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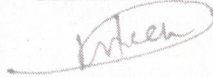
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**QUALITY ASSURANCE PLAN
IGNITER BAG (IB)
FOR
155 mm BMCS M92 HZ**

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RECORDS OF AMENDMENTS

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Ordnance Factory Nalanda, Unit of Munitions India Ltd.
Govt. of India Enterprise, Ministry of Defence, Rajgir, Bihar-803121

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1.0 GENERAL

- 1.1 QAP has been prepared by Standard Cell, OFN on the authority of the CGM, OFN, a unit of MIL, under Ministry of Defence, Govt. of India.
- 1.2 The information contained herein is privileged and should be used by authorized Personnel only.
- 1.3 The purpose of the QAP is to ensure the quality of IB and its raw materials, satisfy contractual agreements and meet quality standards.
- 1.4 This QAP is applicable and specific to manufacturing of IB.
- 1.5 The CGM, OFN or his authorized representative must have free access to the Suppliers/Manufacturers work premises, his processing facilities, assembly lines, Testing fields at all times during the auditing/ PDI as well as run of the contract. The supplier/manufacturer shall also make arrangements with outside agencies wherever becomes imperative to execute the Special Quality Management Tools / Tests with information to The CGM, OFN for effective and meaningful auditing as per IS/ ISO 19011: 2018 standard.

1.6 DEFINITIONS FOR TERMS AND ACRONYMS

ANSI	-	American National Standards Institute
AQL	-	Acceptable Quality Level
BMCS	-	Bi Modular Charge System
CGM	-	Chief General Manager
DCL	-	Defect Classification List
DRG	-	Drawing
DPSU	-	Defence Public Sector Unit
HZ	-	High Zone
IB	-	Igniter Bag
IS	-	Indian Standard
ISO	-	International Organization for Standardization
MIL	-	Munitions India Limited
mm	-	Millimeter
NABL	-	National Accreditation Board for Testing and Calibration laboratories
OFN	-	Ordnance Factory Nalanda
PDI	-	Pre Dispatch Inspection
QC	-	Quality Control
QAP	-	Quality Assurance Plan
RMC	-	Raw Material Clearance
Sl. No.	-	Serial Number
Spec.	-	Specification
STEC	-	Storage and Transportation of Explosive Committee
w.r.t	-	with respect to

2.0 BRIEF DESCRIPTION OF THE PRODUCT

IB is being used to keep the Igniters material (Gun Powder G12) inside Igniter Tube.

3.0 SAFETY/ SECURITY ASPECT

IB is a non explosive component. Hence no special safety regulation prescribed in STEC Pamphlet No. 2 is applicable to it.

4.0 TECHNICAL SPECIFICATION

IB shall be manufactured in accordance with the relevant drawings and relevant process schedule and shall meet all the technical requirements of the spec.

5.0 MARKING / IDENTIFICATION DETAILS AND LOT NO.

IB are to be marked / identified as per the relevant drg. /spec. Any changes required shall be subject to approval of The CGM, OFN and shall not be changed without approval.

However the supplier / manufacturer shall mention lot no. in every consignment at their end w.r.t Lot Size as mentioned below at Para.9.

6.0 QUALITY**6.1 ORGANISATION**

The supplier / manufacturer shall have an appropriate organizational chart for the QC program describing the tasks in terms of QC activities, the roles and responsibilities of QC personnel performing the QC tasks to ensure that the concepts & standards applied are implemented and all testing & evaluation are done in accordance with approved plans, drawings, Standards and procedures.

6.2 FACILITIES

6.2.1 The supplier / manufacturer shall establish and maintain appropriate facilities for manufacturing of IB. The Shops used for manufacturing of IB shall be provided with all the necessary equipment/instruments, skilled personnel and appropriate environmental conditions with means of regulating temperature and relative humidity. The shops shall have a program for scheduled maintenance of all the equipment/test equipment/instruments. The shop shall maintain records of environmental conditions where required.

