कोचीन शिपयार्ड लिमिटेड/COCHIN SHIPYARD LIMITED

कोच्ची/COCHIN - 682 015

पोत निर्माण प्रभाग/SHIP BUILDING DIVISION

आउटसिर्सिंग विभाग

OUTSOURCING DEPARTMENT

निविदा दस्तावेज़/TENDER DOCUMENT

TENDER NO. SB-OSD/TSHD/887/2024 Dtd. 19-07-2024

ELECTRICAL OUTFIT STRUCTURAL WORKS - INSTALLATION OF CABLE WAYS & EQUIPMENT SEATS OF TRAILING SUCTION HOPPER DREDGER (TSHD- SH037)

JULY - 2024

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पोत निर्माण प्रभाग / SHIP BUILDING DIVISION
आउटसिर्सिंग विभाग / OUTSOURCING DEPARTMENT

SB-OSD/TSHD/887/2024 **19TH JULY 2024**

निविदा सूचना / TENDER NOTICE

संक्षिप्त विवरण / BRIEF DETAILS:

निविदा जांच संख्या और तारीख **Tender enquiry No. and date**	**SB-OSD/TSHD/887/2024 Dtd: 19-07-2024**
कार्य का नाम **Name of work**	**Electrical Outfit Structural Works Installation Of Cable Ways & Equipment Seats Of Trailing Suction Hopper Dredger (TSHD- SH 037)**
निविदाएं प्राप्त करने की अंतिम तिथि और समय **Last date & time of receipt of Tenders** (भाग/Part I – तकनीकी-वाणिज्यिक बोली और भाग - II मूल्य बोली/ **Techno-Commercial Bid & Part II-Price Bid)**	**2ND AUGUST 2024 at 15.00 Hrs IST**
पूर्व बोली बैठक की तारीख **Date of Pre bid meeting**	**26TH JULY 2024 at 14.00 Hrs IST**
भाग I (तकनीकी–वाणिज्यिक) बोली खोलने की तिथि और समय **Date & time of opening of Part I (Techno – Commercial) Bid**	**2 ND AUGUST 2024 at 15.30 Hrs IST**
संपर्क व्यक्ति **Contact Person**	***For Commercial queries:*** Mr. Vidhu Sebastian, Mob No:9995806136, SM (outsourcing) ***For Technical queries:*** Mr. Avinash Ramachandran Nair, Mob. No: 8129232686, Mgr. (Electrical-SB-OF)

नोट : इस निविदा के खिलाफ उद्धृत करने से पहले, संभावित बोलीदाता से अनुरोध है कि वे निविदा जांच दस्तावेज़ (और अनुलग्नक, यदि कोई हो) को पूरी तरह से और सावधानी से पढ़ लें। निविदा के नियमों और शर्तों में विचलन अत्यधिक हतोत्साहित किया जाता है। इसलिए, निर्धारित किसी भी नियम और शर्तों, योग्यता मानदंड, ईएमडी जमा करने से छूट के लिए पात्रता, दस्तावेज़ीकरण/प्रक्रियात्मक आवश्यकताओं आदि के संबंध में स्पष्टीकरण, यदि कोई हो, के संबंध में उत्पन्न होने वाले किसी भी संदेह को संभावित बोलीदाता द्वारा बोली जमा करने से पहले निरपवाद रूप से उपरोक्त सूचित व्यक्तियों के माध्यम से अनिवार्य रूप से स्पष्ट किया जाएगा।

Note: Before quoting against this Tender, the prospective bidder is requested to go through the Tender Enquiry document (& Annexes, if any) thoroughly & carefully. Deviations to the Terms & Conditions of the Tender are highly discouraged. Therefore, any doubts arising in respect of any of the Terms & Conditions stipulated, Qualification Criteria, Eligibility for exemption from submission of EMD, clarification if any w.r.t. Documentation / Procedural requirements, etc. shall get clarified by the prospective bidder through above noted contact persons invariably before the submission of the Bid.

1. कोचीन शिपयार्ड लिमिटेड, एक प्रमुख पोत निर्माण और पोत मरम्मत उद्योग और वैश्विक पोत निर्माण के मोर्चे पर विख्यात, इच्छुक, प्रतिष्ठित, संसाधन संपन्न और वित्तीय रूप से सक्षम कंपनियों/ठेकेदारों को एकल चरण दो भाग बोलियों को प्रस्तुत करने हेतु आमंत्रित करता है।
   Cochin shipyard Limited, a leading Ship Building & ship repair industry and also well known player on the global ship building front, invites interested, reputed, resourceful and financially solvent firms/contractors to submit **single stage two part bids.**
2. निर्धारित प्रपत्र में पासवर्ड संरक्षित प्रतिस्पर्धी मूल्य बोलियां निविदा जांच के अनुबंध में उल्लिखित नियम और शर्तों के अनुसार होनी चाहिए।
   The password protected competitive Price bids in the prescribed form should be as per the terms and conditions as mentioned in the annexure to tender enquiry
3. निविदा के कार्यक्षेत्र के विस्तार पर चर्चा करने के लिए निविदा पूर्व बैठक दिनांक 26.07.2024 को सीएसएल के जहाज निर्माण सम्मेलन हॉल (प्रेरणा) कक्ष में अपराह्न 14.00 बजे से आयोजित की जाएगी। पूर्व निविदा बैठक में भाग लेने के इच्छुक ठेकेदारों को अपने पूर्व निविदा प्रश्नों (यदि कोई हो) को दिनांक 25.07.2024 तक सकारात्मक रूप से सूचित और अग्रेषित करना चाहिए।
   The pre-bid meeting will be held on 26.07.2024 at Ship Building Conference Hall (Prerana) of CSL from 14.00 PM. to discuss the detail scope of work of the tender. The Contractors interested to participate in Pre-bid meeting should inform and forward their Pre-bid queries (if any) by 25.07.2024 positively

4. पूर्व निविदा बैठक में भाग लेने के लिए सूचना और पूछताछ, यदि कोई हो, तो निम्नलिखित मेल आईडी avinash.rn@cochinshipyard.in पर, vidhu.s@cochinshipyard.in पर प्रति के साथ समय पर अग्रेषित की जानी चाहिए।
   Information to participate in pre-bid meeting and queries, if any should be forwarded in time to following mail ID: avinash.rn@cochinshipyard.in with a copy to vidhu.s@cochinshipyard.in
5. निविदाएं दो बोली प्रणाली में प्रस्तुत की जानी हैं; भाग I: तकनीकी वाणिज्यिक बोली और भाग II: सॉफ्ट कॉपी के रूप में मूल्य बोली (पासवर्ड से सुरक्षित) और निर्धारित तिथि और समय पर या उससे पहले अधोहस्ताक्षरी के पास पहुंच जानी चाहिए:
   The tenders are to be submitted in two bid system; **Part I : Techno Commercial Bid** and **Part II : Price Bid (Pass word protected)** as Soft copy and should reach the undersigned on or before the date and time as stipulated:

6. **MODE OF SUBMISSION OF BIDS**
   a. निविदा केवल ई-मेल के माध्यम से सॉफ्ट कॉपी में प्रस्तुत की जानी चाहिए। सीएसएल किसी अन्य प्रकार की निविदा स्वीकार नहीं करेगा।
      Tender should be submitted in soft copy via E-mail only. CSL will not accept any other mode of tender.
   b. ई-मेल के विषय में स्पष्ट रूप से निविदा पूछताछ संख्या और जमा करने की देय तिथि का उल्लेख होना चाहिए। मूल्य बोलियों को पासवर्ड से सुरक्षित किया जाना चाहिए और जब तक मांगा नहीं जाता तब तक पासवर्ड अग्रेषित नहीं किया जाना चाहिए।
      The subject of the E mail should clearly state the tender enquiry number and due date of submission. **Price bids have to be password protected, and passwords are not to be forwarded unless asked for.**
   c. निविदा दस्तावेज़ पीडीएफ प्रारूप में प्रस्तुत किया जाना चाहिए और पीडीएफ प्रारूप से सीधे खोला जा सकता है। उपरोक्त का अनुपालन न करने वाले प्रस्तावों को बिना किसी सूचना के सरसरी तौर पर खारिज कर दिया जाएगा।
      Tender Documents should be submitted in PDF Format and Directly openable from the PDF format. Offers not complying with the above shall be summarily rejected without further intimation.
   d. निविदाएं, तकनीकी - वाणिज्यिक बोली (भाग-I) और मूल्य बोली (भाग-II) अलग से ई-मेल के माध्यम से **"SB-OSD/TSHD/887/2024"** विषय के साथ प्रस्तुत की जाएगी।
      Tenders, Techno- commercial bid (Part-I) and Price bid(Part -II) shall be submitted separately via email , with subject as " **SB-OSD/TSHD/887/2024"** to:

(i) vidhu.s@cochinshipyard.in

प्रतिलिपि / Copy to:

(ii) madhu.pk@cochinshipyard.in

(iii) philip.thomas@cochinshipyard.in

e. बोलियां दिनांक **02** अगस्त **- 2024** को अपराह्न **15.00** बजे या उससे पहले कोचीन शिपयार्ड लिमिटेड में प्राप्त की जाएंगी और भाग **I** तकनीकी **-** वाणिज्यिक बोली उसी दिन अपराह्न **15.30** बजे खोली जाएगी।

The Bids shall be received at Cochin Shipyard Ltd on or before 15.00 Hrs on 02nd August - 2024 and Part I Techno-Commercial Bid will be opened at 15.30 Hrs on the same day.

f. देर से आनेवाली निविदाएं/शर्तों वाली निविदाएं सरसरी तौर पर खारिज कर दी जाएंगी।

Late tenders / tenders with conditions will be summarily rejected.

g. सीएसएल ई-मेल द्वारा भेजी गई निविदाओं के विलंब, खो जाने या प्राप्त न होने की कोई ज़िम्मेदारी नहीं लेगा।

CSL takes no responsibility for delay, loss or non-receipt of tenders sent by e-mail.

h. मूल्य बोली खोलने के लिए केवल तकनीकी रूप से योग्य बोलियों पर विचार किया जाएगा। तकनीकी पहलुओं और वाणिज्यिक शर्तों दोनों के लिए बोलियों का मूल्यांकन करने के बाद, तकनीकी-व्यावसायिक रूप से योग्य बोलीदाताओं को भाग-II

Only technically qualified bids will be considered for price bid opening. After evaluating the bids for both technical aspects and commercial terms, the techno-commercially qualified bidders will be intimated regarding the date and time of opening of Part II - Price Bid.

i. केवल तकनीकी – वाणिज्यिक बोली खोलने को अनुबंध देने के लिए प्रस्ताव की स्वीकृति के रूप में नहीं माना जा सकता है।

Merely opening of Techno-Commercial Bid cannot be construed as acceptance of offer for awarding of contract.

j. भाग **I** (तकनीकी-वाणिज्यिक) बोली के साथ निम्नलिखित प्रस्तुत किया जाएगा:

The following shall be submitted along with Part I (Techno-commercial) Bid:-

i. अनुलग्नक **I, II, III, IV, V,VI** और परिशिष्ट – A to I में रखे गए पूछताछ के नियम और शर्तें, समान्य शर्तें, तकनीकी विनिर्देश और आरेखण सहित सभी पृष्ठों पर विधिवत हस्ताक्षरित मूल निविदा दस्तावेज़।

Original tender document duly signed on all pages - including Terms & conditions of enquiry, general conditions, technical specification and drawings placed at Annexure I, II, III, IV, V,VI & Appendix- A to I

ii. अनुलग्नक **IV** में तकनीकी वाणिज्यिक जांच सूची पूरी तरह से भरी हुई है और विधिवत हस्ताक्षरित है। विधिवत भरी हुई तकनीकी वाणिज्यिक जांच सूची प्रस्तुत न करने पर बोलियों को अस्वीकार कर दिया जाएगा।

The techno commercial Check List at Annexure IV filled up completely and duly signed. **The non submission of duly filled techno commercial checklist will lead to the rejection of the bids.**

iii. गैर-मूल्य बोली प्रारूप की प्रतिलिपि (कीमत/अंकों के बिना मूल्य बोली)।

Copy of un-priced bid format (price bid WITHOUT prices/numerals)

iv. निविदा पूछताछ नियम और शर्तों से विचलन/बहिष्करण की सूची (यदि कोई हो)।

List of deviations/exclusions from the tender enquiry terms and conditions (if any).

k. **एमएसएमई - विशेषाधिकार / MSME- PRIVILEGES**

सीएसएल वेबसाइट (www.cochinshipyard.in) के अनुसार एमएसएमई, स्टार्ट-अप आदि से संबंधित भारत सरकार की सार्वजनिक खरीद नीति पहल इस निविदा के लिए लागू होगी।

Public procurement policy initiatives of Govt. of India, pertaining to MSME's, Start-up etc. as per CSL website (www.cochinshipyard.in) shall be applicable for this tender.

l. कोचीन शिपयार्ड लिमिटेड (सीएसएल) ने ट्रेड्स पोर्टल अर्थात आरएक्सआईएल, एम1 एक्सचेंज और इनवॉयस मार्ट में पंजीकरण कराया है । वे विक्रेता जिन्होंने ट्रेड्स पोर्टल में पंजीकरण कराया है, वे ट्रेड्स पोर्टल के ज़रिए भुगतान को संसाधित करने के लिए संबंधित निष्पादन अधिकारी को सूचना के तहत संबंधित पोर्टल में चालान अपलोड कर सकते हैं। आपूर्तिकर्ताओं से अनुरोध है कि ट्रेड्स पोर्टल में चालान अपलोड करने से पहले, जहां भी लागू हो, गुणवत्ता निरीक्षण स्थिति के संबंध में संबंधित निष्पादन अधिकारी से जांच करें।

Cochin Shipyard Limited (CSL) has registered in the **TReDS Portal viz., RXIL, M1xchange and Invoice Mart.** Those vendors who have registered in the TReDS portal may upload the invoice in the respective portal under an intimation to concerned executing officer for processing the payment through TReDS portal. Suppliers are requested to check with the concerned executing officer regarding the Quality inspection status, where ever applicable, before uploading the invoices in TReDS portal.

m. सीएसएल के पास पूरा ऑर्डर देने या ऑर्डर की मात्रा का कुछ हिस्सा देने या काम को दो या दो से अधिक फर्मोंउपठेकेदारों में विभाजित करने या किसी भी निविदा को स्वीकार या अस्वीकार करने/, या निविदा खोलने की तारीख बढ़ाने, और या कुल निविदा प्रक्रिया को रद्द करने और सभी को अस्वीकार करने का अधिकार सुरक्षित है। अनुबंध प्रदान करने से पहले किसी भी समय निविदाएं। सीएसएल प्रभावित फर्मके प्रति कोई दायित्व नहीं निभाएगा (फर्मों), सीएसएल की कार्रवाई के आधार के बारे में प्रभावित फर्म को सूचित करने का कोई दायित्व नहीं होगा। (फर्मों) बोलीदाताओं से अनुरोध है कि वे नोट करें और तदनुसार बोली लगाएं।

CSL reserves the right to place order whole or part of order quantity or split the work on two or more firms/subcontractors or to accept or reject any tender, or extend the tender opening date, and or to cancel the total tender process and reject all tenders at any time prior to award of the contract. CSL will not incur any liability to the affected firm(s), any obligation to inform the affected firm(s) of the grounds for CSL's action. Bidders are requested to note and quote accordingly.

n. मुख्य महाप्रबंधक, पोत निर्माण प्रभाग, कोचीन शिपयार्ड लिमिटेड, निविदा या उसके हिस्से को स्वीकार करने हेतु अधिकृत व्यक्ति है, जो न्यूनतम निविदा को स्वीकार करने हेतु स्वयं को बाध्य नहीं करता है और बिना कोई कारण बताए प्राप्त किसी या सभी निविदाओं को अस्वीकार करने का अधिकार सुरक्षित रखता है।

Chief General Manager, Ship Building Division, Cochin Shipyard Limited, is the authorized person to accept the tender or part thereof, who does not bind himself to accept the lowest tender and reserves the authority to reject any or all of the tenders received without assigning any reason.

7. **अनुबंध पूर्व सत्यनिष्ठा समझौता/ PRE CONTRACT INTEGRITY PACT**

यदि बोली 1 करोड़ रुपये से अधिक है, तो निविदा में भाग लेने वाले बोलीदाताओं को पूर्व अनुबंध अखंडता समझौते (अनुलग्नक VI) पर हस्ताक्षर करना होगा।

The bidders who are participating in the tender shall sign the pre contract integrity pact (Annexure VI), in case the bid is above Rs 1 crore.

कृते उप महाप्रबंधक / For Deputy General Manager

आउटसोर्सिंग विभाग / Outsourcing Department

विधु सेबास्टियन
VIDHU SEBASTIAN
वरिष्ठ प्रबंधक /Senior Manager
कोचीन शिपयार्ड लिमिटेड
Cochin Shipyard Ltd.
कोच्ची / Kochi - 682 015

ANNEXURE- I

जांच की नियम और शर्तें / TERMS & CONDITIONS OF ENQUIRY

ELECTRICAL OUTFIT STRUCTURAL WORKS - INSTALLATION OF CABLE WAYS & EQUIPMENT SEATS OF TRAILING SUCTION HOPPER DREDGER (TSHD- SH037)

1. कार्य का विवरण / DESCRIPTION OF WORK

1.1. This tender enquiry pertains to the awarding of contract for **Electrical Outfit Structural works in Trailing Suction Hopper Dredger (TSHD – SH037)** as per the following documents:

1.1.1. Cochin Shipyard Ltd - Terms and conditions (Annexure I)

1.1.2. Cochin Shipyard Ltd - General conditions (Annexure II)

1.2. Scope of work / Technical Specification (Annexure III)

1.3. The scope of work covers Electrical Outfit Structural works- which includes Installation of Electrical Cable Ways, Cable Coamings, MCTs and all Equipment Seats including structural works related to under water equipment like ICCP, Speed log and Echo sounder up to the entire satisfaction of CSL, Royal IHC, Owner, and Class Surveyors as per relevant clause of Technical Specification.

1.4. The work is to be carried out In-Situ area (Block/Onboard the ship) allotted to the contractor inside CSL premises.

1.5. Bidders are requested to study the scope of work before submitting their offer. Technical Clarification, if any, required may be obtained from **Mr. Avinash Ramachandran Nair, Manager (Electrical – SB - OF)** before quoting.

2. विक्रेताओं के लिए पात्रता मानदंड / QUALIFICATION CRITERIA FOR BIDDERS

The Bidder should qualify the following PQ Criteria.

2.1. The bidder/contractor should have prior experience in the execution of electrical structural works (erection of cable tray/saddle, cable coamings etc) and should be conversant with Ship Building / Ship Construction procedures or paramilitary ships or submarines or offshore structure in CSL or other yards/Marine projects corresponding to a Work Order value of minimum Rs. 13,00,000/- (INR Thirteen Lakhs) against a single work order.

(**Executed within last 7 years**).Necessary documents in proof of carrying out similar works shall be submitted with the offer.

2.2. The manpower requirement for this project varies from 20 to 60 based on phase of Outfitting. Bidder shall provide an undertaking stating that as and when needed , the bidder shall deploy man power up to 60 workmen to meet the targets set by the Yard.

3. निविदा शर्तें / TENDER CONDITIONS

3.1. The bidder / contractor should have prior experience in the execution of electrical structural works in ships, corresponding to a Work Order value of minimum Rs. 13,00,000/- (INR Thirteen Lakhs) against a single work order. The firm has to submit the documents which validate the above-mentioned experience requirement. Contractors should have the experience in executing similar jobs in CSL or other yards/projects. Necessary documents in proof of carrying out similar work in other yards/projects shall be submitted with the offer.

3.2. Documents to prove credentials of the firm to undertake the subject work. eg: Details of available equipments & facilities, Skilled Manpower, Work experience of similar job, etc. The firm has to submit the documents which validate the above mentioned requirement.

3.3. Bidder shall not be under a declaration of ineligibility issued by Govt. of India/ State govt./ Public Sector Undertakings etc. The bidder shall not have been debarred / black listed by CSL or by any of the Public Sector Undertaking or Government department etc. A self declaration from the firm with this effect shall be provided at the time of submission of Techno commercial offer.

3.4. The firm has to submit the documents, which validates the above mentioned requirements.

4. प्रस्ताव की वैधता / VALIDITY OF OFFER

4.1. The offer shall be valid for acceptance for a period of 90 days from the date of opening of the Part-I Techno-Commercial Bid.

5. अनुबंध प्रदान करने का तरीका / METHOD OF AWARDING CONTRACT

5.1. Electrical Outfit Structural Works which includes Installation of Electrical Cable Ways, Cable Coamings, MCTs and all Equipment Seats including structural works related to under water equipment like ICCP, Speed log and Echo sounder up to the entire satisfaction of CSL, Royal IHC, Owner, and Class Surveyors as per relevant clause of Technical Specification for Trailing Suction Hopper Dredger (TSHD – SH037) is covered under this contract

5.2. Contract will be concluded with the Bidder qualifying to Techno-Commercial conditions and emerging as L1.

5.3. The performance of the contractor will be assessed based on Appendix A which shall be evaluated by Officer in-Charge monthly. CSL reserves the right to reduce the work if the performance rating is less than 50 for a month. CSL reserves the right to re-allocate such work to other parallel contractor found suitable by CSL.

5.4. In the event of resultant single bid, CSL reserves the right to place order in part/ full, depending upon project schedule, priorities, etc. and after assessing the bidder's financial capabilities, etc. CSL's decision in this regard will be final and binding on the bidders.

5.5. CSL reserves the right to accept / reject any or all offers in part / full without assigning any reasons whatsoever. In case of any dispute, our decision in this matter shall be final and legally binding on the bidder/ subcontracted Inspection Agency/ Agencies

5.6. Once work order is placed, successful contractors shall be able to start the works immediately.

5.7. CSL reserves the right to cancel the tender if required.

6. कार्य की प्रगति तथा समापन की समय - सारणी / WORK PROGRESS AND SCHEDULE OF COMPLETION

6.1. The work is expected to start in the first week of August 2024.

6.2. The entire work is to be completed within a period of 10 – 12 Months. The contractor should be in a position to mobilize his team within 14 days of intimation from CSL after placement of Letter Of Intent (LOI) / Work Order.

6.3. Tentative construction schedule of the vessel is attached at Appendix B.

6.4. The contractor shall submit their detailed schedule of completion of the work to the Officer-in-Charge. The progress of work shall be made in tandem with the progress of completion of the vessel allowing sufficient time for other interface activities/works.

6.5. CSL has the right to change the schedules of the project to the interests of the company and the contractor should be capable of adjusting the resources according to the instructions from the CSL contact person.

6.6. Detailed work progress report as per mutually agreed format (Weekly, Monthly etc.) is to be prepared and submitted to yard personnel.

7. कार्य प्रक्रिया / WORK PROCEDURE

7.1. The work procedure briefly described below, detailed scope for each category of works are mentioned in the Annexure III to the tender enquiry.

7.2. Necessary job instructions, drawings etc. for the work will be issued by CSL.

7.3. Contractor required carrying out the work as per the specifications / drawings supplied, and to the satisfaction of CSL /Classification Society/ IHC/Owners.

7.4. Contractor should maintain the quality as per CSL Quality Standards & yard quality procedures. Inspection will be carried out during fabrication by CSL.

7.5. Contractor shall submit the weekly /monthly progress reports to CSL.

8. अनुबंध की वैधता / VALIDITY OF CONTRACT

8.1. Once the contract is awarded, the price offered and mutually agreed shall remain firm (Contract concluded price as per Annex-V) till completion of work and no escalation in rate shall be allowed by CSL on whatsoever reason thereafter.

8.2. Contract Validity: **Contract completion date will 10- 12 months from the date of award of LOI / WO from CSL .**The contract may be extended for a further period of 6 months on mutual agreement with the same Terms & Condition if found necessary. Any work released till the completion of contract shall be carried out by the contractor.

8.3. Contractor shall complete mobilization of his workforce, tools & equipment within two week from advance intimation from CSL to start the work. During this mobilization period, contractor should complete QAP approval and required to arrange entry passes for his employees and no excuse for delay in commencing work on this account will be entertained.

9. निरीक्षण / INSPECTION

9.1. The complete work has to be carried out under the survey of Royal IHC, Owner, and Class Surveyors classification society / Owner / CSL.

9.2. Survey presentation to CSL I&QC, IHC , Owners and Class authorities as per Yard practices shall be under the contractor's scope of work.

10. बोलियां जमा करने के लिए दिशानिर्देश / GUIDELINES FOR SUBMISSION OF BIDS

10.1. Technical Bid (Part –I)

10.1.1. The technical bid as specified in the scope of work (Annexure III) shall be submitted by e-mail mentioning the subject as the bid No, tender No. and date.

10.1.2. **The following shall be submitted along with technical Bid, failing which the bid may be summarily rejected :-**

10.1.2.1. Tender document general Terms & conditions and technical specifications placed at Annexure I, II & III duly signed on all pages.

10.1.2.2. The Techno commercial Check List at Annexure IV filled up completely and duly signed

10.1.2.3. Copy of un-priced bid format of each category of works at Annexure V.

10.1.2.4. As per Govt. of India guidelines, Integrity pact (IP) at Annexure VI should be signed for all contracts above Rs. One Crore. Accordingly IP should be signed and forwarded along with the offer.

10.1.2.5. Supporting documents with relevant work experience, job executed in Shipyards as per clause 2 of Annexure I and Clause B category of work in Annexure III. Evaluation of this document forms one of the essential criteria

10.1.3. **The non submission of duly filled Techno commercial checklist will lead to the rejection of the bids.**

10.2. **Price Bid (Part-II)**

10.2.1. The bid shall be comprehensive of the nature of Electrical Outfit Structural Works which includes Installation of Electrical Cable Ways, Cable Coamings, MCTs and all Equipment Seats including structural works related to under water equipment like ICCP, Speed log and Echo sounder, to be executed in TSHD SH-037and shall be inclusive for all the applicable charges envisaged under the scope of the contractor as specified in the technical specification at Annexure III. All costs related to welder's qualifications shall be borne by the Contractor.

10.2.2. Bidders shall quote total amount in figures and in words. Corrections and additions if any must be attested/ duly signed by the bidder. In the case of error in multiplication/addition in amount calculated, the Unit rate quoted will be considered as correct and the amount will be calculated accordingly. Conditional rebates & discounts, incomplete/ ambiguous offer will be rejected.

10.2.3. The price bid shall be all inclusive of scope of contractor on unit rate basis and any rates on variable basis will not be accepted within the price bid and thereafter throughout the period of the contract. Any variable rates if deemed inevitable and applicable only in special cases/situations (not in the normal course of execution of contract) will only be considered for mutual agreement.

10.2.4. Price Bid Format: The price bids shall be prepared as per the format given in Annexure V to the enquiry. The bidder must quote all line items as per price bid format any failure in this regard will lead to the rejection of bid. Password protected price bid to be submitted by e-mail mentioning the subject as the bid No, tender No. and date.

10.2.5. Rates of individual line items for the overall L1 is considered as L1 rate, irrespective of lower rates in the line items of other bidders.

10.2.6. Currency: The price bids shall be prepared in Indian National Rupees for all bidders.

10.2.7. The bids which are not conforming above requirements shall be summarily rejected without any further notice.

11. कर / TAXES

11.1. GST shall be applicable extra on the prescribed work. Bidders should indicate the applicable GST percentage and HSN code of the category in the offer. Bidders are also requested to furnish the following details in the invoice/Bill.

11.1.1. Applicable rate of GST/SAC Code

11.1.2. Firms GST Reg. No.

11.1.3. Service Accounting Code (SAC) as prescribed by statutory authorities.

11.1.4. GST Reg. No. of Cochin Shipyard Ltd **(32AAACC6905B1ZD)**.

11.2. Any new tax/duty that may be made effective by the government for this work and paid by the contractor shall be reimbursed on production of documentary evidence.

12. भुगतान की शर्तें / PAYMENT TERMS

12.1. Payment for Electrical Outfit Structural works will be released to the contractor in 7 stages, for the following work completion stages and on certification by the Officer-in-Charge.

a) Stage -1: After completion of 15% of works detailed in Annexure V.
b) Stage -2: After completion of 30% of works detailed in Annexure V.
c) Stage -3: After completion of 45% of works detailed in Annexure V.
d) Stage -4: After completion of 60% of works detailed in Annexure V.
e) Stage -5: After completion of 75% of works detailed in Annexure V.
f) Stage -6: After completion of 90% of works detailed in Annexure V.
g) Stage -7: After completion of 100% of works detailed in Annexure V

12.2. The contractor shall prepare and submit Work Completion Certificate (WCC), Payment will be made based on completed works certified by the Officer-in-Charge

12.3. Quantum of work indicated at Annexure-V is for estimation purpose only. Since ship's design modelling works are in progress, the quantity of items indicated is approximate only. Downward or upward variation of quantity shall be anticipated.Actual quantum of work executed at site shall be considered for the payment purpose.

