

**ITEM SPECIFICATION:** - CONVERSION OF FUZE HOLDER TO OFAJ DRG. NO. FS-3025 INTO FUZE HOLDER ASSY. TO OFAJ DRAWING NO FS-3027 BY VULCANIZATION.

**ITEM CODE:** - W412018100

**A. PRE-QUALIFICATION CRITERIA :-**

**ESSENTIAL**

- Suitable Rubber Moulding press with heating facility.
- Rubber Mixing Mill.
- Rubber Extruder/Rolling Mill.
- Suitable Heating Over.

**DESIRABLE**

- Rubber Testing facilities as per tests specified in drawing and specifications such as :-
  - a. Tensile tester.
  - b. Shore hardness tester.
  - c. Determination of Low Temperature Retraction tests (TR 10, TR 30)
  - d. Tear strength checking facilities.

**B. Other standard terms & conditions will be as under :-**

1. Firm shall arrange the required desirable facilities from reputed source, if the same is not available with the firm. The firm has to enclose MOU / Tie-up letter of the reputed source for outsourcing desirable facilities along with the technical bid offered.
2. During the technical bid firm has to submit rubber raw material sample (in proper dimension) as per technical specification attached with tender to Ordnance Factory Ambajhari (OFAJ), Nagpur within 10 days after tender opening date in sealed condition with proper identification, for carrying out Tear Strength Test and NG Vapour Ageing Test. OFAJ will arrange the NG Vapour Ageing Test through Ordnance Factory Bhandara and the expenses incurred in the above testing will be borne by OFAJ and for Tear Strength Test firm will have to arrange at their end and same will be witness by OFAJ Rep. only those firms will be considered technically qualified, whose Rubber Raw material samples will qualify in the Tear strength Test and NG Vapour Ageing Test as per the technical specification.
3. Firm has to arrange the raw material of specified grade mentioned in relevant specifications & drawing and to arrange the inspection facilities and requisite test certificates from Govt. approved / NABL Lab. Firm must confirm the same in technical bid.
4. The firm has to arrange for suitable packing of the stores to protect the store damage during storage & transit deterioration, if firm gets the order. Firm must confirm the same in their technical bid.
5. All the required facilities, whether in-house or outsourced should be capable and suitable for producing/supplying the component as per quality requirement projected in the monitoring instruction/drawings/specifications. Firm must confirm the same in their technical bid along with self-declaration of capability of firm and its sub vendors and also submit the list of available Plant & Machinery and inspection facilities.
6. The firm shall have supplied same/similar category of items to other firms. The firm will provide the details of same/similar category of items supplied to other firms in last three year with details of purchaser.
7. Bank Guarantee: firm has to submit requisite Bank Guarantee against the FIM issued as a security deposit.

### QUALITY MONITORING INSTRUCTIONS FOR VENDORS:-

1. Firm has to take raw material clearance (Rubber & Adhesive) and Firm has to submit pre-inspection test report from NABL accredited / P.S.U. / Manufacturer / Govt. approved lab for the parameters specified in para 3 (Product requirements) of specification FS-3028 before submitting Raw material for clearance.
2. Test report to give reference of OFAJ supply order.
3. Firm has to submit proof of Raw material purchase and indicate its sufficiency for No. of Components to be manufactured from purchased raw material.
4. After raw material clearance, firm has to submit advance sample for clearance before starting bulk production. (advance sample required from first time supply)
5. Components to be made as per OFAJ drawing number FS-3027 & technical specification FS-3028 and Firm shall submit inspection report /dimensional report mentioning OFAJ supply order number along with supply.
6. Firm to take all necessary precautions for proper packaging and surface protection to avoid corrosion, damage during handling, transporting and storage.
7. Component will be subjected to surveillance quality check and performance trial at OFAJ.
8. OFAJ team may visit the firm for Process/quality Audit.

