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VULCANISED NATURAL RUBBER

APPROVAL REFERENCE	DATE OF APPROVAL	APPROVAL AUTHORITY
No. 73729/DGI(Arm-13)	01 MARCH 1977	D.I.(ARMTS)

CONTROLLERATE OF INSPECTION
(MILY EXPLOSIVES)
KIRKEE, PUNE-411 003.

DEPARTMENT OF DEFENCE PRODUCTION

MINISTRY OF DEFENCE

AMENDMENT RECORD

Amendment		Authority letter from DI(Armts)	Clauses affected	Remarks
DCI No	Date			
2143-ME	17-10-77	No. 737-29/DGI(Arm-13) dt 01-3-77	The specn has been revised & updated it is printed in the new format and advanced to IND/ME/584(f) New copy sealed	
2274-ME	12-1-79	S.O. FOR DIO Chapter Six, Section One, clause 30	Page 8, clause 9.2, Note 2 added	

VULCANISED NATURAL RUBBER

C O N T E N T S

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0. ~~FOREWORD~~

0.1 This specification has been prepared by the CONTROLLERATE OF INSPECTION (MILITARY EXPLOSIVES) KIRKEE, PUNE-411 003.

0.2 For additional copies or any other enquiry regarding this specification reference should be made to the Inspecting Authority named in the tender or contract (i.e. ~~C.I.~~(M.E.), KIRKEE)

CQA DGQA/ME/3754-ME
12/12/02

1. SCOPE

1.1 This specification is meant to govern manufacture, supply and inspection of vulcanised natural rubber.

1.2 The material, having different hardness degree limits and good shelf ageing propdrties, is suitable for general use in service stores in which special properties such as resistance to oil/solvents are not required, e.g. in the manufacture of rubber rings, washers, gaskets, plugs, pellet-holders and sheets of assorted sizes etc.

1.3 The rubber articles covered by this specification may be suitably moulded or steam vulcanised and shall have good ageing properties. Components may also be obtained by punching from suitably vulcanised sheets.

2. RELATED DOCUMENTS

2.1 The related documents mentioned at clause 2.2 are those applicable at the date of publication of this specification. It is contractor's responsibility to confirm their current applicability and to obtain from the Authority Holding Sealed Particulars (i.e. ~~C.I.~~(M.E.); KIRKEE) SQA information concerning any change that may be necessary due to cancellation, replacement or supersession of any of these documents.

2.2 Copies of the related specifications referred in clauses 3.5 and 9 are obtainable as follows:-

BS specifications (BS - 903)	Indian Standards Institution, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi-110 002.

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3. COMPOSITION

3.1 Rubber Mix: The ~~manufacturer should prepare~~ a suitable mix which on vulcanisation, will give material conforming to the physical properties given in clause 9.2. The basic polymer may be natural rubber, No reclaimed natural rubber, reclaimed synthetic rubber, ground vulcanised scrap or waste rubber shall be used. The incorporation of factice or any other organic extender will not be permitted. The mix should also contain suitable plasticisers, softeners, fillers, accelerators, anti-oxidants, vulcanising agents etc. in requisite propertion.

3.2 The manufacturer shall give a declaration of the mix/~~kx~~ he proposes to use for manufacturing articles against a particular contract and this mix shall not be altered in any way during the period of contract without the written permission of the Inspecting Officer/ Inspecting Authority.

3.3 The compounding and processing must be such that the material may be calendered, extruded, moulded or otherwise fabricated and give after suitable vulcanisation, a product free from grit, foreign matter and sulphur bloom and from defects such as blisters, porosity and surface imperfections and complying with all the requirements of section 6. The material shall have a smooth surface.

3.4 Mix which has been found to give satisfactory material is apended at Appendix 'A' for guidance.

3.5 If the manufacturer proposes to use a mix composed entirely of natural rubber, it shall meet the following requirements. The rubber hydrocarbon content of the material when determined by the method described in B.S. specification 903-1960, Part B 12, Section 4, must not be less than the figures given in the table below, by mass of the mixing.

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Class		Rubber Hydrocarbon
A	:	85 percent
B	:	70 percent
C	:	58 percent
D	:	45 percent
E	:	37 percent

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4. DESCRIPTION

4.1 The vulcanised natural rubber shall consist of first quality smoked sheet natural (~~Hevea Braziliensis~~) rubber compounded with approved ingredients so that the composition is in accordance with the requirements of clause 3 above.

5. TENDER SAMPLE

5.1 Details of the composition of the mix which the contractor proposes to use together with test samples as given below shall be submitted to the Inspecting Officer for approval prior to the commencement of bulk manufacture.

5.1.1 The contractor shall submit, free of charge, one each of the following samples:-

i) Test slab size - 300 mm x 300 mm x(2.5 mm ± 0.25 mm thick)

ii) Test slab size - 150 mm x 150 mm x (6.35 mm ± 0.125 mm thick)

5.2 The samples will be manufactured from the mix proposed to be used by the contractor and for which declaration of the mix shall be given as per clause 3 above.

6. PRE-INSPECTION

6.1 Before tendering the store to be Inspector, the supplier shall carry out a thorough inspection of each delivery to satisfy himself that the store fully conforms to this specification and shall tender a certificate to that effect to the Inspecting Officer.

7 INSPECTION

7.1 The vulcanised natural rubber and the packages in which it is contained, shall be subject to inspection by, and the final approval of the Inspecting Officer/Inspecting Authority.

