# C

# TYPES AND FEATURES OF NOK PACKINGS

# C. TYPES AND FEATURES OF NOK PACKINGS

NOK supplies several different types of packing materials to suit various applications. **Table C-1** shows the type and characteristics of rubber materials and **Table C-2** shows the type and characteristics of resin material. Standard materials are offered for items in this catalog to best meet the operating conditions. Refer to **chapter B** for the types and features of each type of packing. Compatibility in the following tables indicates general tendencies. For a specific brand-wise oil resistance, refer to pages **271 to 292** and to the oil resistance data in **chapter I**.

〈Table C-1〉 Types and characteristics of NOK rubber material

| Material | | NOK material code | Material | | | | | | | Resistivity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hardness (Durometer A) (Instant value) | Tensile strength (MPa) | 100% modulus (MPa) | Elongation (%) | Permanent compression set (%) Test condition: A : 80°C 70h, B : 100°C 70h, C : 120°C 70h, D : 175°C 70h | Hardness change by air oven aging test (point) | Low temperature brittleness $TR_{10}$ (°C) | Lubricating oil (agent) | | | | | | | |
| | | | | | | | | | | Engine oil | Gear oil | Machine oil | Spindle oil | Refrigerator oil | Cup grease | Lithium grease | Silicon grease |
| Rubber material | Nitrile rubber [NBR] | A102 (Black) | 60 | 17 | 2.6 | 470 | 32 (B) | + 7 (B) | − 22 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A103 (Black) | 70 | 19 | 4.5 | 430 | 33 (B) | + 5 (B) | − 22 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A104 (Black) | 80 | 19 | 7.3 | 340 | 31 (B) | + 5 (B) | − 21 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A216 (Black) | 85 | 19 | 11 | 190 | 26 (B) | + 5 (B) | − 36 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | | A297 (Black) | 75 | 22 | 4.8 | 260 | 18 (B) | + 5 (B) | − 34 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A305 (Black) | 70 | 21 | 4.3 | 340 | 10 (B) | + 2 (B) | − 23 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A402 (Black) | 60 | 13 | 2.3 | 440 | 13 (B) | + 3 (B) | − 26 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A505 (Black) | 90 | 21 | 15 | 170 | 31 (B) | + 2 (B) | − 22 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A527 (Black) | 85 | 20 | 12 | 160 | 18 (B) | + 3 (B) | − 57 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A566 (Black) | 90 | 17 | 14 | 130 | 15 (B) | + 3 (B) | − 34 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A567 (Black) | 82 | 17 | 16 | 130 | 20 (B) | + 4 (B) | − 55 | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | | A626 (Black) | 70 | 18 | 5 | 260 | 13 (B) | + 7 (B) | − 35 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | | A795 (Black) | 80 | 20 | 7.8 | 400 | 48 (B) | + 6 (B) | − 11 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | A980 (Black) | 80 | 14 | 11 | 150 | 17 (B) | + 3 (B) | − 52 | ◎ | ○ | ○ | ○ | ○ | ◎ | ◎ | ○ |
| | Fluoro rubber [FKM] | F201 (Black) | 70 | 14 | 5 | 230 | 7 (D) | 0 (D) | − 15 | ○ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | F357 (Black) | 90 | 17 | 12 | 140 | 18 (D) | + 1 (D) | − 15 | ○ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | F548 (Black) | 85 | 11 | 7.7 | 230 | 22 (D) | + 1 (D) | − 16 | ○ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | F975 (Brown) | 80 | 11 | 7.9 | 220 | 33 (D) | 0 (D) | − 18 | ○ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | Silicon rubber [VMQ] | S813 (Brown) | 70 | 7.2 | 5.4 | 150 | 16 (D) | + 1 (D) | − 49 | ○ | △ | ○ | △ | △ | △ | △ | × |
| | Iron rubber [PUR] | U451 (Green) | 92 | 43 | 11 | 500 | 30 (A) | 0 (B) | − 30 | ○ | △ | ◎ | ◎ | ◎ | ○ | ○ | ◎ |
| | | U593 (Green) | 92 | 29 | 17 | 200 | 28 (A) | 0 (B) | − 34 | ○ | △ | ◎ | ◎ | ◎ | ○ | ○ | ◎ |
| | | U641 (Blue) | 94 | 41 | 15 | 370 | 36 (A) | 0 (B) | − 18 | ◎ | △ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ |
| | | U652 (Blue) | 96 | 47 | 17 | 380 | 35 (A) | 0 (B) | − 17 | ◎ | △ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ |
| | | U801 (Yellowish white) | 94 | 52 | 13 | 500 | 32 (A) | 0 (B) | − 29 | ○ | △ | ◎ | ◎ | ◎ | ○ | ○ | ◎ |
| | | UH04 (Blue) | 92 | 46 | 11 | 370 | 37 (A) | 0 (B) | − 22 | ◎ | △ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ |
| | | UH08 (Brown) | 90 | 37 | 9.5 | 340 | 29 (A) | 0 (B) | − 26 | ◎ | △ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ |
| | | UH05 (Purple) | 95 | 51 | 19 | 430 | 36 (A) | 0 (B) | − 27 | ◎ | △ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ |
| | Fabric reinforced rubber | 21AG (Black) | – | – | – | – | – | – | – | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | ◎ |
| | Hydrogenated nitrile rubber [H-NBR] | G869 (Black) | 90 | 27 | 13 | 220 | 19 (C) | + 2 (C) | − 28 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | G928 (Black) | 85 | 20 | 13 | 200 | 9 (C) | + 1 (C) | − 22 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

