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Specification for

Classification system for vulcanized rubbers

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British Standards Institution · 2 Park Street · London W1A 2BS
Telephone 01-629 9000
Telex 266933

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The following BSI references relate to the work on this standard:
Committee reference RUC/15 Draft for comment 73/51828 DC

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The Rubber Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

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*British Rubber Manufacturers' Association Ltd.
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*Malaysian Rubber Producers' Research Association
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Contents

Foreword

This British Standard has been prepared under the authority of the Rubber Industry Standards Committee as a reference classification system for vulcanized rubbers. It provides means of specifying the physical properties of vulcanized rubbers in a convenient notation, and in the interests of rationalization of test methods limits the times and temperatures available for selection in connection with certain tests.

The classification system is based on the physical properties of the vulcanized rubber rather than on composition requirements and follows closely the system published by the American Society for Testing and Materials (ASTM Designation: D2000 ' Classification system for elastomeric materials for automotive applications '). An important difference is the use throughout of SI units and this results in changes in the line call-out.

This standard is intended for use in a wide range of industries and should not be regarded as limited to automotive applications.

In the preparation of this British Standard consideration has been given to the economic importance of restricting the number of vulcanized rubbers in general demand. To this end rubbers of low technical quality have in general been omitted.

The tests employed in this standard have been chosen for their reproducibility and ability to assess the properties of an elastomeric material. They are not intended to be simulated service tests which may be unsatisfactory for control purposes.

The properties listed in this standard should therefore not be regarded as design data, especially with respect to heat resistance. As service conditions vary considerably it is recommended that the selection of a rubber material for a given application should be discussed between user and supplier, so that all relevant operating factors may be considered.

NOTE. In order to assist in the adoption of this classification system the types of elastomer normally used to prepare the various vulcanizates are given in the appendix. The appendix does not, however, form part of the classification system.

BS 5176 : 1975

British Standard Specification for

Classification system for vulcanized rubbers

1. Scope

This British Standard specifies a system of classification of solid vulcanized rubbers based on the test values obtained in standard laboratory tests for physical properties. This classification does not imply that every combination of properties for which a code can be given is technically feasible.

In addition this British Standard seeks to limit the variety of vulcanized rubbers used in industry and table 6 contains a range of vulcanized rubbers to meet the great majority of industrial needs.

2. References

The titles of the British Standards referred to in this standard are listed on the inside back cover.

3. Classification system

3.1 Basic requirements

3.1.1 *General.* The basic classification code for a vulcanized rubber is:

(a) The letter M to indicate that metric units are used.
(b) A letter indicating the Type assigned on its level of heat resistance.
(c) A letter indicating the Class assigned on its level of resistance to mineral oil.
(d) A single figure indicating the hardness range.
(e) A double figure indicating the tensile strength.

3.1.2 *Type (heat resistance).* This is based on changes in tensile strength of not more than $\pm$ 30%, elongation at break of not more than -50%, and hardness, of not more than $\pm$ 15 IRHD, after heat ageing for 70 h at an appropriate temperature. The temperatures at which these materials shall be tested for determining Type are listed in table 1.

3.1.3 *Class (oil resistance).* This is based on the resistance of the material to swelling in oil No. 3 of BS 903: Part A 16. In the test the immersion time shall be 70 h and the oil temperature shall be the Type temperature or 150 °C, whichever is the lower. Limits of swelling for each Class are shown in table 2.

NOTE. 150 °C has been chosen as the highest temperature

Table 1. Basic requirements for establishing Type by heat resistance

Type	Test temperature °C
A	70
B	100
C	125
D	150
E	175
F	200
G	225
H	250
J	275

Table 2. Basic requirements for establishing Class by oil resistance

Class	Volume swell, % max.
A	No requirement
*	–
C	120
D	100
E	80
F	60
G	40
H	30
J	20
K	10

* Class B has been omitted as of no practical value but the other class letters/volume swell values of ASTM D 2000* have been retained in order to preserve correspondence with that standard.

NOTE 1. The selection of Type, assessed by standard laboratory test methods is an indication of the inherent dry heat resistance that can normally be expected from commercial compositions. Similarly, choice of Class is based on volume increase (assessed by standard laboratory test methods) which can be expected from such commercial compositions as established by Type.

The fact that a Type and Class of material is listed in table 6 under basic requirements indicates the commercial availability of materials which meet these requirements for heat and oil resistance.

NOTE 2. Since laboratory heat ageing tests are of relatively short term a material is not necessarily suitable for use in any particular application at the relevant material Type temperature. The Class designation does not indicate the level of resistance which can be expected when a material is exposed to oils other than mineral oils.

3.1.4 *Mechanical properties.* The basic mechanical properties indicated in all cases are a single figure for the hardness, followed by a double figure for the tensile strength in megapascals (MPa). Thus the code 507 indicates a hardness of 50 $^{+5}_{-4}$ IRHD and a tensile strength of 7 MPa minimum and the code 710 indicates a hardness of 70 $^{+5}_{-4}$ IRHD and a tensile strength of 10 MPa minimum.

3.2. Supplementary requirements

3.2.1 *General.* When properties are needed that either supersede or supplement the basic requirements, they shall be indicated by the use of Grade numbers and by means of suffix letters and numbers. The Grade number gives the test limits, the suffix letter indicates the property to be tested, and the suffix number indicates the test method and test conditions.

The last column in table 6 under ' Basic requirements ' for each material gives the available Grade numbers.

Supplementary requirements shall be specified only as needed to define qualities necessary to meet service requirements; not all suffix values available for a material need be specified. However, if all the supplementary requirements for a given Grade number are required, this may be indicated by the word ALL to abbreviate the line call-out (see **3.2.2** and **3.4**).

Basic requirements are always in effect, unless superseded by specific supplementary requirements in the line call-out.

3.2.2 *Grade numbers.* To specify supplementary requirements a system of prefix Grade numbers shall be used. Grade 1 indicates that only the basic requirements are compulsory, and no supplementary requirements are permitted. Grades other than Grade 1 are used for expressing supplementary requirements.

Grade numbers are written as material prefix numbers, for example:

2MBC510, 3MBK610 or 5MHK614.

* ASTM D 2000 ' Classification system for elastomeric materials for automotive applications '.

3.2.3 *Suffix letters.* The suffix letters that may be used together with their meaning appear in table 3.

Table 3. Meaning of suffix letters

Suffix letter	Test required
A	Heat resistance
B	Compression set
C	Ozone or weather resistance
D	Compression stress/strain
E	Fluid resistance
F	Low-temperature resistance
G	Tear resistance
H	Flex resistance
J	Abrasion resistance
L	Water resistance
M	Flammability
P	Discoloration of organic finishes
R	Resilience
S	Corrosion of metals
T	Stress relaxation
Z	Any special requirement, which shall be specified in detail

3.2.3.1 *Suffix Z.* As stated in the Foreword this classification system is based on properties and not composition. However, many existing rubber specifications include clauses relating to composition, and users may be reluctant to lose this facility. It is therefore permissible to employ suffix Z to demand or prohibit certain ingredients, e.g. to specify a particular type of polymer.

Where there is a requirement for a particular test not available in the relevant supplementary requirement table the necessary suffix Z to be shown at the end of the line call-out (see **3.4**) should, wherever possible, be identified by the appropriate suffix letter and numbers listed in tables 4 and 5.

3.2.4 *Suffix numbers.* Each suffix letter should be followed by two suffix numbers.

The *first suffix number* indicates *method of test.*

The *second suffix number* indicates the *temperature of test.*

The number indicating the method of test, which also includes the duration of test, is taken from table 4. The number indicating the temperature of test is taken from table 5.

Examples of the use of suffix letters and numbers would be A14 and E34. Suffix A (see table 3) stands for heat resistance, suffix 1 (see table 4) specifies that the test be run according to BS 903 : Part A19, method A or B for 70 h, and suffix 4 (see table 5) indicates the temperature of test as 100 °C. Similarly, suffix E34 indicates resistance in oil No. 3 in accordance with BS 903 : Part A16, method A for 70 h at 100 °C.