6.2.2 The supplier/manufacturer shall have/ arrange laboratory facilities for testing of IB. The laboratory shall be furnished with all the relevant test equipment/instruments and shall have a Program for scheduled maintenance of the test/measuring equipment/instruments. The laboratory shall have a program for calibration of its test/measuring instruments/equipment.

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6.3 RAW MATERIALS / INPUTS

- 6.3.1** The supplier/ manufacturer shall offer all the raw materials as required for manufacturing of IB for sampling to the CGM, OFN in the format as per Annexure 'A' on supplier's / manufacturer's letter head.
- 6.3.2** The CGM, OFN reserves the right to draw sample of raw material at firm premises for further testing or alternatively the CGM, OFN may instruct firm to draw sample on their own and submit to laboratory for testing of physical as well as chemical parameters as per spec. Here in both cases the supplier/ manufacturer shall submit test report from Ordnance Factory/ DGQA/ Govt./DRDO/NABL accredited Lab after testing.
- 6.3.3** The laboratory test report must contain the following information-
- i. OFN supply order no. & date
 - ii. Relevant specification no. and test method
 - iii. Date of sample receipt
 - iv. Date of testing
 - v. Representing bulk Lot quantity
- 6.3.4** After receipt of laboratory test reports of all raw materials to be used in manufacturing of IB from Ordnance Factory/ DGQA/ Govt./DRDO/NABL accredited Lab, OFN will examine the test reports and give RMC to the supplier/manufacturer for starting production of IB if all parameters found within range. Stores shall be manufactured only after getting RMC from OFN.
- 6.3.5** The supplier/ manufacturer should make effort to submit all the raw material against the SO at one go.

6.4 INTERMEDIATE

The Supplier/ manufacturer shall carry out inspection of all intermediates to ensure that they conform to the relevant spec. / drg. / standard. Only those intermediates meeting the spec. / standard /drg. shall be used for further processing.

6.5 PROCESS

The supplier/manufacturer shall ensure that only approved processes are adopted in the manufacturing of IB. The supplier/ manufacturer shall monitor and control the processes throughout the manufacturing process and shall maintain records of all critical process parameters. These records shall be made available to the CGM, OFN as and when required.

6.6 ACCEPTANCE / PERFORMANCE TESTS

The supplier/ manufacturer shall evaluate the lot of the finished IB and assure himself that the lot shall satisfy the requirements laid down in the relevant drg./ spec. The number of samples to be drawn and the method of sampling shall be in accordance with the relevant standard/spec. Records of evaluation done on the lots shall be maintained and made available to the CGM, OFN as and when required.

7.0 PROCESS AUDIT

- 7.1** The CGM, OFN or his authorized representative may conduct process audit in accordance with IS/ISO 19011:2018. The supplier/ manufacturer shall offer his premises to the CGM, OFN, free of cost, all reasonable / related facilities (including test equipment / gauges) for satisfying himself during process audit, that the stores are being manufactured in accordance with the governing specifications / Environment.
- 7.2** The CGM, OFN shall forward the audit report to the Supplier/ manufacturer for necessary corrective action. The process audit report shall indicate either conformity or non-conformity with audit criteria and whether the process is effective /efficient and identify opportunities for improvement. The overall objective of the audit is continual improvement. The Supplier / manufacturer shall identify corrective action and implement the same. A follow up audit may be planned and conducted by the CGM, OFN to assess the effectiveness of the corrective actions.

8.0 QUALITY AUDIT**8.1 AUDIT METHODOLOGY AND PRINCIPLES**

The CGM, OFN shall carry out Quality Audit in accordance with IS/ISO 19011:2018.

8.2 SAMPLING PLAN

- 8.2.1** The CGM, OFN or his authorized Representative shall inspect/ audit the bulk lot as per approved Sampling Plan ANSI/ASQ Z1.4-2003 (R 2018). Single sampling plan, Normal inspection, and General Inspection level-II or as per requirement of the CGM, OFN during PDI or receipt inspection at OFN. These samples should be thoroughly representative of the bulk.

