

<b>MONITORING INSTRUCTION FOR INSPECTION</b>		Issue No. 01 Rev. No. 02
		Date of Issue 01.02.2022
<b>INSITU MOULDING RUBBER SEAL (FOR 125mm PRACTICE SHOT )</b>		<b>HEPF/QA/SC/B/009</b>
<b>No</b>	<b>AMENDMENTS</b>	<b>DATE</b>
1	Material & QAP no. amended as per latest QAP dated May 2021 Rev 00	01.02.2022

1. MATERIAL SPECIFICATION : Rubber Base: A tri-blend of poly-isoprene, NBR and CSM.
2. DRG.NO : 9607 01 03 03 04 000 12TC
3. REFERENCE DOCUMENT : ARDE QAP NO.: DRDO-ARDE-DOA-TOT-209-2017  
Revision No: 00 (May 2021)

**4. INSPECTION REPRESENTATIVES AND LOCATION**

- 4.1. Inspection will be done by representative of HEPF (or) ARDE (or) both.
- 4.2. Tests will be carried out at firm's premises (or) at CQA (ME).

**5. COMPONENT TESTING AND INSPECTION**

**TABLE -A TESTING & INSPECTION**

SL.NO	TESTING & INSPECTON PROCEDURE	RESPECTIVE CLAUSE IN QAP
1	Raw material	3.1
2	Stage inspection	5.0
3	Final inspection	6.0
4	Detail of test/checks on finished item and acceptance criteria	6.3
5	Detail of tests and other information	7.0
6	Process details	8.0

**6.0 INSPECTION DOCUMENTS**

SL. NO.	INSPECTION DOCUMENTS
1	Firm's material test certificates from NABL accredited lab or govt. Approved laboratory, lot wise with batch no. & qty
2	Firm's dimensional & visual inspection reports
3	Inspection / acceptance documents issued by HEPF or ARDE inspector or both
4	Packing slip indicating lot wise with batch no.,qty details & supply order no with firms seal.
5	Guarantee / warranty certificate of supplier
6	In addition to the above soft copies of all the certificates shall be sent to e-mail id's. <a href="mailto:happqa.ofb@ofb.gov.in">happqa.ofb@ofb.gov.in</a> , <a href="mailto:mmhapp.ofb@ofb.gov.in">mmhapp.ofb@ofb.gov.in</a>

Note : in case of any differences, QAP & drawing shall prevail

  
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<b>Technical Specification &amp; Quality Document</b>			<b>Document No.: DRDO-ARDE-DOA-TOT-209-2017</b>				
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**Assembly-II (In situ Rubber Moulding)**

1.	Drawing No.	:	9607 01 03 03 04 000 12TC
2.	Method of manufacture	:	Injection Moulding Process (single stage)
3.	Receiving Inspection	:	Nil
3.1	Raw material	:	Rubber Base: A tri-blend of poly-isoprene, NBR and CSM.
Tests/checks and acceptance criteria for raw material:			
1. Chemical : Certificate of the supplier to be submitted.			
2. Mechanical properties:			
<b>Hard Rubber</b>			
Sr. No.	Properties	Acceptance criteria	Specification
1.	Tensile Strength	110 kg/sq.cm (min)	ASTM D412
2.	Elongation at Break	150% (min)	ASTM D412
3.	Hardness: Shore 'A'	85±5	ASTM D2240
4.	Tear Strength (kg/cm)	50 (max)	ASTM D624 Die'C'
5.	Specific Gravity	1.2 ±0.05	ASTM D792
6.	Brittleness Temperature	-20°C (max)	ASTM D2137
7.	Compression Set (maximum) (at 70±2°C for 22±0.5 hrs)	25%	ASTM D 395
Note: On an average, any three samples of the slab prepared for the testing purpose should be taken.			
<b>Soft rubber</b>			
Sr. No.	Properties	Acceptance criteria	
1.	Tensile Strength	225 kg/sq.cm (min)	ASTM D412
2.	Elongation at Break	200% (min)	ASTM D412

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3.	Hardness: Shore 'A'	65±5	ASTM D2240		
4.	Tear Strength (kg/cm)	100 (max)	ASTM D624 Die'C'		
5.	Specific Gravity	1.15 ±0.05	ASTM D792		
6.	Brittleness Temperature	-50°C (max)	ASTM D2137		
7.	Compression Set (maximum) (at 70±2°C for 22±0.5 hrs)	25%	ASTM D 395		
Note: On an average, any three samples of the slab prepared for the testing purpose should be taken.					
4.	In-process inspection	:	Nil		
5.	Stage inspection	:			
5.1	Sr. No.	Stage Detail	Feature		
	1.	Mould Checking	Mould to be preserved in good condition.		
	2.	Pre-production sample	03 Samples to be checked for correctness before starting bulk production. In addition, rubber thickness(1.5+0.2mm) to be checked using a gauge as per base sabot dimensions.		
6.	Final Inspection:				
6.1	Visual inspection: sample size 100%				
6.1.1	Features for visual examination and acceptance criteria:				
	Sr. No.	Details of features	Acceptance criteria	Defect Classification	
	1.	Cracks, Lumps or Cavities, Blow holes, uneven surface, etc.	Not permitted	Critical	
6.2.	Dimensional Inspection: Nil				
6.3.	Details of tests /checks on finished items and acceptance criteria:				
	Sr. No.	Tests/Surface Treatment	Acceptance value	Defect classificat	Inspection Method

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				ion	
1.	Gauging ID122.70mm	Shall pass up to sabot step	Critical	Cylindrical gauge	
2.	Leakage test	2 kg/cm <sup>2</sup> @2minute	Major	Pressure Test setup	
3.	Hardness: hard rubber	85±5 Shore 'A'	Major	Durometer	
4.	Hardness: soft rubber	65±5 Shore 'A'	Major	Durometer	
5.	Shot Gauging	Shall pass	Critical	Receiver gauge	
7.	Details of tests and other information: Leakage test: Leakage test to be carried out at suitable set up, as shown in figure below for guideline. Required fixtures to be made by vendor to perform the test.				