Where three or more digits are required to specify the test conditions the test method and temperature elements are separated by a dash, for example A1-10; F1-11.

Table 4. Methods of test (see note 1)

Requirement or suffix letter	Basic requirements and first suffix number									
	Basic	1	2	3	4	5	6	7	8	9
Tensile strength, elongation at break	BS 903:A2*									
Hardness	BS 903:A26†									
Density (if required, see 3.3)	BS 903:A1									
Suffix A, heat resistance		BS 903:A19 method A or B‡ 70 h		BS 903:A19 method A or B‡ 168 h	BS 903:A19 method A or B‡ 336 h	BS 903:A19 method A or B‡ 1000 h				
Suffix B, compression set, Type 1 test pieces moulded or cut, one piece, no lubricant		BS 903:A6 method A 22 h	BS 903:A6 method A 70 h		BS 903:A6 method A 336 h					
Suffix C, resistance to ozone or outdoor ageing		BS 903:A23 50 pphm ozone 72 h 20% extension	ASTM D 1171 (see note 2) weather	BS 903:A23 200 pphm ozone 72 h 20% extension	BS 903:A23 25 pphm ozone 72 h 20% extension					
Suffix D, compression stress/strain		BS 903:A4 method A	BS 903:A4 method B							
Suffix E, fluid resistance		BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method	BS 903:A16 volumetric method
		Oil No. 1 70 h	Oil No. 2 70 h	Oil No. 3 70 h	Liquid 100 70 h	Liquid A 70 h	Liquid B 70 h	Liquid C 70 h	Liquid 101 70 h	Other reference fluids
Suffix F, low-temperature resistance (liquid cooling medium)		BS 903:A25	BS 903:A13 modulus 70 MPa maximum							
Suffix G, tear resistance		BS 903:A3								
Suffix H, flex resistance		BS 903:A10								

Table 4. (*continued*)

Requirement or suffix letter	Basic requirements and first suffix number									
	Basic	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Suffix J, abrasion resistance		BS 903:A9 Du Pont method								
Suffix L, water resistance		BS 903:A16 70 h (see note 3)	BS 903:A16 168 h (see note 5)							
Suffix M, flammability (see note 4)										
Suffix P, discoloration of organic finishes		BS AU 111 stage A	BS AU 111 stage B							
Suffix R, resilience		BS 903:A8 method B								
Suffix S, corrosion of metals (see note 6)										
Suffix T, stress relaxation		BS 903:A15 (in tension)								
Suffix Z, special requirement (see note 6)										

* *Using Type 2 test pieces.*

† The precise hardness method within BS 903: A26 depends on the required nominal test piece hardness and shall be as follows:
Specimens 40 to 80 IRHD, inclusive : Normal test, N
Specimen 30 IRHD : Low hardness test, L
Specimen 90 IRHD : High hardness test, H
The standard test piece shall be used.

‡ *Method A (cell type oven method) is preferred.*

Notes to table 4

NOTE 1. The following test methods are referred to in this table.

ASTM (A corresponding BS method of test is being prepared.)

D 1171 Test for weather resistance exposure of automotive rubber compounds

BS 903

Part A1 Determination of density
Part A2 Determination of tensile stress-strain properties
Part A3 Determination of tear strength (crescent test piece)
Part A4 Determination of compression stress-strain
Part A6 Determination of compression set
Part A8 Determination of rebound resilience
Part A9 Determination of abrasion resistance
Part A10 Determination of resistance to flex cracking
Part A13 Determination of the stiffness of vulcanized rubbers at low temperatures (Gehman test)
Part A15 Determination of creep and stress relaxation
Part A16 The resistance of vulcanized rubber to liquids
Part A19 Accelerated ageing tests
Part A23 Determination of resistance to ozone cracking under static conditions
Part A25 Determination of impact brittleness temperature
Part A26 Determination of hardness

BS Automobile Series

AU 111 Method of test for discoloration of organic finishes and plastics materials

NOTE 2. Test conditions and assessment to be agreed between the purchaser and the manufacturer.

NOTE 3. Demineralized water should be used. Determine the volume increase by the water displacement method, except that the alcohol dip should be omitted. When determining changes in tensile strength, elongation at break and hardness, the test tube should be $\frac{3}{4}$ full after the test pieces have been immersed. The determination should be made after 30 min. Cool in distilled water and omit the methanol dip.

NOTE 4. A method of test is to be established.

NOTE 5. A method of test is in process of preparation. Materials with low corrosion characteristics are available in certain cases.

NOTE 6. Requirement to be specified.

Table 5. Suffix numbers to indicate temperature of test

Applicable supplementary requirements	*Second suffix number*	*Test temperature*
		°C
A, B, C, D, E, G, H, J, L, P, R, T	11	275
	10	250
	9	225
	8	200
	7	175
	6	150
	5	125
	4	100
	3	70
	2	40
	1	23
	0	...*
F	1	20
	2	0
	3	−10
	4	−18
	5	−25
	6	−35
	7	−40
	8	−50
	9	−55
	10	−65
	11	−75
	12	−80

* The preferred temperature specified in the test method or ambient in the case of outdoor testing.

3.3 Available materials. The materials listed in the appropriate material section of table 6 are considered to cover the majority of applications. Special requirements not listed may be specified by the use of suffix Z but in this case prior consultation between the purchaser and the supplier is recommended.

Materials meeting the same physical requirements may differ in density. Nominal values for density may therefore be agreed between the manufacturer and the user for control purposes.

With the exception of MFC, MFE, MFK and MGE materials, the values in the material tables are based on black compounds and comparable values may not be available in colour.

3.4 Line call-outs. A line call-out, which is a specification, shall contain the Grade number, the material designation (Type and Class), and the hardness and tensile strength, followed by the appropriate supplementary requirements. Examples of line call-outs or specifications are 1MBC514, 2MBC514A14E14 and 2MBC514 ALL and figure 1 illustrates the requirements they cover. The meaning of the codes and the source of the information is given under the relevant letters or numbers in figure 1.

In all cases the line call-out shall be preceded by the number of this British Standard, i.e. BS 5176.

NOTE. In the second line call-out specification example in **3.4**, the basic requirement for heat resistance is superseded by a supplementary requirement (A14) and an additional oil resistance requirement is introduced (E14). However, the basic requirement of 80% for compression set, which is not included as a supplementary requirement, is not superseded and therefore should be met as specified in table 6. On the other hand in the third line call-out specification example the basic requirement of 80% for compression set is superseded by a supplementary requirement (B14) which is implicit in the word ALL.

3.5 Methods of test. The methods of test to be used in this classification are listed in table 4.

Line call-out 1MBC514

Example 1

1	M	B	C	5	14					
Basic grade	Metric	Material type (see table 1)	Material class (see table 2)	Hardness $50\ ^{+5}_{-4}$ IRHD (3.1.4) BS 903:A26 (see table 4)	Tensile strength 14 MPa minimum (3.1.4) BS 903:A2 (see table 4)	Also including:	Elongation at break 400% minimum (see table 6/9) BS 903:A2 (see table 4)	Heat resistance BS 903:A19 70 h at 100 °C (see table 6/9)	Oil resistance BS 903:A16 Oil No. 3 70 h at 100 °C (see table 6/9)	Compression set BS 903:A6 22 h at 100 °C (see table 6/9)

Line call-out 2MBC514A14E14

Example 2

2	M	B	C	5	14	A	1	4	E	1	4
Grade No. (see table 6/10)	As Example 1	As Example 1	As Example 1	As Example 1	As Example 1	Heat resistance BS 903:A19 method A or B 70 h (see table 4)	Test conditions	Test temperature 100 °C (see table 5)	Fluid resistance BS 903:A16 oil No. 1 70 h (see table 4)	Test conditions	Test temperature 100 °C (see table 5)

Line call-out 2MBC514 ALL

Example 3

This is an abbreviation of 2MBC514A14B14C12C20E14F27G11P20

2	M	B	C	514	A14	B14	C12	C20	E14	F27	G11	P20
As Example 2	As Example 2	As Example 2	As Example 2	As Example 2	As Example 2	Compression set BS 903:A6 22 h at 100 °C (see tables 4 and 5)	Resistance to ozone BS 903:A23 50 pphm 72 h at 40 °C (see tables 4 and 5)	Resistance to outdoor ageing ASTM D 1171 at ambient temperature (see tables 4 and 5)	As Example 2	Low-temperature resistance BS 903:A13 at −40 °C (see tables 4 and 5)	Tear resistance BS 903:A3 at 23 °C (see tables 4 and 5)	Discoloration of organic finishes BS AU 111 (see tables 4 and 5)

See table 6/10 for test requirements.