12.4. Reworks up to +10% of total work order value shall be under contractor's scope.For re-works more than 10% due to amendment in CSL drawings 40% of that particular line item

rate is applicable for removal & dry-survey and full installation rate (as per corresponding line item) is applicable for the re installation at new location

12.5. All claims for payment for the work/additional work shall be submitted by the subcontractor within one month of completion of work.

12.6. An invoice upload facility by vendor is established through the Vendor Invoice Management (VIM) Portal is currently available for supply as well as service vendors including subcontractors so as to facilitate transparency and timely payment. The portal can be accessed at: https://apps.cochinshipyard.in:446/vim/Home/.jsp . The same can also be accessed via Cochin Shipyard Website (https://cochinshipyard.in) as below;
Path: Cochin Shipyard Website--> Related Links--> Vendor Payment Info

12.7. All invoices above 10 Lakhs (including GST) are required to be digitally signed by the vendors and uploaded in VIM portal. The direct submission of invoices value above 10 Lakhs will not be accepted. Once the invoices are digitally signed and uploaded, there is no need to submit the hard copy for processing the payment.

12.8. Service Acknowledge Number (SAN) to be obtained from the Executing Officer at the time of certification of Work Completion Certificate (WCC) for the above process.

12.9. The invoice can be tracked using the generated Invoice Tracking Number till the payment.

12.10. Statutory levies such as I.T, Contribution towards PF, ESI etc., shall be deducted from the bill as applicable.

12.11. Payment will be made by RTGS/NEFT to the account of contractor. The name of the bank, branch, A/C No., IFSC code & other particulars shall be furnished by the contractor in the proforma of CSL.

13. प्रतिभूति जमा / SECURITY DEPOSIT

13.1. The successful tenderer shall remit 5% of the value of the contract as security deposit within 15 days of receipt of the work order. This amount has to be remitted by way of demand draft or bank guarantee (in approved proforma of CSL) from any of the Nationalized banks, valid till the satisfactory completion of the entire work. The Security Deposit will be released after satisfactory completion of the contract/ guarantee period (if separate BG as per clause 14 is not furnished) and on certification of nil liability to CSL by Officer-in charge. The Security Deposit retained will not bear any interest.

14. निष्पादन गारंटी / PERFORMANCE GUARANTEE

14.1. The complete work carried out by the contractor shall be guaranteed against performance of work and/or poor workmanship for a period of one year from the date of completion of work. Any damage or failure due to defects in execution of the work for a period of 12 months from the date of completion of work, should such damage or failure occur within the guarantee period, the contractor shall rectify/rework the defect as applicable without any extra expenditure to CSL and such repaired work shall be guaranteed for a further period of one year from the date of repair.

14.2. Should any unsatisfactory performance and / or damage or failure occur due to poor workmanship and poor quality material used by the contractor, the contractor shall be solely responsible for payment/reimbursement of expenditure incurred by Ship owner for rectifying the defect.

14.3. Towards this, a performance guarantee equivalent to 5 % of the value of the contract to be furnished by the contractor along with submission of first bill in case of pro rata payment or completion of entire work in other cases, as per payment terms, by way of a bank guarantee (in approved proforma of CSL) from a nationalized bank valid till the expiry of the guarantee period plus a grace period of 3 months.

14.4. Performance Guarantee is applicable for all bidders irrespective of MSME/NSIC registration for necessary coverage under the performance guarantee clause.

15. असामान्य रूप से कम उद्धृत दरें / ABNORMALLY LOW QUOTED RATES

15.1. In case the price of L-1 Bidder is found to be unreasonably low and/ or bidder expresses desire to withdraw from the tender after opening of price bid, then tender will be cancelled and suitable penal action as per CSL procedure shall be taken against the firm.

16. परिसमापन क्षतिपूर्ति / LIQUIDATED DAMAGES

16.1. The progress of work will be monitored against the mutually agreed detailed schedule referred in this tender. Liquidated damages for delays in execution of the work envisaged as per this order, for any reason other than force majeure conditions, will be recovered at the rate of half percent (0.5%) of the basic value of the delayed work per week or part thereof, subject to a maximum of ten (10) percent of the basic value of the delayed work.

17. **आदेश रद्द करना और जोखिम अनुबंध / CANCELLATION OF ORDER AND RISK CONTRACTING**

17.1. In the event the contractor fails to complete the work promptly and satisfactorily as per the terms of the order, and if the work is delayed beyond the agreed schedule, CSL, without prejudice, reserves the right to cancel the order and get the work done at contractor's cost and the expenditure so incurred including any damage or loss will be recovered from the firm and the Security Deposit furnished by the firm is liable to be forfeited either in whole or in part and suitable penal action as per CSL procedure shall be taken against the firm.

18. **कार्मिकों की सुरक्षा और प्राथमिक चिकित्सा /SAFETY OF PERSONNEL AND FIRST AID**

18.1. The contractor shall be entirely responsible for the safety of all the personnel employed by the firm on the work. In this regard, the contractor may adopt all the required safety measures and strictly comply with the safety regulations in force. A copy of CSL's "Safety Rules for Contractors (Revised)" is available with SB-Outsourcing department for reference.

18.2. The Contractor may arrange to suitably insure all his workmen/ other personnel in this regard. CSL will not be responsible for any injury or illness to the Contractor's workmen/other personnel during execution of the works due to whatsoever reasons.

18.3. In this regard, the Contractor will have to fully indemnify CSL against any claims made by his workmen/other personnel.

18.4. The Contractor shall provide and maintain so as to be readily accessible during all working hours, a first aid box with prescribed contents at every place where the firm employs contract labour for executing the works.

18.5. The entire work force under the contractor shall always follow all instructions from CSL safety personal.

18.6. The contractor shall allocate safety officer / supervisor as per prevailing safety rules / office orders of CSL.

19. **अप्रत्याशित घटना / FORCE MAJEURE**

19.1. Should failure in performance of any part of this contract arise from war, insurrection, restraint imposed by Government act or legislation of other statutory authority, from explosion, riot, legal lock-out, flood, fire, act of Govt. or any inevitable or unforeseen event beyond human control which will be construed as a reasonable ground for extension of

time, CSL may allow such additional time as is mutually agreed to be justified by the circumstances of the case.

19.2. The occurrence / cessation of force majeure situation have to be informed with documentary evidence within 15 days from the date of occurrence / cessation.

20. मध्यस्थता / ARBITRATION

20.1. Any disputes arising during the currency of the contract shall, in the first instance be settled by mutual discussions and negotiations. The results of such resolution of dispute shall be incorporated as an amendment to the contract, failing which the parties can resort to arbitration.

20.2. If any dispute, disagreement or question arising out of or relating to or in consequence of the contract, or to its fulfillment, or the validity of enforcement thereof, cannot be settled mutually or the settlement of which is not herein specifically provided for, then the dispute shall within thirty days from the date either party informs the other in writing that such disputes, disagreement exists, be referred to arbitration. The arbitrators shall be appointed and the arbitration proceedings shall be conducted in accordance with and subject to the Arbitration and Conciliation Act, 1996 (No. 26 of 1996) as amended form time to time and the decision of the Arbitrators shall be final and binding on the parties hereto. The arbitration will be done by a Board comprising one officer nominated by each party, and a mutually agreed Umpire. Each party shall bear its own cost of preparing and presenting its case. The cost of arbitration shall be shared equally by the parties unless the award provides otherwise. The enforcement of the award shall be governed by the rules and procedures in force in the State in which it is to be executed. Performance under this Contract shall however, continue during arbitration proceedings and no payment due or payable by the parties hereto shall be withheld unless any such payment is or forms a part of the subject matter of arbitration proceedings.

20.3. In case of disputes, the same will be subjected to the jurisdiction of courts at Ernakulum, Kerala, India only.

21. क्षेत्राधिकार / JURISDICTION

21.1. All questions, disputes or differences arising under/out of or in connection with this contract shall be subject to the jurisdiction of the Courts in Cochin.

22. **श्रम कानून और नियम / LABOUR LAWS AND REGULATIONS**

22.1. The Contractor shall undertake and execute the work with contract Labour only after taking license from the appropriate authority under the Contract Labour (Regulation &Abolition) Act 1970.

22.2. The Contractor shall observe and comply with the provisions of all Labour and Industrial laws and enactments and shall comply with and implement the provisions of the Factories Act, 1948, Employees Provident Funds & Miscellaneous Provisions Act, 1952, Employees State Insurance Act, Payment of Gratuity Act, minimum Wages Act, Payment of Bonus Act. Contract Labour (Regulation and Abolition) Act and all other enactments as are applicable to him and his workmen employed by him. The Contractor shall inform CSL his license number from the Central Labour Commissioner.

22.3. All contract workmen, except those exempted under the respective Acts, shall necessarily be insured under the ESI scheme and be made members of the EPF Scheme from the day of their engagement as contract workmen in the company. All such insured contract workmen should carry with them their ES Identity Card for verification by the authorities. No contract workmen without a valid ESI Identity Card for verification by the authorities will be permitted to work in the company.

22.4. The Contractor shall submit the Labour Reports/Returns as required by the Company from time to time· in respect of their workmen in standard format to the concerned contracting officer so as to enable the same to reach Personnel Department by the 5th of every month. Delayed submission of the same shall attract penal interest /damages at the rate as levied by the respective authorities under the relevant Acts.

22.5. The Contractor shall maintain the records viz. Muster Roll, Acquaintance Roll with full details, Account books etc., in original. These are required for inspection by the concerned authorities under each scheme.

22.6. If the Contractor fails to pay any contributions, charges or other amounts payable under any of the aforementioned provisions of law, CSL shall deduct or adjust amounts equivalent to such contribution, charges or amounts from amount payable to him by CSL, including any deposit or amounts payable against bills and make payments on his account to the appropriate authority. He shall not be entitled to question or challenge such deductions, adjustments or payment made by CSL.

22.7. Any other amount payable under any law or in respect of any person employed by the Contractor, if not paid by him, shall be deducted or adjusted by CSL out of any amount

payable to the Contractor including any Security Receipt and paid ever or withheld for payment by CSL.

22.8. The Contractor shall be fully responsible for the conduct and discipline of the workmen employed by him in the Company premises. If such workmen commit any misconduct or criminal act inside the Company, the Contractor hall take appropriate action against such workmen. The contractor shall abide by the instructions/ guidelines issued by the Company for maintenance of discipline and good conduct among the workmen employed by him.

22.9. All people who are engaged for various works in CSL either directly or through contractors, should produce the following documents prior to issuing their entry passes:

i. Passport/attested copy of passport with photo and address particulars. **OR**

ii. Police clearance certificate with photo and address particulars. (Police clearance certificate to the effect that the concerned person is staying in the area of jurisdiction of the certificate issuing Police Station and that the person is not involved in any criminal offences as per the records available therein.)

22.10. Application and Declaration for enrolling under Employees Provident Fund and ESI Scheme 3 individual passport size photographs and two copies of family photographs of the members.

22.11. Contractors are requested to familiarize themselves with the labor rules & regulations prevailing in CSL Including the labour wage pattern of contract labour as per the settlement between the trade unions & contractors.

23. आई एम एस दिशानिर्देशों / IMS GUIDELINES

23.1. CSL has implemented an Integrated Management System (IMS) consisting of Environmental Management system (EMS), Occupational Health and Safety Management System (OHSMS) and the Quality Management System (QMS) within the yard. As part of IMS, subcontractors shall comply with the following measures related to the Quality, Health, and Safety & Environment (QHSE) policy of CSL.

23.1.1. Meeting or exceeding customer requirements.

23.1.2. Assuring quality of the products and service.

23.1.3. Preventing occupational ill health & injuries.

23.1.4. Ensuring safe work sites.

23.1.5. Conserving natural resources.

23.1.6. Preventing/ minimizing air, water & land pollution.

23.1.7. Handling and disposal Hazardous wastes safely.

23.1.8. Complying with statutory & regulatory and other requirements.

23.1.9. Developing skills and motivating employees.

23.2. Occupational Health, safety & Environmental requirements of CSL shall also include the following.

23.2.1. The contractor (or a sub-contractor performing work on behalf of the contractor) is deemed to comply with the Occupational health, safety and environmental policy of the company and also to all operational controls/standard operating procedures and shall undertake the work in total compliance with the requirements of the established Integrated Management System (IMS) of the company.

23.2.2. The Contractor shall undertake the work in total compliance with all applicable legal/statutory requirements related to occupational health, safety and environment effective in the state of Kerala.

23.2.3. It is the sole responsibility of the contractor to assure that any sub-contractor who shall perform works in company lands/facilities/worksites on behalf of the contractor, is also following all requirements related to the Integrated Management System of the company and the health/safety/environmental Rules effective in the state.

23.2.4. The contractor shall provide/implement and operate/practice all occupational health, safety and environmental management measures/facilities, for their period of contract, in their activities/at their work sites, which shall be required according to the IMS of the company or that required by the health/safety/environmental Rules established and effective in the state, at their own cost.

23.2.5. If any contractor failed to comply with or violated any clauses/requirements of occupational health, safety and environmental Rules effective in the state, in their activities or at work sites and the same shall be exposed to the government or any competent authorities upon inspections, the contractor shall be solely responsible for all liabilities caused by his/her action and shall be responsible for paying the penalty and taking stipulated corrective actions insisted by the authorities within the specified time, at their own cost. Any liability to the company in this regard needs to be compensated by the contractor.

23.2.6. Upon completion of the work, contractor shall clear the area and shall not leave any Occupational health/safety/environmental liabilities to the company, from their activities at the worksites.

23.2.7. Any clarification related to IMS requirements of the yard, may be obtained by the

contractor from the DGM (OF) or the authorized representative of the contract, prior to the commencement of work.

24. **बिजली के नियम और कानून / ELECTRICITY RULES AND REGULATION**

24.1. The contractor shall adhere to the various rules in respect of electrical installation as per the Indian Electricity Rules and Regulations and Electrical Inspectorate Standards in order to make sure that men and materials are safe from hazards.

25. **गोपनीयता खंड / SECRECY CLAUSE**

25.1. The CONTRACTOR shall be responsible to ensure that all persons employed by them in the execution of any work in connection with this contract are aware of the provisions of the official secrets act 1923 and to comply with the same. The CONTRACTOR shall also ensure secrecy of design, construction, equipment and completion of the vessel. Any information provided to you under this contract is to be treated as strictly confidential and is not to be disclosed to any person or persons not concerned therewith.

25.2. All documents under this Contract transferred when the parties shall be treated as UNCLASSIFIED unless explicitly marked.

25.3. The CONTRACTOR shall ensure that their organization, suppliers/ installation agency/test and trials teams etc. shall not communicate for use in advertising, publicity, sales release or in any other medium, system details, photographs and reproduction of equipment and their fitment on board Navy vessels except without or security clearance from the Indian Navy.

25.4. Since this is a project of national importance, proper, procedure has to be followed by the vendor in documentation; in this regard a Non-Disclosure Agreement has to be signed between CSL and the vendor.

26. **अधिलेखन और सुधार / OVERWRITING & CORRECTIONS**

26.1. Tenders shall be free from overwriting or erasures. Corrections and additions, if any, shall be duly attested and a separate list of such corrections shall be attached with the offer.)

26.2. All terms and conditions, other than those mentioned above, contained in the Enquiry specification and drawings (Annexure I), Cochin Shipyard Ltd - General Terms and conditions (Annexure II) and other annexure pertaining to this tender shall also be attested by the bidder as a token of acceptance.

26.3. CSL reserves the right to reject any or all bids without assigning any reasons whatsoever and or based on the past unsatisfactory performance by the bidders at CSL/other

PSE's/Government Departments. After issuing the work order, CSL reserves the right to terminate the contractor if the performance of the contractor is not found satisfactory. The decision of CSL regarding the same shall be final and conclusive.

कृते उप महाप्रबंधक / **For Deputy General Manager**

आउटसोर्सिंग विभाग / **Outsourcing Department**

विधु सेबास्टियन
VIDHU SEBASTIAN
वरिष्ठ प्रबंधक /Senior Manager
कोचीन शिपयार्ड लिमिटेड
Cochin Shipyard Ltd.
कोच्ची / Kochi-682 015

ANNEXURE-II

कोचीन शिपयार्ड लिमिटेड / COCHIN SHIPYARD LIMITED
कोच्ची / KOCHI-682015

1. सामान्य शर्तें / GENERAL CONDITIONS

1.1. Quality of workmanship shall conform to the specification/ standards laid down by CSL.

1.2. CSL reserves the right to accept / reject any offer.

1.3. CSL reserves the right to award the work to more than one contractor or to take over partially or fully the work depending upon the scheduled requirements.

1.4. Compliance of all statutory safety requirements and other safety rules stipulated by CSL and other applicable statutory bodies shall be the responsibility of the Contractor while working at CSL premises. The Contractor should ensure that their workmen and staff are adequately covered under Insurance.

1.5. Damages caused to the CSL properties/tools/accessories should be rectified by the Contractor at his cost or proportional recoveries will be made from the contractor while passing their bills for payment.

1.6. CSL reserves the right to terminate the Contract at short notice in case the Contractor's performance is found not satisfactory with regard to progress of work, quality, time factor, labour dispute with their workers, poor safety records etc., and other contractual obligations. No claim whatsoever will be entertained by CSL on this account.

1.7. The Contractor shall have to engage men on round the clock basis and also on Sundays and holidays, if required. Work has to be completed to the satisfaction of CSL representative deputed for the job. The job should be completed at the time specified by the representative deputed for the job for each stage of work.

1.8. The Contractor shall indemnify CSL and CSL's personnel against any claims arising out of accidents or injuries to workmen or other persons or damage to other property which may arise during the execution of the contract or from breach of any Law or Regulation prior to delivery and acceptance of the items at CSL.

1.9. It is also to be understood by the Contractor that CSL does not bind itself to give the Contractor any regular or specific quantity or area of work and it shall be done at the sole discretion of CSL depending on the prevailing site conditions and other limiting factors and no claim on this account from the contractor shall be entertained.

1.10. The Contractor shall also be governed by the General Conditions of Contract of CSL, General Safety Rules and other relevant labour laws.

1.11. Jurisdiction for the Contract shall be Ernakulam. Laws of India shall govern the Contract.

1.12. The Contractor is to ensure proper cleanliness all around his work area while working on board ship. The contractor shall arrange to collect and clean up every day all waste, scraps; debris, etc. generated by the work men while working onboard the vessel and other locations and dispose the same suitably at his cost to the full satisfaction of CSL. In case any failure on his part to comply with this requirement, CSL will arrange the required cleaning entirely at the contractors cost.

1.13. The upper age limit of all workers and supervisors employed by the contractor and those contractors who do or supervise the job themselves shall be as per the prevailing rules of CSL.

1.14. General Manager (SB) or his authorized representative will be the Officer-in-Charge of this Contract.

1.15. Withdrawal of the quotation after it is accepted or failure to make contract execution within the stipulated completion period will entail cancellation of the order and forfeiture of EMD/ Security Deposit, if any/ and or risk purchase.

1.16. Subcontracting to other vendors shall be only after written intimation and approval of competent CSL authorities. Vendor shall not delegate or subcontract any of its obligations under the agreement without CSL's written consent. Vendor will remain liable for all subcontracted obligations and all acts or omissions of its subcontractors.

1.17. The procedures of work, standard operating procedures of work including documents like welding procedure specifications developed by CSL are intellectual property of CSL. Vendors shall not use or copy the procedure in any format without the written consent of competent authorities of CSL.

1.18. Vendor shall return the CSL resources to CSL immediately after provision of all deliverables and services or any termination of the agreement.

1.19. Conditional discounts, if any, will not be reckoned for tender evaluation/comparison purposes. However the same will be considered at the time of placement of purchase order if the firm turns out to be lowest bidder.

1.20. The complete work to be carried out with the highest degree of workmanship under the inspection of CSL, Classification Society (when specifically indicated in the technical specifications), Ship owner, or any other agency nominated by the Shipyard.

1.21. Any minor modifications, resulting from the change in statutory regulations prevailing at the time of final inspection of work by Classification Society, to be carried out by the

Contractor free of cost. In case of rework/modification/additional work, written consent is to be obtained from the Officer-in-charge before commencement of the work.

1.22. Contractor shall execute, during or after completion of the work, any minor job connected with the work, should it be considered necessary by Shipyard and/or Classification Society

1.23. The contractor shall be responsible for any damage caused to the material supplied by CSL. Compensation with penalty for damage or loss of the item will be recovered from the Contractor, in the event of loss or damage .The responsibility is limited only with respect to the damages caused due to any mistake or negligence of contractor.

1.24. Contractors are required to work round the clock / Sundays/ holidays as per the requirement of concerned department in order to complete the work in time.

1.25. Any material which needs to be taken out of CSL after completion of the work must be declared in the Material Declaration Form (MDF) available with CISF, South Gate. CSL cannot permit to take out any material not reflected in MDF.

1.26. Any particulars/literature/information/certificates required by the Shipyard in connection with the work is to be forwarded free of cost.

1.27. All correspondence with the Shipyard to be in English language. All documents and plans to be in English and in metric units.

कृते उप महाप्रबंधक / For Deputy General Manager
आउटसोर्सिंग विभाग / Outsourcing Department

विधु सेबास्टियन
VIDHU SEBASTIAN
वरिष्ठ प्रबंधक /Senior Manager
कोचीन शिपयार्ड लिमिटेड
Cochin Shipyard Ltd.
कोच्ची / Kochi-682 015

ANNEXURE- III

कार्य क्षेत्र / SCOPE OF WORK

ELECTRICAL OUTFIT STRUCTURAL WORKS – INSTALLATION OF CABLE WAYS & EQUIPMENT SEATS OF TRAILING SUCTION HOPPER DREDGER (TSHD –SH 037)

A. परिचय / INTRODUCTION

Cochin Shipyard Ltd (CSL) and Royal IHC Dredging together signed an agreement for the design and engineering, hardware and support package for the licensed construction of India's largest dredger Beagle® 12 Trailing Suction Hopper Dredger (TSHD).

The new dredging vessel will be used by DCI for safeguarding and improving the accessibility of the ports and waterways of India. With the construction of this new TSHD for DCI, IHC Dredging is looking forward to become the technical partner of Cochin Shipyard Ltd.

The new vessel to be built is part of the Beagle® series of medium sized TSHDs. These TSHDs have a hopper volume ranging from 4,000 to 12,000m3, are designed for a wide range of dredging activities and are known for their high efficiency and maximum uptime. Cochin shipyard Ltd intends to outsource the Electrical Outfit Structural Works of Trailing suction hopper Dredger as detailed below to competent subcontractors.

B. आवश्यकता / REQUIREMENT

CSL invites a detailed offer to carry out Electrical Outfit Structural Works which includes Installation of Electrical Cable Ways, Cable Coamings, MCTs and all Equipment Seats including structural works related to under water equipment like ICCP, Speed log and Echo sounder up to the entire satisfaction of CSL, Royal IHC, Owner, and Class Surveyors as per relevant clause of Technical Specification.

C. पोत विवरण / VESSEL DETAILS

(i) Main Particulars of vessel

Length overall	127.00M
Length b.p.p	117.00 M
Breadth mld	28.40 M
Depth mld	10.40M
Design draught	8.00 M
Max Draught, Approx	9.00 M

(ii) Master Construction Schedule (Appendix -B).

(iii) General Arrangement (GA) of vessel (Appendix-C).

(iv) List of drawings issued by CSL at the time of work execution (Appendix- D).

(v) MCT welding procedure – Roxtec (Appendix-E)

(vi) IHC Quality Manual (Appendix-F)

(vii) CSL Electrical Outfitting Standards (Appendix-G)

(viii) Fitting arrangement of Bottom Equipments (Appendix-H)

(ix) Fitting arrangement of ICCP (Appendix-I)

(x) CLASSIFICATIONS

Type of vessel: Trailing suction hopper Dredger (TSHD).

The vessel shall be designed and constructed under supervision of Royal IHC and in accordance with the regulations of **Lloyd's and IRS** for dual class classification mark:

(xi) Ship type: Trailing Suction Hopper Dredger

Electrical installations comply with the requirements of Royal IHC classification rules. Where no further specification is provided, the electrical installations shall comply with IHC standard, including the following publications: NEN-IEC 60092-352:2006, Royal IHC Yard standard I117, I116-6, C730SS & C730SS, C101, C330m-ST52, Royal IHC Yard standard& I119-1

D. काम की गुंजाइश-ठेकेदार / SCOPE OF WORK-CONTRACTOR

The work shall be carried out based on the contract specification, general arrangement drawing, CSL mentioned standards (refer Appendix-G), IHC standards (refer Appendix-F) and Design drawings. The scope of contractor involves Installation of Cable ways, flat bar, MCTs, coamings, electrical conduit pipes & Electrical Equipment Seats including structural works (refer Appendix-H&I) related to under water equipment's like ICCP, Echo Sounder and Speed Log of whole ship up to the entire satisfaction of CSL / IHC/Owner / Class surveyor, and up to the delivery of the vessel, which includes the following.

a. Installation of complete cable way (cable coamings, Flat bars, cable trays/saddles, MCTs, cable conduit pipes, gland pipes, Goose necks etc.) including all connected hot works & dry survey required for satisfactory completion of installation works.

b. As per IHC standard, each cable tray must be welded together (double side) to ensure continuity. If welding is not possible, bonding straps must be used. Considering vibrations during dredging all cable trays needs to be welded on to the support instead of bolting. For cable trays located near machinery and other equipment, a removable arrangement

must be provided. In these instances, the cable trays should be bolted onto the cable way supports. Sub-contractor has to drill the holes on both cable trays and cable way supports as required.

c. The contractor will be given painted cable trays to install and must remove the paint to weld the angle bar/supports to the cable tray and do a primer touch-up (after grinding) in the weld and installed area.

d. Painted cable tray of type LSH will be provided of 2.4 Mtr length with different widths and the contractor has to install cable trays as per the drawing. If the cable trays of smaller lengths are required depending on site conditions, contractor has to cut and use from 2.4 Mtr L tray. According to the standards, cable way supports must be provided at intervals not exceeding 1.5 meters. Depending up on site conditions, sometimes additional supports shall be provided based on the suggestions from IHC. Additional supports and modification of cable trays based on site conditions and suggestions from IHC will not be considered as revision works and the work shall be done by the subcontractor without any additional payment.

e. For weather deck covered areas, CSL will provide galvanized straight flat bars measuring 6 meters in length. The subcontractor is responsible for fabricating the required flat bars as specified in Sl. No. 18,19 of the Price Bid Format (Annexure-D) using these materials.

f. The use of SFGs is limited to a maximum of two continuous SFGs. For widths exceeding 150mm, subcontractors should use flat bars, which is to be fabricated according to site conditions from the standard 6-meter flat bars.

g. The free ends of all angle bar or flat bar to be rounded or canted and brake sharp edges.

h. Electrical conduit pipes are provided in exposed weather areas and beneath chequered plates in machinery spaces. The subcontractor is responsible for installing these pipes according to the drawings. For goose necks and electrical conduit pipes, flat bars (50mm) must be provided at both ends to facilitate cable strapping. The installation of these flat bars is also within the subcontractor's scope of work.

i. Special Earthing/ Braising required for MF-HF antenna is in the scope of sub-contractor.

j. According to IHC standards, cables passing through a coaming must be secured inside the coaming using a saddle wherever required. The installation of these saddles will be in the scope of sub-contractor.

k. IHC site representatives shall recommend minor modifications based on site conditions (such as bending cable trays, modifying cable way supports, trays, etc.) during the course

of work to facilitate cable laying. The subcontractor must carry out these modifications after obtaining approval from the executing officer, without any additional payment.

l. Hot works related to under water equipment's like ICCP, Speed Log, Echo Sounder is contractors' scope (refer Annexure-H&I). All required hot works for installation including Hull cutting, preparing bevel, complete/full penetration welding as applicable and fair out as per the tolerance given is to be carried out. Post welding contractor has to offer welding surveys, Non-Destructive tests like MPI/UT as per approved QAP. Welding of underwater equipment is to be carried out by WPS 249/250 qualified welders.

m. Strict adherence to the manufacturer's welding procedure (Roxtec) must be ensured when welding MCTs (refer Annexure-E). Double-sided full welding is to be ensured for all welding associated with cable ways.

n. Installation of seats for entire Electrical equipment's/systems on the vessel including all connected hot works for Installation of Field sensors, Level Switches, Remote control valves, Tank sounding system sensors and other instrumentation works, which are mentioned in the Drawing/MLF/BOM issued by Electrical Outfit Design, are under the scope of contractor. Welding of earth bolts where ever required is under the scope of the sub-contractor.

o. The Price Bid Format, item Sl. No. 22, lists a total of 20 seats for which a direct angle bar is welded onto the deck. For these seats, the outer part must be fully welded, while the inner part should be stitch welded (100mm weld followed by 100mm gap).

p. 690VMSB is to be stich welded at the outside onto the equipment seat (100mm weld followed by 100mm gap) which is in sub-contractor's scope.

q. There would be a total of 10% seats without holes issued to sub-contractor. For these seats the holes are to be drilled at site by the sub-contractor.

r. Hot works in connection with instrumentation works like fitting seats & brass clamps for Gauge Boards and Transmitters, which are not mentioned in the Drawing/MLF/BOM issued by Electrical Outfit Design, will be contractor's scope.

s. CSL shall supply the required number of pads for cable trays & fitting seats and contractor has to fit the same while welding trays/ equipment's to tanks & bulkheads/deck (exposed to weather) or any other area as per installation drawings.

t. Contractor has to undertake the primer touch up (after grinding) in all weld/cut area.

u. Welding shall be carried out only by qualified welders to CSL standard welding procedure. WPS 249/250 certified welders to be arranged by contractor for welding of underwater equipment seats.

v. Any minor modification in the cable way or equipment seat required for the execution of the job shall be done by the subcontractor.

w. Material movement & accounting of the items are in the scope of work of contractor. Contractor shall note down the variations in the quantity of items in MLFs after comparison with the Installation Drawings, record in prescribed formats and submit to CSL Officer in Charge.

x. Survey presentation to Yard I&QC, IHC, Owners and Class authorities as per yard practices which coming under the above scope of work.

y. Rectification of defects as per the comments from Yard I&QC, IHC, Owners & Class authorities.

z. All tools and tackles required for the work are under the scope of the sub-contractor.

aa. Minor staging up to 3-meter height shall be erected by the contractor for the work using CSL material without any separate payment. Any requirement over and above this shall be arranged by CSL separately.

