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BRITISH STANDARD : AUTOMOBILE SERIES

SPECIFICATION FOR

SOLID RUBBERS

FOREWORD

This British Standard, which is published under the authority of the Automobile Industry Standards Committee of the B.S.I., is based upon data-sheet SMMT NM-8E : 1963 of the Society of Motor Manufacturers and Traders Ltd.

SPECIFICATION

SCOPE

1. This British Standard specifies requirements for natural and synthetic based solid rubbers for general use in the automobile industry, other than for tyres.

Ten types of rubber are specified and several grades within each type.

A summary of the physical properties and an indication of typical applications of each type are given in Appendix Q.

Detailed compositions for the rubbers are not given.

SECTION ONE: GENERAL REQUIREMENTS

APPEARANCE AND FINISH

2. The surfaces of all components shall be smooth and free from irregularities. Unless otherwise specified, the components shall be coloured full black.

QUALITY

3. Components shall be made from compounds so formulated as to be free from unsightly bloom.

ORGANIC MATERIALS STAINING

4. Components shall not cause staining when in contact with body finish or internal trim materials. Testing shall be carried out in accordance with B.S. AU 111*.

DENSITY AND ELECTRICAL RESISTIVITY

5. For control purposes, the purchaser, by agreement with the manufacturer, may specify a density figure. If required, the test for density and specific gravity shall be made in accordance with B.S.903, Part A1†.

When required for specific applications, the value of electrical resistivity shall be subject to agreement between the purchaser and manufacturer (see Clause 6 for ordering code).

* B.S. AU 111, 'Method of test for discoloration of organic finishes and plastics materials by rubber.'
† B.S.903, 'Methods of testing vulcanized rubber', Part A1, 'Determination of density and specific gravity'.

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DESIGNATION

6. Rubbers shall be identified by a Type number and a Grade reference according to the requirements in Section Two, e.g. 'B.S. AU 106 Rubber No. 1 Grade A'.

In addition to the type number and grade reference the following additional references, where applicable, should be made by the purchaser:

a. When non-staining properties apply, the suffix 'P'.

b. When a specified degree of electrical resistivity is required, the suffix 'R'.

SAMPLES

7. If requested by the purchaser, the manufacturer shall submit samples together with the original quotation. The samples shall be fully representative of the material to be supplied.

Prior notice shall be given by the manufacturer of any subsequent alteration in formulation as distinct from specification, and further samples, if required by the purchaser, shall be submitted for approval.

The samples shall be in the form of sheet or slab suitable for carrying out the tests required by this standard. Samples of finished parts of a similar type to those covered by the quotation may also be requested.

SECTION TWO: SPECIFIC REQUIREMENTS

The requirements stated in this section for each type of rubber are to be read in conjunction with Section One.

B.S. AU 106 RUBBER No. 1

MATERIAL AND COMPOSITION

8. Rubber No. 1 shall normally be high strength natural rubber. Synthetic rubbers may be used by agreement between the purchaser and manufacturer. The composition shall be a carefully controlled high grade mix.

GRADES

9. The three grades specified below shall be designated A, B and C, according to the properties tested in Table 1.

PHYSICAL PROPERTIES

10. When tested by the appropriate methods, Rubber No. 1 shall comply with the requirements given in Table 1.

TABLE 1. PHYSICAL PROPERTIES

	Grade			Method of test
	A	B	C	
Hardness BS°	55-65	45-55	40-45	Appendix A
Tensile strength lbf/in² (min.)	2750	2750	2750	Appendix B
Elongation at break per cent (min.)	450	500	550	Appendix B
Compression set per cent (max.)	20	20	20	Appendix E
Resilience per cent (min.)	75	80	85	Appendix F
Abrasion resistance index (Std. A)	70	70	70	Appendix G
Accelerated ageing	Max. hardness change ±5 BS°			Appendix K
Outdoor exposure resistance	shall not show cracks			Appendix L
Low temperature resistance	shall not crack at −40°C			Appendix M
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed			Appendix L

continued

B.S. AU 106 RUBBER No. 2

MATERIAL AND COMPOSITION

11. Rubber No. 2 shall normally be high strength natural rubber. Synthetic rubbers may be used by agreement between the purchaser and manufacturer. The composition shall be a carefully controlled high grade mix.

