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IND/ME/1023

EXPANDED CROSS-LINKED  
POLYETHYLENE FOAM BASED  
CUSHIONING MATERIALS FOR PACKING  
OF AMMUNITION

आदेश/अनुमति/विशिष्ट  
प्रमाणित प्रतिलिपि  
Certified/Controlled Copy of  
Serial/SPEC. NO. 1023  
दिनांक/At this date  
... 23/10/2020 ...  
को नियंत्रक मुद्रांकित (मे.दि.)  
पुणे, पुणे-411 020.  
FOR CONTROLLER COA (MG)  
PUNE, PUNE-411 020.

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DEPARTMENT OF DEFENCE PRODUCTION  
MINISTRY OF DEFENCE  
CONTROLLERATE OF QUALITY ASSURANCE  
(MILITARY EXPLOSIVES)  
AUNDH ROAD, PUNE-411 020.

RECORD OF AMENDMENTS

| Amendment<br>Ser. No. | Date           | Details of amendment                                                      | Amendment our<br>by<br>(Name & Date) |
|-----------------------|----------------|---------------------------------------------------------------------------|--------------------------------------|
| 3857 -ME              | 29 - 04 - 2005 | New Specification formulated<br>Approved<br>and Sealed by the Controller. | R. N. JOSHI                          |

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THIS SPECIFICATION OR ANY PATTERN DRAWING OR ANY OTHER INFORMATION ISSUED IN CONNECTION THEREWITH MAY ONLY BE USED FOR A SPECIFIC ORDER PLACED BY THE COMPETENT AUTHORITY. IT IS NOT TO BE USED FOR OTHER PURPOSE WHATSOEVER WITHOUT THE EXPRESS WRITTEN SANCTION OF THE DIRECTOR GENERAL OF QUALITY ASSURANCE, MINISTRY OF DEFENCE. DHQ PO NEW DELHI 110011.

## 0. FOREWARD

- 0.1 This specification is formulated on the basis of the project report initiated by CQA(Ammn) Khadki and conducted at O.P. Bhusawal to replace Internal steel fitments of steel boxes with varying density upto  $85\text{kg/m}^3$  cushioning materials.
- 0.2 For additional copies or any other information regarding this specification, reference should be made to the Quality assurance Authority i.e. CQA (ME), Aundh Road, Pune-411020.

## 1. SCOPE

1.1 This specification is meant to govern the manufacture, supply and Quality Assurance of Expanded Polyethylene (Crosslinked) Foam based cushioning material.

1.2 The Crosslinked Polyethylene Foam is useful for Clamp lining applications etc. in steel boxes like C-48, C-53 and C-51.

## 2. RELATED SPECIFICATIONS AND DOCUMENTS

- 2.1 (a) IS 138:1992 Ready mixed paint, marking for packages  
(Revision No. 3) and Petrol containers - Specification  
Reaffirmed 2009 Amds 1
- (b) ASTM-D 624 Test method for Surface resistivity
- (c) ASTM-D 3575 Standard Test method for Flexible Cellular Material from Olefin Polymer
- (d) JSG 0112:1997 General Methods of Tests and assessment of  
(Revision No. 1) impurities in Chemicals/Materials used in the  
Manufacture of Explosives and Ammunition.

2.2 Copies of related specifications are obtainable on payments basis as follow: -

| 1) ASTM & Indian standard      | 2) JSG                           |
|--------------------------------|----------------------------------|
| Bureau of Indian standards,    | The Director                     |
| Manak Bhavan                   | Directorate of Standardisation   |
| 9, Bahadur Shah Zafar Marg     | Standard Document Centre         |
| New Delhi - 110 002            | J-5, 'J' Block, Nirman Bhavan PO |
| Or                             | NEW DELHI 110011                 |
| Its Regional / Branch offices. |                                  |

### 3. MATERIAL / FINISH

3.1 The subject materials shall be in the form of sheets, blocks, profiles and fabricated fittings of various thicknesses.

### 4. MANUFACTURE

4.1 Crosslinked Expanded Polyethylene Foam of varying density is manufactured from resins or blend of resins of Polyolefin family such as LDPE (except EVA) chemically crosslinked with the help of suitable additives. The finished product having been Crosslinked by the process of compression moulding in the form of buns. The buns are later on skived sliced into sheets of various dimensions.

### 5.0 PRE - INSPECTION OF STORES / CONSIGNMENT

5.1 Manufacturer / contractor must satisfy themselves that the stores are in accordance with the terms of contract and fully conform to the required specification, by carrying out a thorough pre-inspection of each lot before actually tendering the same for inspection to the Quality Assurance Officer nominated under the terms of contract. A declaration by the contractor that necessary pre-inspection has been carried out of the store tendered will be submitted along with the challan. The declaration will also indicate the method followed in carrying out pre-inspection showing the features checked / tested and will have the test certificate attached to the challan / declaration.

5.2 If the Quality Assurance Officer finds that the pre-inspection of the consignment as required above, has not been carried out, the whole consignment is liable for rejection.

### 6.0 QUALITY ASSURANCE

6.1 The material Expanded Crosslinked Polyethylene foam and the packages in which it is packed shall be subjected to inspection by and to the approval of QA officer/ QA Authority.

6.2 Samples of the material and the packages may be taken from any portion of the batch / lot of manufacture.

6.3 If on examination, any sample be found not to conform to this specification, the whole batch / lot shall be rejected.

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

### 7. SAMPLING

7.1 The number of samples to be drawn as per approved sampling plan.

## 8 TEST REQUIREMENTS

8.1 Samples taken from any portion of the batch / lot shall be as per App-A addition shall satisfy the following test requirements.