Notes

1. Details for the execution of works are mentioned in the drawings issued by CSL Design Department as per Appendix - D.
2. Minor rectification / modification works have to be undertaken by the contractor as part of the job, at no extra cost. However, major revision works based on the revision drawings issued by Design Department shall be treated as an additional work. Major & minor work shall be decided on a case-by-case basis and the same shall be intimated to the subcontractor and mutually agreed before commencement of the work.
3. Reworks up to +10% of total work order value shall be under contractor's scope.For re-works more than 10% due to amendment in CSL drawings 40% of that particular line item rate is applicable for removal & dry-survey and full installation rate (as per corresponding line item) is applicable for the re installation at new location.
4. Total estimated quantity of items per vessel is indicated in the Price Bid Format (Annexure – V) . Since ship's design modeling works are in progress, the quantity of items indicated is approximate only. After the completion of work, payment will be made on prorata basis as per the actual quantity installed against each type of item.

E. ठेकेदार की अन्य जिम्मेदारियां / OTHER RESPONSIBILITIES OF THE CONTRACOTR

a. The transportation, storage, preservation and protection of the materials etc., intended for installation on the ship, will be under the responsibility of the firm.

b. All works shall be carried out according to approved drawings issued by Yard and Yard/IHC standards provided.

c. All work to comply with the requirements of the Classification Society/ IHC/Owners/Marine standards /CSL Quality standard and based on the building practice of the Yard.

d. Qualified Manpower, equipment's, tools with valid certification, welding sets etc. necessary for the work will be the responsibility of the firm, and should be carried out as per CSL standards.

e. Yard has the right to change the schedules of the project to the interests of the company and the firm should be capable of adjusting the resources according to the instructions from the Yard contact person.

f. Detailed working schedule (Weekly/monthly) etc. to be prepared and submitted to yard personnel. However, a detailed overall schedule, in a reasonable manner should be submitted prior to commencement of work.

g. Localized lighting, DBs etc. for the smooth work to be arranged by the firm. Required general lights/DBs etc. shall be arranged by Yard based on availability.

h. Mobilizing own equipment's, necessary working tools and tackles, safety and protective gear for their personnel inside the yard for carrying out the work as per Safety/Statutory rules/Yard rules of working people under the firm is the responsibility of the firm.

i. Firm shall be responsible for safety and welfare of all its employees employed for construction, and shall be responsible for payment of all salaries to their employees and other statutory dues and for all provisions of statues governing them.

j. Once the item/material is issued to the contractor, proper accounting of the items consumed shall be maintained, till the delivery of vessel.

k. The contractor, on receipt of any material, is requested to immediately verify the quality and quantity of the material with respect to the requirement and inform the executing officer any shortage/discrepancy noted/anticipated well in advance so that CSL can take corrective action in time.

F. सीएसएल का दायरा / SCOPE OF CSL

1. The design & supply of materials for Electrical Installation for the mentioned scope of work.
2. Estimated quantities of welding consumables, grinding and cutting wheels.
3. Estimated quantities of paints, thinner and primer.

4. Power supply, Water, compressed air (at available pressure) and cutting gases at centralized points.
5. Services of CSL cranes and forklifts will be provided subject to availability.
6. Required space for fabrication & working inside the Yard (as on available area)
7. Power and water supply to office space / container / room, at free of cost.
8. Staging above 3M height
9. Necessary items like fire cloth, polythene/silpaulin sheets, Bubble sheets etc required for protection of equipments.
10. Fabrication of Cable tray supports, pads, cable coamings and Equipment seats are under CSL scope.

G. काम करने की पद्धति / METHODOLOGY OF WORKING

a) A detailed project report to be submitted prior to commencement of works.

b) The contractor shall deploy/nominate a person who will be in-Charge of the work for the entire period of project execution. He/she shall keep close liaison with CSL Officers/Supervisors concerned and ensure smooth and satisfactory progress of the work from time to time and shall be available for the entire duration of the project.

c) Necessary competent supervisors for the work, to be deployed.

d) Employees of the firm shall work under close coordination with CSL personnel, structural contractors and Piping/Painting contractors with a conciliatory approach and team spirit to achieve the project completion in time.

e) The Contractor is expected to have full knowledge and understanding of the Labour rates, conditions, practices etc. prevalent in the CSL and premises. The contractor shall be entirely responsible for all matters related to manpower and labour engagement for the subject contract.

f) Issues related to availability and utilization of manpower shall be dealt by the Contractor. Availability of competent labour with requisite skills for the specified jobs shall be ensured by the contractor.

g) The complete work is to be carried out with the highest degree of workmanship under the inspection of CSL,IHC, Classification society (when specifically indicated in the technical specifications), Ship owner, or any other agency nominated by Shipyard .

h) The contractor shall execute the work in every area under instruction/intimation to CSL personnel at site. Clearance from CSL in terms of permits/internal regulations etc. as applicable from time to time shall be obtained. The contractor shall obtain necessary hot

work sanctions, permission to work in confined areas, safety clearance for scaffolding done by the contractor, electrical related provisions etc. as per CSL safety rules.

i) Segregation of waste at source and deposit into the respective pallets is the sole responsibility of the contractor. In case of any mixing of waste, CSL will segregate the waste at the expenses of the contractor.

j) Any material/ fitting/ equipment fitted onboard the vessel is CSL property. Removal of any such item shall be done only with the written approval of officer concerned. 'Permit for Removal and Refitting' has to be meticulously followed to this effect.

k) Contractor has to ensure proper diligence while laying hoses and cables onboard vessel. Separate route to be used for fuel hoses and electric cables. Clear space/ passage for movement of personnel are to be maintained throughout the construction period. CSL reserves the right to confiscate the hoses/ cables those are laid in a haphazard/ inconvenient way or to impose suitable penalty on the contractor.

l) All cables and hoses used by the contractor should have name on every 5 m for easy identification.

m) Half yearly inspection of portable electrical tools and leak testing of cutting hoses are mandatory. Electric tools/ cutting hoses without valid inspection certificate will not be permitted onboard vessel.

n) Hot works are to be carried out as per the existing CSL norms. Timely closing of hot work permits is the responsibility of the Contractor. This is to be done in a regular manner in consultation with the Executing Officer.

o) The contractor has to handle the CSL properties and materials issued to the contractor with due care. CSL reserves the right to recover any losses due to damage/ loss occurred in this regards.

p) All equipment/ portable electric tools, plug boards etc. used by the contractor should have tally plated/ tags for easy identification.

H. काम की अनुसूची / SCHEDULE OF WORK

a) CSL shall indicate the master construction schedule of completion of the work of vessel. The contractor in turn shall submit their detailed scheduled of completion of the work to the officer In-charge. The progress of work shall be made in tandem with the progress of completion of the vessel allowing sufficient time for other interface activities/works.

b) CSL has the right to change the schedules of the project to the interests of the company and the contractor should be capable of adjusting the resources according to the instructions from the CSL contact person.

c) Detailed working schedule (Weekly, Monthly etc.) to be prepared and submitted to yard personnel. However, a detailed overall schedule, in a reasonable manner should be submitted prior to commencement of work.

d) WORKING ON CSL HOLIDAYS: Intimation for working on Saturday / Sunday / holidays if required, should be submitted 2 working days prior to the date of holiday indicating names of personnel to Personnel Department and Security through concerned Department.

e) Performance of Work done shall be evaluated and rated in accordance with the form available in Appendix A.

I. कार्य पूर्ण होने का प्रमाण पत्र / WORK COMPLETION CERTIFICATE

The contractor shall prepare and submit Work Completion Certificate (WCC) after completion of each stage of work. Stage payment shall be made based on duly signed WCC.

J. सुरक्षा / सांविधिक दायित्व / SAFETY/STATUTORY RESPONSIBILITY

a) The contractor shall be entirely responsible for the safety of all the personnel employed by him on the work. In this regard, he should adopt all the required safety measure and strictly comply with the safety regulations in force. A copy of CSL's "Safety Rules for Contractors (Revised)" is available with SBOC Department for reference.

b) The Contractor should arrange to suitably insure all his workmen/other personnel in this regard. CSL will not be responsible for any injury or illness to the Contractor's workmen/other personnel during execution of the works due to whatsoever reasons.

c) In this regard, the Contractor will have to fully indemnify CSL against any claims made by his workmen/other personnel.

d) The Contractor shall provide and maintain so as to be readily accessible during all working hours, a first aid box with prescribed contents at every place where he employs contract labour for executing the works.

कृते उप महाप्रबंधक / For Deputy General Manager
आउटसोर्सिंग विभाग / Outsourcing Department

विधु सेबास्टियन
VIDHU SEBASTIAN
वरिष्ठ प्रबंधक /Senior Manager
कोचीन शिपयार्ड लिमिटेड
Cochin Shipyard Ltd.
कोच्ची / Kochi-682 015

ANNEXURE- IV

तकनीकी वाणिज्यिक जांच सूची / TECHNO COMMERCIAL CHECK LIST

(To be submitted by the bidder)

TENDER NO. SB-OSD/TSHD/887/2024 Dtd. 19-07-2024

(Bidders may confirm acceptance of the Tender Conditions/deviations if any to be specified)

SL No.	Tender Enquiry Requirements	Confirmation from bidder (strike off whichever is not applicable)	Specific comments /Remarks
1	Scope of work as per Technical Specification/Drawings/ General Terms & conditions (Annexure III)	Agreed as per tender /Do not agree	
2	Whether technical bid & price bid are submitted in separate E-mails?	Yes / No	
3	Schedule of work as specified in technical specification/ price bid of this tender is acceptable?	Yes/ No	
4	Submission of Information/Documents relevant as per clause 2 & 3 of Annexure I	Submitted/Not submitted	
5	Offer Validity (date)	90days - Agreed as per tender/Do not agree	
6	Completion period as mentioned in the tender enquiry is acceptable	Yes/ No	
7	Taxes & Duties	Specified/included in Price	
8	Payment terms - confirm		
a	Payment terms as per Annexure-I, Clause 12.	Agreed as per tender/Do not agree	
b	Any others (Specify details)		
9	Price shall remain firm and fixed and No Escalation in prices after awarding of contract	Agreed as per tender/Do not agree	
10	Security Deposit & Performance Guarantee as per Annexure-I Clause 13 & 14.	Agreed as per tender/Do not agree	
11	Termination of contract/risk purchase as per relevant clause in the terms & conditions of tender enquiry is acceptable	Yes / No	

12	Force Majeure	Agreed as per tender/Do not agree	
13	Liquidated damages and cancellation of contract	Agreed as per tender/Do not agree	
14	Arbitration & Jurisdiction clauses	Agreed as per tender/Do not agree	
15	Confirm all other terms and conditions of our enquiry are acceptable.	Confirmed/Not confirmed	
16	Confirm, un-priced price bid (price bid without price) is submitted with Part – I bid	Confirmed/Not confirmed	
17	Fully aware about the safety, general rules, regulations, standards, entry pass eligibilities etc.?	Yes / No	
18	Bidder shall not be under a declaration of ineligibility issued by Govt. of India/ State govt./ Public Sector Undertakings etc. The bidder shall not have been debarred / black listed by CSL or by any of the Public Sector Undertaking or Government department etc.	Self declaration submitted/Not submitted	
19	Is your firm registered under TReDS?	Yes/No	
20	Does your firm have valid registration under statutory schemes such as ESI / EPF	Yes/No	
21	Submission of MSME and NSIC registration document with offer	Submitted/Not submitted	
22	Deviations from Tender conditions	No Deviations /Deviations are specified	

हस्ताक्षर / Signature:

ठेकेदार का पता / Address of the Contractor

मुहर / Seal:

ANNEXURE-V

मूल्य बोली प्रारूप / PRICE BID FORMAT

TENDER NO. SB-OSD/TSHD/887/2024 Dtd. 19-07-2024

ELECTRICAL OUTFIT STRUCTURAL WORKS – INSTALLATION OF CABLE WAYS & EQUIPMENT SEATS OF TRAILING SUCTION HOPPER DREDGER (TSHD –SH 037)

Sl. No.	Particulars	Type	Approximate Quantity (Nos)/ Vessel. (a)	Unit Price (INR) (b)	Total amount (c) = (a)*(b) in INR
1	Cable rack	LSH15/20/30	297		
2		LSH/40/50	243		
3		LSH/60	520		
4		LSR15/20/30	49		
5		LSR40/50	58		
6		LSR60	62		
7	Cable saddle "FB and SFG" type	FB3-070/200/330H	3476		
8		FB5-070/200/330H	1826		
9		SFG3-070/200/330H	1500		
10		SFG5-070/200/330H	1000		
11	Penetration	Cable coamings, DC-4520, DC-3010, DC-4515, DC-5015, DC-3015, DC-3020, DC-4035, DC-3030, DC-4020	34		
12		MCT (Type) S6+6x1, S8x1, S8x2, S8+8x1, S8+6x1, S8+8x2, S8+8x3, S4+4x1,S6+6x3	83		
13		MCT (Type) S4x4, S4x1, S6x1, S2x1	64		
14		MCT box type for weather deck (S2X1- 5),(S4X1-10)	15		
15	Gland W pipe	Gland with pipe All types	180		

Sl. No.	Particulars	Type	Approximate Quantity (Nos)/ Vessel. (a)	Unit Price (INR) (b)	Total amount (c) = (a)*(b) in INR
16	Goose neck	All types	15		
17	Electrical Equipment Seat		12000kg		
18	Flat bar	Fabrication and installation of special type flatbars from standard length of 50mmx4mmx6m	300 m		
19		Fabrication and installation of special type flatbars from standard length of 100mmx4mmx6m	100 m		
20	Electrical Conduit Pipes	25NB	24 m		
		32NB	276 m		
		40NB	180 m		
		50NB	24 m		
		80NB	60 m		
		100NB	36 m		
21	Structural works related to underwater equipments – Speed Log, Echo Sounder and ICCP		Lumpsum		
22	Equipment seats to be welded directly (20 Nos. approx 1640kg)		100 m		
23	SUB TOTAL AMOUNT EXCLUDING GST (SUM OF SL No.1 to SL No.22)				
24	GST ----- % HSN Code : ……				
25	LANDED COST INCLUDING GST (SL No 23 + 24)				

Grand Total amount (in words) Rupees……
……

NOTE:

A. Price basis: For Destination (at CSL).
B. L1 will be determined based on Sub total Amount at Sl. No. 23 . (Sum of of Sl. No. 1 to 22) excluding GST.
C. Total estimated quantity of items per vessel is indicated in the Price bid Format. Since ship's design modeling works are in progress, the quantity of items indicated is approximate only. Hence Downward or upward variation of quantity shall be anticipated. As the work being urgent, Tender will be processed with this quantity and evaluation of L1 will be done based on the above figure. After the completion of each stage of work, payment will be made as per as per WCC and Payment Terms and Conditions.
D. GST as per the prevailing rate will be paid.
E. L1 declaration will be based on the price bid verification by CSL finance dept as per the calculation specified.
F. The L1 bidder will be awarded Electrical Outfit Structural Works - Installation Of Cable Ways & Equipment Seats Of Trailing Suction Hopper Dredger (TSHD- SH 037)
G. Work Performance shall be evaluated and rated based on Appendix A.
H. Reworks up to +10% of total work order value shall be under contractor's scope.
I. For re-works more than 10% due to amendment in CSL drawings 40% of that particular line item rate is applicable for removal & dry-survey and full installation rate (as per corresponding line item)is applicable for the re installation at new location.
J. Unit rate quoted per Nos/Kg. should include labour charge, handling charge, Equipments, Tools & tackles, consumable charges and any other cost included for the satisfactory completion of all works as per drawings and scope of work mentioned at Annex-III.

Signature of Contractor/authorized signature
of firm or agency:
Name of contractor or authorized signatory
of firm/agency:
Designation:
Address:
Contact No:

ANNEXURE-VI

PRE CONTRACT INTEGRITY PACT
COCHIN SHIIPY ARD LIMITED
OUTSOURCING DEPARTMENT

General

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on …….…… day of the month of ……..……., between Cochin Shipyard Ltd (CSL), A Government of India Enterprise under the Ministry of Ports, Shipping & Water Ways having its registered office at Cochin, Kerala, India (hereinafter called the "PRINCIPAL") of the First part and M/s……...…… (hereinafter called the "BIDDER/Seller") of the second part.

WHEREAS the PRINCIPAL proposes to procure ……..…… and the BIDDER/Seller is willing to offer/has offered the stores and

WHEREAS the BIDDER is a private company / public company / Government undertaking / partnership/registered export agency, constituted in accordance with the relevant law in the matter and the PRINCIPAL is a Government of India Enterprise.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any Influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the PRINCIPAL to obtain the desired said stores/equipment/item at a competition price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERs to abstain from bribing or indulging in any corrupt practice in order to secure the Contract by providing assurance to them that their competitors will also abstain from bribing d Other corrupt practices and the PRINCIPAL will commit to prevent corruption, in any form, b its Officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:-

Commitments of the PRINCIPAL

1.1 The PRINCIPAL undertakes that no official of the PRINCIPAL, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or

through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting on implementation process related to the contract.

1.2 The PRINCIPAL will, during the pre-contract stage, treat all BIDDERs alike and will provide to all BIDDERs the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to other BIDDERs.

2. In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the PRINCIPAL with full and verifiable facts and the same is prima facie found to be correct by the PRINCIPAL, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the PRINCIPAL and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the PRINCIPAL the proceedings under the contract would not be stalled.

3. COMMITMENTS OF BIDDERS

The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following:-

3.1 The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the PRINCIPAL, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

3.2 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the PRINCIPAL or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract of any other contract with the government for showing or forbearing to show favour or disfavor to any person in relation to the contract of any other contract with the Government.

3.3 BIDDERs of foreign origin shall disclose the name and address of their Indian agents and representatives, if any and Indian BIDDERs shall disclose their foreign principals or associates, if any , in the bid

3.4 BIDDERs shall disclose the payments to be made by them to their Indian agents/brokers or any other intermediary, in connection with this bid/contract and the payments have to be in Indian Rupees only.

3.5 The BIDDER further confirms and declares to the PRINCIPAL that the BIDDER is the original manufacturer/ integrator/authorized agent of the stores/equipment/items and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the PRINCIPAL or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

3.6 The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the PRINCIPAL or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

3.7 The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

3.8 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.9 The BIDDER shall not use improperly, for purposes of competition or personal gain, pass on to others, any information provided by the PRINCIPAL as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

3.10 The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

3.11 The BIDDER shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.

3.12 If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly, is a relative of any of the officers of the PRINCIPAL, or alternatively, if any relative of an officer of the PRINCIPAL has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filing of tender.

The term 'relative' for this purpose would be as defined in section 6 of the Companies Act 1956.

3.13 The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee or the PRINCIPAL.

4. PREVIOUS TRANSGRESSION

4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify; BIDDER's exclusion from the tender process.

4.2 The BIDDER agrees that if it makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

5. EARNEST MONEY (SECURITY DEPOSIT)

5.1 While submitting commercial bid, the BIDDER shall deposit an amount NIL (to be specified in RFP) as Earnest Money as applicable/Security Deposit, with the PRINCIPAL through any of the following instruments:

(i) Bank Draft or Pay Order in favor of CSL.
(ii) A confirmed guarantee by an Indian Nationalized Bank, promising payment of the guaranteed sum to the PRINCIPAL on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the PRINCIPAL shall be treated as conclusive proof of payment.
(iii) Any other mode or through any other instrument (to be specified in the RFP).

5.2 The Earnest Money if applicable/Security Deposit shall be valid upto the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and the PRINCIPAL, including warranty period.

5.3 In case of the successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the PRINCIPAL to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

5.4 No interest shall be payable by the PRINCIPAL to the BIDDER on Earnest Money/Security Deposit for the period of its currency.

6. SANCTIONS FOR VIOLATIONS

6.1 Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the PRINCIPAL to take all or any one of the following actions, wherever required:-

(i) To immediately call off the pre contract negotiations without assigning any reason or giving any; compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.

(ii) The Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/ Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the PRINCIPAL and the PRINCIPAL shall not be required to assign any reason therefore.

(iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.

(iv) To recover all sums already paid by the PRINCIPAL, and in the case of an Indian BIDDER with interest thereon at 2% above the prevailing Prime Lending Rate of State Bank of India, while in case of a BIDDER from a country other than India with interest thereon at 2% above the LIBOR (London Inter Bank Offer Rate). If any outstanding payment is due to the BIDDER from the PRINCIPAL in connection with any other contract for any other stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.

(v) To en cash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the PRINCIPAL, along with interest.

(vi) To cancel all or any other contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to the PRINCIPAL resulting from such cancellation/recession and the PRINCIPAL shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

(vii) (vii) To debar the BIDDER from participating in the future bidding processes of CSL for a minimum period as deemed appropriate, which any be further extended at the discretion of the PRINCIPAL.

(viii) To recover all sums paid in violation of this Pact by BIDDER(s) to any middle man or agent or broker with a view to securing the contract.

(ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the PRINCIPAL with the BIDDER, the same shall not be opened.

(x) Forfeiture of Performance Bond in case of a decision by the PRINCIPAL to forfeit the same without assigning any reason for imposing sanction for violation of this pact.

6.2 The PRINCIPAL will be entitled to take all or any of the actions mentioned at para 5.l (i) to (x) of this pact also on the Commission by the BIDDER or any one employed by it or

acting on its behalf (whether with or without the knowledge of the BIDDER), of an offence as defined in chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the PRINCIPAL to the effect that a breach of the provisions of this pact has been committed by the BIDDER shall be binding on the BIDDER. However, the BIDDER can approach the Independent Monitor(s) appointed for the purposes this Pact.

7. FALL CLAUSE

7.1 The BIDDER undertakes that it has not supplied/is not supplying similar product/systems/items or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems/items was supplied by the BIDDER to any other Ministry/Department of the Government of India or PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the PRINCIPAL, if the contract has already been concluded.

8. INDEPENDENT MONITORS

8.1 The PRINCIPAL has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance Commission.
Shri. Jagadip Narayan Singh, IAS (Retd.),
C-54, Bharatendu Harischandra Marg,
Anand Vihar, Delhi - 110092.
Mobile: 9978405930
Email: jagadipsingh@yahoo.com

8.2 The task of the Monitors shall be to review independently and objectively, whether and to what extend the parties comply with the obligations under this Pact.

8.3 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

8.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.

8.5 As soon as the Monitor notices, or has reason to believe, a violation of this pact, he will so inform the Authority designated by the PRINCIPAL.

8.6 The PRINCIPAL accepts that the Monitor has the right to access without restriction to all Project documentation of the BUYER including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unlimited access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with confidentiality.

8.7 The PRINCIPAL will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

8.8 The Monitor will submit a written report to the designated Authority of PRINCIPAL/Secretary in the Department/ within 8 to 10 weeks from the date of reference or intimation to him by the PRINCIPAL /BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

9. FACILITATION OF INVESTIGATION

In case of any allegation of violation of any provisions of this pact or payment of commission, the PRINCIPAL or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER. The BIDDER shall provide necessary information and documents in English and shall extend all possible help of the purpose of such examination/inspection.

10. LAW AND PLACE OF JURISDICTION

10.1 This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the PRINCIPAL.

10.2 A person signing Integrity Pact shall not approach the Courts while representing the matters to Independent External Monitors and shall await await their decision in the matter

11. OTHER LEGAL ACTIONS

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extent law in force relating to any civil or criminal proceedings.

12. VALIDITY

12.1 The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the contract to the satisfaction of both the PRINCIPAL and the BIDDER/Seller, including warranty period, whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

12.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

The parties hereby sign this Integrity Pact at……on……

For & on behalf of PRINCIPAL For & on behalf of BIDDER

Cochin Shipyard Limited (Office Seal)
(Office Seal)

Witness	Witness
1…..……	1…..……
2…..……	2…..……

* Provisions of these clauses would need to be amended/deleted in line with the policy of the BUYER in regard to involvement of Indian agents of foreign suppliers.

APPENDIX-A

PERFORMANCE EVALUATION FORM

	Evaluation Grade Points Awarded (Grade Points X Weightage)					
Parameters	Grade	Excellent	Good	Average	Bad	Very Poor
	Weightage	**5**	**4**	**3**	**2**	**1**
Timely Completion as per Project schedule	10					
Work Planning & Coordination	2					
House Keeping and HSE	2					
Responsiveness to critical and complex works	2					
Overall Quality Management	2					
Integrity and Professionalism	2					
Total Grade Points *(sum of points in each grade)*	**20**					
Grand total of grade points awarded (Max 100)						

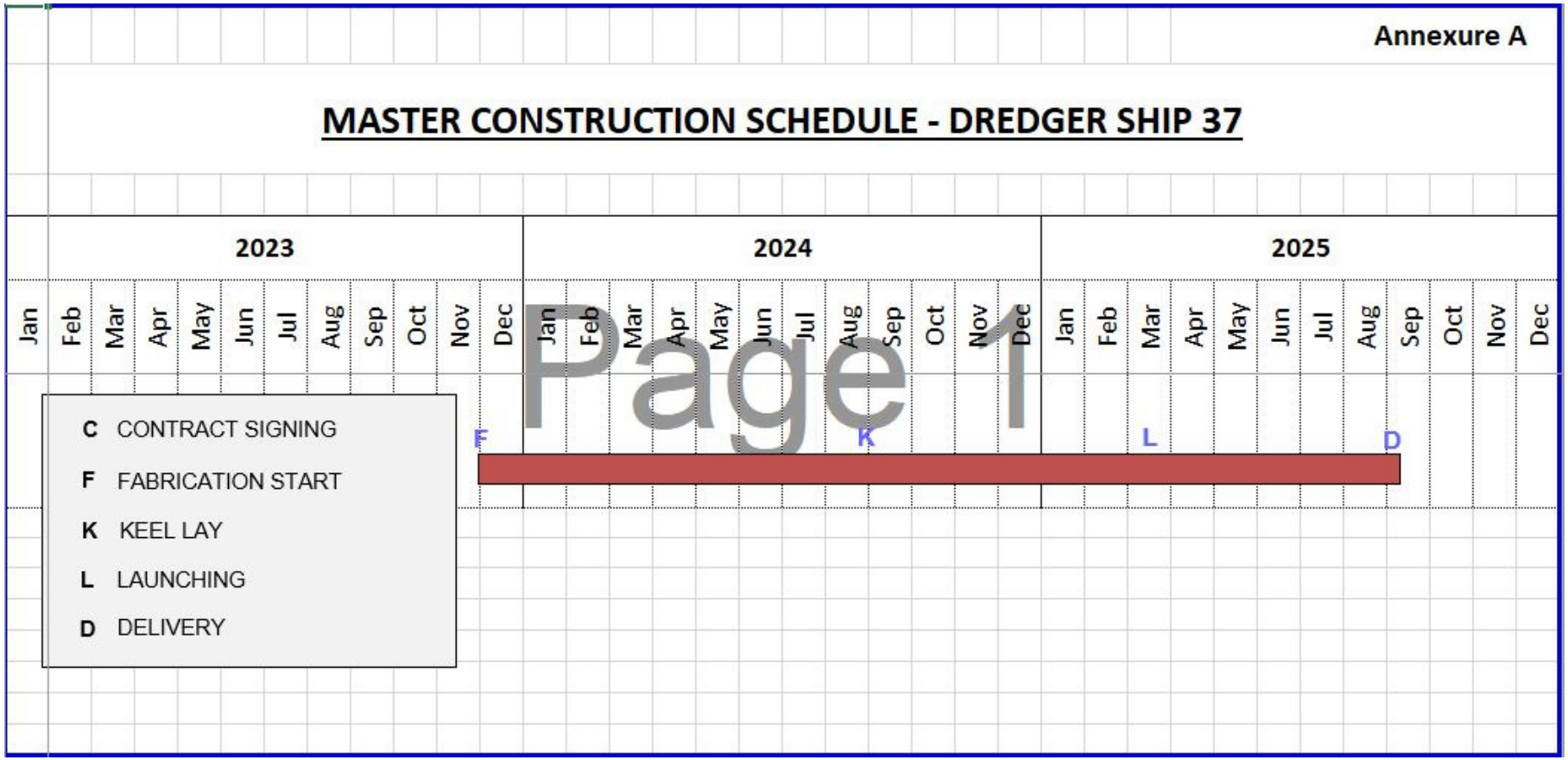
Points to be considered during evaluation

Timely Completion as per Project schedule	Completion of work within stipulated time, including class surveys & till submission of proper quotation. (No Reworks/Survey failures)
Work Planning & Co-ordination	Planning of (material, labour & machinery) for smooth execution of work, coordination with multiple agencies/stakeholders, Pro-active approach in avoiding hindrance of work, Supervisory skills, communication etc.
Responsiveness to critical and complex works	Willingness to execute complex works understanding the importance of the work for CSL, deployment of adequate workers in time & round the clock in critical tasks.
Overall Quality Management	Quality of Work, No of QC/Class survey points, Re-works, RT/Survey Failures, quality of manpower, supervisors etc. to be considered
House Keeping and HSE	Adherence to CSL HSE policies and instructions, use of PPEs, commitment & continuing practises for good housekeeping at site, daily tool box meetings at site.
Integrity and Professionalism	Responsiveness & commitment to work, uniforms to workers, appropriate & polite behaviour at site, ethics in preparation of quotations, corrections in quotation, proper documentation.