GRADES

12. The eight grades specified below shall be designated A, B, C, D, E, F, G and H, according to the properties listed in Table 2.

PHYSICAL PROPERTIES

13. When tested by the appropriate methods, Rubber No. 2 shall comply with the requirements given in Table 2.

TABLE 2. PHYSICAL PROPERTIES

	Grade								Method of test
	A	B	C	D	E	F	G	H	
Hardness BS°	70-75	65-70	60-65	55-60	50-55	45-50	40-45	35-40	Appendix A
Tensile strength lbf/in² (min.)	2000	2000	2250	2500	2500	2250	2000	1750	Appendix B
Elongation at break per cent (min.)	350	350	400	400	450	450	500	500	Appendix B
Compression set per cent (max.)	30	30	30	25	25	25	25	25	Appendix E
Resilience per cent (min.)	60	65	70	75	75	80	80	80	Appendix F
Shear strength lbf/in²	200	200	200	200	200	200	200	200	Appendix H
Stress at 10 per cent compression (lbf/in²)	95-130	75-100	65-80	55-65	45-55	38-45	33-40	27-33	Appendix D
Accelerated ageing	max. hardness change ±5 BS°								Appendix K
Outdoor exposure resistance	shall not show cracks								Appendix L
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed								Appendix L
Low temperature resistance	shall not crack at –40°C								Appendix M

B.S. AU 106 RUBBER No. 3

MATERIAL

14. Rubber No. 3 shall normally be medium strength natural rubber. Synthetic rubbers may be used by agreement between the purchaser and manufacturer.

GRADES

15. The four grades specified below shall be designated A, B, C and D, according to the properties listed in Table 3.

PHYSICAL PROPERTIES

16. When tested by the appropriate methods, Rubber No. 3 shall comply with the requirements given in Table 3.

TABLE 3. PHYSICAL PROPERTIES

	Grade				Method of test
	A	B	C	D	
Hardness BS°	70-80	60-70	50-60	40-50	Appendix A
Tensile strength lbf/in² (min.)	1500	1500	1500	1500	Appendix B
Elongation at break per cent (min.)	250	300	400	400	Appendix B
Tensile set per cent (max.)	30	30	30	30	Appendix C
Compression set per cent (max.)	40	40	35	35	Appendix E
Accelerated ageing	max. hardness change ±5 BS°				Appendix K
Outdoor exposure resistance	shall not show cracks				Appendix L
Low temperature resistance	shall not crack at –40°C				Appendix M
Staining test (where applicable)	max. degree of staining as agreed between purchaser and manufacturer				Appendix N
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed				Appendix L

B.S. AU 106 RUBBER No. 4

MATERIAL

17. Rubber No. 4 shall normally be medium strength natural rubber. Synthetic rubbers may be used by agreement between the purchaser and manufacturer.

GRADES

18. The five grades specified below shall be designated A, B, C, D and E, according to the properties listed in Table 4.

PHYSICAL PROPERTIES

19. When tested by the appropriate methods, Rubber No. 4 shall comply with the requirements given in Table 4.

TABLE 4. PHYSICAL PROPERTIES

	Grade					Method of test
	A	B	C	D	E	
Hardness BS°	70-80	60-70	50-60	40-50	35-40	Appendix A
Tensile strength lbf/in² (min.)	1000	1000	1000	1000	1000	Appendix B
Elongation at break per cent (min.)	300	300	300	400	400	Appendix B
Compression set per cent (max.)	40	40	35	35	35	Appendix E
Resilience per cent (min.)	40	40	45	50	60	Appendix F
Shear strength lbf/in² (min.)	200	200	200	200	200	Appendix H
Accelerated ageing	max. hardness change ±5 BS°					Appendix K
Outdoor exposure resistance	shall not show cracks					Appendix L
Low temperature resistance	shall not crack at –40°C					Appendix M
Staining test (where applicable)	max. degree of staining as agreed between purchaser and manufacturer					Appendix N
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed					Appendix L

B.S. AU 106 RUBBER No. 5

MATERIAL

20. Rubber No. 5 shall normally be low strength natural rubber. Synthetic rubbers may be used by agreement between the purchaser and manufacturer.

