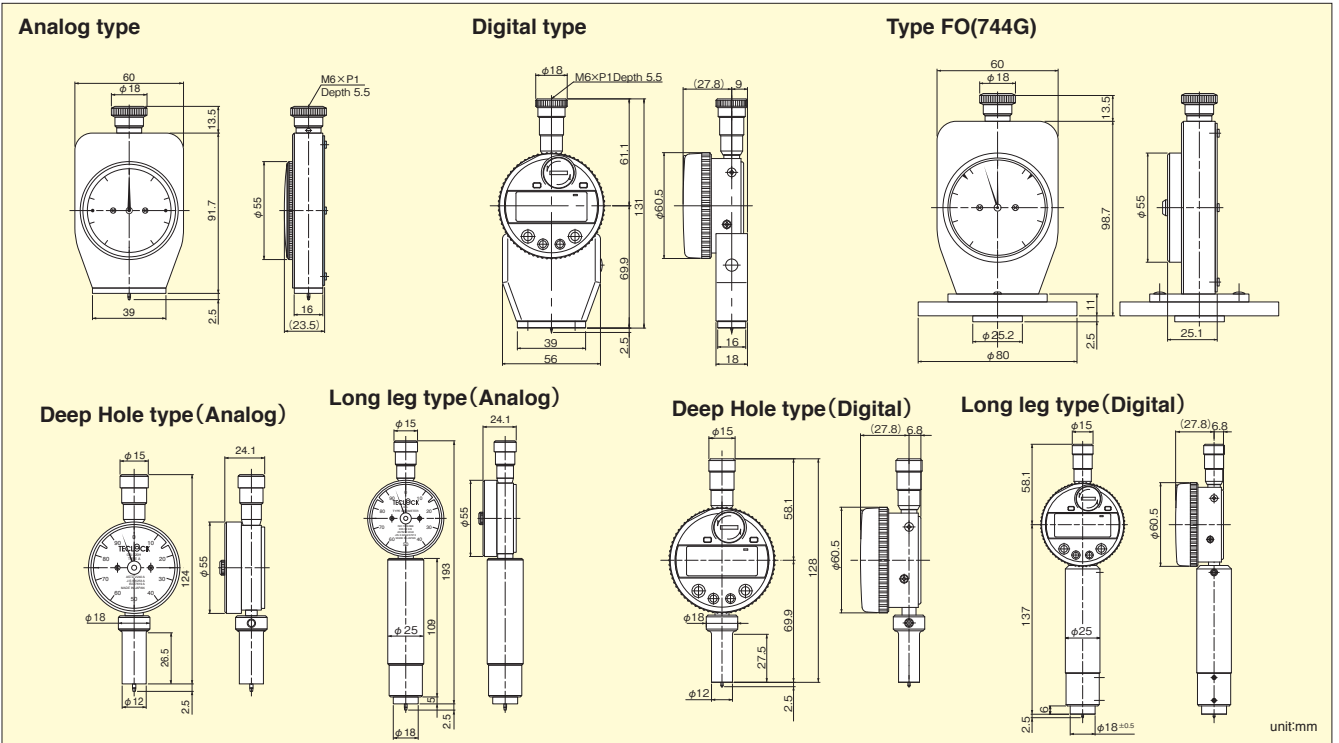
This is simplified micro-hardness tester which measures hardness of thin sheet such as rubber and Estolamer. Height of indenter is 1mm that is 1per 2.5 of that of normal durometer. It is effective for dispersiveness of sheet hardness and its relative comparison. It is original standard of Teclock and designed so as to obtain the value similar to type A durometer.

Specifications

Model	Type	Spring load value 0-100	Indenter shape (mm)	Indenter height(mm)	Weight (g)
GS-779G	Type A approximate	388-1288mN (9-131gf)	ϕ 0.35	1	125



Dimensions





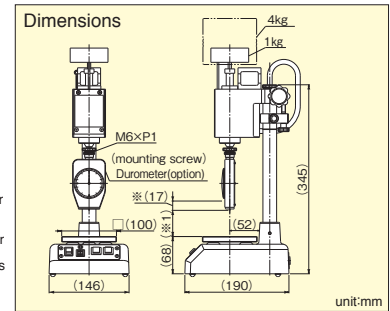
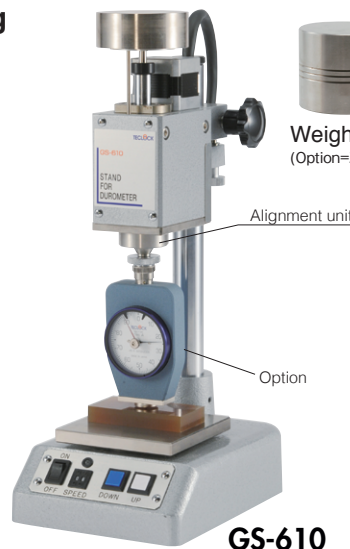
Measuring Stand for Durometers

New JIS compliance

In case of measuring with durometer by pushing by hand, measuring values vary in some degree due to individual difference. Therefore, Measuring stand is materialized as measuring method for high reproducibility, which is prescribed in JIS and ISO.