**Resistivity standards**
◎ : Very good
○ : Good for most applications ※
△ : Fair, can be used if no other materials exist, otherwise not recommended ※
× : Not recommended
— : No resistivity data available or the resistivity varies depending on the ingredient. Please consult NOK.

※ Please consult NOK before using these materials.

| Resistivity | | | | | | | | | | | | | | | | | Features | Recommended NOK types |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydraulic fluid oil | | | | | | | | | Water and others | | | | | Heat resistance | Cold-temperature resistance | Wear resistance | | |
| Turbine oil | Oil+water emulsion type | Water + glycol type | Water soluble hydraulic fluid oil | Raw resolution type hydraulic fluid oil | Phosphate ester type | Silicon oil | Brake fluid | Torque converter oil | Water | Steam and hot water | Water soluble cutting oil | Chloric cutting oil | Sulfuric cutting oil | | | | | |
| ◎ | ◎ | ◎ | ○ | ○ | × | ◎ | △ | ◎ | △ | △ | ○ | × | ○ | ○ | ○ | ○ | Standard material of C shaped packings | CPH |
| ◎ | ◎ | ◎ | ○ | ○ | × | ◎ | △ | ◎ | △ | △ | ○ | × | ○ | ○ | ○ | ○ | Standard material of C shaped packings | CPH |
| ◎ | ◎ | ◎ | ○ | ○ | × | ◎ | △ | ◎ | △ | △ | ○ | × | ○ | ○ | ○ | ○ | Standard material of C shaped packings | CPH・DKH・VAY |
| ○ | ○ | ○ | ○ | ○ | × | ○ | △ | △ | △ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of valve unit seals | SVY |
| ◎ | ○ | ○ | ○ | ○ | × | ◎ | △ | △ | △ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of power steering seals | SCJY |
| ◎ | ○ | ○ | ○ | ○ | × | ◎ | △ | △ | ○ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of O ring (JIS B 2401 1 type A) | SPGC・SPNC・SPNO・SPGO SPNS・DSPB |
| ◎ | ○ | ○ | ○ | ○ | × | ◎ | △ | △ | ○ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of back ring for large diameter combination seals | SPG |
| ◎ | ◎ | ◎ | ◎ | ○ | × | ◎ | △ | ○ | ○ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of nitrile rubber packings | IUH・UPH・OUHR・LBH・ LBHK・V96H・USH・CPH |
| ◎ | ○ | ○ | ○ | △ | × | ◎ | △ | △ | △ | × | △ | × | △ | ○ | ◎ | ○ | Material of cold resistant packing (for general petroleum hydraulic fluid oil Remark 2) | OUHR・IUH・USH・LBH・LBHK |
| ◎ | ◎ | ◎ | ◎ | ○ | × | ◎ | △ | ○ | ○ | × | △ | × | ○ | ○ | ○ | ○ | Standard material of OKH shaped packings | OKH |
| ◎ | ○ | ○ | ○ | △ | × | ◎ | △ | △ | △ | × | △ | × | △ | ○ | ◎ | ○ | Material of cold resistant packing (mainly for Low temperature petroleum hydraulic fluid oil Remark 3) | OUHR・IUH・USH・LBH・LBHK |
| ○ | ○ | ○ | ○ | ○ | × | ○ | △ | △ | △ | × | △ | × | ○ | ○ | ◎ | ○ | Standard material of back ring (O ring) for buffer rings | HBTS |
| ◎ | ◎ | ◎ | ○ | ○ | × | ◎ | △ | ◎ | △ | △ | ○ | × | ○ | ○ | △ | ○ | Standard material of dust seals for reciprocal movement and oil seal for pressure resistance | TCV・TCZ・DKB・DKH |
| ○ | ○ | ○ | ○ | △ | × | ○ | △ | △ | ○ | △ | ○ | × | △ | ○ | ◎ | ○ | Standard material of back ring for combined seals | SPG・SPGW・SPN・DKB |
| ○ | △ | △ | ◎ | ○ | ◎ | ◎ | △ | ○ | △ | △ | △ | ○ | ○ | ◎ | △ | ○ | Heat resistant material of back ring for combined seals | HBTS・SPG・SPGW・SPGC SPNC・SPNO・SPN・SPNS・DSPB |
| ○ | △ | △ | ◎ | ○ | ◎ | ◎ | △ | ○ | △ | △ | △ | ○ | ○ | ◎ | △ | ◎ | Standard material for heat resistant packings | UPH・USH・LBH・V96H |
| ○ | △ | △ | ◎ | ○ | △ | ◎ | △ | ○ | △ | △ | △ | ○ | ○ | ◎ | △ | ○ | Heat resistant material of oil seals for pressure resistance | TCV・TCZ |
| ○ | △ | △ | ◎ | ○ | ◎ | ◎ | × | ○ | △ | × | △ | ○ | ○ | ◎ | △ | ○ | Heat resistant material of dust seals for reciprocal movement | DKB・DKH |
| ○ | ○ | ○ | — | — | ◎ | × | ○ | ○ | ○ | △ | △ | — | — | ◎ | ◎ | △ | Material of back ring for U packings | UNI |
| ◎ | × | × | × | ○ | × | ◎ | × | ○ | △ | × | × | — | — | ○ | ○ | ◎ | Material of hinge pin dust seals | DLI2 |
| ◎ | × | × | × | ○ | × | ◎ | × | ○ | △ | × | × | — | — | ○ | ◎ | ◎ | Iron rubber improved for better cold resistance | USI・LBI・DLI |
| ◎ | △ | △ | △ | ◎ | × | ◎ | × | ○ | ○ | △ | △ | — | — | ○ | △ | ◎ | Iron rubber improved for better heat and water resistance | ISI・OUIS・IUIS・HBY |
| ◎ | △ | △ | △ | ◎ | × | ◎ | × | ○ | ○ | △ | △ | — | — | ○ | △ | ◎ | Material for center swivel seals | CSI |
| ◎ | × | × | × | ○ | × | ◎ | × | ○ | △ | × | × | — | — | ○ | ○ | ◎ | Standard material of Iron rubber packings | ODI・OSI・CPI・IDI・ISI・UNI・UPI・IUIS・DKI・ DKBI・DKBZ・DWI・CSI・DSI・HBY・DWIR・DLI |
| ◎ | △ | △ | △ | ○ | × | ◎ | × | ○ | ○ | △ | △ | — | — | ○ | ○ | ◎ | Material for improving installation to the integrated groove | (Packings) |
| ◎ | △ | △ | △ | ○ | × | ◎ | × | ○ | ○ | △ | △ | — | — | ○ | ○ | ◎ | Material for improving installation to the integrated groove | (Packings) |
| ◎ | △ | △ | △ | ○ | × | ◎ | × | ○ | ○ | △ | △ | — | — | ○ | ○ | ◎ | Heat & cold resistant wide-range iron rubber | HBY |
| ◎ | ○ | ○ | ○ | ○ | × | ◎ | △ | ○ | △ | △ | ○ | × | ○ | ○ | △ | ○ | Standard material of fabric reinforced V packings (nitrile rubber) | V99F |
| ◎ | ◎ | ◎ | ◎ | ○ | × | ◎ | △ | ◎ | ○ | ○ | ○ | × | ○ | ○ | ○ | ○ | Heat, water & water vapor resistant special nitrile rubber | (Packings) |
| ◎ | ◎ | ◎ | ◎ | ○ | × | ◎ | △ | ◎ | ○ | × | △ | × | ○ | ○ | ○ | ○ | Special nitrile rubber for better heat and wear resistance | SPGW・IUH |