GRADES

21. The three grades specified below shall be designated A, B and C, according to the properties listed in Table 5. The different suffix numbers indicate mixes of equal hardness but differing tensile strengths.

PHYSICAL PROPERTIES

22. When tested by the appropriate methods, Rubber No. 5 shall comply with the requirements given in Table 5.

TABLE 5. PHYSICAL PROPERTIES

	Grade			Method of test
	A	B	C	
Hardness BS°	60-80	40-60	60-80	Appendix A
Tensile strength lbf/in² (min.)	800	800	500	Appendix B
Elongation at break per cent (min.)	200	200	150	Appendix B
Tear strength lbf (min.)	10	10	8	Appendix J
Abrasion resistance index (Std. A) (min.)	35	35	35	Appendix G
Accelerated ageing	max. hardness change ±5 BS°			Appendix K

B.S. AU 106 RUBBER No. 6

MATERIAL AND COMPOSITION

23. Rubber No. 6 shall be of synthetic rubbers of two classes having very good resistance to fuels and lubricating oils. The composition shall normally be based on nitrile synthetic rubbers.

GRADES

24. The five grades specified below shall be designated A, B, C, D and E, according to the properties listed in Table 6.

PHYSICAL PROPERTIES

25. When tested by the appropriate methods, Rubber No. 6 shall comply with the requirements given in Table 6.

TABLE 6. PHYSICAL PROPERTIES

	Grade					Method of test
	A	B	C	D	E	
Hardness BS°	75-85	65-75	55-65	45-55	35-45	Appendix A
Tensile strength lbf/in² (min.)	1000	1000	1000	1000	1000	Appendix B
Elongation at break per cent (min.)	100	200	250	350	450	Appendix B
Compression per cent (max.)	30	30	30	35	35	Appendix E
Fuel resistance (volume change) per cent:						
Class 1	−0 to +25	−0 to +25	−0 to +30	−0 to +30	−0 to +30	Appendix P
Class 2	−0 to +50	−0 to +50	−0 to +50	−0 to +50	−0 to +50	
Diesel fuel resistance (volume change) per cent:						
Class 1	±5	±5	−5 to +10	−5 to +10	−5 to +10	
Class 2	−10 to +30	−10 to +30	−10 to +30	−10 to +30	−10 to +30	Appendix P
Oil resistance (volume change) per cent:						
Class 1 - ASTM 3	−5 to +10	−5 to +10	−5 to +10	−5 to +10	−5 to +10	
Class 2 - ASTM 1	−5 to +10	−5 to +10	−10 to +15	−10 to +15	−10 to +15	Appendix P
Accelerated ageing: hardness change BS°	−5 +10	−5 +10	−5 +10	−5 +10	−0 +10	Appendix K
Low temperature resistance	shall not crack at −40°C					Appendix M
Staining test (where applicable)	maximum degree of staining to be agreed between purchaser and supplier					Appendix N

B.S. AU 106 RUBBER No. 7

MATERIAL AND COMPOSITION

26. Rubber No. 7 shall be a synthetic rubber having a good resistance to lubricating oil, normally based upon Neoprene synthetic rubbers. Other synthetic rubbers are not excluded, provided that the properties specified are attained.

GRADES

27. The five grades specified below shall be designated A, B, C, D and E, according to the properties listed in Table 7.

PHYSICAL PROPERTIES

28. When tested by the appropriate methods, Rubber No. 7 shall comply with the requirements given in Table 7.

TABLE 7. PHYSICAL PROPERTIES

	Grade					Method of test
	A	B	C	D	E	
Hardness BS°	75-85	65-75	55-65	45-55	35-45	Appendix A
Tensile strength lbf/in² (min.)	1500	1500	1500	1500	1500	Appendix B
Elongation at break per cent (min.)	150	250	300	350	450	Appendix B
Tension set per cent (max.)	10	10	10	15	15	Appendix C
Compression set per cent (max.)	30	30	30	30	30	Appendix E
Oil resistance (volume change) per cent:						
ASTM 3	−0 to +80	−0 to +80	−0 to +80	−0 to +80	−0 to +100	Appendix P
ASTM 1	−10 to +15	−10 to +15	−10 to +15	−10 to +15	−10 to +15	Appendix P
Accelerated ageing	hardness change +10 −5 BS°					Appendix K
Lower temperature resistance	shall not crack at −40°C					Appendix M
Outdoor exposure resistance	shall not show cracks					Appendix L
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed					Appendix L
Staining test (where applicable)	maximum degree of staining as agreed between purchaser and manufacturer					Appendix N

B.S. AU 106 RUBBER No. 8

MATERIAL AND COMPOSITION

29. Rubber No. 8 shall be a synthetic rubber having medium resistance to lubricating oil, normally based upon Neoprene synthetic rubber.

GRADES

30. The five grades specified below shall be designated A, B, C, D and E, according to the properties listed in Table 8.

PHYSICAL PROPERTIES

31. When tested by the appropriate methods, Rubber No. 8 shall comply with the requirements given in Table 8.

TABLE 8. PHYSICAL PROPERTIES

	Grade					Method of test
	A	B	C	D	E	
Hardness BS°	75-85	65-75	55-65	45-55	35-45	Appendix A
Tensile strength lbf/in² (min.)	1000	1000	1000	1000	1000	Appendix B
Elongation at break per cent (min.)	150	250	300	350	450	Appendix B
Tension set per cent (max.)	15	15	20	20	25	Appendix C
Compression set per cent (max.)	35	35	35	35	30	Appendix E
Oil resistance (volume change) per cent:						
ASTM 1	−10 to +15	−10 to +15	−10 to +15	−10 to +15	−10 to +15	
ASTM 3	−0 to +80	−0 to +100	−0 to +100	−0 to +120	−0 to +120	Appendix P
Accelerated ageing	hardness change +10 −5 BS°					Appendix K
Outdoor exposure resistance	shall not show cracks					Appendix L
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed					Appendix L
Low temperature resistance	shall not crack at −40°C					Appendix M
Staining test (where applicable)	maximum degree of staining as agreed between purchaser and manufacturer					Appendix N

continued overleaf

B.S. AU 106 RUBBER No. 9

MATERIAL AND COMPOSITION

32. Rubber No. 9 shall be high strength synthetic rubber having moderate resistance to lubricating oil, normally based upon Neoprene synthetic rubber.

GRADES

33. The two grades specified below shall be designated A and B according to the properties listed in Table 9.

PHYSICAL PROPERTIES

34. When tested by the appropriate methods, Rubber No. 9 shall comply with the requirements given in Table 9.

TABLE 9. PHYSICAL PROPERTIES

	Grade		Method of test
	A	B	
Hardness BS°	55-65	45-55	Appendix A
Tensile strength lbf/in² (min.)	2500	2500	Appendix B
Elongation at break per cent (min.)	400	400	Appendix B
Compression set per cent (max.)	20	20	Appendix E
Resilience per cent (min.)	50	60	Appendix F
Abrasion resistance index (Std. A)	70	70	Appendix G
Oil resistance (volume change) per cent:			
ASTM 3	0 to +100	0 to +120	Appendix P
ASTM 1	−10 to +15	−10 to +15	
Accelerated ageing	hardness change +10 to −5 BS°		Appendix K
Low temperature resistance	shall not crack at −40°C		Appendix M
Outdoor exposure resistance	shall not show cracks		Appendix L
Ozone resistance	shall not show cracks with a rating greater than 1 unless otherwise agreed		Appendix L

B.S. AU 106 RUBBER No. 10

MATERIAL AND COMPOSITION

35. Rubber No. 10 shall be synthetic rubber having very good resistance to all motor vehicle lubricants including service at high temperature.