Automatic type Motor Driving Durometer Stand

- Hardness can be measured by durometer with load and speed prescribed as standard only by operating switch.
- Varying in some degree of data measured by pushing by hand has been dramatically improved due to adopting stepping motor driving system.
- Alignment unit which realizes high contact between indenter (contact point) of durometer and test piece is mounted.
- 1kg can be measured by type A and type E durometer as they are. Measuring by type D needs optional weight ZY-046 for measuring 5kg.. Digital durometer GSD series needs optional weight ZY-090 for measuring 1kg..
- Calibration certificate can be issued.



Specifications

Pressure Value	Weight code-No.	Applicable durometer model
1kg	Analog	ZY-089(Accessory)
	Digital	ZY-090(Optional)
4kg	ZY-046(Optional)	D, ASTM C, DO, JIS C(old type)

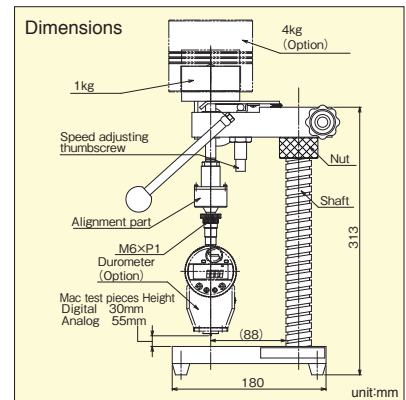
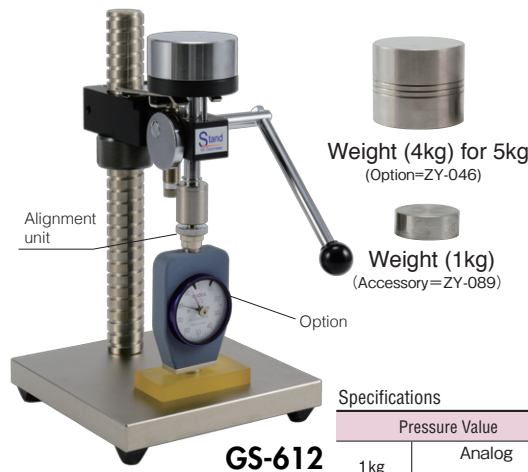
Lowering speed adjustable range: 1[mm/sec] - 19[mm/sec], by 1[mm/sec]

Power: 100 - 240 VAC (AC adapter accessory)

Weight: Approx. 9kg

Manual Operation type Durometer Stand with Speed Controller

- Speed controller with high reliability is adopted for moving down speed adjustment unit.
- Alignment unit which realizes high contact between indenter (contact point) of durometer and test piece is mounted.
- 65mm for analog and 40mm for digital are obtained for possible measuring range.
- Shaft with square thread is adopted that can prevent holder falling down and moving up and down.
- 1kg can be measured by type A and type E durometer as they are. Measuring by type D needs optional weight ZY-046 for measuring 5kg.. Digital durometer GSD series needs optional weight ZY-090 for measuring 1kg..
- Calibration certificate of mass (with durometer) can be issued, which are prescribed in ISO / JIS.



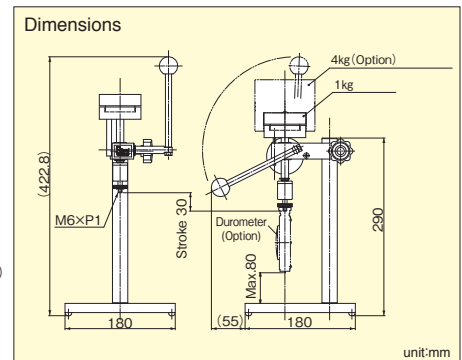
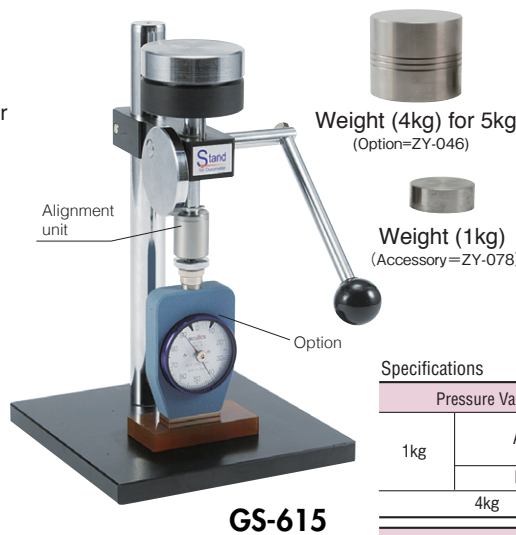
Specifications