7.2 Samples of the material and of the packages in which it is contained may be taken from any portion of the consignment.

7.3 If, on examination, any sample be found not to conform to this specification, the whole consignment is liable for rejection.

7.4 The foregoing provisions shall apply equally to prime contractors and to sub-contractors, if any.

8. SAMPLING

8.1 The number of samples to be drawn from each lot/consignment will be at the discretion of the Inspecting Officer.

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9. TEST REQUIREMENTS

9.1 Samples drawn from any portion of the supply shall comply with clause 3 and 4 above and shall also conform to the following requirements:-

9.2 PHYSICAL

Sl. No.	Characteristics	Passing Standard					Test Method
1	2	3					4
		Class of rubber					
		A	B	C	D	E	
1	Hardness °BS	33-42	43-50	51-60	61-70	71-80	BS 903: (pt. A 7) 1957
2	Tensile Strength MPa Min.	20.70	20.70	20.70	12.1	10.4	BS 903: (Pt A2) 1956 using ~~type 'D'~~ dumb-bell test pieces
3	Elongation at break, per cent Min	650	600	550	350	300	BS 903:(Pt A2) 1956 using type 'D' test pieces
4	Compression set (when tested at 70°C ± 2 deg C for 22 hours and cooled to room temperature before mesurement) per cent Max.	30	30	30	35	45	BS:903: (Part A 6): 1963 Method 'A' Type I test pieces, recovery time 10 minutes
5	Resistance to accelerated ageing (Permitted change in properties from those on unchanged sample)						As per relevant method given above
	i) Tensile strength per cent Max.	± 10	± 10	±10	± 10	±10	
	ii) Elongation at break, per cent,	+ 0 _ 10	+ 0 _15	+ 0 -15	+ 0 -15	+0 -20	
	iii) Hardness °BS	+ 4 - 0	+ 4 - 0	+ 4 - 0	+ 4 - 0	+ 4 - 0	
	Also °BS Max	43	52	63	-	-	

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Note 1:- The physical tests given above shall be carried out on the test slabs.

Note 2:- Tests at Serial No. 5 above shall be carried on the test pieces which are aged at 80°C for 96 hours and allowed to be conditioned at room temperature for 24 hours.

9.3 CHEMICAL

As the manufacturer is free to formulate the mix, the chemical tests given below are intended to ensure that the mixes used in the production of bulk consignments correspond with the approved mix as indicated in clause 5.1 above. For this purpose, results of tests obtained on the approved sample will be taken for comparison. If the results of tests fall within the tolerances shown below, the samples will be considered to be conforming to the following requirements:

Sl. No.	Characteristics	Passing Standard	Test Method
1	2	3	4
1	Acetone soluble matter	± 1.0 % for results upto 5% ± 2.0 % for results upto 5.0 to 20.0% ± 3.0 % for results above 20.0%	BS:903: (Part B1): B2) 1958
2	Ash	± 1.0 % for results upto 5.0% ± 2.0% for results from 5.0 to 20.0% ± 3.0 % for results above 20.0 %	BS:903: (Part B.13) . . 1964 Section 2

10. PACKING AND MARKING

10.1 PACKING :

a) Components : Rubber components shall be packed loose in a wooden box/card-board box/paper carton and shall be adequately dusted with french chalk; where wooden boxes are used, they shall be lined internally with brown paper.

b) Sheets : - Sheets in running length shall be rolled. The rolls shall be covered with brown paper and then packed in hessian cloth. Sheets shall be dusted with french chalk during rolling.

10.2 MARKING

10.2.1 The packages, constituting a consignment, shall each be legibly and durably marked with the following details as applicable:-

i) Nomenclature and specification number of the material.
ii) Name and address of the consignee.
iii) AT/SO No. and date,
iv) Consignment number,
v) Lot No./Batch No. and date of manufacture.
vi) Gross and net mass.
vii) Consecutive number of package and total No. of packages.
viii) Date of supply
ix) Contractor's initials or recognised trade mark.

10.2.2 The components will be appropriately marked with initials/ trade mark of the manufacturer, date of manufacture, if specified onthe relevant compbnent drawing.

10.2.3 In addition to above, the Inspecting Officer may suggest some more marking/identification, suitable at the time of inspection.

10.2.4 The inclusion of any foreign matter or impurities in any of the packages shall render the whole consignment liable to rejection.

(Dr. SURJIT SINGH)
DIRECTOR
CONTROLLER OF INSPECTION (MILITARY EXPLOSIVES)
for DIRECTOR OF INSPECTION(ARMAMENTS)

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DGM/TS

APPENDIX 'A'

11. APPENDIX

Mix which has been found to given satisfactory material.

Ingredients	Class				
	A	B	C	D	E
		PARTS	BY	MASS	
Smoked sheet	100	100	100	100	100
Stearic acid	1	1	1	1	1
Pine tar	-	2	2	2	2
Ramp black	-	15	35	60	80
Zinc oxide	2	6	10	30	40
Phenyl naphthylamine	1.5	1	1	1	1
Sulphur	1.5	2.0	2.0	2.0	2.0
Mercaptobenz thiazole	1.5	1.5	1.5	1.5	1.5
Time of press cure for 2.5 mm thick sheet at 141°C ± 2 deg C	-	20 minutes	20 minutes	20 minutes	20 minutes

MDG/- 23/5/79