8.3 PRE DISPATCH INSPECTION

- 8.3.1** Upon completion of the manufacturing of the bulk lot, the supplier/ manufacturer shall offer the bulk lot of IB to the CGM, OFN, free of cost, all reasonable / related facilities (including test equipment / gauges) for PDI along with following documents.
- a. Pre inspection and in-process inspection reports of IB as per relevant drawing and specification.
 - b. Raw material consumption and balance statement as per Annexure-'C' on supplier's / manufacturer's letter head.
 - c. Safety certificate and guarantee/warranty certificates for every consignment as per Annexure-'B' on supplier's / manufacturer's letter head.
 - d. Any other quality related documents at the discretion of the CGM, OFN or his authorized Representative, as per general industry practice.
- 8.3.2** The CGM, OFN or his authorised representative shall audit the quality documents and draw samples from the bulk lot as per sampling plan, evaluate physical parameters as per approved Drg. & Spec. and classify the samples as defective/non defective as per DCL based on physical inspection.

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- 8.3.3 The CGM, OFN or his authorised representative shall draw samples, wherever required, for testing of physical and/or chemical parameters as per spec. to any Ordnance Factory/ DGQA/ Govt./DRDO/NABL accredited Lab.
- 8.3.4 Upon successful completion of PDI and satisfactory laboratory test results of IB, the bulk lot shall be recommended for Dispatch Clearance from OFN. Lots not meeting the criteria for acceptance requirement during PDI or unsatisfactory laboratory test results the lot shall be **REJECTED**.
- 8.3.5 The CGM, OFN in his discretion may exempt the PDI and allow consignment to dispatch without PDI. In that case the lot will be accepted/ rejected based on receipt inspection of the bulk lot at OFN.
- 8.4 **RECEIPT INSPECTION**
- 8.4.1 Upon receipt of the bulk lot at OFN, QC team of OFN shall audit the quality documents and draw samples from the bulk lot as per sampling plan, evaluate physical parameters as per approved drg. & Spec. and classify the samples as defective/non defective as per DCL based on physical inspection. The supplier/ manufacturer shall submit following documents along with consignment-
- Pre inspection and in-process inspection reports of IB as per relevant drawing and specification.
 - Raw material consumption and balance statement as per Annexure-'C' on supplier's / manufacturer's letter head.
 - Test report of all chemical and physical parameters from any Ordnance Factory/ DGQA/ Govt./DRDO/NABL accredited Lab.
 - Safety certificate and guarantee/warranty certificates for every consignment as per Annexure-'B' on supplier's / manufacturer's letter head.
 - Any other quality related documents at the discretion of the CGM, OFN or his authorized representative, as per general industry practice.
- 8.4.2 Additional samples may also be drawn from the bulk lot by OFN QC team and send it to user section for user trial.
- 8.4.3 If required, samples of IB may be sent to laboratory for testing of physical as well as chemical parameters.
- 8.4.4 Upon successful completion of receipt inspection, satisfactory quality documents and reports provided by the supplier / manufacturer, satisfactory user trial and laboratory test report, bulk lot shall be sentenced as **ACCEPTED**. Lots not meeting the criteria for acceptance requirement or unsatisfactory quality documents/reports provided by the supplier/manufacturer or adverse user trial / laboratory test report, the lot shall be sentenced as **REJECTED**.
- 8.4.5 In case where PDI has been done, the scope of receipt inspection will be in the purview of the CGM, OFN.

9.0 ATTRIBUTED INSPECTION PLAN

Normal inspection- Single Sampling Plan- General Inspection level II

Lot Size : 10800 nos. or multiple of 10800 nos.