Pressure Value	Weight code-No.	Applicable durometer model
1kg	Analog	ZY-089(Accessory)
	Digital	ZY-090(Optional)
4kg	ZY-046(Optional)	D, ASTM C, DO, JIS C(old type)

Weight 8.5kg

Manual Operation type Durometer Stand

- Hardness can be measured by durometer with load prescribed by JIS by mounting durometer and manual operation.
- Adopting cam has realized easy operation and cost performance.
- Alignment unit which realizes high contact between indenter (contact point) of durometer and test piece is mounted.
- 1kg can be measured by type A and type E durometer as they are. Measuring by type D needs optional weight ZY-046 for measuring 5kg.. Digital durometer GSD series needs optional weight ZY-079 for measuring 1kg..
- Calibration certificate can be issued (Operation speed certificate can not be issued.)



Specifications

Pressure Value	Weight code-No.	Applicable durometer model
1kg	Analog	ZY-078 (Accessory)
	Digital	ZY-079 (Optional)
4kg	ZY-046 (Optional)	D, ASTM C, DO, JIS C(old type)

Weight 3.9kg



Durometer Periodical Inspection / Calibration

Durometer is a testing machine. In case that it corresponds to “Monitoring Machine ” and “Measuring Machine” of ISO 9001 (JIS G 9001), controlling machines along with it is needed. Teclock is one of a few manufacturers of durometer which has obtained the authentication of ISO 9001 and can originally issue 3 kinds of traceability system diagram, calibration certificate and inspection report that are needed for calibration documents. In addition, Teclock can issue 3 kinds of documents for durometer tester and indenter height gauge, that are needed for internal inspection. Use these for control based on internal calibration standard.

Durometer Tester

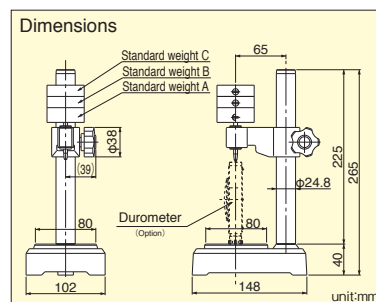


GS-607

Photos of durometer is optional.

This is inspection machine which simply checks spring load value of analog type durometer. Putting defined load with 3 pieces of standard weight to the inverted durometer and inspecting whether graduation of 25, 50 and 75 correctly point out. Calibration certificate can be issued. (Digital type durometer and other makes products can not be calibrated.)

In addition, in the standard of overseas and also domestic, inspection method by using mechanism of even balance and with normal position of durometer is introduced.

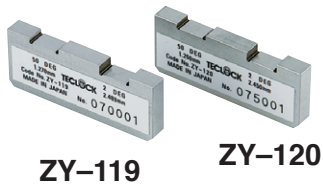


Specifications

Code.No.	対応機種	Weight (kg)
GS-607	GS-701N/GS-701G/GS-706N/GS-706G	3.7
GS-607A	GS-709N/GS-709G	3.7
GS-607B	GS-719N/GS-719G/GS-721N/ GS-721G/GS-750G/GS-753G	3.7
GS-607C	GS-743G	3.7

Type D durometer for tester does not manufacture. Calibration certificate is possible.

Indenter Extension Gauge



ZY-119

ZY-120

Height of indenter (contact point) of durometer is simply checked. ZY-119 is for JIS K 6301 and ZY-120 is for JIS K 6253. Products of other makes can be checked.

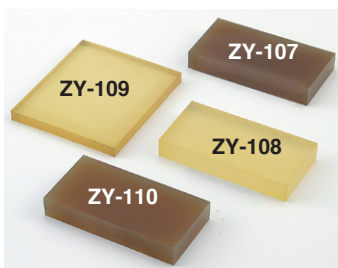
Specifications

Code No.	Indenter Height (mm)	50DEG	2DEG	Applicable Durometer
ZY-119	2.54 type	1.27mm	2.489mm	GS-701N/G, 706N/G
ZY-120	2.5 type	1.25mm	2.45mm	GS-GSD-719, 720 Series

Calibration certificate is possible

Rubber piece for Durometer Measuring

This is not rubber test piece. It is used for easy checking to find out failure of durometer. Measuring hardness when it is purchased and use it for daily control of durometer.