Figure 1. Examples of line call-outs

Table 6. Basic and supplementary requirements

Table 6/1. MAA materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 70 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 70 °C	Compression set, BS 903:A6, 22 h at 70 °C, %, max.	Additional Grade numbers available
30	7	400	Change in tensile strength, ± 30% max.	No requirement	50	2, 3, 4
30	10	400			50	2, 3, 4
30	14	400			50	2, 3, 4
40	7	400	Change in elongation at break, − 50% max.		50	2, 3, 4
40	10	400			50	2, 3, 4, 6
40	14	400			50	2, 3, 4, 6
40	17	500			50	2, 3, 4, 6
40	21	600	Change in hardness, ± 15 IRHD max.		50	2, 3, 4, 6
50	5	250			50	2, 3
50	7	400			50	2, 3
50	10	400			50	2, 3, 4, 5, 6
50	14	400			50	2, 3, 4, 5, 6
50	17	400			50	2, 3, 4, 5, 6
50	21	500			50	2, 3, 4, 5, 6
60	5	250			50	2, 3
60	7	300			50	2, 3
60	10	350			50	2, 3, 4, 5, 6
60	14	400			50	2, 3, 4, 5, 6
60	17	400			50	2, 3, 4, 5, 6
60	21	400			50	2, 3, 4, 5, 6
70	5	150			50	2, 3
70	7	200			50	2, 3
70	10	250			50	2, 3, 4, 5, 6
70	14	300			50	2, 3, 4, 5, 6
70	17	300			50	2, 3, 4, 5, 6
70	21	350			50	2, 3, 4, 5, 6
80	7	100			50	2, 3
80	10	150			50	2, 3
80	14	200			50	2, 3
80	17	200			50	2, 3
90	7	100			50	2, 3
90	10	125			50	2, 3
90	14	125			50	2, 3

Table 6/2. MAA materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A33 Heat resistance, BS 903:A19, method B. 168 h at 70 °C:								
Change in hardness, IRHD, max.		±10	±10	+10	+10	±5		
Change in tensile strength, %, max.		±20	±20	−25	−25	−20		
Change in elongation at break, %, max.		−30	−30	−25	−25	−20		
B13 Compression set, BS 903:A6, 22 h at 70 °C, %, max.				25	25	20		
C12 Resistance to ozone, BS 903:A23		no cracks		no cracks				
C42 Resistance to ozone, BS 903:A23			no cracks					
C32 Resistance to ozone, BS 903:A23					no cracks			
C20 Resistance to outdoor ageing, ASTM D 1171			limits to be agreed					
F27 Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa		pass	pass	pass	pass	pass		
G11 Tear resistance, BS 903:A3		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed		
P20 Discoloration of organic finishes, BS AU 111		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed		
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/3. MAJ materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 70 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 70 °C	Compression set, BS 903: A6, 22 h at 70 °C, %, max.	Additional Grade numbers available
50	14	300	Change in tensile strength, ±30% max.	Change in volume, +20% max.	50	
50	20	400			50	
60	14	300			50	3, 6
60	20	350	Change in elongation at break, −50% max.		50	3, 6
60	27	400			50	3, 6
70	14	300			50	3, 6
70	20	350	Change in hardness, ±15 IRHD max.		50	3, 6
70	27	400			50	3, 6
80	20	300			50	2, 3, 4, 5, 6, 7
80	27	350			50	2, 3, 4, 5, 6, 7
90	20	250			50	2, 3, 4, 5, 6, 7
90	27	350			50	2, 3, 4, 5, 6, 7

Table 6/4. MAJ materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, 70 h at 100 °C:								
Change in hardness, IRHD, max.		±5	±5	±5	±5	±5	±5	
Change in tensile strength, %, max.		−25	−25	−15	−25	−25	−25	
Change in elongation at break, %, max.		−20	−20	−20	−20	−20	−20	
B13 Compression set, BS 903:A6, method A, 22 h at 70 °C, %, max.		45	30	45	30	45		
C12 Resistance to ozone, BS 903:A23		no cracks	no cracks	no cracks	no cracks	no cracks	no cracks	
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	
E34 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:								
Change in tensile strength, %, max.		−25	−25	−15	−25	−25	−25	
Change in elongation at break, %, max.		−20	−20	−20	−20	−20	−20	
Change in hardness, IRHD, max.		−12 to +3	−12 to +3	−12 to +3	−12 to +3	−12 to +3	−12 to +3	
Change in volume, %		−2 to +12	−2 to +12	−2 to +12	−2 to +12	−2 to +25	−2 to +12	
E51 Fluid resistance, BS 903:A16, liquid A, 70 h at room temperature:								
Change in tensile strength, %, max.		−15	−15	−15	−15	−35	−15	
Change in elongation at break, %, max.		−15	−15	−15	−15	−15	−15	
Change in hardness, IRHD, max.		±5	±5	±5	±5	±6	±5	
Change in volume, %		±5	±5	±5	±5	−5 to +10	±5	
E61 Fluid resistance, BS 903:A16, liquid B, 70 h at room temperature:								
Change in tensile strength, %, max.		−40	−40	−40	−40	−70	−70	
Change in elongation at break, %, max.		−40	−40	−40	−40	−40	−40	
Change in hardness, IRHD, max.		0 to −15	0 to −15	0 to −15	0 to −15	0 to −20	0 to −20	
Change in volume, %		0 to +30	0 to +30	0 to +30	0 to +30	0 to +40	0 to +40	
F26 Low-temperature stiffness, BS 903:A13, at −35 °C, modulus max. 70 MPa						pass		
L13 Water resistance, BS 903:A16, 70 h at 70 °C:								
Change in tensile strength, %, max.		−35		−15	−30	−40	−40	
L14 Water resistance, BS 903:A16, 70 h at 100 °C:								
Change in tensile strength, %, max.				−45				
Z (Special requirements)	Any special requirements should be specified in detail including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/5. MAK materials: Basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 70 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 70 °C	Compression set, BS 903:A6, 22 h at 70 °C, %, max.	Additional Grade numbers available
40	3	400	Change in tensile strength, ± 30% max.	Volume change, + 10% max.	50	2
50	3	400			50	2
60	5	300	Change in elongation at break, −50% max.		50	2
70	7	250			50	2
80	8	150	Change in hardness, ± 15 IRHD max.		50	2
90	7	100			50	2

Table 6/6. MAK materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, method B, 70 h at 100 °C:								
Change in hardness, IRHD, max.		+15						
Change in tensile strength, %, max.		−15						
Change in elongation at break, %, max.		−40						
E14 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 100 °C:								
Change in tensile strength, %, max.		†				•		
Change in elongation at break, %, max.		†						
Change in hardness, IRHD, max.		†						
Change in volume, %, max.		−3 to +5		•				
E34 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:		•						
Change in tensile strength, %, max.		−30						
Change in elongation at break, %, max.		−50						
Change in hardness, IRHD, max.		−5 to +10				•		
Change in volume, %, max.		†						
F27 Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa		pass		•	•		•	
Z (Special requirements)	Any special requirements should be specified in detail including colour.							

* Basic properties only; no supplementary requirements for Grade 1.
† The requirement is applicable and materials are available to satisfy specified limits for these characteristics but a standard classification has not yet been established.