Sample Size : As per Sampling Plan no. ANSI/ASQ Z1.4-2003 (R 2018)

DCL	AQL%	Accept	Reject,
Critical	0.04	As per Sampling Plan no. ANSI/ASQ Z1.4-2003 (R 2018)	
Major	0.65		
Minor	1.50		

9.1 DEFECT CLASSIFICATION LIST (DCL):

Sl.	Inspection Parameter	Specified Limit	Nature of defect	DCL
01	Physical Dimension of IB	As per Drg.	Dimension of Igniter Bag not as per spec. limit.	Major
03	External Defect on IB	--	Abrasion mark or weak spot, Broken or missing yarn, Floats or skips, Knots, Smash, Cut, Hole, Tear, Slubs, jerked in weft, slough off or course yarn, Wrong draw, Wrinkle or Crease, Objectionable odour, Uneven weaving.	Minor
04	Marking or stumping of 'M 92' letter	As per Drg.	Missing or illegible letter	Minor

10.0 PROCEDURE FOR DISPOSAL OF NON-CONFORMING MATERIAL

IB not meeting the standard/specifications during bulk receipt inspection at OFN shall be sentenced as 'REJECTED' and intimated to the supplier/ manufacturer for collection from OFN Store. Further action will be taken as per procedure laid down in Supply Order.

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11.0 PHYSICAL DIMENSION OF IB

Specification No. OFN/SPEC/BMCS/M92/IB/00			
Sl. No.	PROPERTIES	UNIT	Spec. limit
1.1	Length	mm	180±5.0
1.2	Width	mm	50±2.0
1.3	Seam Width stitched with Blue Thread	mm	6±1.0
1.4	Silk Ribbon Length	mm	195±5.0
1.5	Silk Ribbon Width	mm	8±2.0

12.0 LIST OF DRAWINGS

Sl. No.	Assembly/ Component	Nomenclature	OFN Drawing No.
1	IB	Igniter Bag assembly for 155mm BMCS M92 (Empty)	BMCS-M92-IB-01
2		Body Igniter bag M92 for 155 mm BMCS M92	BMCS-M92-IB-02
3		Marking of Empty Igniter Bag Assembly for 155 mm BMCS M92	BMCS-M92-IB-04

13.0 SPECIFICATIONS OF RAW MATERIALS FOR IB:

Specification No. OFN/SPEC/RAW MAT/M92/IB/00					
Sl.	Parameter	Unit	SPECIFICATION LIMITS		Spec Ref
1 SPECIFICATION OF CLOTH					
1.1	Material	-	Acrylic Igniter cloth shall be woven from acrylic yarns spun from acrylic fibers containing 85% minimum polyacrylonitrile, no homopolymer shall be used.		MIL-C-13184 (AR) Amnd.4
1.2	Colour	-	In all instances the cloth shall be dyed scarlet. The scarlet dye shall produce a colour closely equivalent to red colour 11086 to 11400 of Federal Standard no. 595. The following type of dye stuffs may be used.		Federal Standard-595
1.3	Appearance	-	Appearance of the cloth shall be uniform and free from visible imperfections		MIL-C-13184 (Ord)
1.4	Weight	Oz. per sq. yd	5.25 to 5.75 (only for reference)		MIL-C-13184 (AR) Amnd.4, Fed Test STD 191A method no. 5041
1.5	Breaking Strength	lb per inch	WARP- 100 minimum FILL- 100 minimum		MIL-C-13184 (AR) Amnd.4 Fed Test STD 191A method no. 5100
1.6	Stretch %	%	WARP- maximum 10.0 FILL- maximum 10.0		MIL-C-13184 (Ord), Fed Test STD 191A method no. 5100
1.7	Thread Count	Threads per inch	WARP	34-45	MIL-C-13184 (AR) Amnd.4 Fed Test STD 191A method no. 5050
			FILL	35-45	
1.8	Ash Content	%	2.0 (max.)		MIL-C-13184 (Ord)
1.9	pH of Water Extract		7 ± 2		MIL-C-13184 (Ord)
1.10	Acidity or Alkalinity	%	Acidity as CH ₃ COOH – 0.1 % (max) or Alkalinity as Na ₂ CO ₃ – 0.1 % (max)		MIL-C-13184 (Ord)
1.11	Ether Soluble Material	%	5 % (Maximum)		MIL-C-13184 (Ord)
1.12	Objectionable sizing	-	The Character and quality of the sizing material shall be such that there shall be no indication of smoldering when the cloth is ignited sufficiently to give a good flame and then extinguished.		MIL-C-13184 (Ord)
1.13	Halogens	-	None		MIL-C-13184 (Ord)