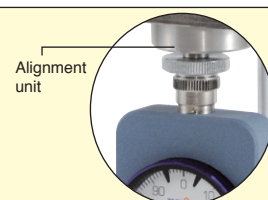
Specifications

Code No.	Type	dimension (mm)	Applicable Durometer
ZY-107	Durometer A Hardness:50	40×80×12 thickness	TypeA(GS,GSD-719J Series)
ZY-108	Durometer A Hardness:80	40×80×12 thickness	
ZY-109	Durometer D Hardness:40	70×80×7 thickness	TypeD(GS,GSD-720J Series)
ZY-110	Durometer E Hardness:80	40×80×12 thickness	TypeE(GS,GSD-721J Series)

* 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.

Alignment Unit for Durometer Stand

As it can move front / back and left /right it is the new function which has materialized high adhesion between pressurized face of durometer and face to be measured of test piece. It is mounted to GS-610, Gs-612, GS-615 and GX-01. Unmovable type is also available. Ask our branch nearby for details.





Automatic rubber hardness measuring system GX-01 series JIS K 6253 compliance

New JIS compliance

ISO compliance

With the combination of Automatic measuring stand [GS-610], Durometer sensor [GSS-719 or GSS-720] and Counter [GSS-C01], Auto rubber hardness measuring system [GX-01 series] is complete, which can perform the measurement with the operating speed, the measuring weight and the pressing-surface dimensions which are specified in JIS K 6253 "Determination of hardness - Vulcanized rubber and Thermoplastic rubber".

- Peak-hold, Timer-hold, Median value, Tolerance judgment etc can be displayed and outputted.
 - GX-01A (Type A) is for 1kg load, and GX-01D (Type D) is for 5kg load, and each can perform automatic hardness measurement.
 - Sensor of Type A and D is changeable.
 - Additionally, for measurements with Type D, 4kg weight (Option: ZY-046) is required.
 - Connectable to PC or printer.
 - Alignment unit achieving high adhesion with a test piece is adopted to the Durometer sensor mounting part.
 - Calibration documents can be issued.
- * Operating speed: 3.2mm/sec or less
 Measurement weight: Type A=1+0.1/0kg
 Type D=5+0.5/0 kg (Total with the weight of Durometer)
 Pressing-surface dimensions: $\phi 18 \pm 0.5$ mm
 = Specified in JIS K 6253
- Vertical installation with less space is possible by using Dedicated stand (Option).

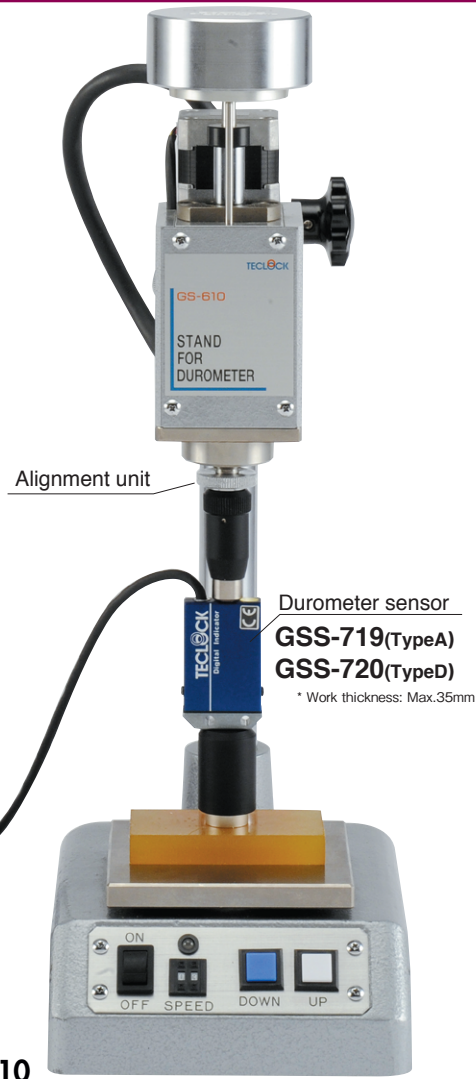
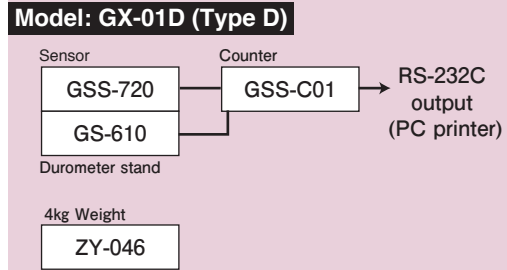
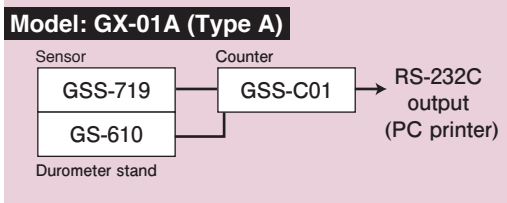