Table 6/7. MBA materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 70 °C, %, max.	Additional Grade numbers available
30	7	400	Change in tensile strength, ± 30% max.	No requirement	50	2
30	10	400			50	2, 3, 4, 8
30	14	400			50	2, 3, 4, 8
40	7	300	Change in elongation at break, − 50% max.		50	6
40	10	400			50	2, 3, 4, 8
40	14	400			50	2, 3, 4, 8
40	17	450			50	2, 3, 4, 8
50	7	300	Change in hardness, ± 15 IHRD max.		50	6
50	10	400			50	2, 3, 4, 8
50	14	400			50	2, 3, 4, 8
50	17	400			50	2, 3, 4, 8
50	20	450			50	2, 3, 4, 8
60	5	250			50	6
60	7	300			50	2, 6
60	10	350			50	2, 3, 4, 8
60	14	400			50	2, 3, 4, 8
60	17	400			50	2, 3, 4, 8
60	20	400			50	2, 3, 4, 8
70	5	150			50	6
70	7	200			50	2, 6
70	10	250			50	2, 3, 4, 8
70	14	300			50	2, 3, 4, 8
70	17	300			50	2, 3, 4, 8
70	20	350			50	2, 3, 4, 8
80	7	100			50	2
80	10	150			50	2, 3, 4, 8
80	14	200			50	2, 3, 4, 8
90	7	100			50	2
90	10	125			50	2, 3, 4, 8

Table 6/8. MBA materials: supplementary requirements

Supplementary requirements		Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14	Heat resistance, BS 903:A19, method B, 70 h at 100 °C:								
	Change in hardness, IRHD, max.			+10	+10				+10
	Change in tensile strength, %, max.			−25	−20				−25
	Change in elongation at break, %, max.			−25	−25				−25
B13	Compression set, BS 903:A6, 22 h at 70 °C, max.			25			25		25
B14	Compression set, BS 903:A6, 22h at 100 °C, %, max.				35				
C12	Resistance to ozone, BS 903:A23		no cracks	no cracks	no cracks		no cracks		
C42	Resistance to ozone, BS 903:A23								no cracks
F27†	Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa	pass	pass	pass					pass
	or								
F19†	Low-temperature brittleness, BS 903:A25, non-brittle after 3 min at −55 °C								
P20	Discoloration of organic finishes, BS AU 111		limits to be agreed	limits to be agreed	limits to be agreed		limits to be agreed		limits to be agreed
Z	(Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.
† These two requirements are alternatives.

Table 6/9. MBC materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C, %, max.	Additional Grade numbers available
30	7	400	Change in tensile strength, ± 30%	Volume change, + 120% max.	80	2, 5
30	10	500			80	2, 5
30	14	500			80	2
40	7	400	Change in elongation at break, − 50% max.		80	2, 5
40	10	500			80	2, 5
40	14	500			80	2, 5
40	17	500	Change in hardness, ± 15 IRHD max.		80	2
50	7	300			80	2, 5
50	10	350			80	2, 5
50	14	400			80	2, 5
50	17	450			80	2
50	20	500			80	2
60	7	300			80	2, 5
60	10	350			80	2, 5
60	14	350			80	2
60	17	400			80	2
60	20	400			80	2
70	7	200			80	2, 5
70	10	250			80	2, 5
70	14	300			80	2, 5
70	17	300			80	2
70	20	300			80	2
80	7	100			80	2
80	10	100			80	2
80	14	150			80	2
90	7	100			80	2
90	10	150			80	2
90	14	150			80	2

Table 6/10. MBC materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, 70 h at 100 °C :								
Change in hardness, IRHD, max.		+15			+15			
Change in tensile strength, %, max.		−15			−15			
Change in elongation at break, %, max.		−40			−40			
B14 Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.		35			45			
C12 Resistance to ozone, BS 903:A23		no cracks			no cracks			
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed			limits to be agreed			
E14 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 100 °C:								
Change in tensile strength, %, max.		−30			−30			
Change in elongation at break, %, max.		−30			−30			
Change in hardness, IRHD, %, max.		±10			±10			
Change in volume, %, max.		−10 to +15			−10 to +15			
F27 Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa		pass						
F29 Low-temperature stiffness, BS 903:A13, at −55 °C, modulus max. 70 MPa					pass			
G11 Tear resistance, BS 903:A3, under 7 MPa tensile strength, N min.		44						
7 MPa to 10 MPa tensile strength, N min.		52						
10 MPa tensile strength and over, N min.		70			52			
P20 Discoloration of organic finishes, BS AU 111		limits to be agreed						
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/11. MBE materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C, %, max.	Additional Grade numbers available
40	7	500	Change in tensile strength, ± 30% max.	Volume change, + 80% max.	40	2
50	7	400			40	2
50	10	400			40	2
50	14	400	Change in elongation at break, − 50% max.		40	2
60	7	350			40	2
60	10	350			40	2
60	14	350	Change in hardness, ± 15 IRHD		40	2
70	7	200			50	2
70	10	250			50	2
70	14	250			50	2
70	17	250			50	2
80	7	100			50	2
80	10	100			50	2
80	14	150			50	2
80	17	150			50	2
90	7	100			50	2
90	10	100			50	2
90	14	150			50	2

Table 6/12. MBE materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, 70 h at 100 °C:								
Change in hardness, IRHD, max.		+15						
Change in tensile strength, %, max.		−15						
Change in elongation at break, %, max.		−40						
B14 Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.		25						
C12 Resistance to ozone, BS 903:A23		no cracks						
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed						
E14 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 100 °C:								
Change in tensile strength, %, max.		−30						
Change in elongation at break, %, max.		−30						
Change in hardness, IRHD, max.		±10						
Change in volume, %, max.		−10 to ±15						
E34 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:								
Change in tensile strength, %, max.		−50						
Change in elongation at break, %, max.		−40						
F27 Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa		pass						
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/13. MBF materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C %, max.	Additional Grade numbers available
60	7	250	Change in tensile strength, ± 30% max.	Volume change, + 60% max.	50	2
60	10	300			50	2
60	14	350			50	2
60	17	350	Change in elongation at break, − 50% max.		50	2
70	7	200			50	2
70	10	250			50	2
70	14	250			50	2
70	17	300	Change in hardness, ± 15 IRHD max.		50	2
80	7	100			50	2
80	10	125			50	2
80	14	125			50	2

Table 6/14. MBF materials: supplementary requirements

Supplementary requirements		Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
B14	Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.		25						
E14	Fluid resistance, BS 903:A16, oil No. 1, 70 h at 100 °C:								
	Change in hardness, IRHD, max.	•	−5 to +10						
	Change in tensile strength, %, max.		−25						
	Change in elongation at break, %, max.		−45						
	Change in volume, %		−10 to +10						
E34	Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:			•		•			
	Change in hardness, IRHD, max.		−20						
	Change in tensile strength, %, max.		−45						
	Change in elongation at break, %, max.		−45						
F19†	Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C	•				•			
	or		pass						
F27†	Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa		•	•					
Z	(Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.
† The two requirements are alternatives.