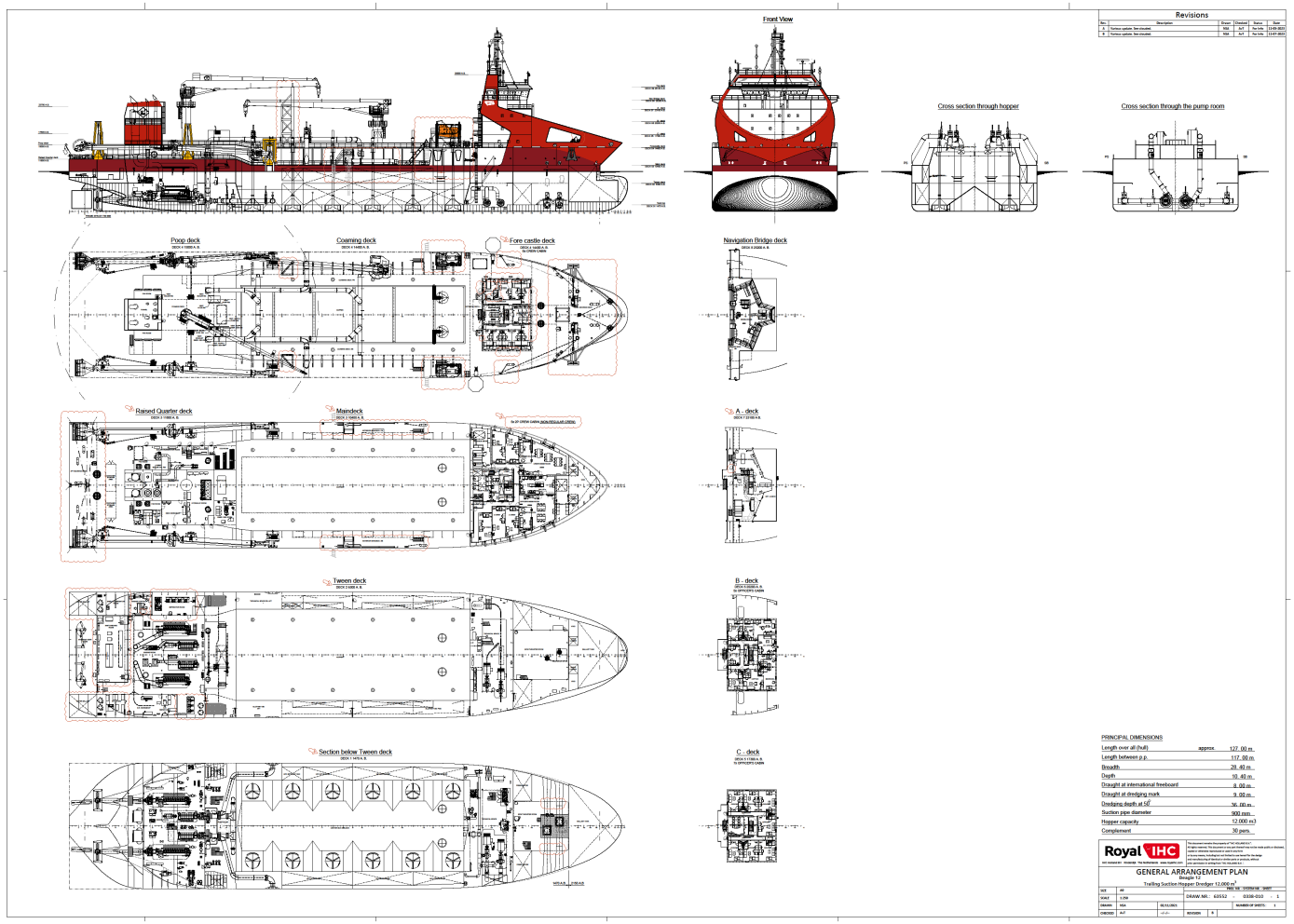
Signature (CSL Officer in-Charge)	
Name & Design	

APPENDIX - B

MASTER CONSTRUCTION SCHEDULE



APPENDIX – C
GENERAL ARRANGEMENT (GA) OF VESSEL



APPENDIX - D

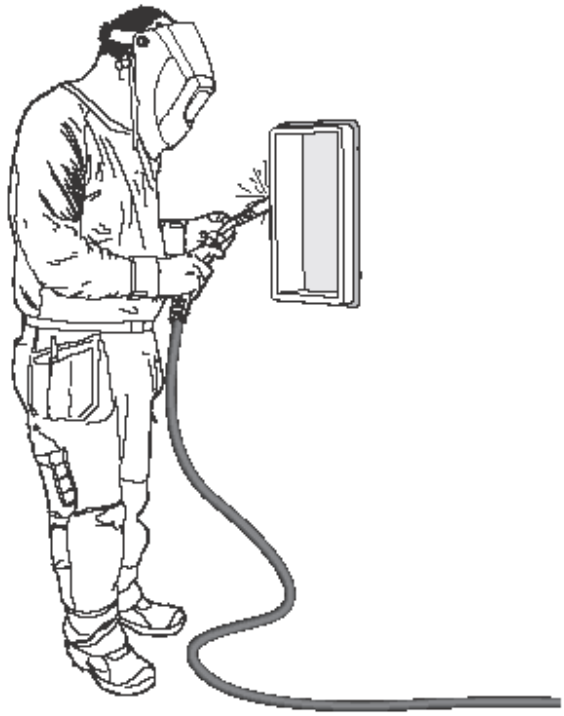
Sr No	Drawings issued by CSL for work execution	Remarks
1	Electrical outfitting practice and standards	
2	Fitting arrangement of electrical equipment seats and cable way	
3	Fabrication Drawing of electrical equipment seats and cable way Supports	
4	Material List of Fittings – F Items	

APPENDIX - E - MCT WELDING PROCEDURE – ROXTEC

Roxtec

Description and application guidelines

Roxtec welding guidelines



Prepared for: Roxtec International AB
Date: 2023-04-20
Author: Jens Bohlin, Anders Hansson
Roxtec International AB, Box 540, Karlskrona, Sweden

roxtec.com

Abstract

This guideline is a help for the welding responsible to produce a welding procedure specification (WPS). This can be unique for every site due to local requirements and regulations.

Personnel competence recommendations

For reliable and high quality results, welders are recommended to be qualified according to the latest editions of AWS D1.1, ISO 9606-1 2013, ISO 9606-2 2004 or other authorized system.

Welding methods described in the guideline

- Shielded metal arc welding (SMAW)
- Flux core arc welding (FCAW)
- Gas tungsten arc welding (GTAW)

Welding consumables

Welding consumables are to be chosen depending on the materials that shall be welded together. Shall be handled and treated according to instructions from manufacturer of consumables.

Welding quality levels for imperfections of the frame

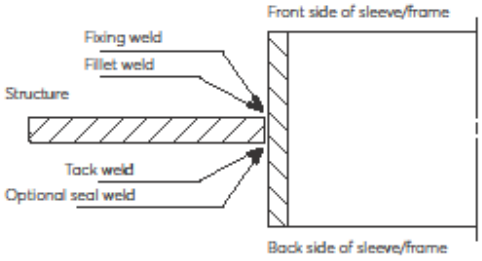
Roxtec frames manufactured in mild steel and stainless steel are welded according to EN-ISO 5817 Min Class C. Aluminum frames are welded according to EN-ISO 10042 Min Class C.

Requirements after welding

The Roxtec system is certified for pressure up to 6 bar. Therefore we recommend undestructive testing of the welds such as liquid penetrant, ultrasonic testing and magnetic particle testing. The dimensions should be according to the table on page 9 to obtain optimal performance of the transit.

Legend

Location of various welds between structure and sleeve/frame.

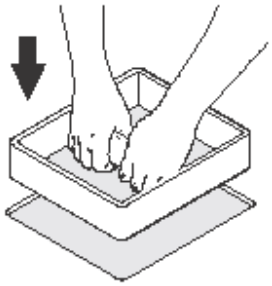


Contents

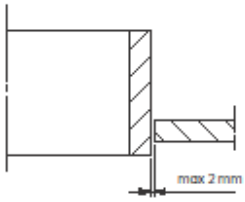
1 Aperture and weld buildup

1.1 For frames without flange

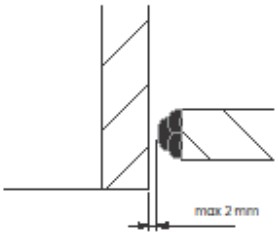
Make the aperture as close to the frame outer dimension as possible to avoid large root gaps. Max allowed total root gap before welding is 2 mm. Larger gaps must be minimized using weld buildup to avoid deformation of the frame. The weld buildup shall not be made on the frame.



Measure the aperture using the frame.



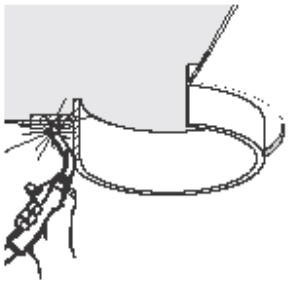
Maximum total root gap for fillet weld.



Weld buildup of aperture shall be performed on the structure.

1.2 For frames with flange

Make the aperture considering the minimum clearance of 15 mm. The edge of the aperture should be placed at the center of the flange of the frame to make room for welding on the inside.



Position of frame with flange in an aperture.

2 Positioning and fixing

The frame or sleeve can be centered or fixed in a corner of the aperture at any depth or angle. It is important not to exceed the maximum allowed root gap also when welding the frame in an angle. Frames and sleeves with flange must cover the aperture in full.

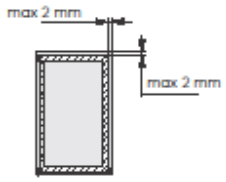
Check fire certification with regard to allowed positioning.

2.1 Positioning

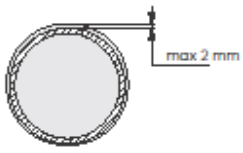
When positioning the frame in weather exposed areas it is recommended to have the frame or sleeve protruding and/or tilted from the structure to prevent standing water and icing on the transit. Frames and sleeves welded to moving structures should be tilted away from the direction of travel if possible.

2.2 Fixing

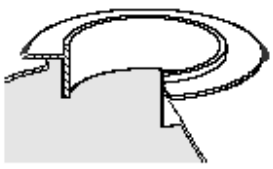
The frame can be centered or fixed in a corner of the aperture at any depth. The maximum allowed root gap is 2 mm to prevent heat deflection.



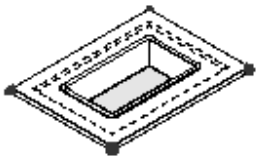
Fixing of rectangular frame without flange.



Fixing of sleeve without flange.



Fixing of sleeve with flange.



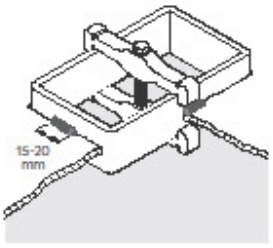
Fixing of rectangular frame with flange.

3 Tack weld

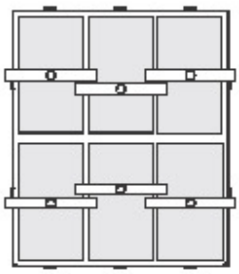
Apply tack welds with a length of 15–20 mm on the back side at the corners and in the center of every opening of the flange. Use an appropriate tool to clamp the frame in tolerance during the whole welding process to avoid heat deflection. Do not remove the tool until the frame has a temperature below 50°C.

Fixing tools are required in all openings on combination frames of size x1, x2 and x3. On combination frames >x4, it is only required to use fixing tools at the side openings.

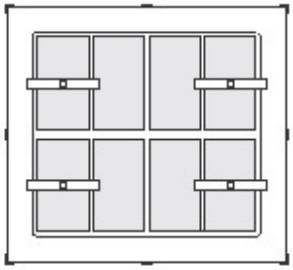
Note: If the fillet weld is applied on only one side, the tacking must be made on the opposite side.



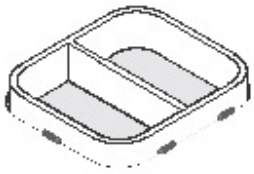
Clamp tool applied on a rectangular frame without flange.



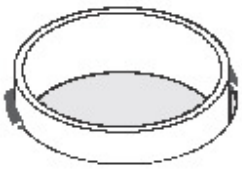
Tack weld of a rectangular combination frame without flange.



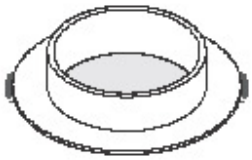
Tack weld of a rectangular combination frame with flange.



Tack welded rectangular frame without flange.

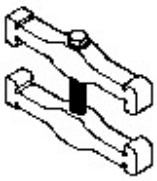


Tack weld of a sleeve without flange.



Tack weld of a sleeve with flange.

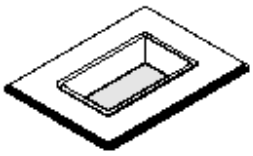
Roxtec welding fixtures are used on S series frames and are designed to prevent frames from expanding out of tolerance during welding. By clamping the frame partition walls early in the welding process, the heat input from the weld is managed.



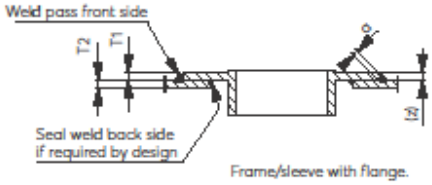
Roxtec Welding fixture tool

4 Fillet and seal weld

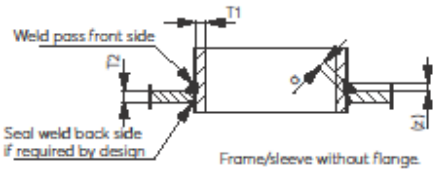
- Apply the fillet weld in several weld seams on the front side with an interpass temperature below 150°C for stainless steel or aluminum and below 250°C for mild steel. The weld runs shall not exceed 150 mm/weld pass.
- Grind off the tack welds on the back side before applying the optional seal weld.



Note: The optional seal weld is for corrosion protection only and not mandatory unless specified by the design.



Frame/sleeve with flange.



Frame/sleeve without flange.

Weld sizes				Max heat input (kJ/mm)		
Frame thickness T1	**Structure thickness T2**	**Fillet weld size (max)**	**Seal weld size (max)**	**Mild steel**	**Stainless steel**	**Aluminum**
5–6	3<T2<12	a3 (z4)	a3 (z4)	1.1	1.0	0.8
10–12	≤6	a4 (z5)	a3 (z4)	1.1	1.0	0.8
10–12	>6	a5 (z7)	a3 (z4)	1.1	1.0	0.8

$$Q = \frac{k \times U \times I \times 60}{v \times 1000}$$

Q	=	Heat input	[KJ/mm]
U	=	Voltage	[V]
I	=	Current	[A]
v	=	Welding speed	[mm/min]
k	=	Thermal efficiency	[dimensionless]

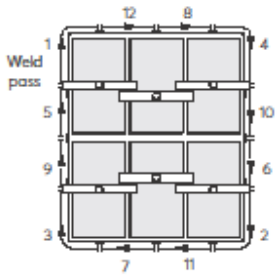
Welding method	Thermal efficiency
MMA (manual metal arc, SMAW)	0.8
MIG/MAG (metal inert gas/metal active gas, GMAW)	0.8
TIG (tungsten inert gas, GTAW)	0.6

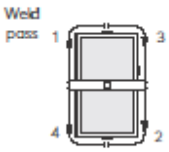
4.1 Weld passes – frames/sleeves without flange (horizontal weld)

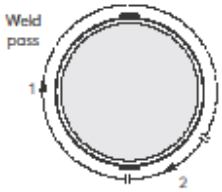
The weld passes are evenly distributed to reduce heat buildup. Take weld length and interpass temperatures into consideration when welding large frame sizes.

Horizontal MMA welding

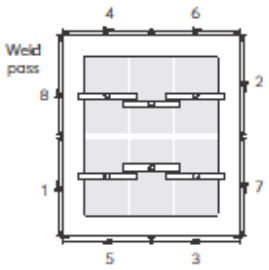
Horizontal MAG welding

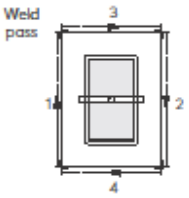


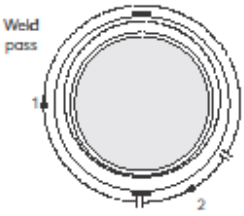




4.2 Weld passes – frames/sleeves with flange (horizontal weld)





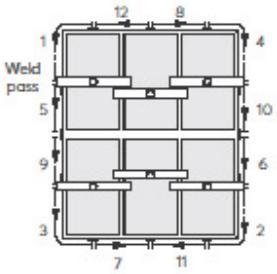


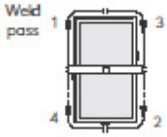
4.3 Weld passes – frames/sleeves without flange (vertical weld)

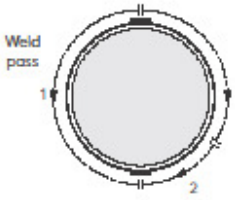
Make sure to fix the frame or sleeve with a gap all around the circumference and to use filler metal approved for welding position vertical welding (ISO 6947 position PG). A 45° upward angle of the welding gun is recommended for the weld passes.

Vertical MMA welding

Vertical MAG welding

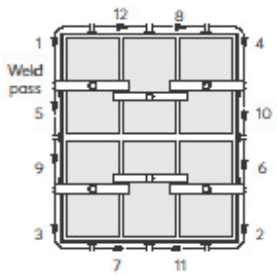


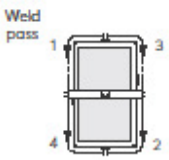




4.4 Weld passes – frames/sleeves with flange (vertical weld)

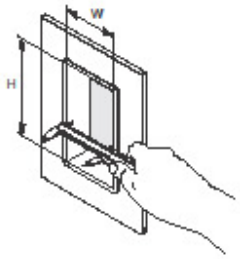
Make sure to fix the frame or sleeve with a gap all around the circumference and to use filler metal approved for welding position vertical welding (ISO 6947 position PG). A 45° upward angle of the welding gun is recommended for the weld passes.

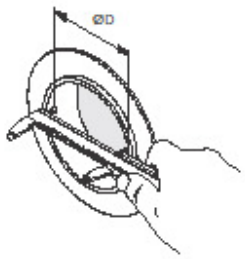




5 Measuring

Measure 10 mm into the frame depth on the front and back side in accordance with the table after welding. The measurements are to be made with a frame or sleeve temperature below 50 °C. Make sure not to tilt the caliper while measuring.





Frame dimensions

Size	H (mm)	W (mm)
1	100–102	59–61
2	100–102	119–121
3	159–161	59–61
4	159–161	119–121
5	217–219	59–61
6	217–219	119–121
7	277–279	59–61
8	277–279	119–121

Sleeve dimensions

Size	ØD (mm)
25	25–26
31	31–32
43	43–45
50	50–52
68	68–70
70	70–72
75	75–77
100	100–102
125	125–127
150	150–152
175	175–177

Sleeve dimensions

Size	ØD (mm)
200	200–202
225	225–228
250	250–253
300	300–303
350	350–353
400	400–404
450	450–454
500	500–504
550	550–554
600	600–604
644	644–648

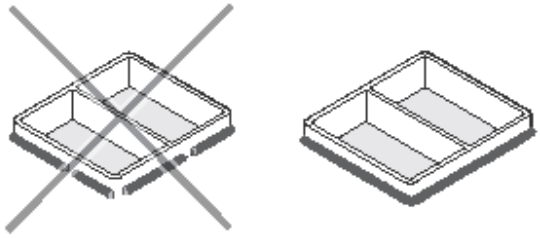
Note:
A frame exceeding tolerance might not reach the full pressure withstand performance without additional compensation modules. Contact Raxtec for consultation.

6 Caution!

Even though the guideline is an help to make safe welds, it is important to be aware of potential errors that can lead to system failure. Below sections are examples of errors that can occur during welding.

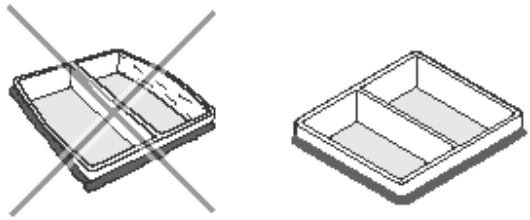
6.1 Intermittent welds

Make sure to overlap weld seams.



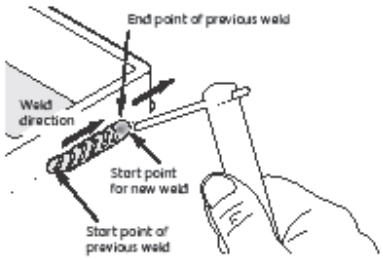
6.2 Exceeding the recommended weld size

Excessive welding or too large heat input can cause the frame to deflect and thereby increase the packing space, lowering the compression in the sealing system.



6.3 Weld pass

Start a new weld seam from an end point of a previous weld.



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General design installation

Quality manual

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Approval

Name	Role	Date	Signature
P. van Dalen	Author	10-03-2022	
F. Verschuuren	Quality Control	14-06-2022	
T. van Buren	Approval	14-06-2022	

Table of contents

Revision Control

Any revision on this quality book can be proposed and will be reviewed and confirmed by the responsible E&A engineers prior to the implementation. If required other departments inside Royal IHC will be consulted.

References

No.	Document	Reference
1	Record abbreviations	SH037-106000-0005-Z290
2	EMC management control document	SH037-101000-0006-I130
3	Inspection procedure steelwork	SH037-106000-2002-Z137
4	Inspection procedure cabinet	SH037-106000-2003-Z137
5	Inspection procedure final room	SH037-106000-2001-Z137
6	Standard materials electrical installation	SH037-106000-2002-M035
7	Cable wire colour table	SH037-880000-0009-SY35
8	Electrical installations in ships-Part 352	NEN-IEC 60092-352:2006
9	Basic agreements for cable trays	Royal IHC Yard standard I117
10		
11		
12	Typical cable supports welded to primary constr.	Royal IHC Yard standard I116-6
13	Cable fixation strip at cable pipe ends	Royal IHC Yard standard C730 & C730SS
14	Dimensions of steel pipes	Royal IHC Yard standard C101
15	Dimensions of threaded sockets	Royal IHC Yard standard C330M-ST52
16	Pipe clamps	Royal IHC Yard standards I114 & I119-1

Definitions and abbreviations

Definitions and abbreviations are listed in the Record abbreviations reference document[1].
Abbreviations and definitions which are specific for this document:

Electrical contractor	Any contractor supplying and installing an electrical installation or system
Cable routing	The entire design which defines how cables have to follow the cable tray network.
Cable tray routing	The entire design which defines how cable trays have to be installed.
Cable tray	A standard metal construction provided on board to support cables.
Cable strip	A standard metal construction on board to support a limited number of cables.
Cable pipe	Galvanized steel cable pipe is applied where cables are led through for mechanical and/or EMC protection.
Multi Cable Transit (MCT)	A standard part which is designed to be installed in a water or weather tight or fire integrity deck or bulkhead and trough which a group of cables can pass.
Cable gland	A standard part to provide a watertight penetration for a single cable.
Coaming	A provision to protect cables for damage by hitting or water flooding.
Bending radius	The minimum bending radius for a cable as specified by its manufacturer or any other recognized regulatory body.
Cable binder (i.e. TY-RAP)	A standard piece of material to fasten one or more cables.

1. Introduction

The purpose of this document is to specify the minimum standards of the electrical installations for projects to be built at/or under contract of Royal IHC.

Project specific requirements will be attached to this manual with a separate project specific document.

Each electrical contractor who is installing electrical systems or installations is responsible for adequate and suitable tools for the intended services.
Examples are, but not limited to:

- Torque tools for securing/confirming the electrical connections (only for rail connections and main feeder cables)
- Calibrated testing instruments
- Tools for fitting ferrules and cable lugs
- Cable peeling knives
- Etc.

The electrical contractor have to use the materials as described in standard materials electrical installation reference document[6].

When alternative standards for the execution of electrical installations on board are used by any contractor it is up to Royal IHC to decide whether these are equivalent to the ones as described in this document. The electrical contractor cannot derive any right to deviate from these standards if any electrical system or installation from others is not in compliance with these standards.

All Equipment, cables, materials should be installed according vendor documentation and according this document. In case of any deviation Royal IHC have to decide.

1.1 Standard

The standards described in this document are based on:

- Rule requirements (i.e. Bureau Veritas, Det Norske Veritas or Lloyds Register of Shipping)
- IEC publications applicable for the project
- Common practice of workmanship for maritime electro technical installations
- Royal IHC standards
- Earthing and EMC according “EMC management control document” reference document [2]

2. Cable support systems

This chapter describes the principals of the cable supporting systems.

2.1 Common practice

Cable tray routing is a design and engineering activity which describes the location, position and sizes of the cable tray network and it consist of cable trays and penetrations. This information should be available on production drawings in time according planned activities.

Secondary iron-works like cable strips and cable pipes are to be determined during pre-outfitting and outfitting period and is based on the installation engineering activities of all electrical equipment. Relevant information should be available in time according planned activities.

The following criteria to be observed during the cable tray routing design activities;

- Cable tray to be applied within the range of 100mm and 600mm.
- The supports, including the welds, to have sufficient strength to carry the expected cable load.
- Bends in cable trays to be curved. The radius depends on the type of cables placed on these cable trays. Generally no straight angle bends (90 degrees) are allowed. See also “Basic agreements for cable trays” reference document [9].
- Separation of cabling have to achieve the EMC requirements according “EMC management control document” [2].
- Cable tray routing to be away from excessive heat areas or surfaces such as boilers or exhaust gas lines etc.
- Cable tray routing to be free from service, transport or hoisting areas.
- Crossings of cable trays on the same height are not allowed.
- Suitable protection against mechanical damages to be provided.
- Cables for essential services may not pass through high fire risk areas such as galley’s, engine-, boiler- and separator rooms. Special precautions need to be considered such as fire insulated cable pipes or cable ducts.
- When length and movement differences are to be expected, expansion points must be provided in the cable tray routes.
- Where required for any additional protection (electromagnetic or mechanic) cables to be installed in pipes or ducts.
- Cables may only be installed on/in dedicated provisions like, cable trays, cable strips and cable pipes and may not be installed on other structures like liquid piping, air ducts, foundations or their supports.
- Generally the supports for cable trays, cable pipes and cable strips are to be attached to the ship’s structure.
- Size and location of additional penetrations which are not available in the design documents and which are to be decided by production department are to be checked with the ship’s structural design parameters in cooperation with the Royal IHC engineering department.