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Sl.	Parameter	Unit	SPECIFICATION LIMITS	Spec Ref
2.0	SPECIFICATION OF THREAD FOR SEWING			A
2.1	Material	--	Thread polyester. Type I-Twisted soft multiple cord. Class 1- Low Elongation, sub class A	Fed Spec VT-285D
2.2	Yarn	--	The yarn shall be bright, continuous multifilament polyester (Polyethylene Glycol terephthalate) having a specific gravity within the range 1.36-1.40.	Fed Spec VT-285D Fed Test STD 191A method no 1600 and Visual Inspection
2.3	Colour	--	Blue Dye- Olive Drab, Shade S-1, Related cable no C A 66022 (The following combination of dyes are suggested Disperse Blue 27, Disperse Red-59, Disperse Yellow 23)	Shade Matching - Fed Spec VT-285D 4.2.4.1 and Fed Test STD 191A method no. 9010
2.4	Twist Direction	--	The direction of the final twist shall be 'Z'	Fed Spec VT-285D, Fed Test STD 191A method no. 4050
2.5	Physical requirement			
2.5.1	Letter Size		E	Fed Spec VT-285D
2.5.2	Plies		3	Fed Spec VT-285D Visual Inspection
2.5.3	Final Twist	t.p.i	6.0 (min.)	Fed Spec VT-285D Fed Test STD 191A method 4054
2.5.4	Length per pound	yard	5700 (min.)	Fed Spec VT-285D Fed Test STD 191A method 4010
2.5.5	Breaking Strength	lb	8.0 (min.)	Fed Spec VT-285D Fed Test STD 191A method 4100
2.5.6	Elongation	%	20 (max.)	

Sl.	Parameter	Unit	SPECIFICATION LIMITS	Spec Ref
3.0	SPECIFICATION OF SILK (VISCOSE RAYON) RIBBON			
3.1	Material	--	8±2.0 mm width silk (viscose rayon) ribbon tape. The tape shall be free from spinning, weaving and dyeing defects.	IS 10056 :1982
3.2	Yarn	%	Multifilament viscose rayon yarn (100 % VISCOSE)	IS 10056 :1982 IS 667 :1981 & IS 3416 :1988
3.3	Mass	g/m	30g/20m (minimum)	IS 10056 :1982, IS 1964 :2001
3.4	Breaking Strength (full width X 20 cm) at 450 mm/ min rate	N	100 N (minimum)	IS 10056 :1982, IS 1969 :2009

14.0 VISUAL INSPECTION OF IB:

Sl. No.	PARAMETER	SPECIFICATION LIMITS
1	Abrasion mark or weak spot	Any open place or any area visibly thinner or weaker than surroundings normal cloth.
2	Broken or missing yarn	Any length
3	Cut, Hole, Tear	Any size
4	Floats or skips	Two or more, more than 5 mm in combined warp and weft direction or single floating over 25 mm in length
5	Knots	Any knot extending above surface of cloth or with untrimmed tails extending from cloth
6	Smash	Any
7	Slubs, jerked in weft, slough off or course yarn	Three or more times diameter of normal yarn
8	Overall appearance	Spots, stains or streaks extending for 25 mm or more in combined direction
9	Wrong draw	Two or more ends 12 mm or more in length or single, 225 mm or more in length.
10	Wrinkle or Crease	Hard embedded
11	Objectionable odour	Any
12	Uneven weaving	Any

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Annexure-A**Raw Materials offered for sampling and Inspection:****Product Name:**

Sl. No.	Nomenclature of Item/ Store	Drg. No./ Part No.	Raw Material Name	Specification No.	Offered Qty

Authorized signatory

Annexure-BGuarantee/ Warranty Certificate

We hereby declare that the product..... quantity supplied by our company M/s..... vide Challan No..... Dated..... as per S. O. No..... Dated..... are meeting all requirements laid down in the relevant specification.