Table 6/15. MBG materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C, %, max.	Additional Grade numbers available
40	7	450	Change in tensile strength, ± 30% max.	Volume change, + 40% max.	50	2, 3, 5
40	10	450			50	2, 3, 5
50	7	350			50	2, 3, 5
50	10	400	Change in elongation at break, − 50% max.		50	2, 3, 5
50	14	400			50	2, 3, 5
60	7	250			50	2, 3, 4, 5
60	10	300	Change in hardness, ± 15 IRHD max.		50	2, 3, 4, 5
60	14	350			50	2, 3, 4, 5
60	17	350			50	2, 3, 4
70	7	200			50	2, 3, 4, 5
70	10	250			50	2, 3, 4, 5
70	14	250			50	2, 3, 4, 5
70	17	300			50	2, 3, 4, 5
80	7	100			50	3, 4, 6, 7
80	10	125			50	3, 4, 6, 7
80	14	125			50	3, 4, 6, 7
90	7	100			50	3, 6, 7
90	10	100			50	3, 6, 7

Table 6/16. MBG materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, 70 h at 100 °C:								
Change in hardness, IRHD, max.					+15	+15		
Change in tensile strength, %, max.					−20	−20		
Change in elongation at break, %, max.					−40	−40		
B14 Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.		25	25	25	25	25	25	
C32 Resistance to ozone, BS 903:A23			no cracks					
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	
E14 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 100 °C:								
Change in tensile strength, %, max.		−25	−25	−25	−25	−25	−25	
Change in elongation at break, %, max.		−45	−45	−45	−45	−45	−45	
Change in hardness, IRHD, max.		−5 to +10	−5 to +10	−7 to +10	−5 to +15	−5 to +15	−5 to +15	
Change in volume, %		−10 to +5	−10 to +5	−5 to +10	−10 to +5	−10 to +5	−10 to +5	
E34 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:								
Change in tensile strength, %, max.		−45	−45	−45	−45	−45	−45	
Change in elongation at break, %, max.		−45	−45	−45	−45	−45	−45	
Change in hardness, IRHD, max.		−10 to +5	−10 to +5	−15 to 0	−15 to 0	−20 to 0	−10 to +5	
Change in volume, %		0 to +25	0 to +25	+10 to +35	0 to +35	0 to +35	0 to +25	
E51 Fluid resistance, BS 903:A16, liquid A, 70 h at 23 °C:								
Change in tensile strength, %, max.		−25	−25				−25	
Change in elongation at break, %, max.		−25	−25				−25	
Change in hardness, IRHD, max.		±10	±10				±10	
Change in volume, %		−5 to +10	−5 to +10				−5 to +10	

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/16. MBG materials: supplementary requirements (*concluded*)

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
E61 Fluid resistance, BS 903:A16, liquid B, 70 h at 23 °C:								
Change in tensile strength, %, max.		−60	−60				−60	
Change in elongation at break, %, max.		−60	−60				−60	
Change in hardness, IRHD, max.		0 to −30	0 to −30				0 to −30	
Change in volume, %		0 to +40	0 to +40				0 to +40	
F16 *Low-temperature* brittleness, BS 903:A25, non-brittle at −35 °C							pass	
or								
F24 Low-temperature stiffness, BS 903:A13, at −18 °C modulus max. 70 MPa								
F17 Low-temperature brittleness, BS 903:A25, non-brittle at −40 °C		pass		pass		pass		
or								
F25 *Low-temperature* stiffness, BS 903:A13, modulus max. 70 MPa								
F19 Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C					pass			
or								
F27 Low-temperature stiffness, BS 903:A13, at −40 °C, modulus max. 70 MPa								
L14 Water resistance, BS 903:A16, 70 h at 100 °C:								
Change in hardness, IRHD, max.		±10	±10	±10	±10	±10	±10	±10
Change in volume, %		±15	±15	±15	±15	±15	±15	±15
P20 Discoloration of organic finishes, BS AU 111, stage B		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/17. MBK materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 100 °C	Oil resistance BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C, %, max.	Additional Grade numbers available
60	5	200	Change in tensile strength, ± 30% max.	Volume change, + 10% max.	50	4, 5, 6
60	7	250			50	4, 5, 6
60	10	300			50	4, 5, 6
60	14	350			50	4, 5
60	17	350	Change in elongation at break, − 50% max.		50	4
70	5	150			50	4, 5, 6
70	7	200			50	4, 5, 6
70	10	250	Change in hardness, ± 15 IRHD max.		50	4, 5, 6
70	14	250			50	4, 5
70	17	300			50	4
80	7	100			50	4, 5
80	10	125			50	4, 5
80	14	125			50	4, 5
90	7	100			50	4, 5
90	10	100			50	4, 5
90	14	100			50	4, 5

Table 6/18. MBK materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A14 Heat resistance, BS 903:A19, 70 h at 100 °C:								
Change in hardness, IRHD, max.				±10	+7	+10		
Change in tensile strength, %, max.				−20	−10	−10		
Change in elongation at break, %, max.				−30	−30	−30		
B14 Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.				25	15	25		
E34 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 100 °C:								
Change in tensile strength, %, max.				−20	−20	−20		
Change in elongation at break, %, max.				−30	−30	−30		
Change in hardness, IRHD, max.				−10 to +5	−10 to +5	−10 to +5		
Change in volume, %				0 to +5	0 to +10	0 to +10		
E61 Fluid resistance, BS 903:A16, liquid B, 70 h at 23 °C:								
Change in tensile strength, %, max.				−50	−50	−50		
Change in elongation at break, %, max.				−50	−50	−50		
Change in hardness, IRHD, max.				0 to −20	0 to −20	0 to −20		
Change in volume, %				0 to +25	0 to +25	0 to +25		
E84 Fluid resistance, BS 903:A16, liquid 101, 70 h at 100 °C:								
Change in tensile strength, %, max.					−30	−30		
Change in elongation at break, %, max.					−30	−30		
Change in hardness, IRHD, max.					−10 to +5	−10 to +5		
Change in volume, %					0 to +10	0 to +10		
F14 Low-temperature brittleness, BS 903:A25, non-brittle at −18 °C				pass				
or								
F23 Low-temperature stiffness, BS 903:A13, at −10 °C, modulus max. 70 MPa					pass			
F24 Low-temperature stiffness, BS 903:A13, at −18 °C modulus max. 70 MPa						pass		
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/19. MCA materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 125 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 100 °C	Compression set, BS 903:A6, 22 h at 100 °C, %, max.	Additional Grade numbers available
40	7	400	Change in tensile strength, ±30% max.	No requirement	50	2
40	10	400			50	2
50	7	400			50	2
50	10	400	Change in elongation at break, −50% max.		50	2
50	14	350			50	2
60	7	350			50	2
60	10	350	Change in hardness, ± 15 IRHD max.		50	2, 4
60	14	300			50	2, 4
70	7	300			50	2
70	10	250			50	2, 4
70	14	200			50	2, 4
80	7	200			50	2
80	10	150			50	2, 4
80	14	150			50	2, 4
90	7	120			50	2, 4
90	10	100			50	2, 4

Table 6/20. MCA materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5
A15 Heat resistance, BS 903:A19, 70 h at 125 °C:					
Change in hardness, IRHD, max.		+10		+10	
Change in tensile strength, %, max.		−20		−20	
Change in elongation at break, %, max.		−25		−25	
B15 Compression set, BS 903:A6, method A, 22 h at 125 °C, %, max.		35			
B25 Compression set, BS 903:A6, method A, 70 h at 125 °C, %, max.				20	
C32 Resistance to ozone, BS 903:A23		no cracks		no cracks	
E93 Fluid resistance, BS 903:A16, 168 h at 70 °C in 'Skydrol 500B†' Change in volume, %, max.		+10 to −0		+10 to −0	
Z (Special requirements)	Any special requirements should be specified in detail, including colour.				

* Basic properties only; no supplementary requirements for Grade 1.
† Phosphate ester type fluid available from Monsanto Chemicals Ltd.

Table 6/21. MCE materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 125 °C	Oil resistance BS 903:A16, oil No. 3, 70 h at 125 °C	Compression set, BS 903:A6, 22 h at 70 °C, %, max.	Additional Grade numbers available
50	14	400	Change in tensile strength, ± 30% max.	Volume change, + 80% max.	80	2, 3, 4, 5
60	10	350			80	2, 3, 4, 5
60	14	400	Change in elongation at break, − 50% max.		80	2, 3, 4, 5
60	17	400			80	2, 3, 4, 5
70	7	200	Change in hardness, ± 15 IRHD max.		80	2, 3, 4, 5
70	10	250			80	2, 3, 4, 5
70	14	300			80	2, 3, 4, 5
70	17	300			80	2, 3, 4, 5
80	7	200			80	2, 3, 4, 5
80	10	250			80	2, 3, 4, 5
80	14	250			80	2, 3, 4, 5

Table 6/22. MCE materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5
A16 Heat resistance, BS 903:A19, 70 h at 150 °C:					
Change in hardness, IRHD, max.		±20		±20	
Change in tensile strength, %, max.		±30		±30	
Change in elongation at break, %, max.		−60		−60	
B15 Compression set, BS 903:A6, method A, 22 h at 125 °C, %, max.		60	80	40	
C12 Resistance to ozone, BS 903:A23		no cracks	no cracks	no cracks	
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed
E45 Fluid resistance, BS 903:A16, liquid 100, 70 h at 125 °C:					
Change in tensile strength, %, max.			−60		
Change in elongation at break, %, max.			−45		
Change in hardness, IRHD, max.			−30		
Change in volume, %			+80		
E46 Fluid resistance, BS 903:A16, liquid 100, 70 h at 150 °C:					
Change in tensile strength, %, max.		−80			
Change in elongation at break, %, max.		−65			
Change in hardness, IRHD, max.		−30			
Change in volume, %, max.		+80			
F19 Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C		pass	pass	pass	pass
L23 Water resistance, BS 903:A16, 168 h at 70 °C:					
Change in volume, %, max.					10
P20 Discoloration of organic finishes, BS AU 111, stage B		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed
Z (Special requirements)	Any special requirements should be specified in detail, including colour.				

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/23. MCH materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, *min.*	Elongation at break, %, *min.*	Heat resistance, BS 903:A19, 70 h at 125 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 125 °C	Compression set, BS 903:A6, 22 h at 100 °C %, max.	Additional Grade numbers available
60	7	250	Change in tensile strength, ± 30% max.	Volume change, + 30% max.	50	2, 3
60	10	300			50	2, 3
60	14	350			50	2, 3, 5, 6
60	17	350			50	2, 3
70	7	200	Change in elongation at break, − 50% max.		50	2, 3
70	10	250			50	2, 3
70	14	250			50	2, 3, 5, 6
70	17	300	Change in hardness, ± 15 IRHD max.		50	2, 3
80	7	100			50	3, 4
80	10	125			50	3, 4
80	14	125			50	3, 4, 5, 6
90	7	100			50	3, 4
90	10	100			50	3, 4, 5, 6

Table 6/24. MCH materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A25 Heat resistance, BS 903:A19, 70 h at 125 °C:								
Change in hardness, IRHD, max.		−0 to +15	−0 to +15	−0 to +15	−0 to +10	−0 to +10		
Change in tensile strength, %, max.		−25	−25	−25	−10	−20		
Change in elongation at break, %, max.		−50	−50	−50	−40	−30		
B14 Compression set, BS 903:A6, method A, 22 h at 100 °C, %, max.		25	25	25	30	25		
B15 Compression set, BS 903:A6, method A, 22 h at 125 °C, %, max.		30	30	30				
C12 Resistance to ozone, BS 903:A23					no cracks	no cracks		
C20 Resistance to outdoor ageing, ASTM D 1171					limits to be agreed	limits to be agreed		
E15 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 125 °C:								
Change in tensile strength, %, max.		−20		−20				
Change in elongation at break, %, max.		−35		−35				
Change in hardness, IRHD, max.		−0 to +10		−0 to +10				
Change in volume, %, max.		−15 to +5		−15 to +5				
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:								
Change in tensile strength, %, max.			−20		−10	−15		
Change in elongation at break, %, max.			−40		−50	−40		
Change in hardness, IRHD, max.			−0 to +10		−0 to +15	−0 to +10		
Change in volume, %, max.			−15 to +5		−0 to +15	−10 to +5		
E35 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 125 °C:								
Change in tensile strength, %, max.		−15		−15				
Change in elongation at break, %, max.		−30		−30				
Change in hardness, IRHD, max.		±10		±10				
Change in volume, %, max.		−0 to +25		−0 to +25				

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/24. MCH materials: supplementary requirements *(concluded)*

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
E36 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 150 °C:								
Change in tensile strength, %, max.			−35		−10	−15		
Change in elongation at break, %, max.			−35		−50	−40		
Change in hardness, IRHD, max.			±10		−5 to +10	−5 to +10		
Change in volume, %, max.			−0 to +25		−0 to +10	−0 to +15		
E71 Fluid resistance, BS 903:A16, liquid C, 70 h at 23 °C:								
Change in tensile strength, %, max.					−50	−50		
Change in elongation at break, %, max.					−50	−50		
Change in hardness, IRHD, max.					−20 to +0	−20 to +0		
Change in volume, % max.					−0 to +40	−0 to +40		
F14 Low-temperature brittleness, BS 903:A25, non-brittle at −18 °C					pass			
F16 Low-temperature brittleness, BS 903:A25, non-brittle at −35 °C				pass				
or								
F24 Low-temperature stiffness, BS 903:A13, at −18 °C, modulus max. 70 MPa						•		
F17 Low-temperature brittleness, BS 903:A25, non-brittle at −40 °C		•						
or		pass		•		pass		
F25 Low-temperature stiffness, BS 903:A13, at −25 °C, modulus max. 70 MPa		•						
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/25. MDH materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 150 °C	Oil resistance BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 150 °C, %, max.	Additional Grade numbers available
40	7	300	Change in tensile strength, ±30% max.	Volume change, + 30% max.	50	2, 6
50	8	250			50	2, 6
60	8	200	Change in elongation at break, − 50% max.		50	2, 6
60	10	200			50	2
70	5	100			70	5
70	8	150	Change in hardness, ± 15 IRHD max.		50	3, 6
70	10	150			50	3
80	5	100			70	5
80	8	125			50	3
80	10	125			50	3
90	10	100			50	4

Table 6/26. MDH materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A16 Heat resistance, BS 903:A19, method B, 70 h at 150 °C:								
Change in hardness, IRHD, max.		+10	+10	+10	+10	+10		
Change in tensile strength, %, max.		−25	−25	−25	−25	−25		
Change in elongation at break, %, max.		−30	−30	−30	−30	−30		
B16 Compression set, BS 903:A6, method A, 22 h at 150 °C, %, max.		30	30	30	50			
C12 Resistance to ozone, BS 903:A23		no cracks	no cracks	no cracks	no cracks			
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed	limits to be agreed	limits to be agreed	limits to be agreed			
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:								
Change in tensile strength, %, max.		−20	−20	−20	−20	−20		
Change in elongation at break, %, max.		−30	−30	−30	−40	−30		
Change in hardness, IRHD, max.		−5 to +10	−5 to +10	−5 to +10	−5 to +10	−5 to +10		
Change in volume, %		±5	±5	±5	±5	−5 to +10		
E36 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 150 °C:								
Change in tensile strength, %, max.		−40	−30	−30	−40	−50		
Change in elongation at break, %, max.		−40	−30	−30	−40	−40		
Change in hardness, IRHD, max.		−15	−15	−15	−15	−25		
Change in volume, %		+25	+25	+25	+25	+30		
E46 Fluid resistance, BS 903:A16, liquid 100, 70 h at 150 °C:								
Change in tensile strength, %, max.		−20	−20	−20	−20	−20		
Change in elongation at break, %, max.		−20	−20	−20	−20	−20		
Change in hardness, IRHD, max.		−5 to +15	−5 to +15	−5 to +15	−5 to +15	−5 to +20		
Change in volume, %		−3 to +5	−3 to +5	−3 to +5	−5 to +5	−5 to +10		
F13 Low-temperature brittleness, BS 903:A25, non-brittle at −10 °C			pass	pass	pass			
F14 Low-temperature brittleness, BS 903:A25, non-brittle at −18 °C		pass						
F15 Low-temperature brittleness, BS 903:A25, non-brittle at −25 °C						pass		
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/27. MEH materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 175 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 175 °C, %, max.	Additional Grade numbers available
50	8	200	Change in tensile strength, ± 30% max.	Volume change, + 30% max.	50	2
60	10	175			50	2
70	10	150	Change in elongation at break, − 50% max.		50	2
80	10	125			60	3
90	10	100	Change in hardness, ± 15 IRHD max.		60	3