2.2 Material

Cable tray supports and cable strips to be of steel S235JR sand blasted SA 2.5 and provided with shop primer before installing on board.

Cable pipes to be of galvanized steel.

Only in accommodation areas and general service areas (i.e. stores) synthetic pipes may be applied for local cabling. Such cable pipes to be of low smoke, self-fire-extinguished and halogen free material.

2.3 Cable trays

The following main cable trays are generally used (See also Figure 1):

- Cable tray with flat rungs (≤ 300mm)
- Cable tray with V-profiled rungs (≥100mm up till 600mm)
- Cable tray with Z-profiled rungs (≥100mm up till 600mm)

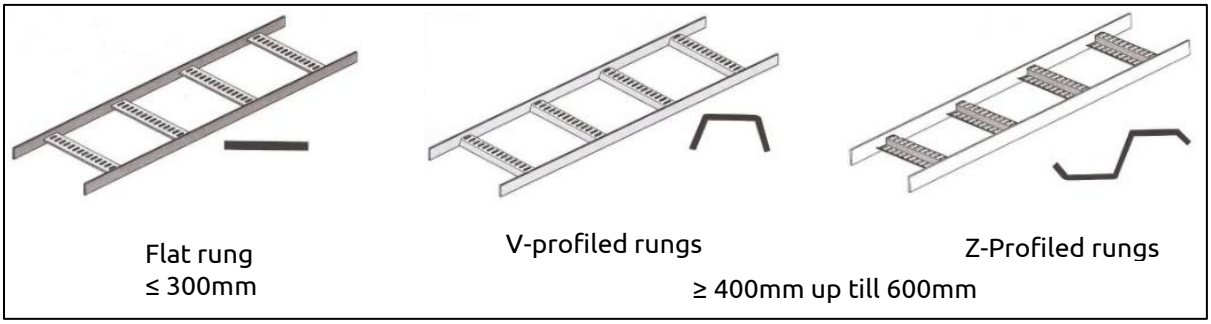


Figure 1: Generally used main cable trays

Bends in cable trays to be curves as in Figure 2. Generally no straight angle bends (90 degrees) are allowed.
The intermediate distance between each rung to be max. 300mm.

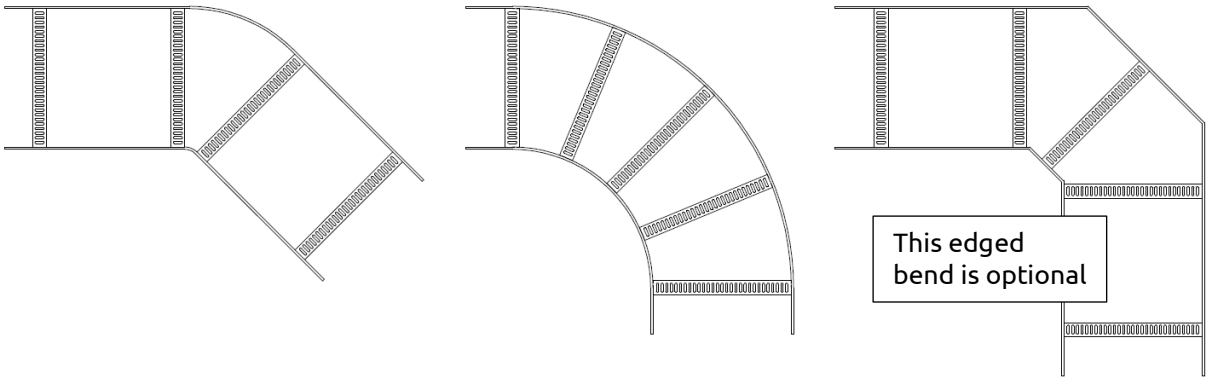


Figure 2: Generally used cable tray bends.

2.3.1.1 Fitting instructions

Generally strips, angle bars and other supports for cable trays, strips and pipes to be welded to the structure (i.e. beams, girders, frames). Supports to be welded as shown on following principal details [12]. In Figure 3, Figure 4 and Figure 5 several examples are illustrated.

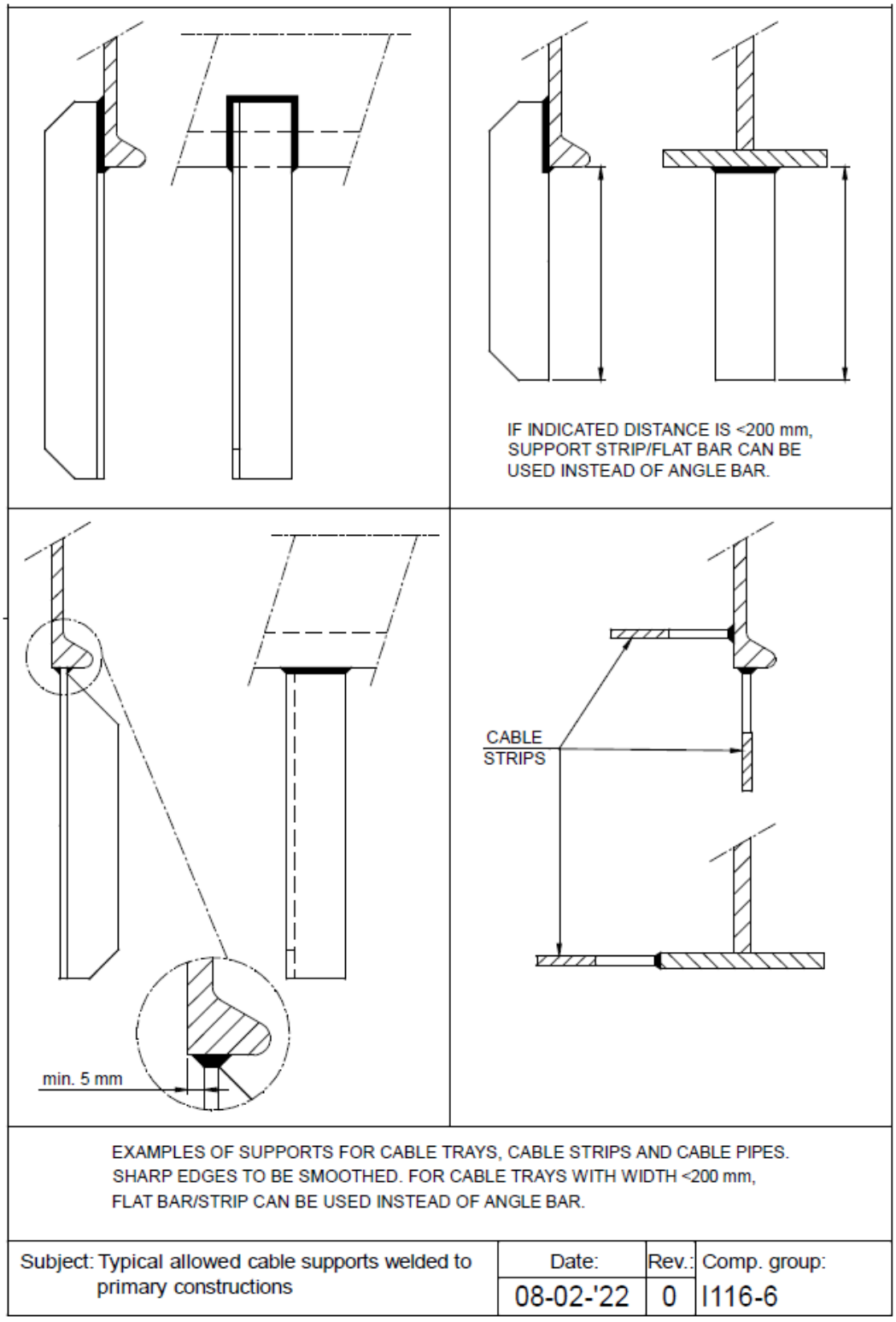


Figure 3: Theoretical welding methods of support to ship structure

2.3.1.2 Fitting instructions

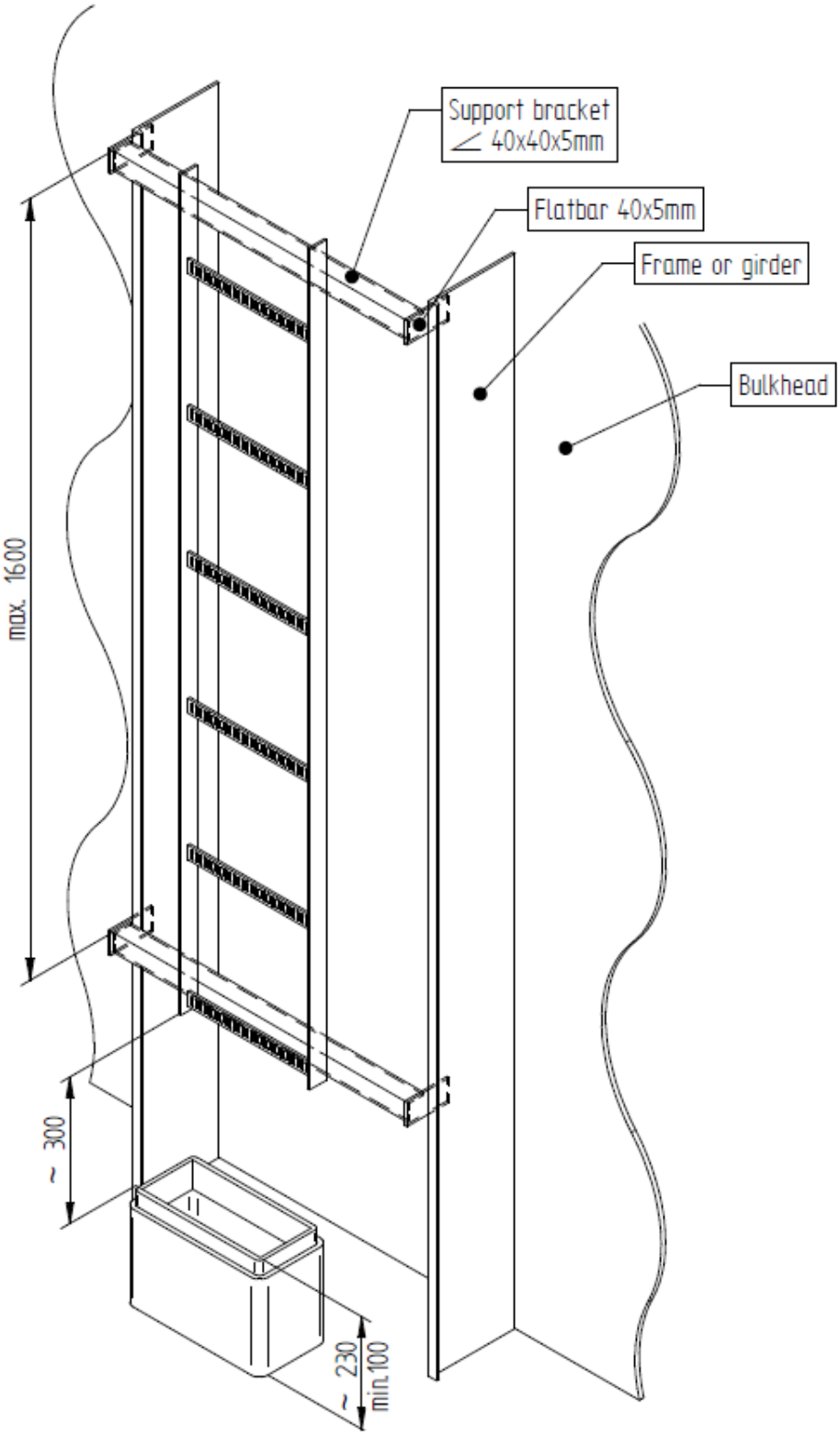


Figure 4 Typical for vertical cable tray support in non-exposed areas

Where it is not feasible or practicable to weld the supports to beams and girders the support brackets may be welded to deck or bulkhead plating (except to the shell). In such cases a double plate for each support to be added to avoid “hard” stress points.

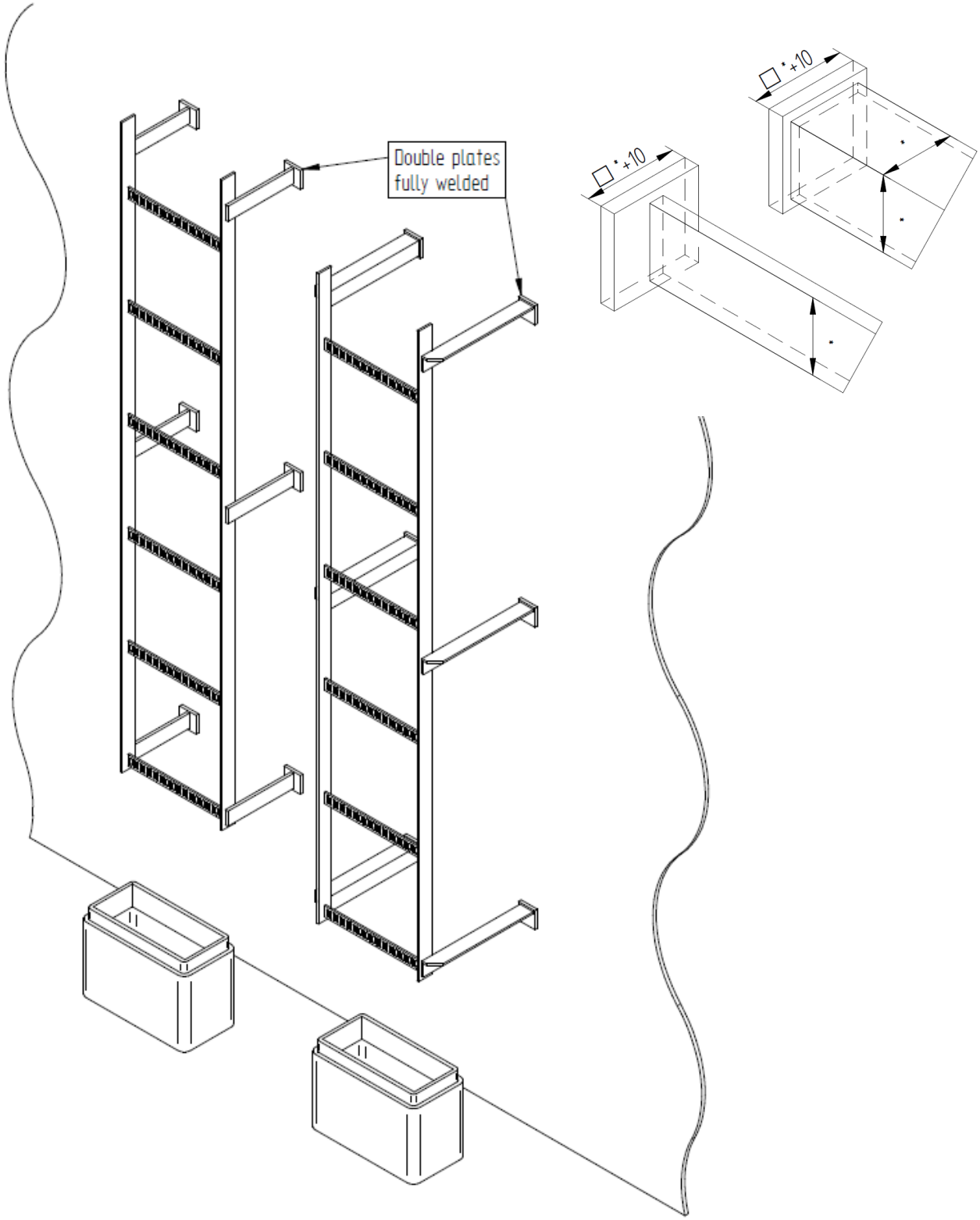


Figure 5 Typical cable tray supports welded to plating

Angle bars and flat bars for supporting the cable trays to the ship's structure are to be applied for all cable trays. The free ends of each angle bar or flat bar to be rounded or canted and brake sharp edges. Maximum lengths for flat bars and angle bars to be as given in table 1.
All supporting bars to be fully welded in exposed and wet areas.

Length (L) from ship's structure	Angle bar	Flat bar
≤200mm	40x40x5mm	30x8mm or 40x8mm
≥200mm till ≤500mm	40x40x5mm	-
≥500mm till ≤1000mm	50x50x5mm	-
≥1000mm	60x60x6mm	-

Table 1: Dimensions of cable tray supports

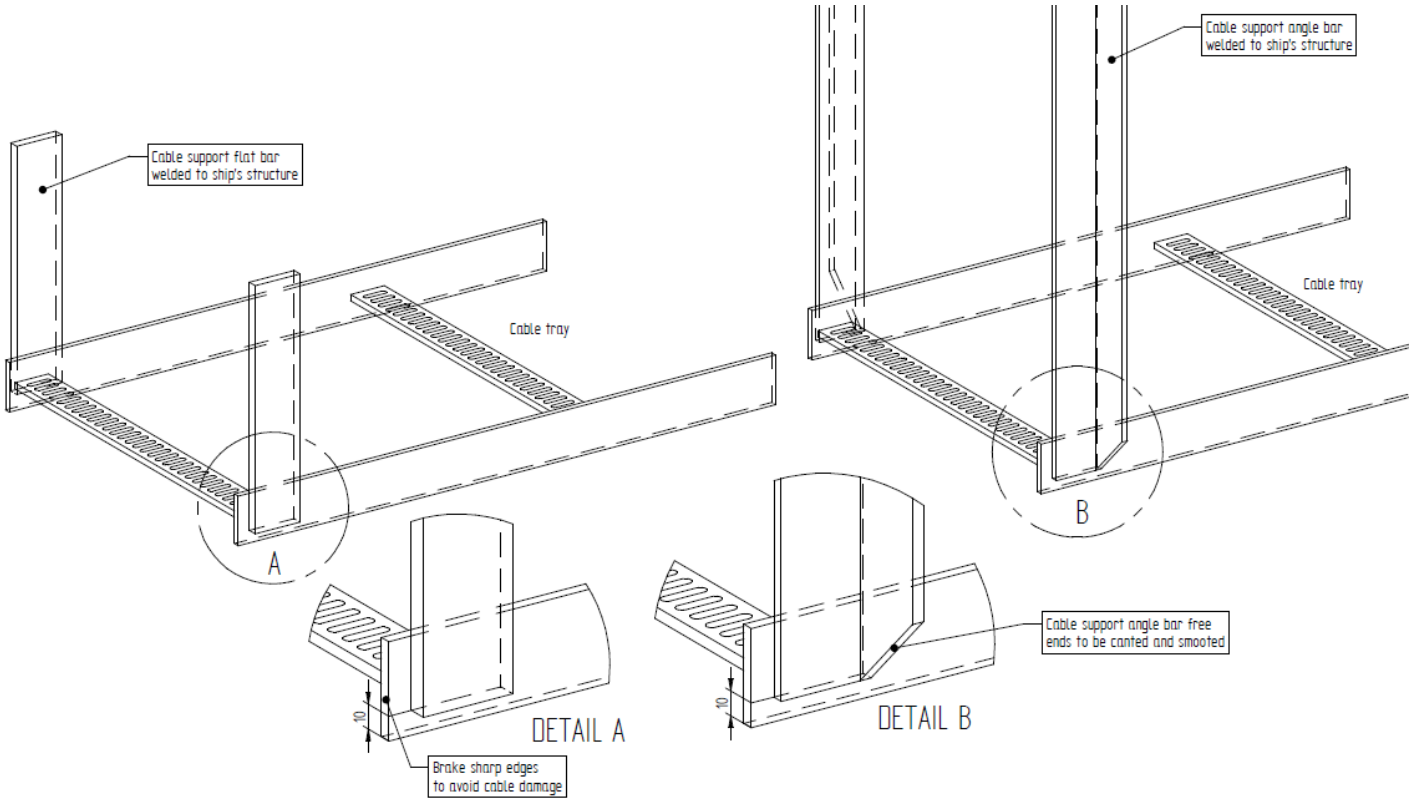


Figure 6 Typical details for cabletray flatbar and canted, smoothed anglebar supports

At any penetration the last cable tray support to be fitted at a maximum distance of approx.300mm from the penetration, reinforcement or cut-out. See Figure 7 for some examples.

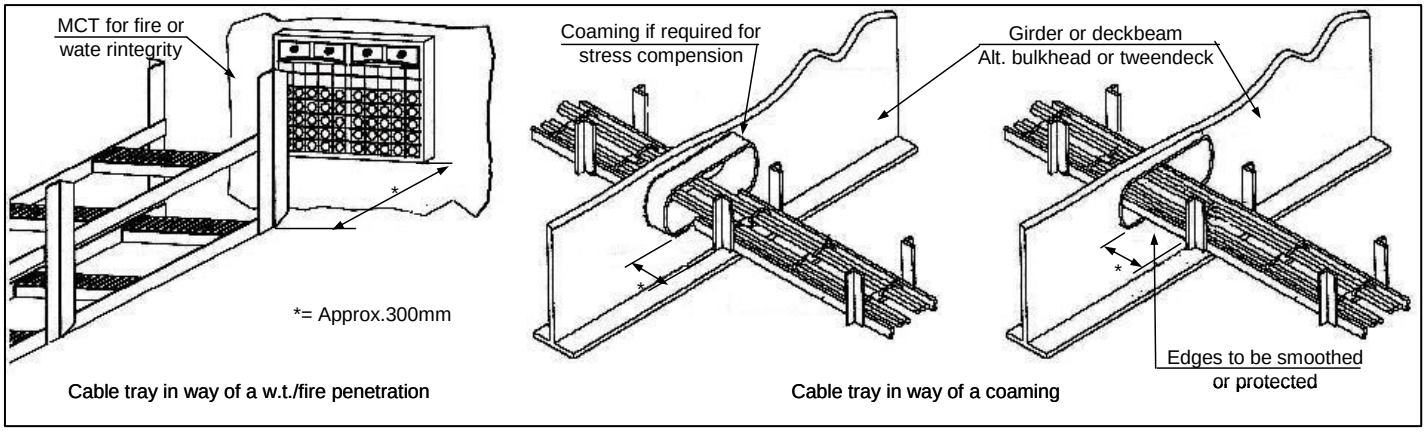


Figure 7 Typical of cable tray supports near penetrations and cut-outs

2.3.2 Cable strips

Cable strips can be applied to install a limited number of cables. The sizes of a cable strip should be 30, 40 or 50x5mm. The intermediate minimum distance of the support strips is approx. 500 and with a maximum of approx. 700mm. An example of a cable strip is shown in Figure 8. Remark: The length of legs depends on the thickness of the insulation.

Generally the supports to be welded to the ship's structure and not directly to decks or bulkheads. In wet areas and on open decks full welds to be applied. Otherwise one side tag welding and other side full welding will be accepted.
In the case where such supports are positioned to decks or bulkheads a double plate to be added and fully welded.

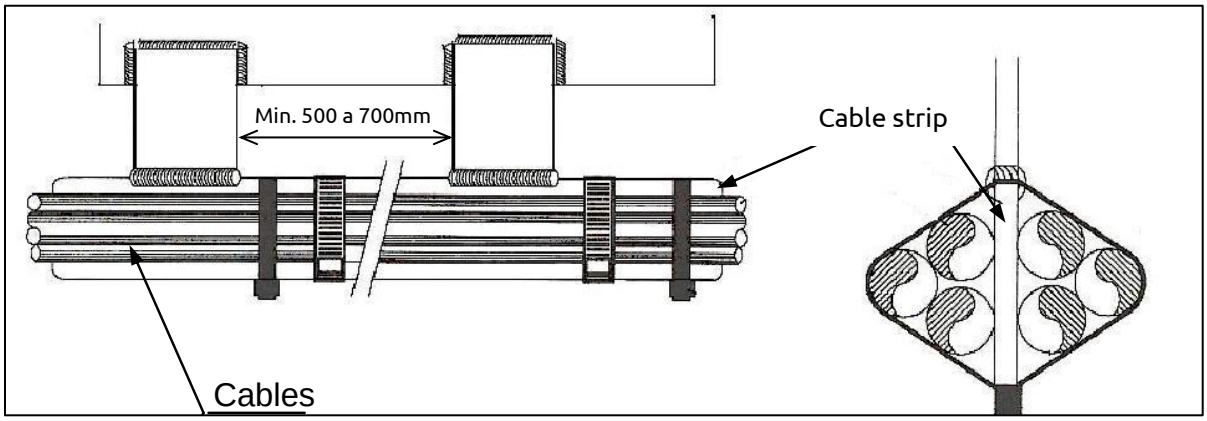


Figure 8: Typical of the cable strip

2.3.3 Cable pipes, conduits or trunking

Where cables should be mechanically protected or where cables are to be laid in pipes to avoid electromagnetic interference cable pipes to be applied. See Figure 9 and Figure 10 for some examples regarding cable pipe installations. The size of the cable pipes are to be selected by the electrical design department based on the applicable rules. See reference document [8]

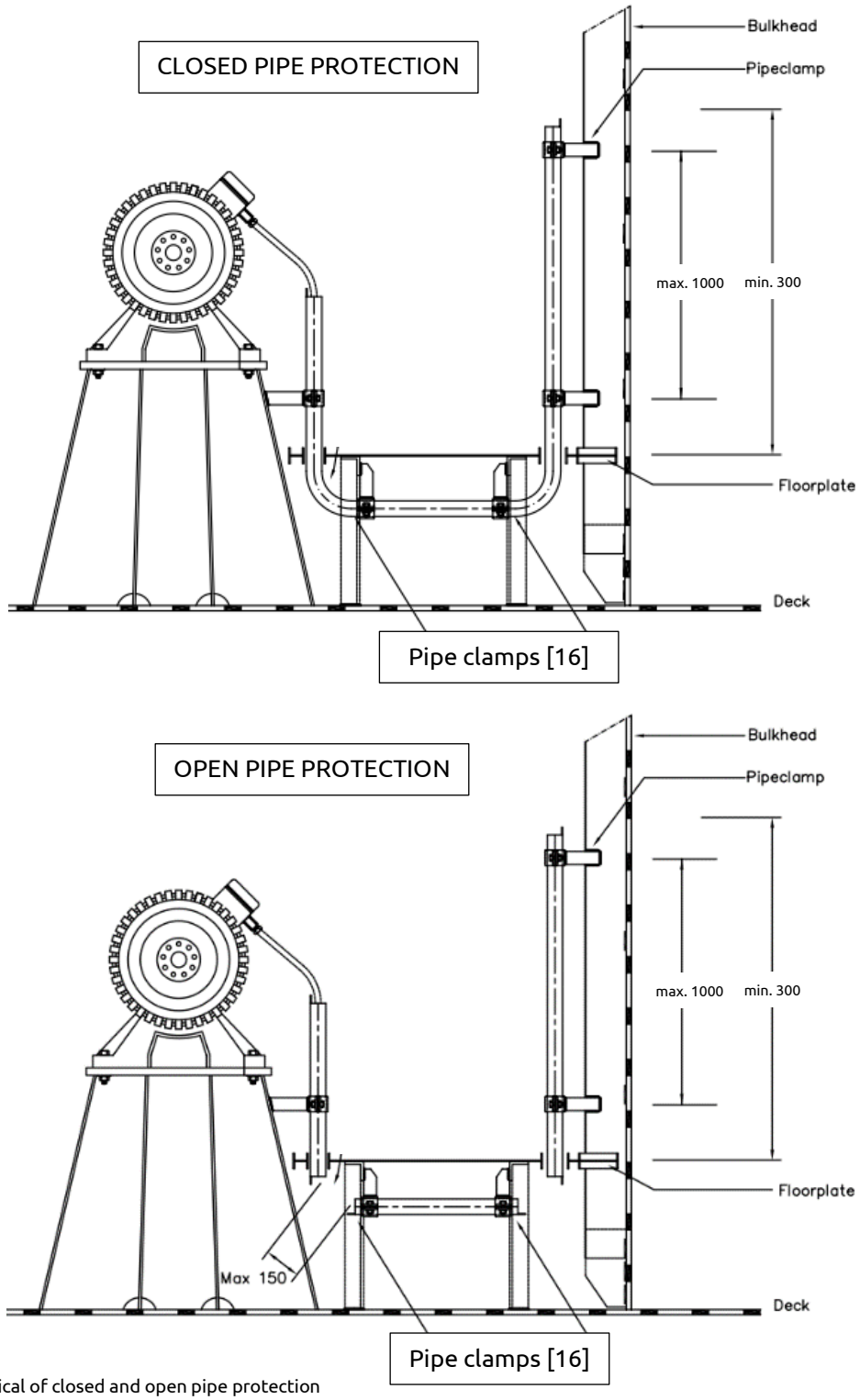


Figure 9: Typical of closed and open pipe protection

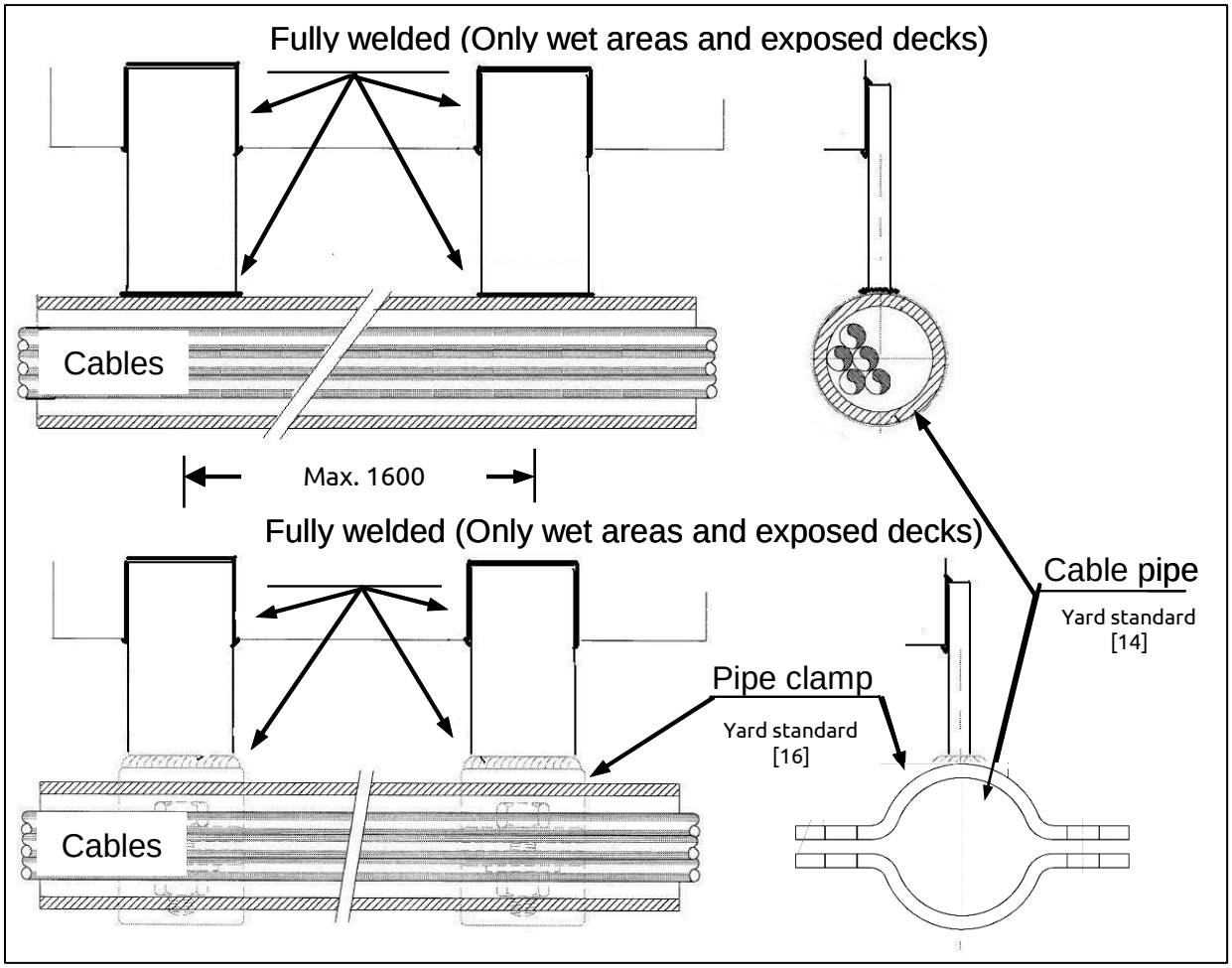


Figure 10: Typical for cable installation in pipe

For cable pipe installation the following details to be taken into consideration:

1. Drain holes to be provided where condensation or water cannot escape.
2. Pipe ends to be smoothened.
3. Cable pipe ends should have lugs at both ends to be able to fix the cables with ty-raps [13].
4. Cable pipes to be pre-galvanized and pipe thickness according IHC standard C101 [14].
5. Double pipe pieces to be applied when a cable pipe passes a weather or water tight deck. Doubling length approximately 100mm with approximately 50mm above deck.
6. Cable pipes can be fitted with legs of strip welded directly to the pipe or with pipe clamps [16]. Distance between legs or clamps is max. 1600mm depending of the straightness of the pipe
7. Single cable pipe penetrations in WT and/or fire bulkheads and decks and exposed areas are to be provided with a thread socket with metric thread for fitting a WT cable gland at one (exposed) side [15].

2.3.4 Weld finishing

All welds for the described details to be cleaned with wire brush and to be free of welding spatters and other dirt.

2.4 Lighting fixtures

Lighting fixtures to be fitted on:

- Pipe support assembly
- Angle bar supports
- Directly to the cable tray system

2.4.1 Pipe support assembly examples

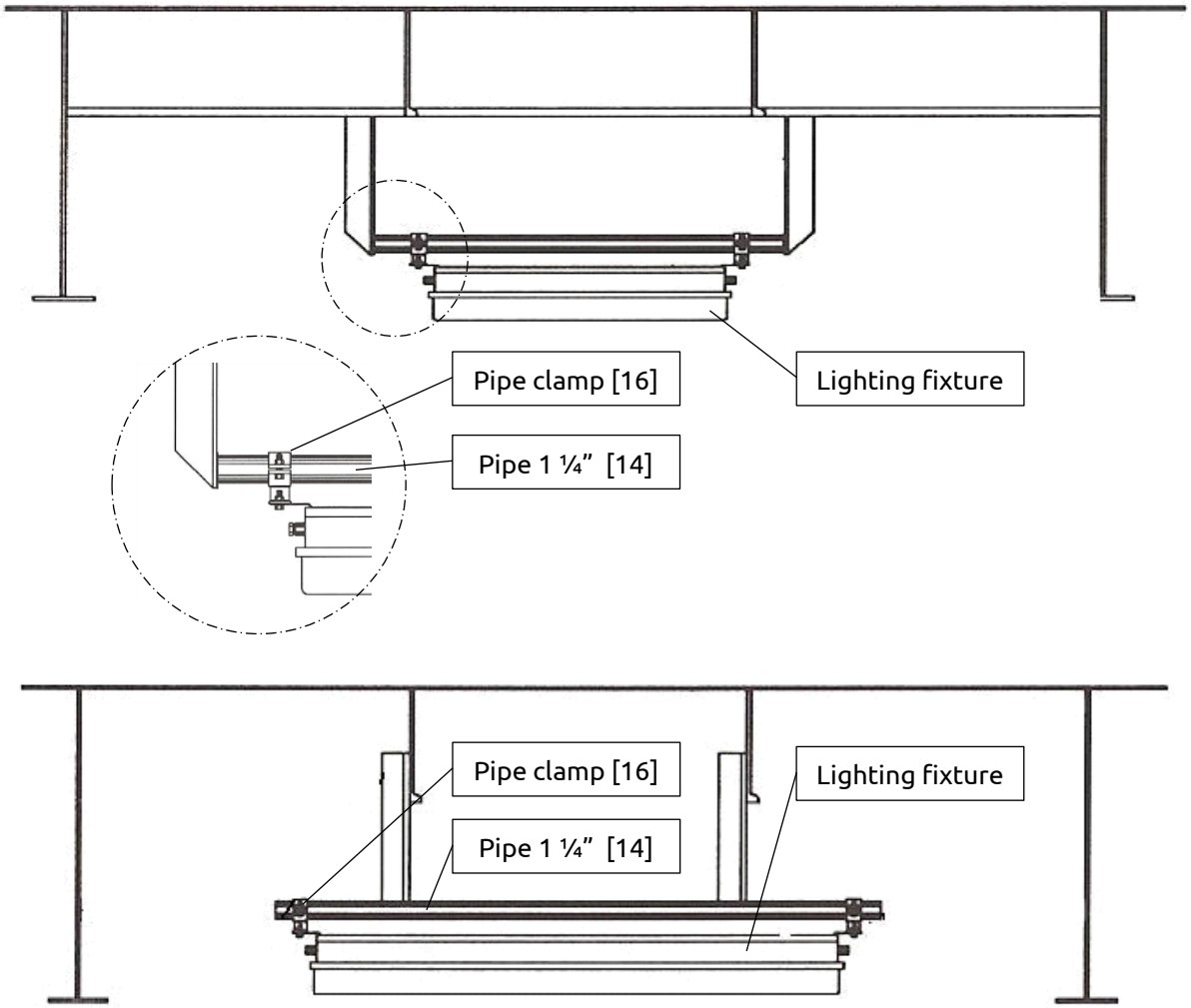


Figure 11: Typical mountings of FL lighting fixture on pipe

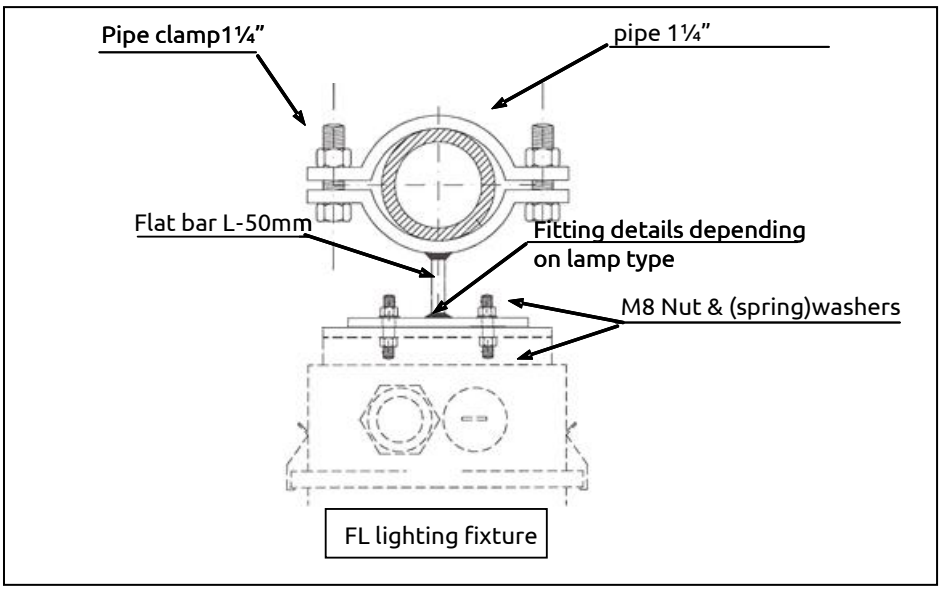


Figure 12: Typical of pipe mounting assembly

2.5 Multi Cable Transit (MCT)

Cable penetrations are standard items designed for installing a group of cables or a single cable through a solid plate (i.e. deck, bulkhead or enclosure) or ship's construction.
A cable penetration can be either:

- Multi Cable Transit (MCT),
- Cable Gland, or
- Coaming/Ring

Generally a cable penetration for the following duties can be distinguished:

- Water tightness (i.e. w.t. bulkheads and decks, enclosures of electric equipment)
- Fire integrity (i.e. A-class decks and bulkheads)
- Others (depending on typical design or engineering criteria)

For each type of cable penetration special standard items are available.

Generally when more than one cable have to pass through a watertight or fire integrity bulkhead a MCT is selected. Such MCT can also be applied if more cables have to enter into bigger electrical equipment like generators and switchboards.
There are several by MCT brands available in the market but Royal IHC allow to use the below listed brands only.

- MCT Brattberg
- Roxtec
- Geaquello® (only after written permission of Royal IHC)

Geaquello® is a sealing system for making removable, fire-retardant, gas- and watertight cable and pipe penetrations for ships and offshore applications. This type of penetration may only be used in exceptional cases after written permission of Royal IHC.
All of these types of penetrations have been designed for a specific duty and are tested and certified accordingly.
Before selecting the type of MCT it should be confirmed that all required certificates are still valid.
Each metal frame should have a maker's reference code as in Figure 13.

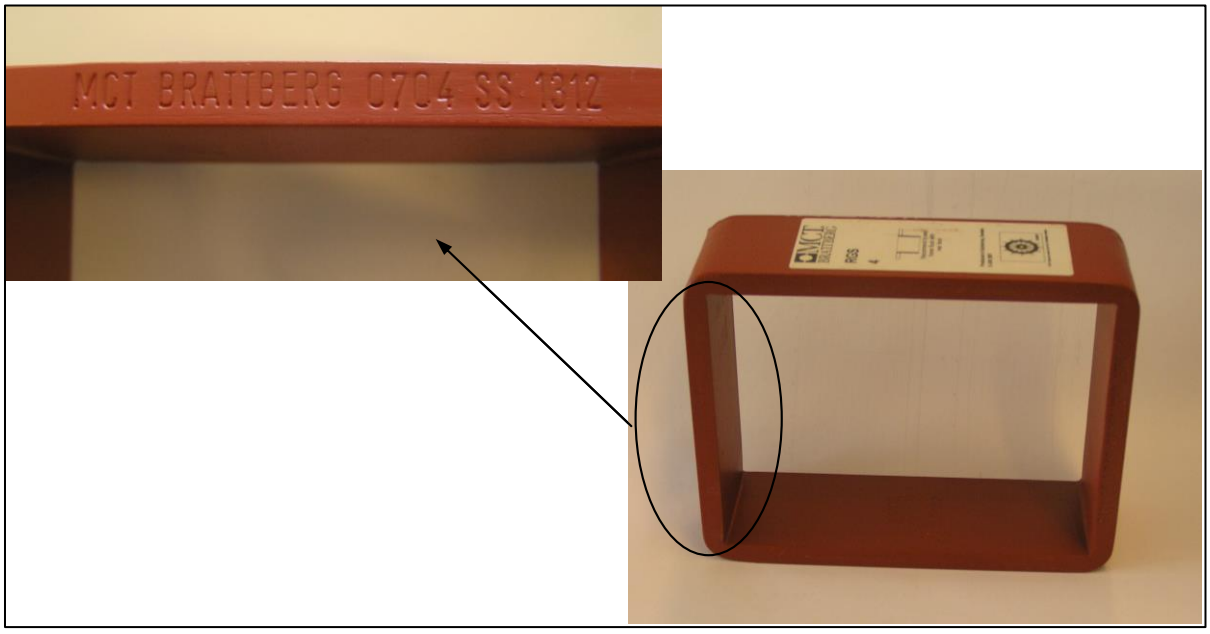
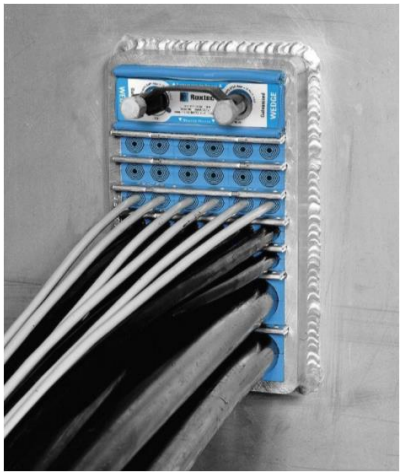


Figure 13: Details of maker's reference for MCT frames

In this quality manual there are two brands used as example. Brattberg RGS and RGP and Roxtec S- and R-transit are used as examples in Figure 14 and Figure 15.

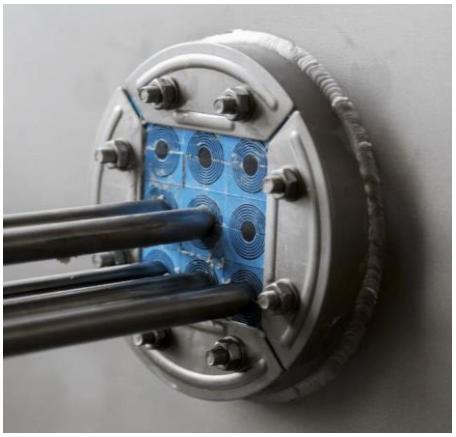
Brattberg RGS



Roxtec S-transit

Figure 14: Rectangular type penetration

Brattberg RGP



Roxtec R-transit

Figure 15: Circular type penetration

In weather exposed areas round or rectangular type MCT's can be used.
The inserts are to be raised in such a way that water will not be collected around the cables to avoid cable damage. See Figure 16.

Inserts to be raised to avoid water collection

NOT ACCEPTABLE on exposed decks

Figure 16: Typical of Round MCT on weather exposed deck

MCT-frames fitted in weather or watertight decks or where mechanical damage can be expected to welded in a coaming frame with a height of 500mm. In case this is not possible a minimum height of 100mm above the finished deck level can be used.

Figure 17: Typical MCT penetration on weather exposed deck with coaming

Table 2: Reference table cable tray versus MCT to be used to determine the size of the required MCT in relation to the cable tray size.

Minimum cable tray size (mm)	Type of Brattberg Multi Cable Transit	
100	RGS-2	
150	RGS-4	
200	RGS-6	
300	RSG-8	RGS-4x2
400	RGS-6+6	RGS-4x3
500	RGS-8+8	RGS-4x4
600	RGS-8+8	RGS-4x5

Table 2: Reference table cable tray versus MCT

2.5.1 Installation requirements

For a proper installation of a MCT penetration the MCT supplier guidelines needs to be followed. In the paragraphs below some items are highlighted.

2.5.1.1 Cut-out tolerances

The size of the cut-out in the deck or bulkhead for fitting a multi cable transit to be carefully determined within the tolerances as specified by the manufacturer.

2.5.1.2 Welding instructions

Another issue which is very important to take into account are the instructions for welding such MCT frames.

If the welding instructions are not followed there might be a change that the frame is deformed. In that case the penetration cannot be fully closed and tightened. All penetrations have to be through welded at both sided.

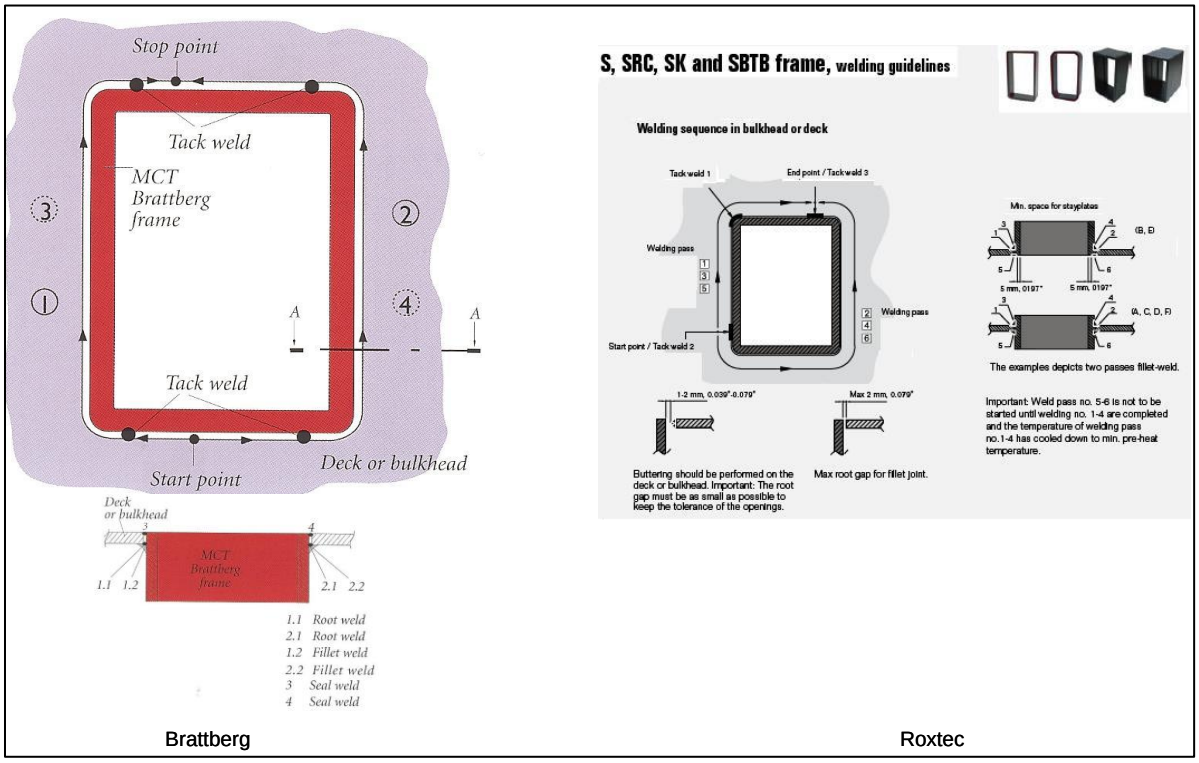


Figure 18: Example of Welding instruction

2.5.1.3 Completion of the MCTs

Only stainless steel stay plates are allowed to be used in MCT's.

2.5.1.4 Painting of MCT's

It is not allowed to paint the inside of any MCT frame.

2.5.1.5 Single core cables through MCT's

Single core cables shall not be separated by magnetic material in a way eddy currents can be formed. As a result through one MCT 3 different phase should run.

2.6 Cable gland

A cable gland is generally applied to penetrate a single cable through a watertight compartment or enclosure of an electric equipment.
A compartment penetration can be either through a deck or a bulkhead.
A penetration through an enclosure can be any electric equipment (i.e. lighting fixture, control panel, rotating machine or a junction box).

A cable gland is a standard piece of equipment which is readily available in the market. A wide range in type and materials are available. Standards installation material is specified in material list [6]. Third party equipment suppliers can use other brands.

Each selected type to be suitable for the intended design criteria. The basic requirement is the IPXX protection.

In dry accommodation areas electric equipment (lighting, outlet sockets, small consumers) may be connected with a standard junction box. The junction box need to be provided with cable glands.

2.7 Penetrations through non-classified ship's constructions

Cables passing through beams, girders, web frames, tween decks or other non-classified ship's constructions just an opening to be provided as in Figure 19.

Special attention to be paid to:

- Smoothing of the opening surroundings.
- Lead the cables free from the surroundings through the coaming. If so required additional cable supports to be welded to the coaming.

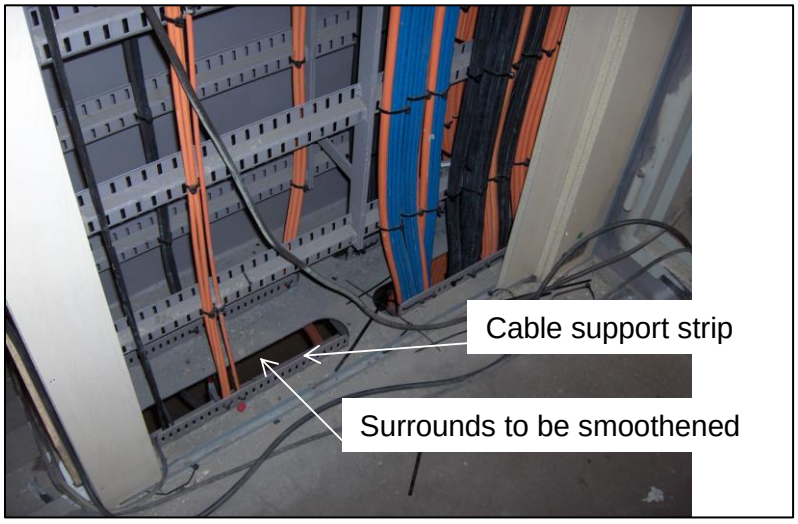


Figure 19: Typical for cable penetration through tween deck

2.8 Wrong type of penetrations

It is not allowed to use the ship's construction provisions (i.e. welding holes) as cable penetration. Cables need to have their own penetration. See Figure 20 for some examples which are not allowed.

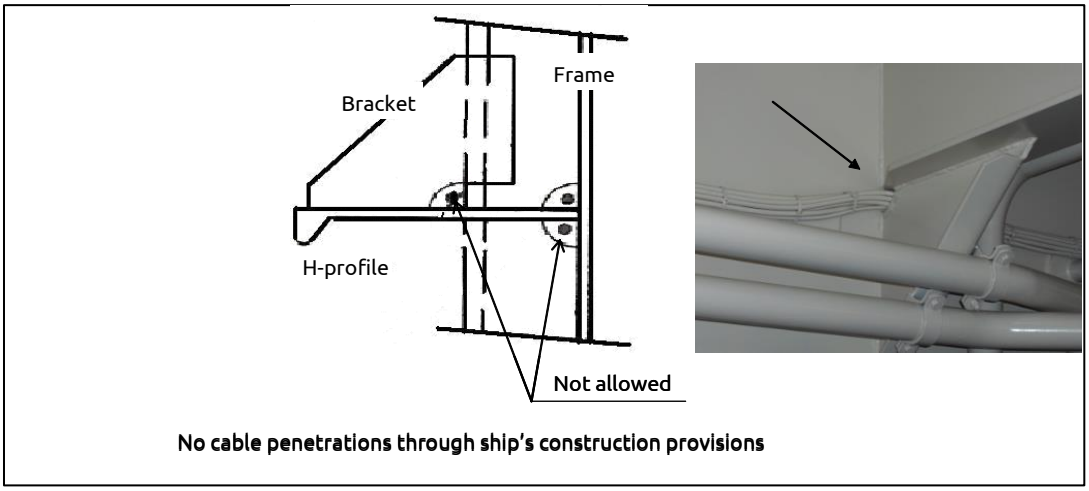


Figure 20: No cable penetration through ship's construction provisions

3. Cable installation

3.1 Introduction

Cables to be pulled in groups according to a cable book which is prepared in the engineering phase. To comply the EMC plan several cable groups to be recognized and followed. This is described in the EMC Management control document [2].

3.2 Special precautions

3.2.1 Damaging of cables

Special attention, by applying guide rolls or other means, to avoid damaging of the cables caused by sharp parts or by excessive friction from cable to cable.
Cable damaging (See Figure 21) can be occurred by sharp edges or by heat friction.

Figure 21: Damaged cables caused by cable pulling

In case of damaged cables the following steps to be taken:

- Cables to be repaired in accordance with maker's instructions
- Approved joint or junction box to be applied after Owner's or Class acceptance
- Cables to be completely renewed. (Only in case of serious cable damages).

3.2.2 Bending radius

The minimum bending radius as specified by the cable manufacturer and by the classification society should be followed.

3.2.3 Painting of cables

Cables which are pulled / installed on the cable trays needs to be protected with plastic or equivalent during painting of the room / equipment. It is not allowed to paint the cables. The paint itself can damage the cables.

3.3 Cable running

Each group of cables to run smoothly and straight on the entire cable route. Cables should not be twisted around each other. There also need to be sufficient slack in the cables at expansion points. Cables should not lie on sharp pieces.

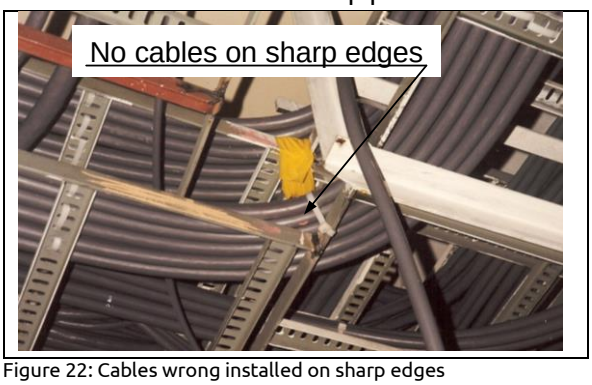


Figure 22: Cables wrong installed on sharp edges

3.4 Cable supporting

Cables are only fixed to cable trays, cable strips or in a cable pipe. Process piping or ducting should not be used for supporting cables as in Figure 23. These pipes need to be free for maintenance etc.

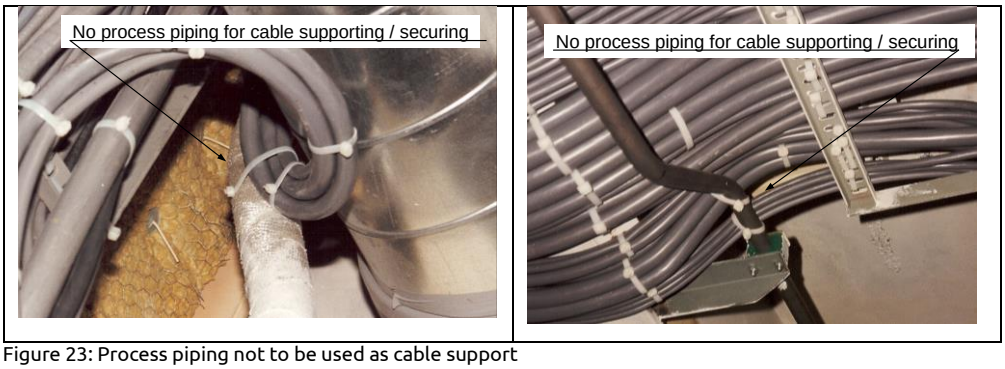


Figure 23: Process piping not to be used as cable support

Generally a cable may be unsupported maximum 300mm.
Unsupported cabling is only allowed if slack is required to absorb vibrations (i.e. on flexible mounted equipment).