FS-3028

Date	Issue	Document ID
2014-04-07	2	301161487

Arming device holder, assy and Fuze holder, assy

Authorisation

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TECHNICAL SPECIFICATION

FS-3023

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1 Applicable documents

1.1 Main documents

Arming device holder, assy	01182433
Fuze holder, assy	01204430
Fuze holder, assy	01185349
FTC Fuze holder, assy	01226829

1.2 Other documents

Rubber – Tolerances for products – Part 1: Dimensional tolerances, Part 2: Geometrical tolerances	SS-ISO 3302-1 and SS-ISO 3302-2:2008
Rubber, vulcanized or thermoplastic – Determination of hardness	SS-ISO 48:2010
Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties	SS-ISO 37:2005 Ed.2
Rubber, vulcanized or thermoplastic – Determination of tear strength	SS-ISO 34-1:2010
Rubber, vulcanized or thermoplastic – Accelerated ageing and heat resistance tests	SS-ISO 188:2011
Rubber, vulcanized or thermoplastic – Determination of low-temperature retraction (TR test)	SS-ISO 2921:2011
Test method standard – Environmental engineering considerations and laboratory tests	MIL-STD 810G
Test method standard – Environmental and performance tests for Fuze and Fuze components	MIL-STD 331C

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Arming device/Fuze Holder, assy consists of Arming device/Fuze Holder and an insulation that is vulcanized to the holder.

This specification applies to the material and vulcanization of the insulation.

The insulation is of rubber and functions as ablation and heat protection to the Arming device/SAI unit and Arming device/Fuze Holder.

On firing, the component will be exposed to severe acceleration stress during a short period of time, and immediately afterwards to hot gases at high pressure and high gas velocity along the insulation.

Arming device/Fuze Holder, assy shall function within the temperature range  $-40^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  and thus among other things the brittleness of the rubber grade at low temperature is of utmost importance to the safety and function of the ammunition.

**3 Product requirements****3.1 Material**

The material of the insulation shall be chlorosulfonated polyethylene or chloroprene rubber with properties as stated below. Approved grades according to §3.1.3. Hardness and tear strength to be inspected for each compound batch. Other properties to be inspected as type test.

**3.1.1 Physical properties [2]**

Property	Unit	Requirement	Method
Hardness	$^{\circ}\text{IRH}$	$56 \pm 3$	SS-ISO 48:2010
Tensile strength	$\text{N/mm}^2$	min 13	SS-ISO 37:2005 ed.2
Ultimate elongation	%	min 400	SS-ISO 37:2005 ed.2
TR 10	$^{\circ}\text{C}$	max -15	SS-ISO 2921:2011
TR 30	$^{\circ}\text{C}$	max -10	SS-ISO 2921:2011
Tear strength	$\text{N/mm}$	min 30	SS-ISO 34-1:2010 method C

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**3.1.1.1**

After ageing in air according to SS-ISO 188:2011 at temperature 125° C for 72 h:

- Reduction in tensile strength shall be maximum 20 % [2]
- Reduction in ultimate elongation shall be maximum 50 % [2]
- Reduction in tear strength shall be maximum 20 % [2]

**3.1.1.2**

After contact with NG-vapours at 65° C for one week, the tear strength must not fall below 80 % of the original value. [2]

**3.1.2 Other properties****3.1.2.1**

The ablation shall be maximum 1 mm at combustion in the rocket motor. [2]

**3.1.2.2**

The material shall be possible to bond to aluminium so that the bonding phase has the same strength as the rubber. [2]

**3.1.2.3**

The material shall give minimum smoke generation on combustion.

**3.1.3 Type-approved grades [2D]**

1. Nolato 66611-P
2. Nolato 66613-P
3. Nolato 16611-P

**3.2 Finished component****3.2.1 Dimensions**



According to drawing stated in respective PDL.

**3.2.2 Surface quality [2]**

The insulation shall visually be free from bulges, bubbles, cracks, scratches, remaining rubber residues and other surface defects that may adversely affect its function.

100 % inspection, at which defectives shall be removed.

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301161487**3.2.3 Adhesion [2D]**

The adhesion between the insulation and the cylindrical surface of the Arming device/Fuze Holder shall be so good that a rubber layer shall remain on the Arming device/Fuze Holder after an attempt is made to tear off the insulation. To be verified by spot-checks (destructive) and follow-up of production method. 1% sampling, at least 2 pcs per shift.

