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Designation TRIPOD, FIRE CONTROL INSTRUMENT, 101A
Cat/PART No. V6/1290-000252
Drawing No. CII.369

Specification to govern manufacture and inspection.

This issue cancels all previous issues of specification No.....

Issued by:-

The Controller,
Controllerate of Inspection (Instruments),
Ministry of Defence (DGI)
Raipur, DEHRA DUN 248 008

Contents: This specification consists ofpages.

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S. S. S.

For Signature S.S.S.

Dehra Dun

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Appendix "B"
specification No
C11-166

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SECTION 1 - GENERAL

1. This specification holds good only for the order for which it is issued. Nothing shall absolve the manufacturer of the responsibility to ensure that the supplied store fully conforms to the relevant drawings and specifications.
2. The manufacturer will be fully responsible for the safety of processes or operations in his works.
3. This specification or any drawings, masters, pattern or the stores issued to the contractor in connection with supply of the store shall be returned to the Controller in undamaged condition after the completion of the order or tender. In case of loss or damage to the above mentioned documents or stores the contractor will be liable to pay full compensation for the subject document or store. The Controller will be the sole authority to decide on the amount of compensation to be paid by the contractor for any loss or damage.
4. The accepted advance sample or certified sample when issued to the supplier will be used for general guidance only. The actual dimensions and other features of the store will strictly conform to the drawings and specifications.
5. Where Zinc Masters or other enlarged masters are issued to the manufacturer or his sub-contractor, the manufacturer will ensure that all inter-negatives and 1:1 negatives and positives made from the said masters are returned to this Controllerate on completion of the order.
6. The contractor shall afford the Controller, or his authorized representative, free of cost, all reasonable facilities for satisfying himself that the stores are being manufactured in accordance with the specifications and other particulars supplied for this purpose, the Controller, or his authorized representative will have full access to the contractor's works at all times during the run of the contract.
7. The contractor is required to notify to the Controller and Inspecting Officer of all sub-contracts while placing the Supply Orders endorsing his copy of the same.
8. Wherever International or IS Specification are quoted on the drawings, the contractor will make his own arrangements for the procurement of the latest issues of specifications from the Indian Standard Institution, Khair Khawan, 9, Bahadur Shah Zafar Marg, NEW DELHI-110 001.



SECTION 8 - MATERIAL

2.1. The materials used shall be of the best quality, thoroughly sound, free from defects and strictly conforming with their respective specifications as quoted in the drawings. Where particulars of specifications are not quoted in the drawings, the materials must be of the best commercial quality and it should be approved by the Controller or his authorized representatives before taken into use.

2.2. Synthetic rubber, wherever specified or similar variety shall conform to specification No. IS:510/24-37 (latest). Natural rubber wherever specified shall conform to IS:512 (latest) unless otherwise specified.

2.3. Grease No. 52 (NL/515-000-003) is recommended for use. The grease used should not get hardened at -30°C and should not flow at $+70^{\circ}\text{C}$.

2.4. Timber, where used should be thoroughly seasoned, free from knots and saps and shall be of straight grain. It should also be knot-treated. It should conform to the specification given in the drawings. Moisture content should be as per IS:237 (latest) unless otherwise specified.

2.5. Plywood, wherever used, should conform to IS:303 B & C quality unless otherwise specified.

2.6. Canvas, wherever used, should be tropic proofed and should conform to specification No IS:424 (latest).

2.7. Felt, wherever used, should be tropic proofed and it should conform to IS:119 unless otherwise specified.

2.8. Duck cotton, wherever used, should conform to specification IS:422 (latest) unless otherwise specified.

2.9. Leather, wherever used, should conform to IS:580 (latest) unless otherwise specified.

2.10. Paints and varnishes, wherever used, as finishing materials, shall be of best quality and shall not deteriorate or flake off when subjected to climatic and durability tests specified later in this specification.

2.11. Fillers, wherever used for filling various gradations and voids, shall not deteriorate or flake off when subjected to climatic and durability tests specified later in this specification. The fillers used shall be as per IS:510-1.

2.12. The paper, wherever to be used, should conform to IS: 899 (latest) unless otherwise specified.

2.13. The welding and soldering, wherever indicated, should be done as per drawings and it should be capable of withstanding stress and force.

2.14. The manufacturer is to supply, free of charge, samples or test pieces of various materials intended to be used, for analysis and testing. All materials must be cleared by the Inspecting Officer or his authorised representative before these are taken into use.