Remark 1) The property value is the measured value, not the guaranteed value.

Remark 2) A527 cannot be used for petroleum-derived work oil in low temperatures. (Rubber material may swell and soften, lowering the sealing performance.) When using petroleum-derived work oil in low temperatures, use A567.

Remark 3) A567 can be used for both general petroleum-derived work oil and petroleum-derived operating oil in low temperatures, how ever, when using general petroleum-derived work oil, we recommend using A527 which has superior oil-resistant properties. (Material for improving the extension of A903)

〈Table C-2〉 Types and characteristics of NOK resin material

| Material | | NOK material code | Material: Hardness | Material: Tensile strength (MPa) | Material: Elongation (%) | Material: Compression strength (MPa) 2.5% deformation | Material: Compression strength (MPa) 10% deformation | Material: Applicable temperature range (℃) | Resistivity: Lubricating oil (agent) Engine oil | Gear oil | Machine oil | Spindle oil | Refrigerator oil | Cup grease | Lithium grease | Silicon grease |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Resin material | Rareflon [PTFE] | 10FF (White) | 58 (Durometer D) | 38 | 400 | 9 | 16 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 34WF (White) | 65 (Durometer D) | 27 | 390 | 12 | 19 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 19YF (Brown) | 70 (Durometer D) | 20 | 180 | 14 | 22 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 49YF (Brown) | 70 (Durometer D) | 18 | 140 | 16 | 25 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 55YF (Brown) | 70 (Durometer D) | 20 | 200 | 16 | 23 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 11YF (Black) | 66 (Durometer D) | 19 | 320 | 12 | 18 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 31BF (Black) | 66 (Durometer D) | 21 | 330 | 13 | 20 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 05ZF (Brown) | 68 (Durometer D) | 25 | 290 | 12 | 20 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 08GF (Black) | 68 (Durometer D) | 20 | 260 | 14 | 22 | −200～260 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | Polyamide resin [PA] | 63NP (Blue) | 109 (Rockwell R) | 42 | 200 | 20 | 49 | − 55～100 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 80NP (Black) | 120 (Rockwell R) | 79 | 15 | 39 | 73 | − 55～120 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 12NM (Navy blue) | 123 (Rockwell R) | 102 | 8 | 38 | 100 | − 55～140 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 21NB (gray) | 122 (Rockwell R) | 194 | 3 | 94 | 155 | − 55～130 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | Fabric reinforced phenolic resin | 12RS (Dark brown) | 105 (Rockwell M) | 105 ＊Flex strength | — | 207 ＊Destruction | — | − 55～120 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | | 15RS (Black) | 105 (Rockwell M) | 112 ＊Flex strength | — | 234 ＊No Destruction | — | − 55～120 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | Resin fiber polyester | 88RS (light blue) | 98 (Rockwell M) | 85 ＊Flex strength | — | 316 ＊No Destruction | — | − 55～120 | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |

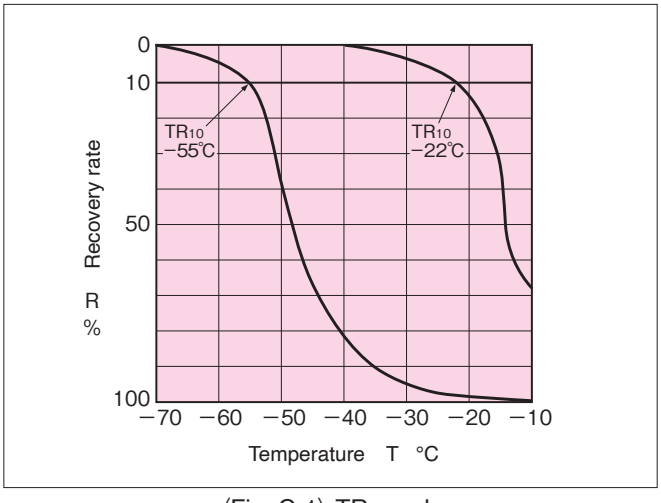
**Resistivity standards** ◎ : Very good
○ : Good for most applications ※
△ : Fair, can be used if no other materials exist, otherwise not recommended ※
※ Please consult NOK before using these materials.

Remark ) The property value is the measured value, not the guaranteed value.

## ■ Low temperature retraction of rubber material

### Apply to $TR_{10}$ Value

$TR_{10}$ value is used to judge low temperature capability of material. TR is an abbreviation for "Temperature-Retraction" as described by ASTM D 1329 and expresses the distortion recovery ability in low temperature. This is roughly the same as recovery of rubber-like elastomer. TR10 value is the temperature where initial distortion has recovered by 10%. **Fig. C-1** shows an example of measuring this value.




〈Fig. C-1〉 TR graph

$TR_{10}$ values can indicate allowable low temperature service range of rubber material for packings.
For allowable low temperature service range of specific types of packings, refer to page **14 to 19**.

| Resistivity | | | | | | | | | | | | | | | | Features | Recommended NOK types |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydraulic fluid oil | | | | | | | | | Water and others | | | | | Heat resistance | Cold-temperature resistance | Wear resistance | |
| Turbine oil | Oil+water emulsion type | Water + glycol type | Water soluble hydraulic fluid oil | Raw resolution type hydraulic fluid oil | Phosphate ester type | Silicon oil | Brake fluid | Torque converter oil | Water | Steam and hot water | Water soluble cutting oil | Chloric cutting oil | Sulfuric cutting oil | | | | |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | △ | Pure PTFE. This material is the standard backup ring material for the O-ring. | (Backup ring) |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | This material is a rareflon material having better creep resistance than the pure PTFE. | (Backup ring) |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | Rareflon material with high extrusion and wear resistance. | BRT2,3・SPG・SPGW・SPGO・SPN・SPNO |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | Special material improving extrusion resistance of 19YF. | (Combined seals, backup ring) |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | This material is a special material that can be used in low lubrication areas. | SPGM・SPNS・HBTS |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | This material is a special material that can be used for water. | DSPB |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | Rareflon material with better wear and creep resistance than with pure PTFE. | SPGC・SPNC・BRT2,3 |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | Bearing material containing bronze for high speed and light load. | KZT・RYT |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | This material is a bearing material excellent in load resistance and abrasion resistance. | (Piston seal, wear ring) |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Material of backup ring for special seals. | BRL |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Material of high pressure backup ring with high-wear resistance and mechanical strength. Its cutting manufacturing process makes large diameter seals available. | BRN2,3・SPGW・HBY |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Material for injection molding having the same performance as 80NP with smaller dimension changes by water absorption | HBY・SPGW |
| ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Seal ring material with special filling, offering excellent wear resistance and mechanical strength. | SPGN |
| ◎ | △ | ○ | △ | ◎ | ◎ | ◎ | △ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Material for bearing with excellent wear resistance and mechanical strength | (wear ring) |
| ◎ | △ | ○ | △ | ◎ | ◎ | ◎ | △ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | This material is a bearing material for improving the load resistance and abrasion resistance of 12RS. | (wear ring) |
| ◎ | △ | ○ | △ | ◎ | ◎ | ◎ | △ | ◎ | △ | △ | △ | ◎ | ◎ | ◎ | ◎ | ◎ | Bearing material with improved load resistance and easier assembly than the 12RS and 15RS. | (wear ring) |