3.5 Cable fixing and securing

On a cable tray the cable is fixed on each rung with a synthetic, steel or stainless steel cable binder. See also the document Standard materials electrical installation[6]
On a cable strip the distance between two fixes is approx. 250mm.

Cables on trays, strips and other special cable supports to be fixed in groups as per EMC document[2]. The EMC document describes a minimum distance between cable groups.

Metal type cable binders to be applied every 1000mm for cables which mounted on a vertical tray or flat bar or for cables fixed at the underside of a tray.

In case of single core cables in all situations stainless steel cable binders needs to be used according classification requirements. This means that also for cables on top of a cable tray stainless steel binders should be used.

3.6 Cable protection

The entire cable installation to be protected against mechanical damage, which can occur during normal ship's operation.

Generally the cables to be fixed free from sharp ship's constructions (i.e. cable tray edges, coamings).
Cables to be installed away from excessive heat surfaces. If this cannot be avoided special measures like heat insulation of heat resistant cables to be applied.

3.6.1 Examples

If in spite of all possible measures risk on mechanical damage is present additional provisions to be provided. The sharp edges needs to be provided with a protective gasket. An example is given in Figure 24.

For deck penetrations extended MCT to be used in situations where mechanical damage can occur as illustrated in Figure 25.

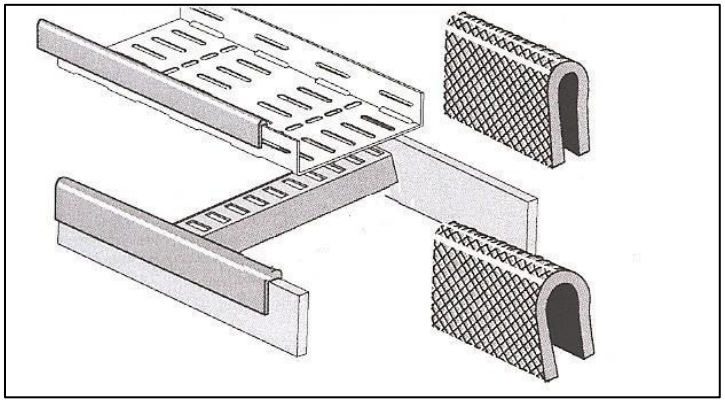


Figure 24: Local cable protection by a protective gasket

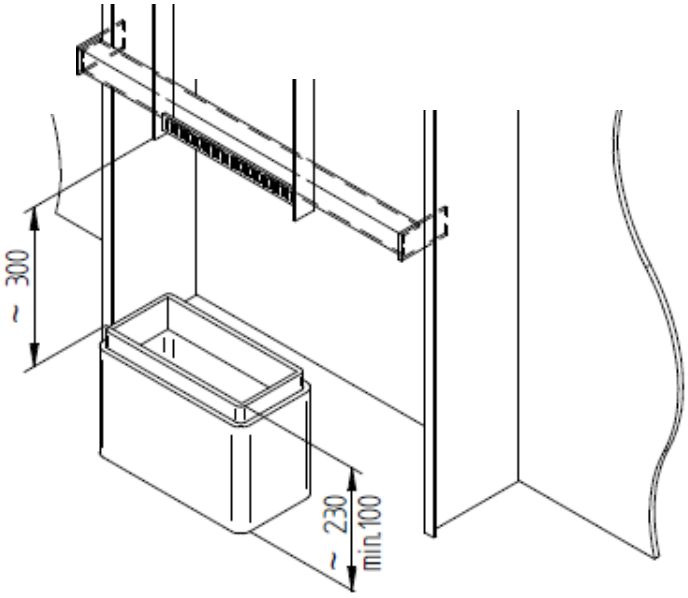


Figure 25: Protection by extended penetration

4. Installation electric components

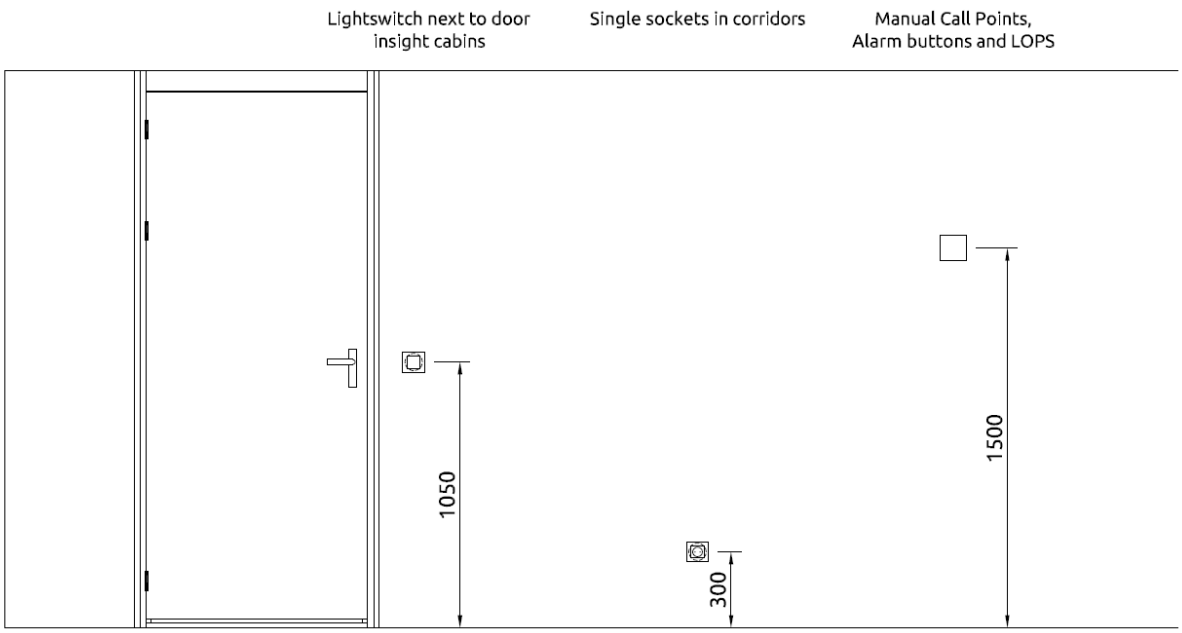
All equipment to be located in such a way that they are available for inspections, trouble shooting and testing.
All components in wet areas and weather decks to be fitted with stainless steel (AISI 316) material i.e. bolts, nuts, washers. A Teflon washer needs to be placed to avoid contact between different steel materials

Large deck mounted panels will be welded to the ship's structure.
In cases where several small electrical components are positioned at the same location a common frame to be provided on which these components are assembled.

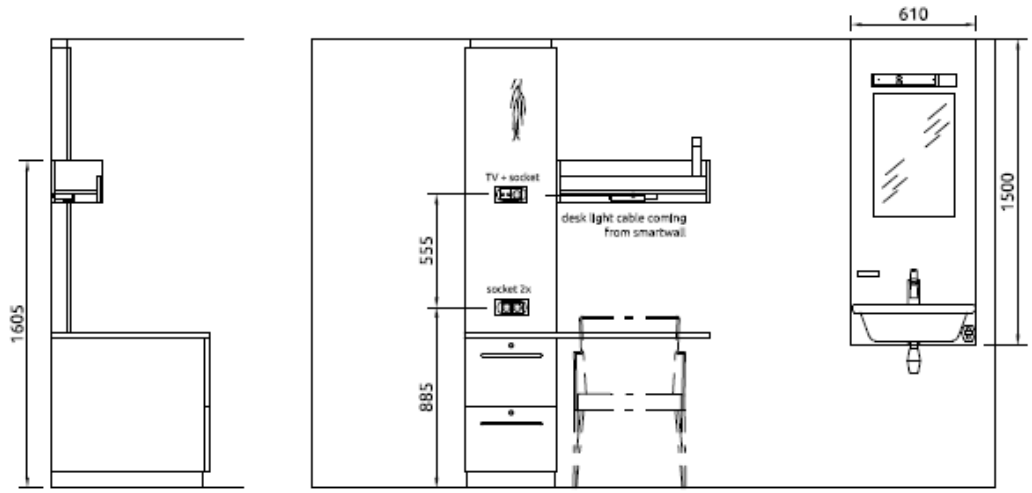
All equipment will have an indication label.

4.1 Heights of electric equipment

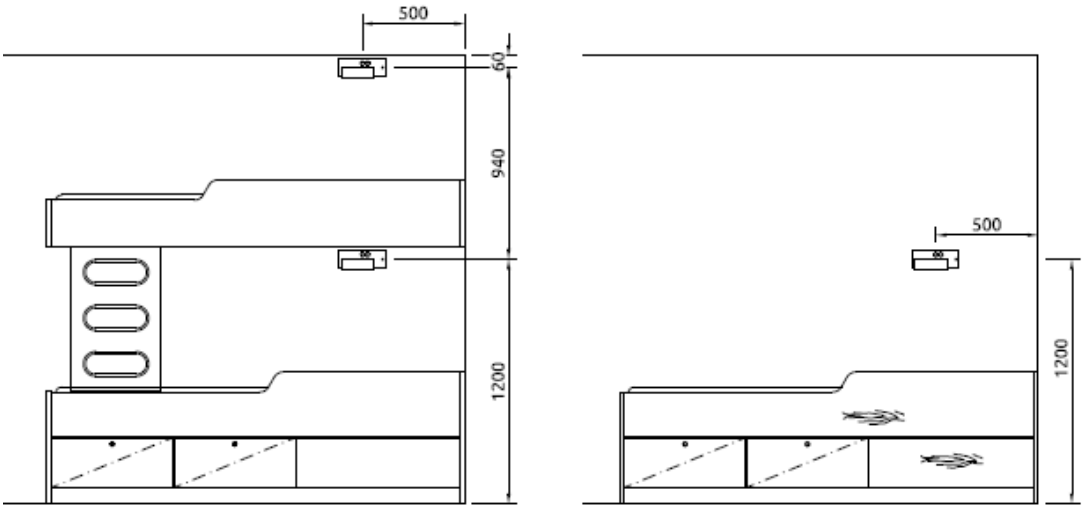
To unify the installation height of the common electrical components the following guidance to be followed. The heights to be adjusted if these cannot be maintained due to the surrounds.



Installation heights for accommodation spaces

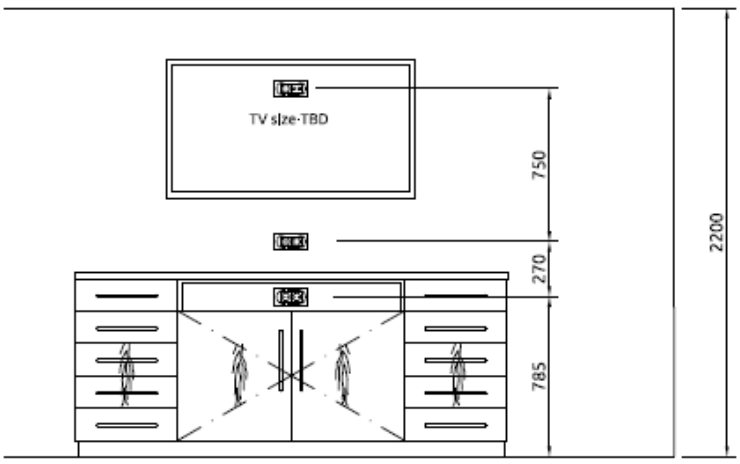


View standard desk.



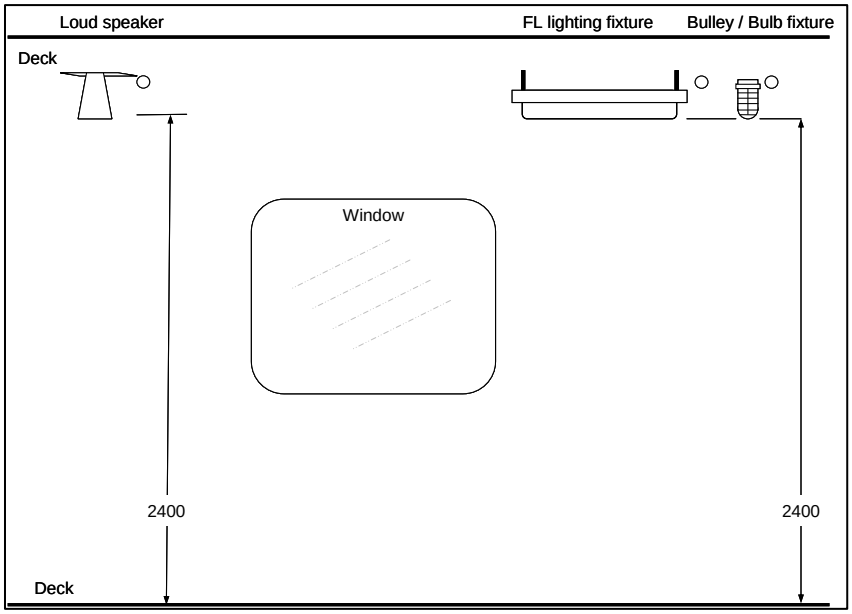
View bunk bed.

View single bed

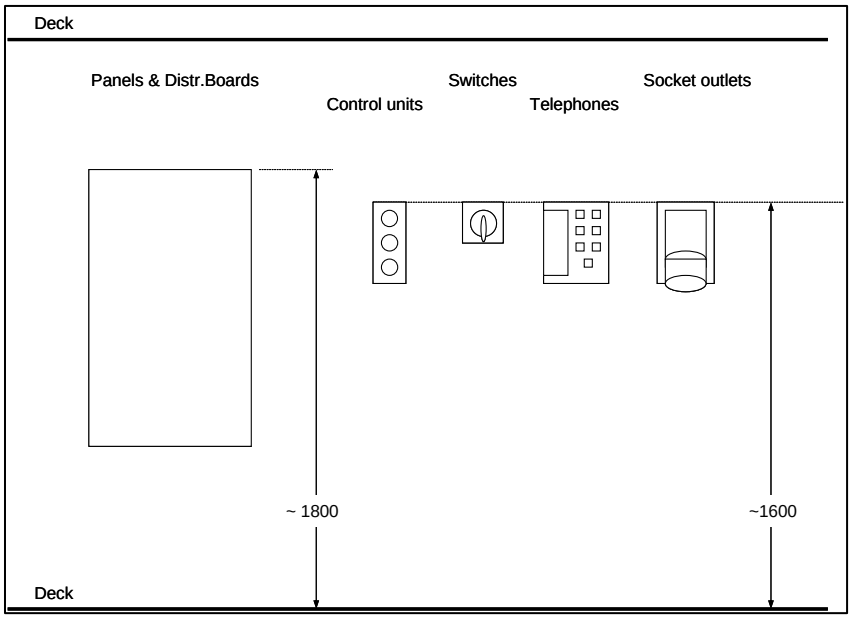


Recreation room.

Installation heights for accommodation spaces



Installation heights for lighting and speakers



Installation heights for machinery spaces

4.2 Junction boxes

Junction boxes can attached on cable trays on the following ways:
-With welded brackets
-With clamped brackets

For clamped brackets special clamp assemblies should be applied (see Figure 26). When the side strips of the cable trays have slotted holes those can be used to fix brackets onto for the junction box. It is not allowed to drill holes in the cable tray assemblies when cables are already pulled onto that cable tray.
Junction boxes fitted to bulkheads to be approx. 50mm extended from plating for painting and to provide a bolt/nut connection.

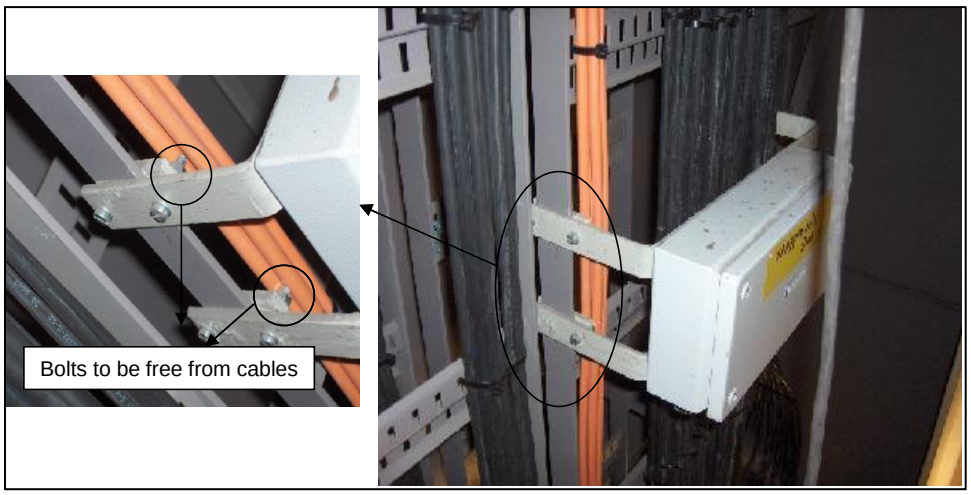


Figure 26: Junction box mounted on cable tray

Junction boxes should be accessible for maintenance(Figure 27).

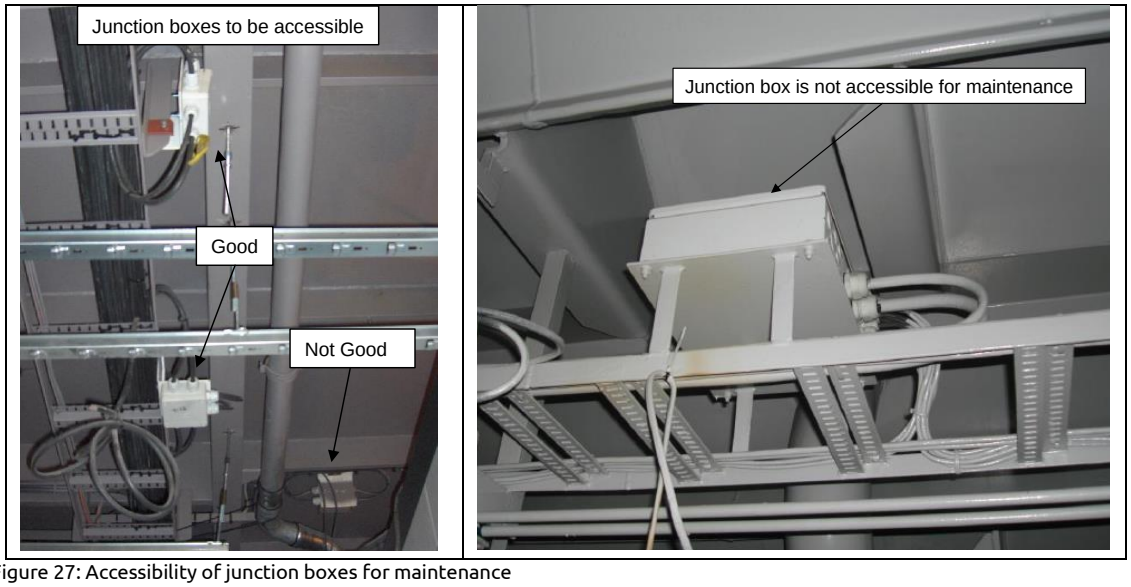


Figure 27: Accessibility of junction boxes for maintenance

Special attention to be paid for junction boxes in accommodation areas behind ceilings walls. Preferably such junction boxes to be positioned and grouped above recessed lighting fixtures or near planned hatches for easy access and maintenance (Figure 28).

Figure 28: Junction boxes at the rear of a wet cabin

5. Low voltage cable connection

After the installation of the cables and electrical equipment the cables can be connected and completed. The following activities to be done:

- Cable end finishing
- Cable coding
- Wire coding
- Using ferrules or cable lugs
- Termination

5.1 Connection of actuators or sensors

A so called pigtail should be applied when connecting an actuator or sensor. This to ensure reconnection possibility.

5.2 Cable end finishing

The outer insulation of the cables to be carefully removed without damaging the core insulation. Special tools for removing the outer insulation to be used. The use of “Stainley” knives or equivalent is not allowed.
Where armor or screening is used without litze a flexible earth wire needs to be connected to the armor or screening by use of a roll spring. See Figure 29.
For EMC cables the connection method is described in the EMC management control document[2].

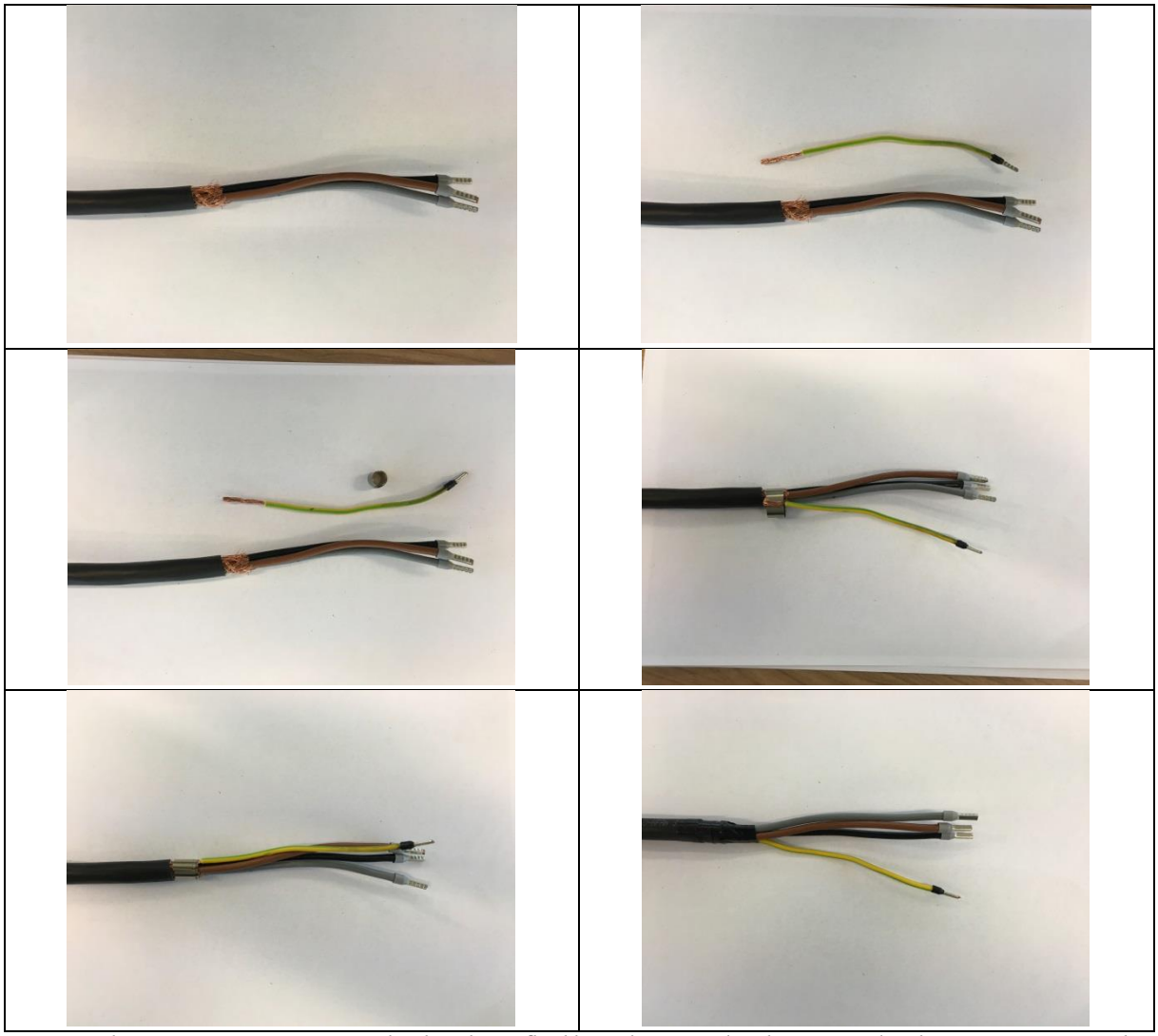


Figure 29: Where armour or screening is used without litze a flexible earth wire needs to be connected to the armour or screening by use of a roll spring.

5.3 Cable coding

Each cable should be clearly and permanently coded (Figure 30) before the cable enters the equipment.
The coding references as per the electrical diagrams to be applied. The branch circuits of the lighting installations are labeled with a reference to the breaker. Generally pen coding, directly applied on the cable or on paper stickers, is not considered as a permanent coding method.
The cable coding label should be fixed close to the gland or cabinet entry. For cables to big panels the cable coding should be added to the cables inside the panel just before the cables are entering into the cable ducts on the mounting plate.

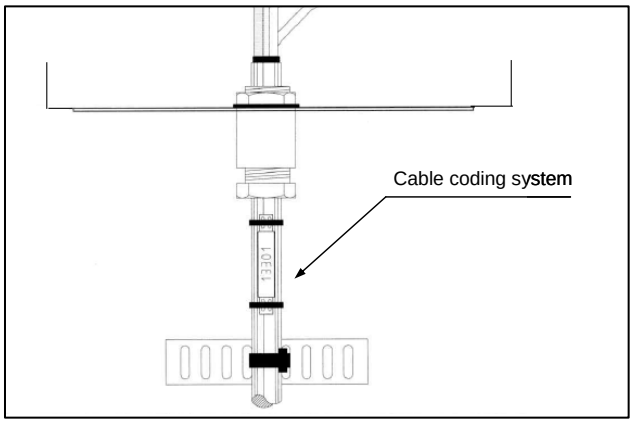


Figure 30: Typical of cable coding system

5.4 Cable core coding

Each cable core should be coded with the reference of the terminal strip and number. For details see Cable wire colour table [7]

Only for power cable used in lighting systems and 2 phase sockets it is not required to code the phase.
Earth core should be yellow/green wire, or a sleeve colour yellow green should be used. See also Cable wire colour table [7]

5.5 Spare cable cores

Spare cores which are not connected to terminals to be tightened together using tape and ty-raps. At the end a permanent visible label with the complete cable reference number and additional text “SPARE” to be provided.

5.6 Cable core connections

5.6.1 Cable core connection methods

Cable core connections can be made with the following methods:

- Bolt connections with cable lugs
- Screwed connections in standard terminal units with press plate with ferrules.
- Clamping connections (spring loaded) with special terminal units with ferrules.
    - Although not required by the terminal suppliers ferrules to be provided (except if datasheet explicitly mentions that ferrules are not allowed).

5.6.2 Wire crimp connections

Two different wire crimp connectors can be used;

- Wire lug
- Ferrules

Ferrules to be used till 6mm^2.

An isolated crimp connection needs to be applied on all cores ≤ 6mm^2.

Above 6mm^2 non-isolated wire lug connections can be used or the core can be mounted without crimp connection depending on cable type of termination.

5.6.3 Wire length

Keep always enough “over length” in the cable cores to have the possibility to change to another terminal. This is for cabinets as well as for the cable cores for the connection of an electromotor.

6. Special cable connection

6.1 Low voltage cable connection

LV connections to be made by an experienced person.

7. Inspection

During the inspection and hand over of the work from the electrical contractor this document will be used as reference.

The inspection of the electric installation is done in three stages.

- Inspections steelwork
- Inspections cabinets
- Inspections rooms

7.1 Inspection steelwork

The cable routing system (Iron-work) to be inspected prior to starting any cable pulling activity. Examples of items which will be checked are if the cable trays are installed according the drawings, are welded correctly and if required painted.
The document inspection procedure steelwork [3] will be used as detail checklist.

7.2 Inspections cabinet

After reporting that the connection work is completed the electrician should check if the cabinets are placed and connected according this manual. For the inspection the document inspection procedure cabinet [4] should be used as detail checklist.

7.3 Inspections final room

This is the final inspections done to handover a room. The inspection includes checking if all equipment is placed, cables are correctly pulled, connected and tagged according this manual. For the inspection the document inspection procedure final room [5] should be used as detail checklist.