Table 6/28. MEH materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
A17 Heat resistance, BS 903:A19, method B, 70 h at 175 °C:								
Change in hardness, IRHD, max.		+10	+10					
Change in tensile strength, %, max.		−10	−10					
Change in elongation at break, %, max.		−20	−20					
B17 Compression set, BS 903:A6, method A, 22 h at 175 °C, %, max.		40	50					
B27 Compression set, BS 903:A6, method A, 70 h at 175 °C, % max.,		50	60					
C12 Resistance to ozone, BS 903:A23		no cracks	no cracks					
C20 Resistance to outdoor ageing, ASTM D 1171		limits to be agreed	limits to be agreed					
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:								
Change in tensile strength, %, max.		−5	−5					
Change in elongation at break, %, max.		−10	−10					
Change in hardness, IRHD, max.		±5	±5					
Change in volume, %		±5	±5					
E36 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 150 °C:								
Change in tensile strength, %, max.		−10	−15					
Change in elongation at break, %, max.		−10	−15					
Change in hardness, IRHD, max.		−15	−20					
Change in volume, %, max.		+20	+20					
E47 Fluid resistance, BS 903:A16, liquid 100, 70 h at 175 °C:								
Change in tensile strength, %, max.		−10	−10					
Change in elongation at break, %, max.		−50	−50					
Change in hardness, IRHD, max.		−5 to +20	−5 to +20					
Change in volume, %		±5	±5					
F13 Low-temperature brittleness, BS 903:A25, non-brittle at −10 °C		pass	pass					
Z (Special requirements)	Any special requirements should be specified in detail, including colour.							

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/29. MFC materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 200 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 150 °C, %, max.	Additional Grade numbers available
40	5	300	Change in tensile strength, ±30% max.	Volume change, + 120% max.	40	2
40	6	300			40	2
50	5	200			40	2
50	6	300	Change in elongation at break, −50% max.		40	2
50	8	400			60	4
60	5	200			40	2
60	6	300	Change in hardness, ± 15 IRHD max.		40	2
60	8	400			60	4
70	5	150			40	2
70	6	200			40	2
70	8	300			80	4
80	5	100			40	2
80	6	200			80	2

Table 6/30. MFC materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5
A19 Heat resistance, BS 903:A19, method B, 70 h at 225 °C:					
Change in hardness, IRHD, max.		+10		+15	
Change in tensile strength, %, max.		−40		−50	
Change in elongation at break, %, max.		−40		−50	
B17 Compression set, BS 903:A6, method A, 22 h at 175 °C, %, max.	•	40		80	
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:					•
Change in tensile strength, %, max.		−50	•	−50	
Change in elongation at break, %, max.		−30		−50	•
Change in hardness, %, max.		−15		−15	
Change in volume, %, max.		+20		+20	
F1-12 Low-temperature brittleness, BS 903:A25, non-brittle at −80 °C	•	pass		pass	
G11 Tear, BS 903:A3, N, min.		18		70	•
L14 Water resistance, BS 903:A16, 70 h at 100 °C:		•			
Change in hardness, IRHD, max.		±5	•	±5	
Change in volume, %, max.		±5		±5	
Z (Special requirements)	Any special requirements should be specified in detail, including colour.				

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/31. MFE materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	*Tensile* strength, MPa, min.	*Elongation* at break, %, min.	*Heat resistance*, BS 903:A19, 70 h at 200 °C	*Oil resistance*, BS 903:A16, oil No. 3, 70 h at 150 °C	*Compression* set, BS 903:A6, 22 h at 150 °C, %, max.	*Additional* Grade numbers available
30	5	300	Change in tensile strength, ±30% max.	Volume change, + 80% max.	50	2
30	6	500			50	2
30	8	500			50	4
40	5	300	Change in elongation at break, −50% max.		50	2
40	8	450			50	4
50	5	250			50	2
50	6	300	Change in hardness, ± 15 IRHD max.		50	2
50	8	400			50	4
60	5	200			50	2
60	6	200			50	2
60	8	350			50	4
70	5	150			50	2
70	6	150			50	2, 3
70	8	300			50	4
80	5	100			50	2
80	6	100			50	2, 3

Table 6/32. MFE materials: supplementary requirements

Supplementary requirements		Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5
A19	Heat resistance, BS 903:A19, method B, 70 h at 225 °C:					
	Change in hardness, IRHD, max.		+15	+15	+15	
	Change in tensile strength, %, max.		−40	−40	−50	
	Change in elongation at break, %, max.		−50	−50	−60	
B17	Compression set, BS 903:A6, method A, 22 h at 175 °C, %, max.		45	40	50	
E16	Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:					
	Change in tensile strength, %, max.		−50	−20	−50	
	Change in elongation at break, %, max.		−50	−20	−50	
	Change in hardness, IRHD, max.		0 to −10	0 to −10	0 to −10	
	Change in volume, %, max.		0 to +20	0 to +10	0 to +20	
E36	Fluid resistance, BS 903:A16, oil No. 3, 70 h at 150 °C:					
	Change in volume, %, max.			+50	+60	
F19	Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C		pass	pass	pass	
G11	Tear, BS 903:A3, N, min.		23	23	70	
L14	Water resistance, BS 903:A16, 70 h at 100 °C:					
	Change in hardness, IRHD, max.		±5	±5	±5	
	Change in volume, %, max.		±5	±5	±5	
Z	(Special requirements)	Any special requirements should be specified in detail, including colour.				

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/33. MFK materials: basic requirements (Grade 1)

Hardness, IRHD, +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 200 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 175 °C, %, max.	Additional Grade numbers available
40	6	250	Change in tensile strength, ± 30% max.	Volume change, + 10% max.	30	2
50	8	400			40	2, 4
60	6	150	Change in elongation at break, −50% max.		50	2, 3
70	8	100			40	5
80	5	80	Change in hardness, ± 15 IRHD max.		40	6

Table 6/34. MFK materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
A48 Heat resistance, BS 903:A19, 336 h at 200 °C:						
Change in hardness, IRHD, max.		+10	+10	+10	+10	+10
Change in tensile strength, %, max.		−30	−30	−30	−30	−30
Change in elongation at break, %, max.		−35	−35	−35	−35	−35
B17 Compression set, BS 903:A6, method A, 22 h at 175 °C, %, max.		30	40	35	25	30
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:						
Change in tensile strength, %, max.		−10	−10	−10	−10	−10
Change in elongation at break, %, max.		−20	−20	−20	−20	−20
Change in hardness, IRHD, max.		−5	−5	−5	−5	−5
Change in volume, %, max.		+5	+5	+5	+5	+5
E62 Fluid resistance, BS 903:A16, liquid B, 70 h at 40 °C:						
Change in volume, %, max.		+30	+30	+25	+25	+25
F19 Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C		pass	pass	pass	pass	pass
G11 Tear, BS 903:A3, N, min.		23	32	70	27	27
L14 Water resistance, BS 903:A16, 70 h at 100 °C:						
Change in hardness, IRHD, max.		±5	±5	±5	±5	±5
Change in volume, %, max.		±5	±5	±5	±5	±5
Z (Special requirements)	Any special requirements should be specified in detail, including colour.					

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/35. MGE materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 225 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 150 °C, %, max.	Additional Grade numbers available
30	4	200	Change in tensile strength, ± 30% max.	Volume change, + 80% max.	40	–
30	5	300			40	2
40	4	200			40	–
40	5	300	Change in elongation at break, − 50% max.		40	2
40	6	300			40	2, 3
50	4	200			40	–
50	5	200	Change in hardness, ± 15 IRHD max.		40	2
50	6	250			40	2, 3
60	4	100			40	–
60	5	150			40	2
60	6	200			40	2, 3
70	4	100			40	–
70	5	100			40	2
70	6	150			40	2, 3
80	4	80			40	–
80	5	80			40	2, 3

Table 6/36. MGE materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
A19 Heat resistance, BS 903:A19, 70 h at 225 °C:							
Change in hardness, IRHD, max.		+10	+8				
Change in tensile strength, %, max.		−25	−20				
Change in elongation at break, %, max.		−30	−20				
B17 Compression set, BS 903:A6, method A, 22 h at 175 °C, %, max.		25	30				
E16 Fluid resistance, BS 903:A16, oil No. 1, 70 h at 150 °C:							
Change in tensile strength, %, max.		−30	−30				
Change in elongation at break, %, max.		−30	−30				
Change in hardness, IRHD, %, max.		−10	−10				
Change in volume, %, max.		0 to +15	0 to +15				
E36 Fluid resistance, BS 903:A16, oil No. 3, 70 h at 150 °C:							
Change in volume, %, max.		+50	+60				
F19 Low-temperature brittleness, BS 903:A25, non-brittle at −55 °C		pass	pass				
G11 Tear, BS 903:A3, N, min.		14	23				
L14 Water resistance, BS 903:A16, 70 h at 100 °C:							
Change in hardness, IRHD, max.		±5	±5				
Change in volume, %, max.		±8	±5				
Z (Special requirements)	Any special requirements should be specified in detail, including colour.						