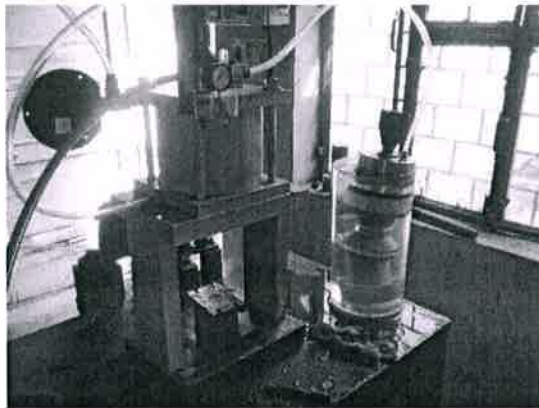


Fig : Leakage test

8. Process:

Following are the guidelines:

- a) Made in a single step injection moulding process under vacuum.

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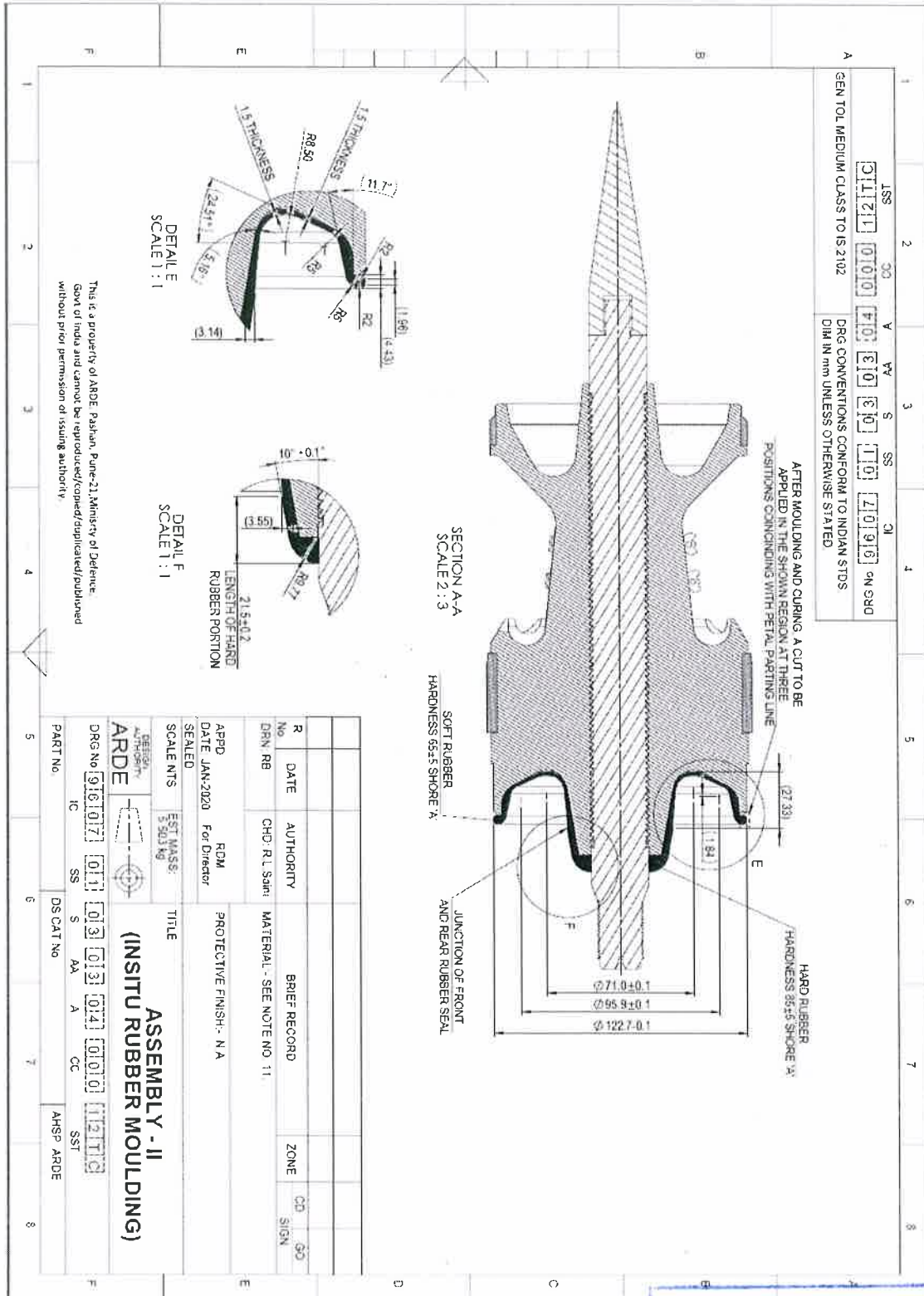
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- b) Both the rubber compounds (Hard & Soft) should be in un-vulcanized state when they enter the mould and should cure parallelly in the mould.
- c) The temperature of the mould to be maintained to minimum possible temperature while handling the shot so that there is no damage to the nylon DB & CB. (below 115<sup>0</sup>C)
- d) The pressure used has to be low so that it causes no deviation in the OD of the DB or expansion in the shot.
- e) No rubber is allowed to enter between the sabot petals.

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DATE: SIGNATURE: