NAVAL HEADQUARTERS

DIRECTORATE OF ELECTRICAL ENGINEERING

EED- 50-26

SPECIFICATIONS OF SIGNALLING PROJECTOR FOR NAVAL SHIPS

ISSUING AUTHORITY

DIRECTORATE OF ELECTRICAL ENGINEERING
INTEGRATED HEADQUARTERS MOD (N)
NEW DELHI 110011

RECORD OF AMENDMENTS

Sl	Amendment	Authority	Date	Signature

2. **Revision Note**: - Nil

3. **Historical Record**:- Nil

STATEMENT OF REQUIREMENT FOR SIGNALING PROJECTOR CUM SEARCH LIGHT

1. **Purpose** Dual purpose signaling projector is designed for use either as a hand operated signaling projector or as a utility search light for navigational purpose and general use from ship to ship. This SOR covers manufacturing, supply of main equipment, spares & documentation and on board commissioning of latest modified version of 15" Signaling Projector cum Search Light System.

2. **Scope Of Supply** The basic signaling system shall include the following equipments and each shall comprise mountings, installation kit, alignment supports etc:-

(a) **Signaling Projector-cum-search Light** The housing/body of the 15" projector should be of Aluminium casting, corrosion proof and suitable for marine environment . It consists of Barrel, front shutter assembly and rear cover. The reflector assembly is to be fitted in the barrel and fronted by shutter assembly and toughened glass plate. The technical specifications and Illumination Characteristics of the projector are as follows:-

(i)	Light Source	:	250-Watt Xenon Arc Lamp
(ii)	Lamp life	:	> 500 Hours
(iii)	Lux at Center	:	3×10^6
(iv)	Horizontal Divergence	:	0.9^0 to 1.5^0
(v)	Vertical Divergence	:	Min 0.8^0
(vi)	Consumed Power	:	Around 500 Watt
(vii)	Degree of Protection	:	IP – 67
(viii)	Dimensions	:	570x710x425 mm (LxHXW). Barrel Dia – 345 mm.
(ix)	Range in Search Light mode:		> 3NM.

(b) **Control Unit** 6Nos. provided with suitable Ballast Inductor, Capacitor etc.

(c) **Power Supply Unit** 6Nos. provided with suitable fuse, switch, etc.

(d) 6 no. 6 Amps Isolating Switch to be provided in the PSU for safety of the equipment. 230V, 1PH, (2wire, no neutral), 50 Hz supply to be provided.

(e) 6 in no. Isolating Switch

3. **Input Supply Voltage and Ac Supply Characteristics** 115/220V, 50Hz, 1Ph Power supply will be, provided from ship's supply network for operation of the system. The main voltage characteristics shall be as per table below:-

Characteristics	Description	Value
Voltage	• Normal Voltage • Load range tolerance • Line to Line • Constant load tolerance • Singe phase of 3 phase system • Maximum Unbalance • Maximum Modulation • Transients (Excluding Spikes) • Frequent Transients • Recovery time • Infrequent Transients • Recovery time	230 V ± 5% ± 1% ± 6 % 2 % 2 % -10% to +6% 0.5 Sec -16% to +10% 1 Sec
Wave form	• Maximum Individual Harmonic • Maximum Total Harmonic	3 % 5 %
Frequency	• Nominal Frequency • Load range Tolerance • Constant Load Tolerance • Modulation • Infrequent Transients • Recovery time	50 Hz ± 2.5 % ± 0.5 % 0.25 % ± 3.75 % Sec

4. **Visual Signaling Positions** 6 Nos. 15" Modified Signaling Projector cum Search light will be fitted. The Projectors will be positioned on the Bridge wings and signal deck. Refer to NES 115 for siting of projectors. The locations are shown in the

layout drawing placed at **Appendix A.**

5. **Arcs of bearing, elevation and depression** Signaling projector lights are to be fitted so that the following arcs of bearing, elevation and depression may be obtained:-

(a) Bearing 10^0 across the bow

(b) Elevation 60^0

(c) Depression 45^0

6. **Working Space** When pedestal fitted, a clear radius of 900mm about the pivot of the signal projector is essential to cover the area inboard, forward and aft of each projector

7. **Guard rails, Bulwarks and platforms** When the Signal Projector is mounted on a pedestal the height of the eye piece on the projector may to be maintained at 1.5m above the deck. It may be necessary to fit a platform around the pedestal to achieve this height. When a projector is fitted on a pedestal with a platform more than 230mm above the deck, a guard rail 1.2m high is to be fitted around the platform. When a projector is fitted on a platform or sponson and the operator is exposed to direct wind, a bulwark with wind deflectors is to be fitted.

8. **Shock Standard** The shock grading shall conform to IN shock grade curve 'A/B' as applicable to this system in conjunction with BR 3021.

9. **Mounting** The mounting arrangements must be such that it is possible to utilize Signal Projector at its max depression, to illuminate the sea alongside the ship.

10. **Earthing** The transformer is to be fitted with a double ended threaded M 10 earth stud and is to be fitted through the casing of the transformer adjacent to the secondary cable entry plate.

11. **Radiation Hazards** Particular attention is to be given to the siting of Visual signaling equipment to ensure that personnel required to operate the equipment are not subjected to hazardous radiation from transmitting aerials (both radar and communication), or form RF shock/burn hazards from local MF/HF transmitting aerials (refer to NES 735).

12. **Internal Wiring** Projectors are to be wired in accordance with BR 6519. Internal wiring of the equipment shall use LFH wires.

13. **Covers** A PVC coated nylon cloth foul weather covers are to be provided for each projector. Each cover is to be made to suit the projector. It is to be snug fit, well

supported to withstand severe weather conditions and shaped such that Signal Projector can be turned over daily with it in place. The covers are to be marked in plain letters internally to indicate the purpose for which it is intended.

14. **Inter connecting cables** Interconnecting cables between PSU, CU & Signaling projector are not in the scope of the firm. However, the firm is required to provide the cable details including load along with the binding drawing.

15. **Cable Entry Glands** Cable entry glands of mild steel for body and Naval brass for nut and their sizes shall conform to specification DGS/EED/VI/1535/R6 for incoming and outgoing cables. The gland nut and washers are to be left un-drilled. The sizes of the glands shall be as indicated in the NES-512. Cable glands are to be supplied along with the main equipment for all incoming and outgoing cables. Cables passed through magazines; oil or water tanks shall be in accordance with NES 502. Cable glands required for each Signaling Projector, Power Supply Unit and Control Unit as per sizes are to be indicated on submission of binding drawings shall be supplied by the firm along with the equipment.

16. **Terminals** Bolted type terminal and crimped socket of electrolytic copper are to be provided for all incoming and outgoing cables. 20% spare terminal strip is to be provided for provision of additional control and indication facilities. Adequate space is to be provided inside the equipment for bending and termination of incoming and outgoing cables.

17. **Components**

(a) All components shall be of naval approved type used for naval ships.

(b) Indication lamps, if used, shall be of neon type.

(c) Standard specification and grade of material of each.

(d) Component used to be indicated in the binding drawings.

18. **Operation Conditions** The system devices/equipment should operate satisfactory in the marine environmental (coastal conditions) and other operating conditions enumerated in the succeeding paragraphs:-

(a) **Seaway Conditions** The seaway conditions shall be followed as per NES 1004 and as mentioned below:-

(i)	Roll	Max ±30° with 8 sec period- Operational
(ii)	Pitch	Max ±10° with 20 sec period- Operational
(iii)	Heave	Max ±4m with 7 sec period- Operational
(iv)	Yaw	Max 1. 75^0 per S^2 - Operational
(v)	Tilt (permanent)	Max 15^0 in any direction - Operational

(vi) List Max 20^0 from vertical (permanent) - survival
(vii) Trim Max 5^0

(b) **Sea water temperature** Seawater temperature shall be 10^0 C to 40^0 C at ambient air temperature of 0^0 C to 45^0 C.

(c) **Environmental Conditions and other Tests** The equipment shall be able to operate in the contaminated air through salt, oil and other contaminates with marine environment (Coastal conditions). The ship borne items shall be capable of operation under severe conditions specified by JSS 55555 for above and below deck items. The equipment shall be able to operate in the contaminated air through salt, oil and other contaminates with marine environment (Coastal conditions).The equipment shall be designed to meet the environment conditions as specified below:

Sl No	Test	Specifications	Test Conditions/Severity
1	High temp.	JSS 55555-Test 17	55± 3° C for 16 Hrs procedure 5, Test condition 'G'
2	Damp heat	JSS 55555-Test 10	40± 2° C at 95 % RH for 16 Hrs
3	Drip proof	JSS 55555-Test 11	Vertical water droplet 1m height for 13 min.
4	Mould growth	JSS 55555-Test 21	29° C 90% RH mould growth chamber for 28 days
5	Bump	JSS 55555-Test 5	4000 ±10 bumps, 40g, 6msec, 1 to 3 bumps /sec
6	Shock /Impact	JSS 55555-Test 24	As per laid down specifications
7	Inclination/Tilt	CL 0563 Sec 19	As per laid down specifications
8	Vibration	JSS 55555-Test 28	5 – 33 Hz
9	Corrosion (Salt)	JSS 55555-Test 9	0° for 16 Hrs as per Procedure 4
10	EMI/EMC	MIL/STD 461 C/E	As per table II applicable for items installed on ship
11	Enclosure Protection	IEC60529 (latest)	As per IP indicated.
12.	Environmental Stress Screening	DQAN/EL/QAP/ESS /205/065 (ver 1.0) dated 31 Jul 06.	
13.	Mechanical and Electrical endurance Test		The unit would be switched 'ON' continuously for 48 hrs. The unit will be subjected

			to 5000 switching operations with 30 sec 'On' period and 30 seconds 'OFF' period. None of the unit component should show any sign of damage / deterioration.
14.	Surge and Transient Tests	IEC 60571-1	
15.	Reverse polarity tests		The unit shall remain functional after applying 200v for one minute in correct polarity as well as in reverse polarity.
16	Dust, Humidity and Heat Tests	IEC 60571-1	
17	Di electric Test	IEC 60571-1	

20. **Product support**. The supply should confirm product support for next 20 years for the equipment offered by them.