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/37. MHK materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 250 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 200 °C, %, max.	Additional Grade numbers available
60	8	200	Change in tensile strength, ± 30% max.	Volume change, + 10% max.	50	2, 3, 4, 5, 6, 7
60	10	200			50	2, 3, 4
70	10	175			50	2, 3, 4, 5, 6, 7
70	14	175	Change in elongation at break, −50% max.		50	2, 3, 4
80	10	150			50	2, 4, 6
80	14	150			50	2, 4
90	10	100	Change in hardness, ± 15 IRHD max.		50	2, 4, 6
90	14	100			50	2, 4

Table 6/38. MHK materials: supplementary requirements

Supplementary requirements	Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
A1-10 Heat resistance, BS 903:A19, 70 h at 250 °C:							
Change in hardness, IRHD, max.		+10	+10	+10	+10	+10	+10
Change in tensile strength, %, max.		−25	−25	−25	−25	−25	−25
Change in elongation at break, %, max.		−25	−25	−25	−25	−25	−25
B18 Compression set, BS 903:A6, *method* A, 22 h at 200 °C, %, max.			40	40			
B28 BS 903:A6, method A, 70 h at 200 °C, %, max.					20	20	20
B48 BS 903:A6, method A, 336 h at 200 °C, %, max.					45	45	35
E72 Fluid resistance, BS 903:A16, 70 h at 40 °C, liquid C:							
Change in tensile strength, %, max.		−25					
Change in elongation at break, %, max.		−20					
Change in hardness, IRHD, max.		±5					
Change in volume, %, max.		0 to 10					
E88 Fluid resistance, BS 903:A16, 70 h at 200 °C, liquid 101:							
Change in tensile strength, %, max.		−40	−40	−40	−40	−40	−40
Change in elongation at break, %, max.		−20	−20	−20	−20	−20	−20
Change in hardness, IRHD, max.		−15 to +5	−15 to +5	−15 to +5	−15 to +5	−15 to +5	−15 to +5
Change in volume, %, max.		0 to +15	0 to +15	0 to +15	0 to +15	0 to +15	0 to +15
F14 Low-temperature brittleness, BS 903:A25, non-brittle at −18 °C				pass		pass	
F15 Low-temperature brittleness, BS 903:A25, non-brittle at −25 °C			pass		pass		pass
G11 Tear resistance, BS 903:A3, N, min.			70	70	45	45	45
Z (Special requirements)	Any special requirements should be specified in detail, including colour.						

* Basic properties only; no supplementary requirements for Grade 1.

Table 6/39. MJK materials: basic requirements (Grade 1)

Hardness, IRHD +5 −4	Tensile strength, MPa, min.	Elongation at break, %, min.	Heat resistance, BS 903:A19, 70 h at 275 °C	Oil resistance, BS 903:A16, oil No. 3, 70 h at 150 °C	Compression set, BS 903:A6, 22 h at 200 °C, %, max.	Additional Grade numbers available
60	10	150	Change in tensile strength, ± 30% max.	Volume change, + 10% max.	50	2, 3, 4, 5, 6, 7
70	12	125			50	2, 3, 4, 5, 6, 7
80	12	100	Change in elongation at break, − 50% max.		50	2, 4, 6
90	12	100	Change in hardness, ± 15 IRHD max.		50	2, 4, 6

Table 6/40. MJK materials: supplementary requirements

Supplementary requirements		Grade 1*	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
A1-11	Heat resistance, BS 903:A19, 70 h at 275 °C: Change in hardness, IRHD, max.					−3 to +7	−3 to +7	−3 to +7
	Change in tensile strength, %, max.					−30	−30	−30
	Change in elongation at break, %, max.					−20 to +40	−20 to +40	−20 to +40
B18	Compression set, BS 903:A6, method A, 22 h at 200 °C, %, max.			40	40			
B28	Compression set, BS 903:A6, method A, 70 h at 200 °C, %, max.					25	25	20
B48	Compression set, BS 903:A6, method A, 336 h at 200 °C, %, max.					45	45	35
E72	Fluid resistance, BS 903:A16, liquid C, 70 h at 40 °C: Change in tensile strength, %, max.		−25					
	Change in elongation at break, %, max.		−20					
	Change in hardness, IRHD, max.		±5					
	Change in volume, %, max.		0 to +10					
E88	Fluid resistance, BS 903:A16, 70 h at 200 °C, liquid 101: Change in tensile strength, %, max.		−40	−40	−40	−40	−40	−40
	Change in elongation at break, %, max.		−20	−20	−20	−20	−20	−20
	Change in hardness, IRHD, max.		−15 to +5	−15 to +5	−15 to +5	−15 to +5	−15 to +5	−15 to +5
	Change in volume, %, max.		0 to +15	0 to +15	0 to +15	0 to +15	0 to +15	0 to +15
F14	Low-temperature brittleness, BS 903:A25, non-brittle at −18 °C				pass		pass	
F15	Low-temperature brittleness, BS 903:A25, non-brittle at −25 °C			pass		pass		pass
G11	Tear strength, BS 903:A3, N, min.			70	70	45	45	45
Z	(Special requirements)	Any special requirements should be specified in detail, including colour.						

* Basic properties only; no supplementary requirements for Grade 1.

Appendix A

Type of elastomer normally used

Material designation (Type and Class)	Type of elastomer normally used
MAA	Natural rubber, reclaimed rubber, styrene-butadiene, *iso*butene-isoprene (butyl), ethylene propylene, polybutadiene, polyisoprene
MAJ	Urethane
MAK	Polysulphide
MBA	Natural rubber, ethylene propylene, styrene-butadiene, *iso*butene-isoprene (butyl)
MBC	Chloroprene
MBE	Chloroprene
MBF	Butadiene acrylonitrile
MBG	Butadiene acrylonitrile, epichlorhydrin
MBK	Butadiene acrylonitrile
MCA	Ethylene propylene, *iso*butene-isoprene (butyl)
MCE	Chlorosulphonylpolyethylene
MCH	Butadiene acrylonitrile, epichlorhydrin
MDH	Polyacrylic
MEH	Polyacrylic
MFC	Silicone
MFE	Silicone
MFK	Fluorinated silicone
MGE	Silicone
MHK	Fluorocarbon
MJK	Fluorocarbon

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BSI publications referred to in this standard

This standard makes reference to the following British Standards:

BS 903 Methods of testing vulcanized rubber

- Part A1 Determination of density
- Part A2 Determination of tensile stress-strain properties
- Part A3 Determination of tear strength (crescent test piece)
- Part A4 Determination of compression stress/strain
- Part A6 Determination of compression set
- Part A8 Determination of rebound resilience
- Part A9 Determination of abrasion resistance
- Part A10 Determination of resistance to flex cracking
- Part A13 Determination of the stiffness of vulcanized rubbers at low temperature (Gehman test)
- Part A15 Determination of creep and stress relaxation
- Part A16 The resistance of vulcanized rubber to liquids
- Part A19 Accelerated ageing tests
- Part A23 Determination of resistance to ozone cracking under static conditions
- Part A25 Determination of impact brittleness temperature
- Part A26 Determination of hardness

BS AU 111 Method of test for discoloration of organic finishes and plastics materials by rubber

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