## ■ Hardness of the material

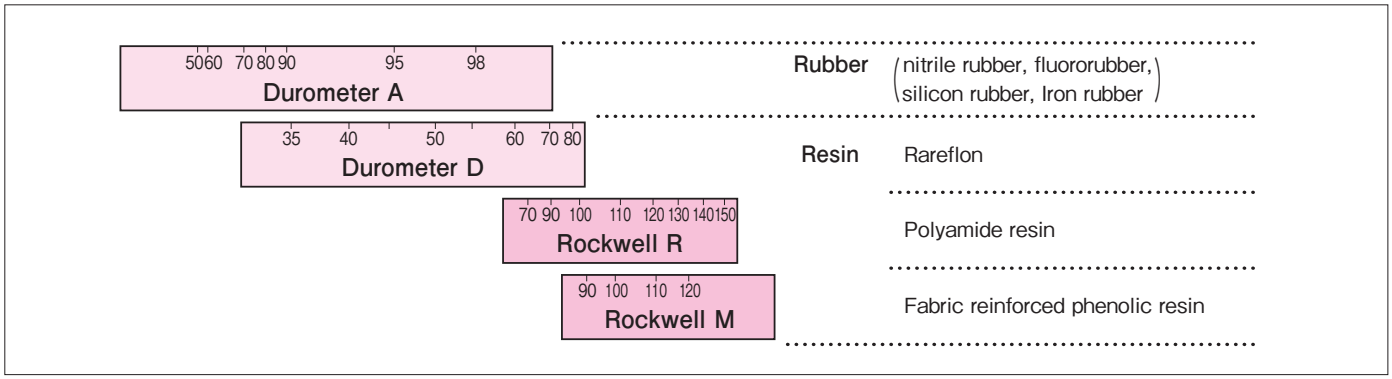
Hardness of the material indicates pressure resistance and strength of a seal, including tensile strength. For example, the pressure resistance of rubber for a packing (extrusion resistance) is indicated by the hardness of the rubber (refer to **Fig. B-7** on page **25**).

The testing method for material hardness is expressed by the industrial standard for each material as shown in **Table C-3**.

In this catalog, rubber hardness is expressed by spring-type hardness (JIS A) of JIS K 6253. **Fig. C-2** shows the correlation of each material hardness.

〈Table C-3〉 Testing method of material hardness

| Vulcanized rubber | Rareflon (polytetrafluoroethylene resin) | Polyamide resin (thermoplastics resin) | Phenolic resin (thermosetting resin) |
|---|---|---|---|
| JIS K 6253 | JIS K 7215 | JIS K 7202 | JIS K 6911 |




〈Fig. C-2〉 Correlation of each material hardness