We hereby undertake to replace whole and/ or part consignment as the case may be in the event of it is not meeting the requirements/ standards laid down in the supply order. This Guarantee/ Warranty Certificate is valid till months from date of receipt at O. F. Nalanda.

Quality Control Manager

Managing Director/General Manager
or his authorized Signatory

Supplier's Stamp

Annexure-CRaw Material Consumption Report

S.O. No.:..... Date:.....

Supplied Qty.....

Product Name:.....

Sl. No.	Raw Material	Accepted Qty	Ref. Document of QC, OFN	Last Consignment balance Qty. (Total)	Present Consignment Consumed Qty.	Present Consignment (balance) Qty
A	B	C	D	E	F	G

Authorized signatory

NDL
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Govt. of India Enterprise, Ministry of Defence, Rajgir, Bihar-803121

H. K. Nalanda

Igniter Bag for 155 mm BMCS M92 HZ

- 1.0 This Monitoring Instruction (MI) shall be applicable invariably as Addendum of Quality Assurance Plan (QAP) no. OFN/QAP/BMCS/M92/IB/00, Rev.00, dated 04.04.2024. MI shall be strictly followed/ complied by all the interested parties.
- 2.0 Supplier/ manufacturers on receipt of Supply Order (SO) should invariably check the correctness of the SO in respect of item description, drawing no., specification, delivery period, place of inspection, inspection authority and quality clauses.
- 3.0 Supplier/ manufacturer shall offer all the raw materials as required for manufacturing of Igniter Bag for sampling to the CGM, OFN in the format as per Annexure 'A' of QAP, mentioned in Para 1.0 above, on supplier's / manufacturer's letter head. Supplier/Manufacturer may offer raw materials for entire Supply Order qty. at their own risk and cost.
- 4.0 For Inspection and acceptance of raw materials, clause no. 6.3.2, 6.3.3, 6.3.4 of QAP, mentioned in Para 1.0 above shall be applicable.

5.0 Source Development Open Tender Enquiry (SDOTE) Cases:**5.1 Advance Sample Qty.: 50 nos.**

- Advance samples shall be manufactured from the approved/cleared raw material and submitted to OFN along with pre-inspection report, raw material consumption report etc. for inspection (Physical and chemical inspection as well as user/ fitment trail).
- The inspection and acceptance of advance samples shall be done as per provisions of QAP, mentioned in para 1.0 above.
- After satisfactory inspection report (Physical and chemical inspection as well as user/ fitment trial), supplier/manufacturer shall be accorded clearance to manufacture a Pilot Lot and offer the same for the inspection.
- In case of rejection of advance samples, supplier/ manufacturer may submit subsequent advance samples free of cost for the inspection. Advance samples shall be in exclusion to the Supply Order Qty.

5.2 Pilot Lot: Lot Size: 10800 nos.

- 5.2.1 Upon getting clearance from OFN to manufacture a Pilot Lot, the supplier/ manufacturer shall manufacture and offer a pilot Lot for inspection along with following documents/reports :
- Pre inspection and in-process inspection reports of Igniter Bag as per relevant Drawing and Spec.
 - Raw material consumption and balance statement as per Annexure-'C' of QAP, mentioned in para 1.0 above on supplier's/manufacturer's letter head.
 - Safety certificate and guarantee/warranty certificates for every consignment as per Annexure-'B' of QAP, mentioned in para 1.0 above on supplier's / manufacturer's letter head.

- 5.2.2 Inspection and acceptance/rejection thereof, of Pilot Lot shall be done as per provision of QAP mentioned in para 1.0 above.

5.3 Bulk Production Clearance (BPC):

After acceptance of the pilot lot, BPC will be accorded to the supplier/manufacturer. For subsequent supplies, QAP, mentioned in para 1.0 above shall be the guiding document.

6.0 Open Tender Enquiry (OTE) / Limited Tender Enquiry (LTE) / Option Clause (OC) Cases:

Inspection and acceptance/rejection thereof, shall be done as per provision of QAP mentioned in para 1.0 above.



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