It has not been found possible at present to cover comprehensively the requirements for this rubber. This specification however, covers the swell characteristics and hardness changes of the rubber when immersed in extreme pressure (E.P.), hypoid, and engine oils at elevated temperature.

GRADES

36. The three grades specified shall be designated A, B and C, according to the properties listed in Table 10.

PHYSICAL PROPERTIES

37. When tested by the appropriate methods, Rubber No. 10 shall comply with the requirements given in Table 10.

continued

TABLE 10. PHYSICAL PROPERTIES

	Grade			Method of test
	A	B	C	
Hardness BS°	90 ± 3	82 ± 5	70 ± 5	Appendix A
Oil resistance (volume change) per cent:				Appendix P
ASTM 1 (100°C)	−6 to +1	−6 to +1	−6 to +1	
E.P. 90 (120°C)	−1 to +6	−1 to +6	−1 to +6	
Max. hardness change after oil resistance test:				Appendix A
ASTM 1 (100°C) provided the hardness does not exceed (BS°)	−2 +5 96	−2 +5 92	−2 +5 78	
E.P. 90 (120°C) provided the hardness does not exceed (BS°)	± 5 96	± 8	± 8	
Bond strength	as agreed between purchaser and manufacturer, but shall be greater than shear strength of rubber			Appendix H

NOTE 1. E.P. oils and hypoid oils are mineral oils generally of the SAE 90 rating containing additives, usually sulphur or chlorine compounds, or both, in varying amounts. Their application is for conditions of heavy duty such as on transmissions.

NOTE 2. The test temperature for E.P. oils has been fixed at 120°C, for from information available this is regarded as being an average temperature. It is realised that temperatures up to 200°C are reached however. Where testing at higher temperatures is regarded as essential, both the temperature and the limits of swell characteristics should be agreed between the purchaser and the manufacturer.

GREASE RESISTANCE

38. While no values can be quoted for 'lip' seal rubbers in contact with greases, it should be noted that some greases at elevated temperatures give, for example, 50 per cent greater volumetric swell at 120°C and greater softening than the maximum values quoted for E.P. oils. Where this property is required to tested, both the grease used and the limits for hardness change and volumetric swell shall be the subject of agreement between the purchaser and the manufacturer.

APPENDICES

APPENDIX A. HARDNESS

The method of test for hardness shall be as given in B.S.903, Part A7*. For routine testing, a pocket instrument may be used, as shown in B.S.2719†:

APPENDIX B. TENSILE STRESS-STRAIN

The method of test for tensile stress-strain shall be as given in B.S.903, Part A2‡, using the Type D or Type E dumb-bell test piece.

APPENDIX C. TENSION SET

The method of test for tension set shall be as given in B.S.903, Part A5§.

For natural rubbers a strain of 75 per cent of the specified minimum elongation at break shall be applied, and for synthetic qualities the applied strain shall be 50 per cent of the specified minimum elongation at break.

The straining period shall be 10 minutes, followed by relaxation for 10 minutes, prior to measurement.

APPENDIX D. COMPRESSION STRESS-STRAIN

The method of test for compression stress-strain shall be as given in B.S.903, Part A4‖.

*B.S.903, 'Methods of testing vulcanized rubber', Part A7, 'Determination of hardness'.
†B.S.2719, 'Methods for use and calibration of pocket type rubber hardness meters'.
‡B.S.903, Part A2, 'Determination of tensile stress-strain properties'.
§B.S.903, Part A5, 'Determination of tension set'.
‖B.S.903, Part A4, 'Determination of compression stress-strain'.

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APPENDIX E. COMPRESSION SET

The method of test for compression set shall be as given in B.S.903, Part A6*. Method A, using Type 1 test piece. Compression set is a percentage of the applied compression as given in that method.

The temperature of the test shall be 70°C. The recovery time after compression shall be 60 minutes.

APPENDIX F. REBOUND RESILIENCE

The method of test for rebound resilience shall be as given in B.S.903, Part A8†.

The method using the Dunlop tripsometer shall be used. The test temperature shall be 50 ± 2°C.

APPENDIX G. ABRASION RESISTANCE

The method of test for abrasion resistance shall be as given in B.S.903, Part A9‡ using the DuPont machine.

APPENDIX H. BOND STRENGTH AND SHEAR STRENGTH

H1. Introduction. The test described in this appendix is intended primarily for the determination of the shear strength of rubber used in the manufacture of bonded components but it also provides a means of evaluating the suitability of the bonding methods employed. The effectiveness of the bond is normally judged by nicking the rubber at the bond line and testing the assembly to destruction, when the break should occur through the rubber and not along the bond line.

H2. Test pieces. The test pieces shall be fully representative of the rubber mix and the bonding process to be used, and shall conform to the form and dimensions set out in B.S.903, Part A15§ Section 5.

The thickness of the metal strips shall be 0·48 in (18 SWG) and the securing pins which pass through the holes A, A1, B shall be at least $\frac{3}{8}$ in diameter.

H3. Procedure. The test piece shall be tested to destruction, the maximum load applied being recorded. The straining speed shall be 6 in to 12 in per minute.

H4. Expression of results. Results shall be expressed numerically as lbf/in^2. Any failure at the bond face and the nature of any such failure shall be recorded.

APPENDIX J. TEAR STRENGTH

The method of test for tear strength shall be as given in B.S.903, Part A3‖.

APPENDIX K. ACCELERATED AGEING TEST

The method of accelerated ageing shall be as given in B.S.903, Part A19¶.

For general testing, Method B shall be employed, but in the case of dispute, Method A shall be employed.

The test conditions shall be as follows:

Natural rubber: 70 ± 1°C for 7 days.

Synthetic rubber (Neoprene, Nitrile and SBR): 100 ± 1°C for 3 days.

APPENDIX L. ATMOSPHERIC EXPOSURE TEST

L1. Outdoor exposure test. The method of outdoor exposure test shall be as given in B.S.AU112**.

L2. Ozone resistance test. The method of ozone resistance test shall be as given in B.S. AU ....††

Both tests shall be applied unless otherwise agreed between the purchaser and the manufacturer.

APPENDIX M. LOW TEMPERATURE TEST

The method of low temperature test shall be as given in ASTM No. D736‡‡.

*B.S.903, 'Methods of testing vulcanized rubber', Part A6, 'Determination of compression set'.
†B.S.903, Part A8, 'Determination of rebound resilience'.
‡B.S.903 Part A9, 'Determination of abrasion resistance'.
§B.S.903, Part A15, 'Determination of creep and stress relaxation'.
‖B.S.903, Part A3, 'Determination of tear strength'.
¶B.S.903, Part A19, 'Accelerated ageing tests'.
**B.S. AU 112, 'Atmospheric exposure testing of rubber for automobile use'.
††B.S. AU...., 'Test for ozone resistance of solid and cellular rubber components for automobile use'. (In course of preparation)
‡‡ASTM. No. D736, 'Low temperature brittleness of rubber and rubber-like materials'.

continued

APPENDIX N. STAINING OF ORGANIC FINISHES

The method of test for the staining of organic finishes shall be as given in B.S. AU 111*

APPENDIX P. OIL AND FUEL RESISTANCE

P1. General. The method of test for oil and fuel resistance shall be as given in B.S.903, Part A16†.

P2. Resistance to oil.

a. Rubbers Nos. 6, 7, 8 and 9. For resistance to oil, ASTM oils Nos. 1 and 3 shall be used. The time of immersion shall be 70 hours at a temperature of 100 ± 1°C.

b. Rubber No. 10. One of the following test oils shall be used at the appropriate temperature, depending upon the application.

For use in engines and gearboxes: ASTM oil No. 1, immersed 72 hours at 100 ± 2°C.
Other applications: Any proprietary E.P. 90 oil, immersed 72 hours at 120 ± 2°C.

It is recommended that the particular E.P. oil used shall be by agreement between the purchaser and the manufacturer, and that a bulk supply be put aside for test purposes.

NOTE. It is important that the rubber specimen be kept supported off the bottom of the test container, for example by a steel wire gauge platform. Precautions should also be taken to prevent the renewal of the air above the oil by using a suitably stoppered container, and care taken that the rubber specimen be maintained at the correct test temperature.

P3. Resistance to petrol. A reference fuel consisting of 70 per cent Alkylate iso-octane and 30 per cent Toluene shall be used. The immersion period shall be 24 hours at 20 ± 1°C.

P4. Resistance to diesel fuel. DERV with an aniline point of 60° to 70°C (Institute of Petroleum Method) shall be used.

Class 1. Immersion period shall be 7 days at 70 ± 1°C.
Class 2. Immersion period shall be 7 days at 20 ± 1°C.

APPENDIX Q. SUMMARY OF PROPERTIES AND TYPICAL APPLICATIONS

Rubber No. 1. Generally good mechanical properties including very low compression set, outstanding wear resistance and high tensile strength.

Typical applications. Shackle, steering, shock absorber and link pin bushes, and other mouldings for severe mechanical applications where resistance to oil is not significant.

Rubber No. 2. Generally good mechanical properties, particularly tensile strength, resilience and low compression set.

Typical applications. Mouldings for severe mechanical applications, including bonded components such as engine mounts.

Rubber No. 3. Outstanding resistance to atmospheric pressure together with low compression and tension sets.

Typical applications. Glazing strips, door seals, weatherseals and grommets.

Rubber No. 4. Medium mechanical properties with good compression set and good resilience.

Typical applications. Buffers, stops, body mounting pads, grommets.

Rubber No. 5. Tear resistance and abrasion resistance.

Typical applications. Pedal pads, floor mats, heel mats.

Rubber No. 6. Very good fuel and lubricating oil resistance and good compression set.

Typical applications.

Class 1. For use in contact with liquid petrol, diesel fuel or lubricating oil, e.g. seals.

Class 2. For use in occasional contact with liquid petrol, diesel fuel and lubricating oil, and/or constant contact with petrol vapour, e.g. washers, grommets.

* B.S. AU 111, 'Method of test for discoloration of organic finishes and plastics materials by rubber'.
† B.S.903, 'Methods of testing vulcanized rubber', Part A16, 'Determination of swelling in liquids'.

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Rubber No. 7. Good oil resistance, good compression and tension sets together with good resistance to heat. Exceptional resistance to weathering.

Typical applications. For use in contact with oil and subjection to heat, e.g. plug covers, grommets and some seals.

Rubber No. 8. Medium oil resistance, good tension and compression sets, medium heat resistance. Good resistance to weathering.

Typical applications. For use in contact with oil laden atmospheres, e.g. grommets, seals.

Rubber No. 9. High strength allied to low compression set, good abrasion resistance and good resistance to oil.

Typical applications. Suspension bushes etc.

Rubber No. 10. A rubber which is for use in 'lip' seals, that is, the type of seal used against rotating shafts where the design of the seal and the surface finish of the shaft are important factors.

NOTE. Rubber No. 10 is not intended primarily for seals on automatic transmission applications, but these are not necessarily excluded.

This British Standard, having been approved by the Automobile Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution on 26th November, 1965.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. reference relates to the work on this standard:
Committee reference AUE/-

APPENDIX E. SUMMARY OF PHYSICAL PROPERTIES AND TYPICAL APPLICATIONS OF CELLULAR RUBBERS

E1. Cellular rubber No. 1. This rubber has a low compression set, good resistance to atmospheric ageing and only a slight stiffening at low temperatures. Typical applications are door and boot-lid seals.

E2. Cellular rubber No. 2. This rubber has low compression set in normal temperate atmospheric conditions, good resistance to atmospheric ageing, low water absorption and only a slight stiffening at low temperatures. Typical applications are as follows:

Grade A. Door glass drop pads.
Grade C. Petrol filler cap washers.
Grade E. Door and boot-lid seals.

This British Standard, having been approved by the Automobile Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council of the Institution on 29th October, 1965.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. reference relates to the work on this standard:
Committee reference AUE/-