21. **Painting** The enclosure finish colour shall be admiralty gray, semi gloss as per approved painting specifications/procedures. Painting shall conform to DGS 251.

22. **Tally and Diagram Plates** All tally and diagram plates shall be anodized aluminum alloy or Naval brass. Size of tally plate and their letters shall conform to specification NES-723. 230 VOLTS-DANGER tally shall be provided on the equipment at a permanent place where required. Safety markings on main equipment and associated devices/units shall conform to NES 784.

24. **Quality Assurance**

(a) **Quality Assurance** The detailed design, material and workmanship shall be in accordance with the best world-wide recognized marine practices, to ensure reliability, durability and ease of maintenance which comply with the ship's requirements. The design shall be such that weight and size are reduced to the minimum practicable, ensuring no compromise in reliability or significant design criteria. A quality assurance programme is to be specified by the manufacturer in his offer.

(b) **QualitvAssurance Programme** Quality assurance plan proposed and

any subsequent amendment shall be discussed and agreed upon between Naval Headquarters and the manufacturer prior to placement of the order. QAP along with the binding drawing to be submitted by the firm.

25. **Warranty** The equipment with associated controls/instrumentation will be guaranteed for stipulated performance for 24months after commissioning. The items supplied shall be warranted from defects arising due to the manufacturer and performance for the said period and cover all the defects arising from malfunction through design faults, inappropriate material, bad production .and non-conformance to specifications. Any expense on account of repair / supply of spares against guarantee defects is to be borne by the supplier. During the guarantee/warranty period if any equipment or component thereof supplied by SUPPLER suffers due to defective material and/or due to improper design and/or due to defective drawing or due to faulty workmanship, SUPPLER shall assume full responsibility of rectification/replacement of such defective equipment or components thereof including all direct expenses, relating to removal and repositioning of the replacement / repaired equipment or components thereof and subsequent test and trial, incurred thereto.

26. **Securitv** The information about the ship and "the\requirements mentioned in the SOR are not to be communicated to any third party without prior approval of IHQ/MoD(Navy).

27. **Binding data, Design Drawings/ Documentation and Technical documentation**

(a) **Binding Drawing** The manufacturers shall submit approved and as made drawings sufficiently detailed to show the manner of construction and operation, the method of assembling and dismantling. The drawings prepared in accordance with JSS 0251-1. The following binding drawing/documents in duplicate shall be submitted to IHQ/MoD (N) with a copy to shipyard within 4-6 weeks after placement of the order. All drawings and documents shall contain dimensions and other parameters in metric units (SI Units). The drawing and documentation shall be complete to enable installation on board. These should cover all sub-assemblies and accessories of the equipment. The documents/drawings shall be provided in both hard copy form and on CD_ROM. The design documents/drawings shall conform to NES 722 and supplied to include the following information:

(i) Overall dimensions with requirement of maintenance space, weight, power supply and CG of the equipment
(ii) Mounting arrangement drawings with installation instructions
(iii) Terminal connection and circuit diagram
(iv) Material list Indicating Part NO. Quantity, Material Makers name etc.

(b) **Design Documents/Drawings**

Drawing

(i) Location and dimension of all major equipment with mounting arrangement

(ii) Block diagram of all major assemblies showing interconnection between these' assemblies

(iii) Type and size of cables and connectors

(iv) Core connection details

(c) **Documentation**

(i) General technical document/information

(ii) Operation maintenance document

(iii) Installation specification

(iv) Drawings in reduced size

(v) Any other special instructions for installation and preservation

(vi) Heat dissipation of devices

(vii) Storage, handling, transportation details etc.

(viii) Details upto 2nd level maintenance for repair and troubleshooting. Component level maintenance details to be provided along with list of components.

28. **On-Board and Base & Depot Spares**

(a) **On-Board Spares** One set of onboard spares recommended by the supplier and approved by the NSM shall be supplied along with the main equipment. Equipment CPL/PIL and item wise cost is to be forwarded along with the list of onboard spares while obtaining NSM approval.

(b) **Base & Depot Spares** Quotation for 5 years Base & Depot spares indicating makers part number, cost of each item is to be provided. The quotation for B & D spares should specify a clear validity of 90 days.

29. **Guarantee** The complete equipment shall be guaranteed against all manufacturing defects for the period of 12 months from the date of commissioning of the ship.

30. **Governing Specifications** The system shall confirm to well defined standards in design construction; All components are to be type tested. In addition the following specifications are also to be followed:-

(a) **MIL-STD-108E** - Requirements for enclosure for electrical and electronic equipment

(b) **JSS-55555** - Environmental test methods for electronic or MIL-STD-810 equipment and general environment 725,335 condition for surface ships

(c) **MIL-STD-461-E** - EMI/EMC requirements and procedures

(d) **BR 6519** - 15 Dual Purpose signaling projector

(e) **JSS-0251/EED-S-048** - Preparation of document

(f) **DGS/EED/VI/1535/R6** - For cable gland