Diagram of Automatic hardness measuring system



[System features]

Peak-holding function, Timer-holding function (Timer value 0.5, 1 to 30sec), Tolerance judging function, Mean value outputting function (n=1 to 30), Data output (PC printer), Outer functions control output (Automatic measurement start by one-button, at combination with GS-610)

Specifications (Counter)

Model	GSS-C01
Standards	ISO 7619 / JIS K 6253 compliance
Minimum indication	0.1
Outside interface	RS-232C
Power	AC100~240V(ACAdapter)
Dimensions	150(W)×160(L)×45(H)mm
Weight	2kg

Specifications (Sensor unit)

Model	GSS-719 (TypeA用) GSS-720 (TypeD用)
Pressing-surface diameter	$\phi 18$ mm
Code length	2m
Dimensions	32.6(W)×24(L)×138.6(H)mm
Weight	160g

* For measurements, the attached weight (ZY-089) for 1kg needs to be replaced with ZY-078.

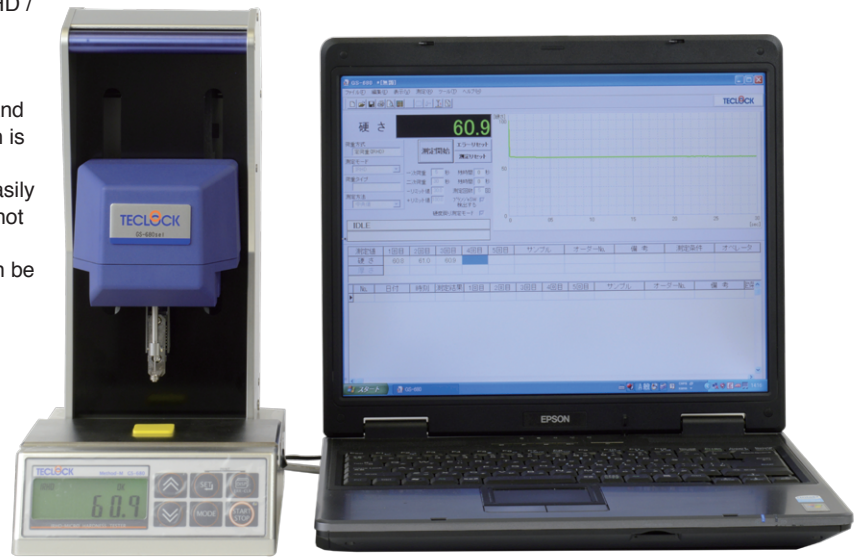


New JIS compliance

ISO compliance

Totally Automatic type IRHD / M method Micro – size International Rubber Hardness Tester

- Micro-hardness can be measured by 8/1 scale each durometer of type A, E, E2, OO, FO in addition to IRHD / M method.
- Hardness of O ring and small rubber parts can be measured with totally automatic.
- Voice coil motor is adopted for load system. Friction and reproducibility of inner mechanism is improved, which is different from weight system.
- It is plug-in type that plunger (contact point) can be easily changed and recalibration on test method change is not needed.
- As test piece table is wide, various measuring jigs can be set up.