2.15. Wherever the component is to be cast, the manufacturer will intimate the Inspecting Officer, well in advance to draw the test bars as per relevant Indian Standard specifications.

2.16. The manufacturer shall give a warranty certificate that the materials used in the store are as per relevant drawings and specifications.

SECTION - 3.

GENERAL MANUFACTURING INSTRUCTIONS

3.1. All components shall be made to correct dimensions as per the drawings for interchangeability. No deviation from the drawings is permissible without prior approval of the Controller.

3.2. All critical dimensions must be maintained within the limits of tolerance specified in the respective drawings.

3.3. All the drawings are in the third angle method of projection unless otherwise specified.

3.4. All dimensions are in terms of SI Units unless otherwise stated.

3.5. Toleranced dimensions other than hole and shaft shall conform to IS 2102 medium class of deviation.

3.6. Toleranced dimensions for hole and shaft shall conform to IS 918 under H11 and h11 respectively.

3.7. Tolerance on angles, chamfers and radii shall conform to IS 2102 fine and medium class of deviation.

3.8. All fits between the mating parts shall be based on the international hole system as in IS: 919.



5.1 All primer paints are used for rustproofing. The primer paint used shall not exceed three days unless otherwise mentioned.

SECTION 5 - FINISH

5.2 All exterior surfaces shall be kept free from paint unless otherwise specified.

5.3 All painted surfaces will be given a primer coat before final painting which will be of service colour 00, or as colour point is indicated. The paint used, shall conform to IS:103 (latest) or Indian Standard colour 240.

5.4 All steel components shall be phosphated before painting as per specification No. IS:3012 (latest).

5.5 All aluminium components shall be anodised conforming to Indian Standard specification IS:1268 grade B (latest).

5.6 Brass components shall be bronzed dull black unless otherwise specified.

5.7 The internal surfaces of all sand cast bodies and castings shall be impregnated with oil based varnish to specification No. IND/SP/217 before giving any other finish.

5.8 No patching or plugging to hide the defects shall be done without the authority of the inspecting officer.

SECTION 6 - INSPECTION

~~6.1 Any claims requiring elucidation in connection with the manufacture of the store shall be referred to the Controller.~~

~~6.2 The materials used in the manufacture of the store shall, before manufacture, be inspected by the Controller or his authorized representative and if any loose or poor representative shall be accepted and used. If the material is found not conforming to the specification all stores manufactured from the said material are liable to be rejected.~~

~~6.3 The manufacturer is to notify the Controller when he is in position to start work on all sub-contracts placed in him or sub-contractors. However, the responsibility for procurement of correct materials as per drawings and specification will be that of the manufacturer and the Govt.~~

4.7 Wherever shims are used for adjustment, the number of shims used shall not exceed three unless otherwise mentioned.

SECTION 5 - FINISH

- 5.1 All bearing surface shall be left free from paints unless otherwise specified.
- 5.2 All painted surfaces will be given a primer coat before final painting which will be of service colour OG, if no other paint is indicated. The paint OG used, shall conform to IS:166 (latest) of Indian Standard colour 220.
- 5.3 All steel components shall be phosphated before painting as per specification No. IS:3619 (latest).
- 5.4 All aluminium components shall be anodised conforming to Indian standard specification IS:1666 grade B (latest).
- 5.5 Brass components shall be bronzed dull black unless otherwise specified.
- 5.6 The interior surfaces of all sand cast bodies meant for tropicalised instruments shall be impregnated with optical varnish to specification No. IND/SL/3217 before giving any other finish.
- 5.7 No patching or plugging to hide the defects shall be done without the authority of the Inspecting Officer.

SECTION 6 - INSPECTION

6.1 Pre-Inspection

The Contractor shall carry out initial inspection prior to tendering the store to the Inspecting Officer to make sure that stores are of acceptable standard. A record to this effect shall be maintained and when so desired by the Inspecting Officer shall be made available to him.

6.2 Any points requiring elucidation in connection with the manufacture of the store shall be referred to the Controller.

6.3 The materials used in the manufacture of the store, at any stage of manufacture, may be inspected by the Controller or his authorised representative and for this purpose he or his representative shall be afforded all facilities. If the material is found not conforming to the specification all stores manufactured from the said material are liable to be rejected.