Test Requirements of Expanded Cross-Linked Polyethylene foam based cushioning materials.

| Sl. No. | CHARACTERSTIC                                                                | PASSING STANDARD              | TEST METHOD                                                                      | Remark                                                                                                                             |
|---------|------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| (1)     | (2)                                                                          | (3)                           | (4)                                                                              | (5)                                                                                                                                |
| 1.      | Colour                                                                       | Black                         |                                                                                  |                                                                                                                                    |
| 2.      | Thickness in mm                                                              | As per requirement $\pm 10\%$ | Appendix 'A' Para -2                                                             |                                                                                                                                    |
| 3.      | Width in mm                                                                  | As per requirement $\pm 5\%$  | Appendix 'A' Para -2                                                             |                                                                                                                                    |
| 4.      | Density $\text{kg/m}^3$ upto thickness 25 mm                                 | 50 to 65                      | ASTM D3575 Suffix W Test Method 'A'                                              | Sample size upto 25mm thickness will be of 25cm x 25cm x 10 mm thick                                                               |
|         | Above 25mm                                                                   | 65 to 85                      | -----oo-----                                                                     | Above 25mm, sample size will be 25cm x 25cm x 30mm thick                                                                           |
| 5.      | Water absorption (At 27 Deg.C for 48 Hrs.)Max.g/cm <sup>2</sup>              | 0.02                          | ASTM D3575 Suffix 'L'                                                            | upto 25mm thickness test sample thickness will be 10mm & above 25mm thickness test sample thickness will be 25mm                   |
| 6.      | Tensile Strength $\text{Kg/cm}^2$ Minimum (At break)                         | 5.0                           | ASTM D3575 Suffix 'T' ASTM-412/D- 638 Die A speed of head travel - 501 5mm /min. | Test specimen thickness will be 8mm                                                                                                |
| 7.      | Elongation % Minimum                                                         | 50                            | ASTM - D 3575 Suffix 'T' ASTM - 412 Die A speed of head travel 501 5mm /min.     | tensile strength & elongation are tested together hence test specimen will remain the same Passing standard should be 50% minimum. |
| 8.      | Tear Strength $\text{Kg/cm}$ Minimum                                         | 1.8                           | ASTM D-624 Die C speed of head travel 500 50mm/min                               | Thickness of the specimen will be 10mm                                                                                             |
| 9.      | Compression Strength at 25 % deflection $\text{Kg/cm}^2$ Minimum             | 0.6                           | ASTM D575 Suffix 'D'                                                             | Test specimen Will be of 25mm thickness                                                                                            |
| 10.     | Thermal Stability at - 50°C/2hrs. & + 70°C/24hrs. Change in dimensions % Max | 5                             | ASTM D-3575 Suffix 'S'                                                           | Sample size 250mm x 250mm x 25mm                                                                                                   |
| 11.     | pH of water extract                                                          | 6.0 to 8.5                    | JSC : 0112:1997 Method No 5(I)                                                   |                                                                                                                                    |

## 9.0 WARRANTY

9.1 The stores supplied against contract shall be deemed to be warranted against defective material and performance by the contractor for a period of 12 months from the date of receipt of the stores at the consignee's end and if during this period any of the stores supplied is found defective, the same shall be replaced by manufacture / supplied / contractor free of all charges at the consignee's premises.

## 10. PACKAGING

10.1 The stores shall be securely packed to avoid damages in transit so as to reach in perfect, serviceable condition to the consignee. The packages shall be legibly marked with the consignee's address and other necessary details for easy identification of the stores by consignee.

10.2 The materials shall be supplied in sound and dry packages, consisting of polythene film of 0.13mm thick and suitable external packages. The packages shall be securely closed.

10.3 The material offered in any other packages shall have the prior approval of the Quality Assurance Officer / Quality Assurance Authority.

10.4 Inclusion of any foreign matter or impurities in any of the packages shall render the whole consignment liable for rejection.

## 11. MARKING

11.1 All the packages containing the material shall be indelibly and legibly marked with following details :-

- i. Nomenclature of the store and specification number
- ii. Name and address of the consignee
- iii. A/T or S.O.No. and date
- iv. Consignment number
- v. Lot / Hatch number
- vi. Gross and net mass
- vii. Consecutive No. of packages and total No. of packages in the consignment.
- viii. Date of supply
- ix. Contractors initials or recognized trade mark

11.2 In addition to above the Quality Assurance Officer may suggest some more markings / identifications suitable at the time of inspection.

11.3 The paint used for marking shall conform to IS 138.

## 12. SAFETY OPERATIONS :-

12.1 Nothing in the specifications shall relieve the manufacture / supplier / contractor user of his responsibility for the safety of operations in manufacture, transit handling, storage and use of the store.

## 13. SUGGESTIONS FOR IMPROVEMENT : -

13.1 Any suggestion for improvement in this specification shall be forwarded to the Controller, Controllerate of Quality Assurance (Military Explosives), Aundh Road, Pune - 411 020.

Date : 09 Feb 2013

sd/-...  
(K. N. Patil)  
Controller CQA (ME),  
Aundh Road  
Khadki, Pune 411 020.

Appendix 'A'

## TEST SPECIMEN

1. Test specimen in case of sheets, fabricated or die-cut parts, moulded sheets shall be cut from buns, as described in clause 4.1
2. Measure the dimensions up to 25mm using a dial type gauge with a minimum foot area of 650 mm square (1 inch square). Thickness of material having irregular surface characteristics shall be measured by a method agreed between end use AHSP and the manufacturer.

Dimensions over 25mm may be measured with dial gauge, scale or measuring tape.

The scale tape or gauge shall be graduated to permit measurements within  $\pm 1.0\%$  of the dimension to be measured.

Results reported shall be the average of 3 equally spaced measurements of length and width. Thickness shall be the average of center and four equally spaced measurements around the perimeter of the specimen / sample.