**3.2.3.1**

The adhesion must not be noticeably deteriorated by environmental treatments (with the rocket motor fitted) according to the following:

- Storage for 28 days at +71° C.
- Temperature cycling for 28 days within the temperature range of -54° C to +71° C according to MIL-STD 331C method C1 (01182433).
- Temperature cycling for 28 days within the temperature range of -46° C to +63° C according to MIL-STD 810G (01204430, 01185349 and 01226829).

Requirements to be checked as type test.

**3.2.4 Approved adhesive/primer**

- Chemosil 231G
- Megum 538
- Chemosil 211 (primer)


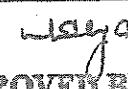
**4 Manufacture****4.1 Methods and equipment****4.1.1**

The Arming device/Fuze Holder shall be completely degreased and blasted before the insulation is vulcanized. The time between blasting and application of adhesive shall be as short as possible. Blasted surface to be protected against touch by hand, dust, moisture etc.

**4.1.2**

The shape and strength of the Arming device/Fuze Holder shall not change at the vulcanization.

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**4.2 Planning and follow-up**

**4.2.1**

**4.2.2**

Components manufactured before tools and other equipment have reached the proper production status shall not be delivered.

**4.2.3**

Alterations in the manufacture that may affect the properties according to this specification are not permissible without the purchaser's approval.

**4.2.4**

A journal shall be kept during manufacture and give information about circumstances that may affect the quality and uniformity of the product. The journal shall contain information about any alterations in the manufacturing process and results from tests made during manufacture. The journal shall be kept available for at least 20 years and shall be shown on request.

**4.2.5**

The operation sequence used at manufacture of accepted outturn samples must not be changed without the purchaser's approval.

**5 Delivery**

**5.1 Packing**

Arming device/Fuze Holder, assy, shall be packed in such a way that it is not damaged during transport, handling and storage.

**5.2 Transportation marking**

The package shall be marked with the name of the product, part number, quantity and lot designation.

**6 Inspection**

**6.1 Vendor's inspection**

**6.1.1**

The vendor shall perform inspection to the extent necessary to verify that the requirements according to this specification are met.

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**6.1.2**

In case of deviation from the product documents, a deviation procedure agreed upon between the purchaser's and vendor's inspection departments shall be followed.

**6.1.3**

Applied in-house inspection specifications shall be available to the purchaser.

**6.2 Purchaser's inspection****6.2.1**

The purchaser's inspector is entitled to be present at and to follow manufacture as well as inspection.

**6.2.2**

The purchaser's inspector shall have access to the vendor's premises, inspection equipment, and personnel necessary for his inspection.

**6.2.3**

When suitable, it shall be possible for the purchaser to coordinate his receiving inspection with the vendor's inspection, mainly in connection with destructive testing.

**6.3 Certificates****6.3.1**

The vendor shall account for his inspection by means of test certificates to the extent agreed upon between purchaser and vendor. The certificate may be arranged in a way to suit the vendor's procedures. The certificate shall show that the product has been inspected and accepted by the vendor and that the manufacture has been carried out according to the laid-down operation sequence.




**6.3.2**

Certificates from sub-contractors shall be available to the purchaser.

**6.4 Inspection lot**

An inspection lot = a delivery lot.

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### 6.5 Outturn samples

To give the purchaser a concept of how the vendor's manufacture will turn out from the quality point of view, the vendor shall deliver outturn samples according to agreements with the purchaser.

#### 6.5.1

The outturn samples shall be representative of the future production and shall be manufactured by the production methods, tools, measuring instruments, etc. that will be used at series production.

#### 6.5.2

Outturn samples shall be delivered

- When the vendor has no previous experience of the product
- When a major design change of the product has been introduced
- When a major change has been made in manufacture, e.g. change of method, changed mixing procedure, changed type of mould or tool
- When the production has been interrupted for a considerable period of time

#### 6.5.3

The vendor shall deliver outturn samples so long before series manufacture is started that any faults may be remedied before first delivery is made. Before series deliveries are started the outturn sample shall be accepted by the purchaser.

#### 6.5.4

On delivery, the outturn sample shall be marked "Outturn sample" and shall be accompanied by an inspection certificate according to § 6.3, covering the vendor's in-house inspection of the sample.

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