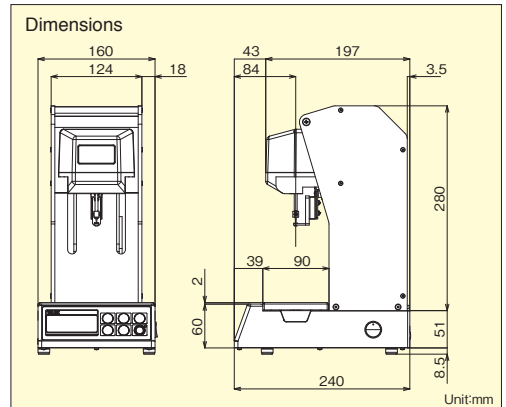


GS-680sel

PC connecting example

Specifications

Hardness testing method	IRHD · M-method	Durometer hardness	
Compliance standards	ISO 48/JIS K 6253	ISO 7619/JIS K 6253	
Measuring accuracy	±0.1 IRHD	TECLOCK standards/ASTM D 2240	
		Type A/E ±1	JIS K 6253
		Type E2/FO ±1	TECLOCK standards
Measuring range	30~100 IRHD	Type OO ±2	ASTM D 2240
		0 ~ 100	
Minimum indication unit	0.1		
Measurement part movable distance	100mm		
Measurable test-piece dimensions	W=160 / D=110 / H=100mm		
Conformity standards	EC Directive (EN61326)		
Outside interface	RS-232C		
Power	AC100~200 V /AdapterDC24V		
Weight	7.8kg (Main unit)/0.6kg (Power unit)		
Accessories	PC application CD (for Windows XP & 7)		
	PC connecting cables/AC adapter Spare plunger (x1) (ZS-121) for IRHD		
Rubber specimen	ZY-917 6 types set (w/Inspection table)	_____	

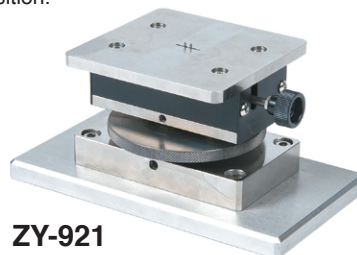


Other functions: Measurement time extension, Return-measurement function, Self-diagnosis function, Statistical processing (Relaxation curve, Average value, Median value etc)

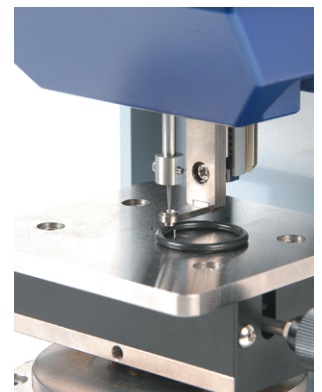
O ring Measuring device for GS-680

This is the device for centering of O ring of which wire diameter is 0.5mm-10mm. The pin at stage center which fixes position of O ring slightly moves up/down and left/right independently and fixes the position. In addition, it is possible to rotate it to an arbitrary position.

Specifications	
Model	ZY-921
Stage dimensions	90x86mm
Applicable O-ring diameter	φ0.5~φ10mm
Weight	2.9kg



ZY-921





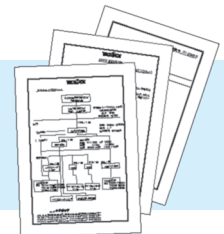
Comparison of Measured Value by Durometer

It is the comparison list of measured data by each durometer based on type A. As hardness values fluctuate owing to various factors temperature and humidity on measuring, dimension and shape, and vulcanizing condition in a certain range, it is impossible to verify complete relative relation between each type. However, refer to the list in right side for comparison value.

TYPE A JIS K6253 JIS K7215	0	10	20	30	40	50	60	70	80	90	100			
(old A) JIS K6301 (Discontinued standard)		10	20	30	40	50	60	70	80	90				
TYPE E JIS K6253		20	30	40	50	60	70	80	90					
JIS S 6050 (old SRIS)		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	

Calibration certificate can be issued to all Teclock durometers.

There is a case that durometers correspond to "Monitoring Machine" and "Measuring Machine" of ISO 9001. Teclock has obtained the authentication of ISO 9001 and can originally issue 3 kinds of traceability system diagram, calibration certificate and inspection report.