6.4 The manufacturer is to notify the Controller when he is in a position to start work and of all sub-contracts placed by him on sub-contractors. However, the responsibility for procurement of correct materials as per drawings and specification will be that of the manufacturer and the fact that the copy of sub-order/sub contract was sent to the Controller will not absolve him of his responsibility.

6.5 The manufacturer shall submit two advance samples of the store on order for approval/technical trials before proceeding with bulk production. One of the sample may be dismantled to check interchangeability of components. This sample will be handed over to the manufacturer in dismantled condition. Any incidental damage to the store during dismantling will be rectified by the contractor at his own cost.

6.6 If on examination 20% of the delivery is found defective or contrary to the terms of specification, the whole delivery may be rejected without further examination. For this purpose, stores may be picked at random from any portion of the consignment.

6.7 Control samples may be drawn from the firm's premises or consignee's end, for critical examination to any extent considered necessary by the Controller.

6.8 Rejection

In the event a store is given back to the manufacturer for rectification of defects, the manufacturer will ensure that the defects are attended to immediately without loss of time so that the manufacturer will not be entitled to dispose off that stores which is given to for rectification but not rejected without prior permission of the Inspector.

6.9 The stores shall be rendered for inspection sufficiently ahead of stipulated delivery period to avoid delay in inspection release of 1/Note and despatch of stores.

6.10 The foregoing provisions shall apply equally to prime contractor and all of his sub-contractor.

SECTION 7 - MARKING

7.1 All components, wherever practicable, shall be marked suitably to bear the Cat/Pt No. as mentioned in the particulars.

7.2 The body of the instruments shall be marked with the nomenclature, Cat/Pt No., contractor's initials and year of supply in accordance with the particulars.

7.3 The registered number where required will be supplied by the inspecting authority on application and shall be engraved/stencilled at a place, as shown in the drawing. If no particular place is shown, it may be engraved at any suitable place.

6.7.1

During bulk inspection the inspector at his discretion can call for any number of samples ranging upto 2% of the quantity on order for dismantling to ascertain the dimensions and interchangeability of the components. The samples will be handed over to the manufacture in dismantled condition. Any incidental damage to the store during dismantling will be rectified by the contractor at his own cost.

SECTION 8 - DESCRIPTION

8.1 Tripod Fire Control Instrument, 101A is the lighter version of Stand, Instrument No. 27, Mk. 2. To make the latter stand lighter, the leg material wood has been replaced by aluminium. Stand, in Instrument, 101A mainly consists of three legs, head carrier, cover and clamping screw. The legs are attached to the head by means of brackets through hinge bolts. The legs are provided with shoes. The head carrier comprises plate, ring and socket. The cover consists of a main plate, wooden block, leather washer, plate and a hinge to join the cover to the head carrier. The clamping screw is used to fix the main equipment to the head carrier. When not in use, the cover is placed on the head carrier and clamped by means of the clamping screw. A hook is provided at the end of the clamping screw to hang a plumb bob. A leather strap is also provided to tie up the legs together.

SECTION 9 - SPECIAL REQUIREMENTS

9.1 Pine wood used for certain components of the tripod shall be free from knots, warps, shakes, cracks, rots and other defects.

9.2 Moisture content of wood shall be checked to specn IS-287 and shall be between 8 to 12%.

9.3 The legs shall swing freely about the hinge bolt axis when the wing nuts are released.

9.4 The stand shall be levelled with the help of a bubble spirit, circular case Mk. 2 (FL-442SA) by fixing it with plasticine on head carrier plate. A torque of 1.5 N.M. (0.1 kgfm) shall be applied on the head carrier, the air ball of the circular bubble shall remain in the centre of its run.

9.5 Top bearing surface of head plate, and the hinge bolt axes shall be mutually parallel. Top bearing surface of head plate shall be perpendicular to the clamping screw axis.

SECTION 10 - TESTS

10.1 Visual The Stand shall be examined visually for the following defects:-

- (a) Loose, missing or damaged screws, nuts or other components.
- (b) Broken, dented or bent plates, legs, shoes, clamping screw etc.
- (c) Knots, shakes, rots and other defects in the wooden parts.
- (d) Cracked, warped or broken wooden parts.
- (e) Defective castings.
- (f) Unstitched, cracked or defective leather strap.
- (g) Unsatisfactory finish.



102. Mechanical:

- (a) The legs shall swing freely about the hinge bolt axis when the wing nuts are released.
- (b) Hinges joining the cover to the head carrier shall function satisfactorily.
- (c) Threads in the clamping screw shall engage the threads in the cover fully.