Durometer Standard Table

	Name of standard	JIS K 6253-2012			JIS K 6301-1995 (1998 abolition)		
		Type A	Type D	Type E ※note1	Type A	Type C	
Specification of Testers	Presser foot dimension	more than 12mm			more than 14mm ※note2	more than Diameter 10mm , approx. 3.2mm hole	
	Indenter shaft diameter						
	Indenter tip diameter						
	Indenter tip angle						
	Indenter amount exceeding from presser foot						
	weight at 0	550mN (56.1gf)		O mN (O gf)	550mN (56.1gf)	539.5mN (55gf)	981mN (100gf)
	weight at 100	8,050mN (821.1gf)		44,450mN (4,533gf)	8,050mN (821.1gf)	8,385mN (855gf)	44,130mN (4,500gf)
	load accuracy	Load allowance value	±75mN (8.16gf)		±445mN (44.9gf)	±75mN (8.16gf)	±8 gf
		Indicating tolerance value	± 1		± 1	± 1	±0.45
	Other standards	ASTM D 2240 - ISO 7619					
Test Piece and Measuring condition	Test pieces	Flat area dimension				more than pressurized surface	
		Thickness	more than 6mm			more than 10mm	more than 1 2 mm more than 6 mm
	Measuring position	more than 12mm			more than 15mm		
	Time to read					Read at once (or after regulating time)	
	Number of measurement and data summary	5-points median more than 6mm off			5-points average value		
		Test report (example):A45	Test report (example):D50	Test report (example):E 60	Test report (example):Hs (JIS A) 50	Test report (example):Hs (JIS C) 50	
	Weight of constant pressure weighter	1 ^{+0.1} ₀ kg		1 ^{+0.5} ₀ kg	1kg (preferable) ^{+0.1} ₀	1kg	5kg
	Temperature condition	23±2°C / more than 3 hours			20°~30°C / one hour		
	Acclimate time of specimen						
	Use range	more than A90 use TypeD under D20 use TypeA			A > 70 use C type C type is preferable for range of 30-90		
Suitable specimen to the standards	Normal Rubber	Normal Rubber (hard)	Soft Rubber	Normal Rubber	Hard Rubber		
Our original durometers	Standard	GS-719N	GS-720N	GS-721N	GS-706N	GS-703N	
	Peak Pointer	GS-719G	GS-720G	GS-721G	GS-706G	GS-703G	
Our original digital durometers	GSD-719K Series		GSD-720K Series	GSD-721K Series	GSD-706K		

note1 ISO 7619 is referred to as a type A note2 For stand 500mm² more

	Name of standard	JIS K 7215-1986		JIS S 6050 / JIS K 7312		
		Type A	Type D			
Specification of Testers	Presser foot dimension	more than diameter 12mm, diameter 3 ^{+0.5} mm hole Center			about 14×50mm approx. 5.2mm hole in Center	
	Indenter shaft diameter					
	Indenter tip diameter					
	Indenter tip angle					
	Indenter amount exceeding from presser foot					
	weight at 0	549mN (56gf)		O mN (O gf)	0.54N (55,185gf)	
	weight at 100	8,061mN (822gf)		44,483mN (4,536gf)	8.39N (855,595gf)	
	load accuracy	Load allowance value	±78mN (±8gf)		±441mN (±45gf)	
		Indicating tolerance value	± 1		± 1	
	Other standards	ASTM D 2240 / ISO 868 (SHORE A) (DIN 53505)		ASTM D 2240 / ISO 868 (SHORE D) (DIN 53505)	JIS S 6050 (Plastics Erasers)	
Test Piece and Measuring condition	Test pieces	Flat area dimension	Width : about 25mm or more			more than pressurized surface
		Thickness	6mm or more, 2mm acceptable for HDD 40 pr above			more than 10mm
	Measuring position	12mm or more from edge				
	Time to read	1sec or less (time to be specified for over 1sec)			At first weighing and 30sec later	
	Number of measurement and data summary	5 or preferably 10meas, at 6mm or more			Average value of 3initial and 30sec later measurement. JIS S 6050	
		Test report (example):HDA83	Test report (example):HDD56		Average value of 5initial and 30sec later measurement. JIS K 7312	
	Weight of constant pressure weighter	approx. 1kg		approx. 5kg	1kg	
	Temperature condition	23±2°C 50±5% (humidity)				
	Acclimate time of specimen	88h (Time can be shortened if measured value does not vary)			20 ^{±10} /h	
	Use range	As a rule, use in range 20-90 Use D for A>90, Use A for D<20				
Suitable specimen to the standards	Plastic (plastic film, tape and foam plastic excluded) (usable for elastomer)			Expanded rubber		
Our original durometers	Standard	GS-709N	GS-702N	GS-701N		
	Peak Pointer	GS-709G	GS-702G	GS-701G		
Our original digital durometers	GSD-719K Series		GSD-720K Series	GSD-701K		



Durometer Standard Table

Name of standard		ASTM D 2240-05				
		Type B	Type C	Type D0	Type O	Type OO
Presser foot dimension		6mm diameter 2.5~3.2mm hole				
Indenter shaft diameter						
Indenter tip diameter						
Indenter tip angle						
Indenter amount exceeding from presser foot						
weight at 0		550mN (56.1gf)		0 mN (0 gf)		
weight at 100		8,050mN (821.1gf)		44,450mN (4,533gf)		
load accuracy	Load allowance value	±0.075N		±0.4445N		
	Indicating tolerance value			±1		
Other standards		---				
Test Piece and Measuring condition	Test pieces	Flat area dimension	more than radius 6mm than			
		Thickness	more than 6mm			
	Measuring position		more than 12mm (length and width)			
	Time to read		within 1-sec.			
	Number of measurement and data summary		5-points of average value or medium 6mm off			
	Weight of constant pressure weighter		1kg Recommendation	5kg	1kg	---
	Temperature condition		23±2°C			
	Acclimate time of specimen					
	Use range		20~90			
	Suitable specimen to the standards		Rubber, Cellular, Elasticity material, Thermoplastic elastomers, Hard plastic, Soft plastic			
Our original durometers	Standard	---		---		
	Peak Pointer	GS-750G	GS-751G	GS-752G	GS-753G	GS-754G
Our original digital durometers		GSD-750K	GSD-751K	GSD-752K	GSD-753K	GSD-754K

Name of standard		Teclock standard	
		Type E2	Type F0
Presser foot dimension		more than 16mm, Diameter 5.5mm hole	
Indenter shaft diameter			
Indenter tip diameter			
Indenter tip angle			
Indenter amount exceeding from presser foot			
weight at 0		550mN (56.1gf)	
weight at 100		4,300mN (438.6gf)	
load accuracy	Load allowance value	0.4N (±4gf)	
	Indicating tolerance value	±1	
Other standards		---	
Test Piece and Measuring condition	Test pieces	Flat area dimension	more than pressurized surface
		Thickness	more than 10mm
	Measuring position		more than pressurized surface
	Time to read		more than 30mm
	Number of measurement and data summary		within 1-sec.
	Weight of constant pressure weighter		5-points median more than 6mm off
	Temperature condition		5-points median more than 80mm off
	Acclimate time of specimen		---
	Use range		23±2°C
	Suitable specimen to the standards		Soft sponge
Our original durometers	Standard	---	
	Peak Pointer	GS-743G	GS-744G
Our original digital durometers		GSD-743K	GSD-744K

Precautions on use of Durometer (rubber / plastic hardness measurement)

1. Confirmation of performance

Please confirm requested standard and type of durometer on the occasion of receiving.
Please refer to the standard of JIS K 6253, K 7215, K 6301, ISO 7619, ISO 868 and ASTM D 2240 in detail.

2. Test environment

- (1) Test environment for measuring samples is prescribed at internal and external standard as " $23\pm 2^{\circ}\text{C}$, humidity $50\pm 5\%$ ".
- (2) please avoid using it where dust and oil mist attach to it.

3. Precaution on use

- (1) Check before using
 - ① Confirm whether operation is smooth.
 - ② Confirm whether accretion is on pressurized surface or indenter.
 - ③ Confirm whether the indicator indicates "0 point".)
- (2) Never disassemble device and loose screws.
- (3) Do not give the products any shock by being dropped or excessive load.
- (4) Keep the products away from direct sun light, excessive high or low temperature, and high humidity or dust. Avoid using and storing the products under the circumstances of water or oil.
- (5) Do not press the products to hard samples like glass or metals excepting for the purpose of checkup and inspection.
- (6) Do not clean with organic detergent (thinner or benzine) and not put oil onto the products.
- (7) Do not apply a load to the indenter in right angle. Do not hit the products with a hard item.

4. Maintenance

- (1) In case that outer dial can not be read due to dirt of crystal, please wipe stains from the crystal by using a dry cloth or a cloth dampened with neutral detergent.
- (2) In case that some sort of defect is observed for indicator, indenter and spring load value by check up and repair or adjustment is needed, please inform the sales outlet where the products are bought. Products repaired or adjusted by parties not authorized by TECLOCK can not be warranted by us.

5. Periodical inspection

- Durometers are needed to be inspected during a certain period, which depends on usage frequency. Especially, in case that instruments are controlled by "inspection, measuring and test instruments " of ISO 9000 series, it is important element.
- (1) Indenter height : Indicator should indicate 0 on free condition. Then it is checked whether indicator is in 100 by pressing pressurized surface onto hard and flat and smooth surface. Meanwhile, be careful so that indenter edge shape of Type D durometer is not changed.
 - (2) Indenter shape : It is checked by measuring microscope whether dimension and shape of indenter edge is in the permissible value of standard. In case that there is abrasion or damage , indenter needed to be changed.
 - (3) Spring force : It is checked by giving load against each indicated value whether indicator correctly indicates. Please use durometer tester "GS-707 series" to check load of ● mark check point of 25, 50 and 75 on outer dial. Permissible error of indicated value is ± 1 .