103. Moisture Content in the Wood of Stand components:
Moisture content in the wooden parts shall be checked 60 specimens IS:287 with a Moisturemeter. The same shall measure between 8 and 12%.

10.4 Dimensional Checkings: Threaded portion of the clamping screw and the dimension of head plate shall be accurately checked by suitable measuring instruments or by making special gauges. Other dimensions of the stand shall be checked in conformity with the drawing dimensions.

10.6 Top bearing surface of head plate and the hinge bolt axis shall be mutually parallel. Top bearing surface of head plate shall be perpendicular to the clamping screw axis.

10.8 Shoos: The spike portion of the shoos shall be driven in the hard ground free from rocks and stones by a wooden mallet. The shoos and the legs shall remain in undamaged condition after the test.

10.8. The stand shall be levelled with the help of a bubble spirit, circular, classed Mk. 2 (IL-423A) by fixing it with elasticine on head carrier plate. A torque of 1 N.m (Oil lbfm) shall be applied on the head carrier, the air ball of the circular bubble shall remain in the centre of its run.

10.9. Leather Strap: The legs shall be tied up together with the leather strap. There shall not be any difficulty in doing so.

11. WARRANTY CLAUSE
120
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SECTION 12 - PACKING INSTRUMENTS

10.10. Tripped Fire Control Instrument, 101A shall be wrapped with brown packing paper and tied up with cord nicely. A suitable number of such stands shall be packed in a wooden box lined with waterproof paper. In between each stand there shall be padding of dry cotton waste. The stands shall be placed in such a manner that minimum possible dry cotton waste is used. After packing the stands, the top of the box shall be filled with cotton waste and then lid be placed. Special care shall be taken to ensure that the stands do not rattle or shift inside the box during transit. The total mass of any such packed box shall not exceed 40 kg.

12.1 Each packing box shall be legibly marked as follows:-

- (a) Nomenclature and part number of the store.
- (b) quantity.

10.10 CLIMATIC AND DURABILITY TESTS

10236

10.10.1 These are only type approval tests and shall be carried out as per relevant clause of specification IS: 2352 (latest) on the Advance/ Control samples (a certain percentage not less than 3% of bulk) or whenever there is a change in design / production techniques or materials used in the manufacture of the store. Degree of severity is given against each test :-

<u>TEST</u>	<u>DEGREE OF SEVERITY</u>
(a) Cold Test	: (as per IS: 10236 (Part- III) At $-30^{\circ}\text{C} + 3^{\circ}\text{C}$ for 4 hrs.
(b) Dry Heat Test	: (as per IS: 10236 Part- II) At $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 16 hrs.
(c) Drop Test	: (as per IS: 10236 Part- 15) The shall be dropped once only from the height of 90 Cm on to 150 mm thick good river sand cover with one layer of canvas.
(d) Vibration Test	(as per IS: 10236 Part- 1A) The test shall be carried out at 7 to 8 Hz and 150 mm amplitude for 15 minutes.
(e) Damp Heat Test	: (as per IS: 10236 Part- IV) At 55°C , RH95% (Min) - 2 Cycles of 24 hrs each.

10.10.2 After the tests carried out as per para 10.10.1 (a) to (d). The tripod shall be checked for damage or deterioration if any.

10.10.3 CLIMATIC AND DURABILITY TESTS (BULK SUPPLY)

10.10.3.1 Drop test and test and vibration test shall be carried out on 100% of bulk supply as per clause 10.7.1(c) & (d). After the test carried out as per para 10.10.1(c) & (d), the tripod shall be checked for damage or deterioration, if any.

10.10.3.2 Damp Heat Test : As per clause 10.10.1. (e) on 5% of bulk Supply.

WARRANTY CLAUSE

§11.1 The store shall bear a warranty of supplier against defective materials design, workmanship and performance for a period of two years from the date of receipt at consignee's end. During this period, if any of the store be found defective by the consignee, the same shall be replaced by the supplier free of charge at consignee's end as soon as possible but not later than six months from the date of reporting.

12 - Packing

11.1 Each packing box shall be legibly marked as follows:-

- (a) Nomenclature and part number of the store.
- (b) Quantity.
- (c) Name and address of the consignee for quick delivery.
- (d) FRAGILE - HANDLE WITH CARE.

DEHRAUN-248 008

Dated

CONTROLLER OF INSPECTION (INSTRUMENTS)