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APPROVED	KIRAN S RAJ
REVIEWED	AKSHATHA
CHECKED	VINEETH
PREPARED	ARJUN V V

ELECTRICAL OUTFITTING PRACTICE AND STANDARDS

DATE: 02.11.2023	SCALE: NTS	DRG NO: 037-K5700200	REV : R1

PLAN HISTORY

PART NO: 02.00 | 02 / 63

DRG NO: 037-K5700200

DATE	REV. NO	MARK	DESCRIPTION	DRAWN BY	CHECKED BY	REVIEWED BY	APPROVED BY
04.09.2023	0		FIRST ISSUE	ARJUN V V	VINEETH	AKSHATHA	KIRAN
02.11.2023	R1	R1	UPDATED AS PER IHC COMMENTS WITH RESPECT TO DREDGER VESSELS	ARJUN V V	VINEETH	AKSHATHA	KIRAN

GENERAL NOTE:

1. ALL DIMENSIONS ARE IN MM.
2. ALL BURS AND SHARP EDGE PARTS ARE TO BE SMOOTHLY REMOVED BEFORE PAINTING.
3. DOUBLE PLATES ARE REQUIRED WHILE WELDING TO THE BULKHEADS OR DECKS.
4. PIPE SLEEVES ARE REQUIRED FOR PENETRATION OF PIPES.
5. FOR ADDITIONAL INFORMATION PLEASE REFER IHC MANUAL (63552-0110.IM001-0)

INDEX

PART NO: 03.00 | 03 / 63

DRG NO: 037-K5700200

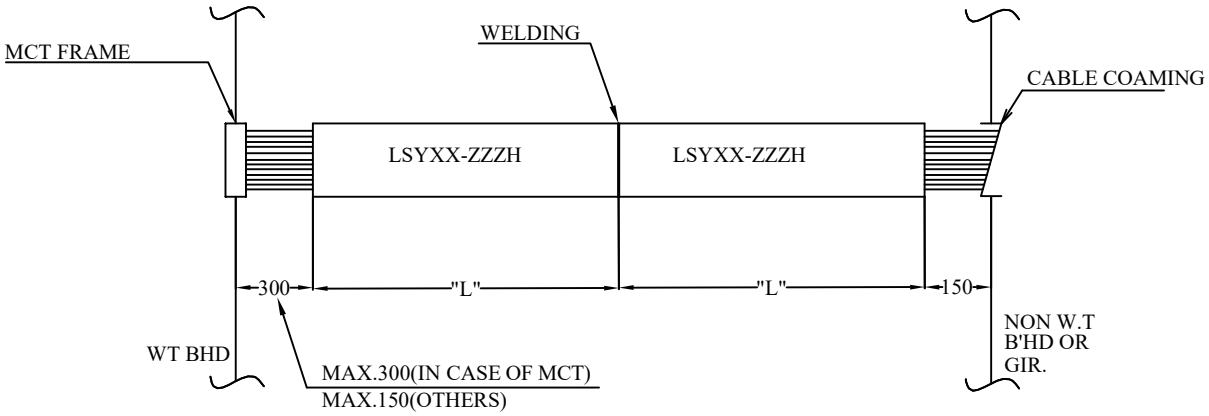
	INDEX	PART NO: 03.00	04/63
		DRG NO: 037-K5700200	

INDEX

PART NO: 03.00 | 05/63

DRG NO: 037-K5700200

	INDICATION METHOD FOR CABLE WAY	PART NO: 04.00	06 / 63
	CABLE WAY INDICATION METHOD	DRG NO: 037-K5700200	



LS (LD) (LT) — Y — XX — ZZZ(H)

- LS (LD) (LT): SINGLE TIER CABLE RACK (DOUBLE TIER CABLE RACK) (TRIPLE TIER CABLE RACK)
- Y: RUNNER BAR LENGTH "L"
- XX: CROSS PIECE SIZE (WIDTH)
- ZZZ(H): DISTANCE FROM DECK(H)

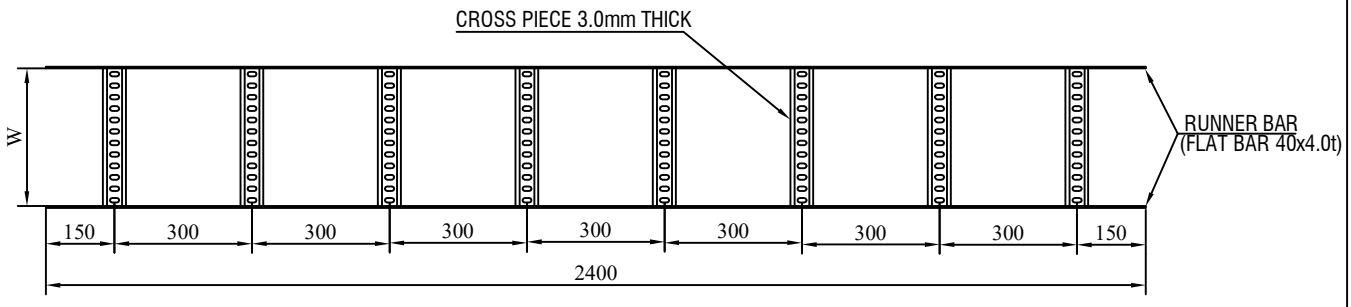
PIECE MARK EX : LSA40-300H

LS — A — 40 — 300H

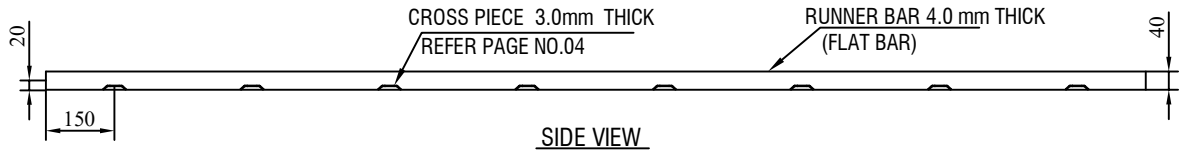
- LS: SINGLE TIER CABLE RACK
- A: RUNNER BAR OF LENGTH 300mm
- 40: CROSS PIECE OF WIDTH 400mm
- 300H: DISTANCE FROM DECK(H)

"L" (LENGTH) STANDARD OF CABLE RACK LENGTH*

SYMBOL	A	B	C	D	E	F	G	H	S
LENGTH (L)	300	600	900	1200	1500	1800	2100	2400	*SPECIAL



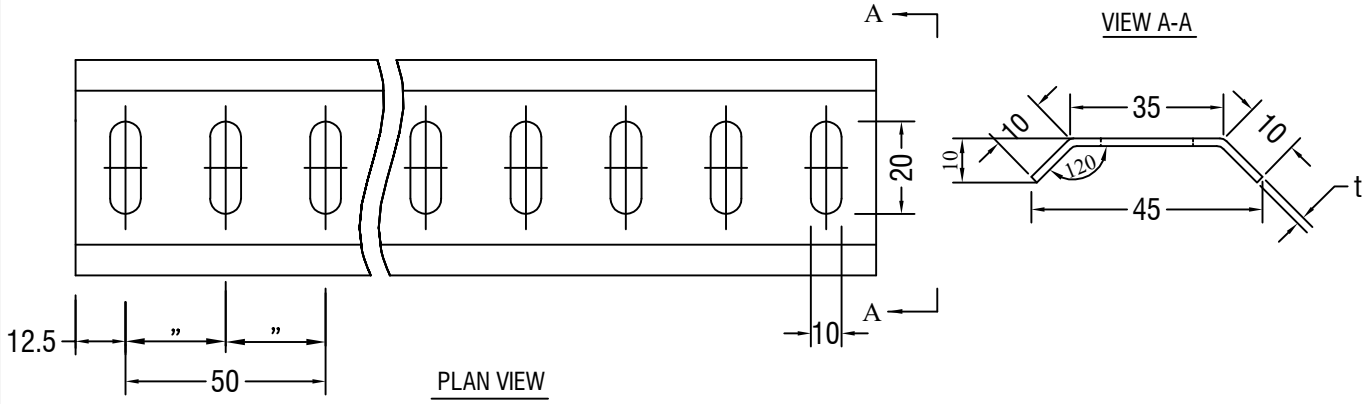
PLAN VIEW

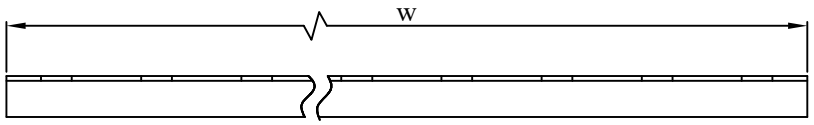


SIDE VIEW

*TYPES - A,B,C,D,E,F,G & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

	CABLE INSTALLATION MATERIALS	PART NO: 05.01	07 / 63
	CROSS PIECE	DRG NO: 037-K5700200	





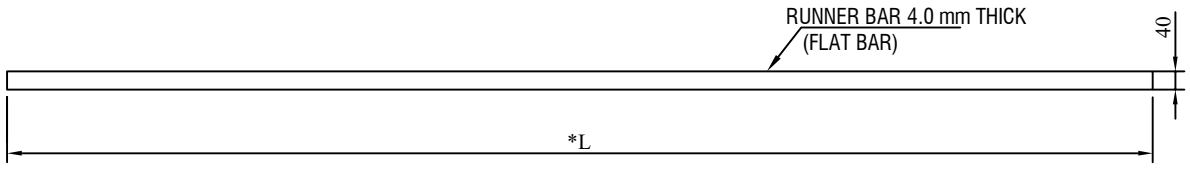
ELEVATION

MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE	W	t	NO. OF SLOTS / CROSS PIECE	WEIGHT Aprox.(KG)
L - 15	150	3	6	0.17
L - 20	200	3	8	0.23
L - 30	300	3	12	0.34
L - 40	400	3	16	0.45
L - 50	500	3	20	0.56
L - 60	600	3	24	0.68

	CABLE INSTALLATION MATERIALS	PART NO: 05.02	08 / 63
	RUNNER BAR (FLAT BAR)	**DRG NO: 037-K5700200**	

RUNNER BAR DETAILS



"L" (LENGTH) STANDARD OF CABLE RACK LENGTH*

SYMBOL	A	B	C	D	E	F	G	H	S
LENGTH (L)	300	600	900	1200	1500	1800	2100	2400	*SPECIAL

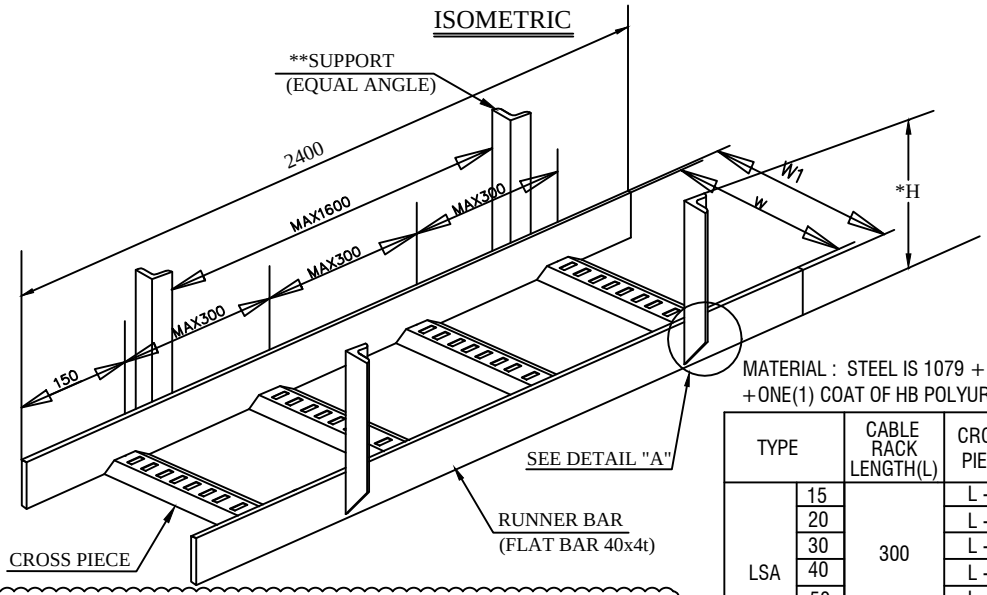
MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE	LENGTH (L)	WEIGHT Aprox.(KG)
A	300	0.28
B	600	0.56
C	900	0.84
D	1200	1.13
E	1500	1.41
F	1800	1.69
G	2100	1.97
H	2400	2.26

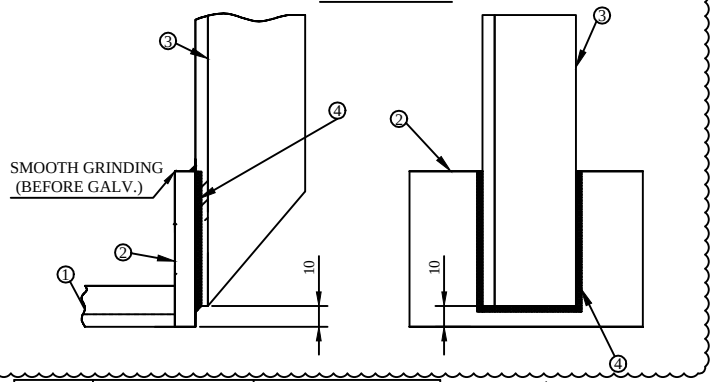
*TYPES - A,B,C,D,E,F,G,& SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

	CABLE INSTALLATION MATERIALS	PART NO: 05.03	09 / 63
	CABLE RACK (TYPICAL)	DRG NO: 037-K5700200	

ISOMETRIC



DETAIL "A"



ITEM NO.	DESCRIPTION	REMARK
1	CROSS PIECE	SEE PAGE 07
2	RUNNER BAR	SEE PAGE 08
3	SUPPORT	SEE NOTE
4	WELDING	

R1

R1

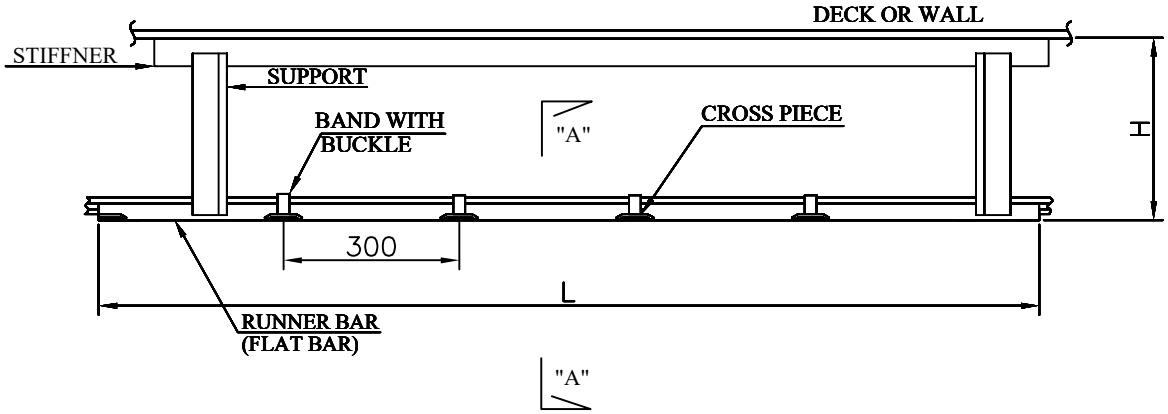
NOTE

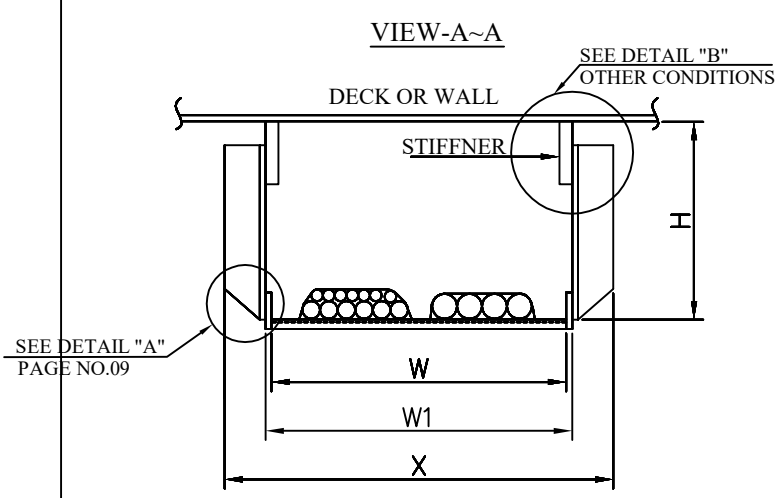
1. ** SUPPORT
   1. FOR ALL CABLE TRAY : 40X40X5 MS ANGLE
   2. SPECIAL CASES AS INDICATED IN DRAWINGS.
   3. CABLE TRAYS ARE TO BE SUPPORTED WITH MAXIMUM SPAN OF 1600 MM .
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. CABLE WAY SUPPORT TO BE WELDED TO THE CABLE RACK ON RUNNER BARS.
4. CABLE WAY SUPPORTS TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.
5. TYPES - A,B,C,D,E,F,G & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

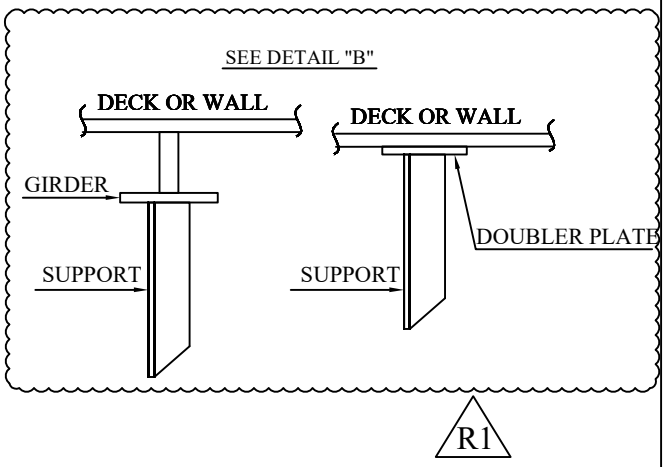
MATERIAL : STEEL IS 1079 + ONE(1) COAT OF EPOXY PRIMER +ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE		CABLE RACK LENGTH(L)	CROSS PIECE	W	W1	WEIGHT Aprox.(KG)
LSA	15	300	L - 15	150	158	0.92
	20		L - 20	200	208	0.98
	30		L - 30	300	308	1.09
	40		L - 40	400	408	1.20
	50		L - 50	500	508	1.32
	60		L - 60	600	608	1.43
LSB	15	600	L - 15	150	158	1.85
	20		L - 20	200	208	1.96
	30		L - 30	300	308	2.18
	40		L - 40	400	408	2.41
	50		L - 50	500	508	2.63
	60		L - 60	600	608	2.86
LSC	15	900	L - 15	150	158	2.77
	20		L - 20	200	208	2.93
	30		L - 30	300	308	3.28
	40		L - 40	400	408	3.61
	50		L - 50	508	508	3.95
	60		L - 60	608	608	4.29
LSD	15	1200	L - 15	150	158	3.69
	20		L - 20	200	208	3.92
	30		L - 30	300	308	4.37
	40		L - 40	400	408	4.82
	50		L - 50	500	508	5.27
	60		L - 60	600	608	5.72
LSE	15	1500	L - 15	150	158	4.61
	20		L - 20	200	208	4.90
	30		L - 30	300	308	5.46
	40		L - 40	400	408	6.02
	50		L - 50	500	508	6.59
	60		L - 60	600	608	7.15
LSF	15	1800	L - 15	150	158	5.54
	20		L - 20	200	208	5.87
	30		L - 30	300	308	6.55
	40		L - 40	400	408	7.23
	50		L - 50	500	508	7.90
	60		L - 60	600	608	8.58
LSG	15	2100	L - 15	150	158	6.46
	20		L - 20	200	208	6.85
	30		L - 30	300	308	7.64
	40		L - 40	400	408	8.43
	50		L - 50	500	508	9.22
	60		L - 60	600	608	10.01
LSH	15	2400	L - 15	150	158	7.38
	20		L - 20	200	208	7.83
	30		L - 30	300	308	8.73
	40		L - 40	400	408	9.64
	50		L - 50	500	508	10.54
	60		L - 60	600	608	11.44

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.04	10/63
	CABLE RACK SINGLE TIER	DRG NO: 037-K5700200	







R1

"L" (LENGTH) STANDARD OF CABLE RACK LENGTH*

SYMBOL	A	B	C	D	E	F	G	H	S
LENGTH (L)	300	600	900	1200	1500	1800	2100	2400	*SPECIAL

MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

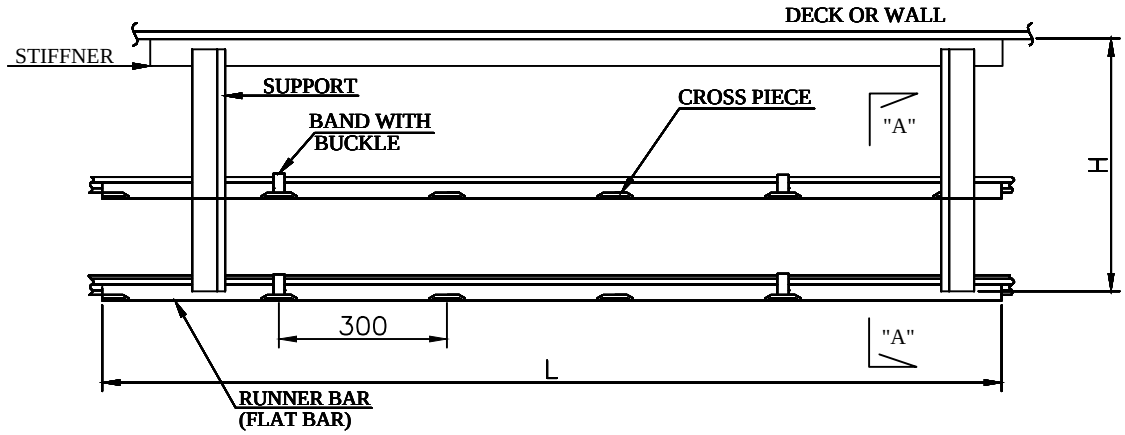
TYPE	CROSS PIECE	RUNNER BAR / SIDE PLATE	W	W1	X
LSA/B/C/D/E/F/G/H - 15	L - 15	40 X 4 F.B.	150	158	238
LSA/B/C/D/E/F/G/H - 20	L - 20	"	200	208	288
LSA/B/C/D/E/F/G/H - 30	L - 30	"	300	308	388
LSA/B/C/D/E/F/G/H - 40	L - 40	"	400	408	488
LSA/B/C/D/E/F/G/H - 50	L - 50	"	500	508	588
LSA/B/C/D/E/F/G/H - 60	L - 60	"	600	608	688

R1

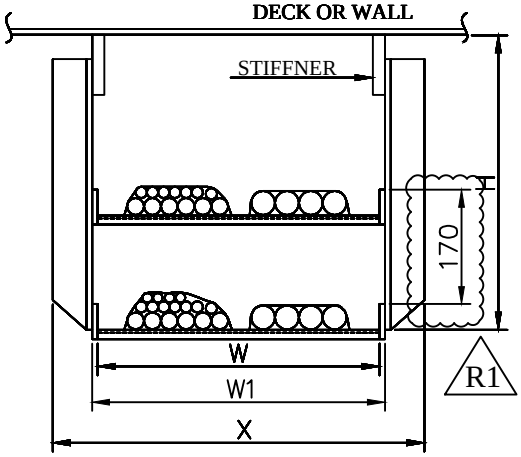
NOTE

1. ** SUPPORT
   1. FOR ALL CABLE TRAY : 40X40X5 MS ANGLE
   2. SPECIAL CASES AS INDICATED IN DRAWINGS.
   3. CABLE TRAYS ARE TO BE SUPPORTED WITH MAXIMUM SPAN OF 1600 MM .
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. CABLE WAY SUPPORT TO BE WELDED TO THE CABLE RACK ON RUNNER BARS.
4. CABLE WAY SUPPORTS TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.
5. TYPES - A,B,C,D,E,F,G & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

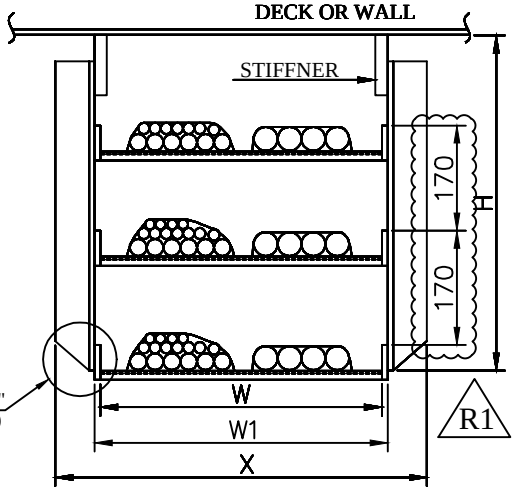
	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.05	11/63
	CABLE RACK DOUBLE TIER	DRG NO: 037-K5700200	



VIEW-A~A



SINGLE TIER - LS
DOUBLE TIER - LD
TRIPPLE TIER - LT



"L" (LENGTH) STANDARD OF CABLE RACK LENGTH*

SYMBOL	A	B	C	D	E	F	G	H	S
LENGTH (L)	300	600	900	1200	1500	1800	2100	2400	*SPECIAL

MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

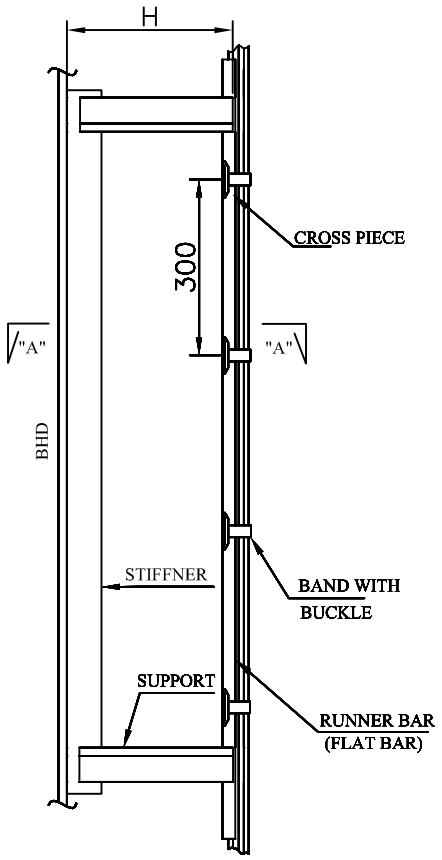
TYPE	CROSS PIECE	RUNNER BAR SIDE PLATE	W	W1	X
LDA/B/C/D/E/F/G/H - 15	L - 15	40 X 4 F.B.	150	158	238
LDA/B/C/D/E/F/G/H - 20	L - 20	"	200	208	288
LDA/B/C/D/E/F/G/H - 30	L - 30	"	300	308	388
LDA/B/C/D/E/F/G/H- 40	L - 40	"	400	408	488
LDA/B/C/D/E/F/G/H - 50	L - 50	"	500	508	588
LDA/B/C/D/E/F/G/H - 60	L - 60	"	600	608	688

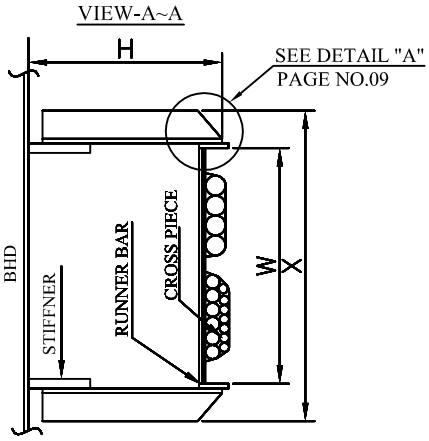
R1

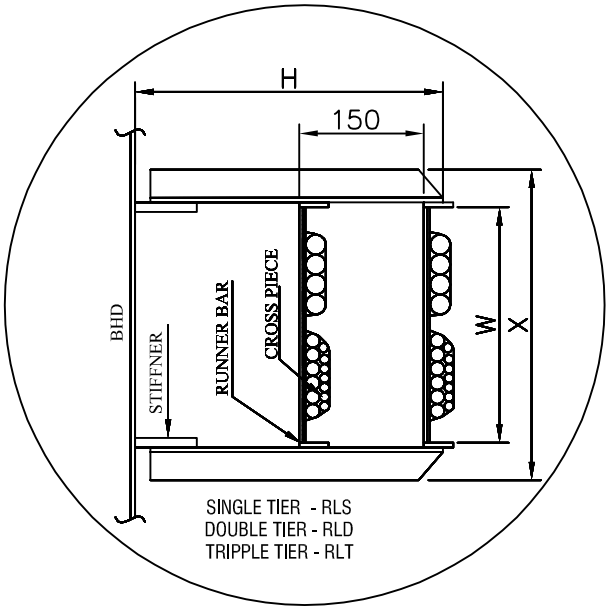
NOTE

1. ** SUPPORT
   1. FOR ALL CABLE TRAY : 40X40X5 MS ANGLE
   2. SPECIAL CASES AS INDICATED IN DRAWINGS.
   3. CABLE TRAYS ARE TO BE SUPPORTED WITH MAXIMUM SPAN OF 1600 MM .
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. CABLE WAY SUPPORT TO BE WELDED TO THE CABLE RACK ON RUNNER BARS.
4. CABLE WAY SUPPORTS TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.
5. TYPES - A,B,C,D,E,F,G & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.06	12/63
	CABLE RACK VERTICAL (REVERSE TYPE)	DRG NO: 037-K5700200	







"L" (LENGTH) STANDARD OF CABLE RACK LENGTH*

SYMBOL	A	B	C	D	E	F	G	H	S
LENGTH (L)	300	600	900	1200	1500	1800	2100	2400	*SPECIAL

MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

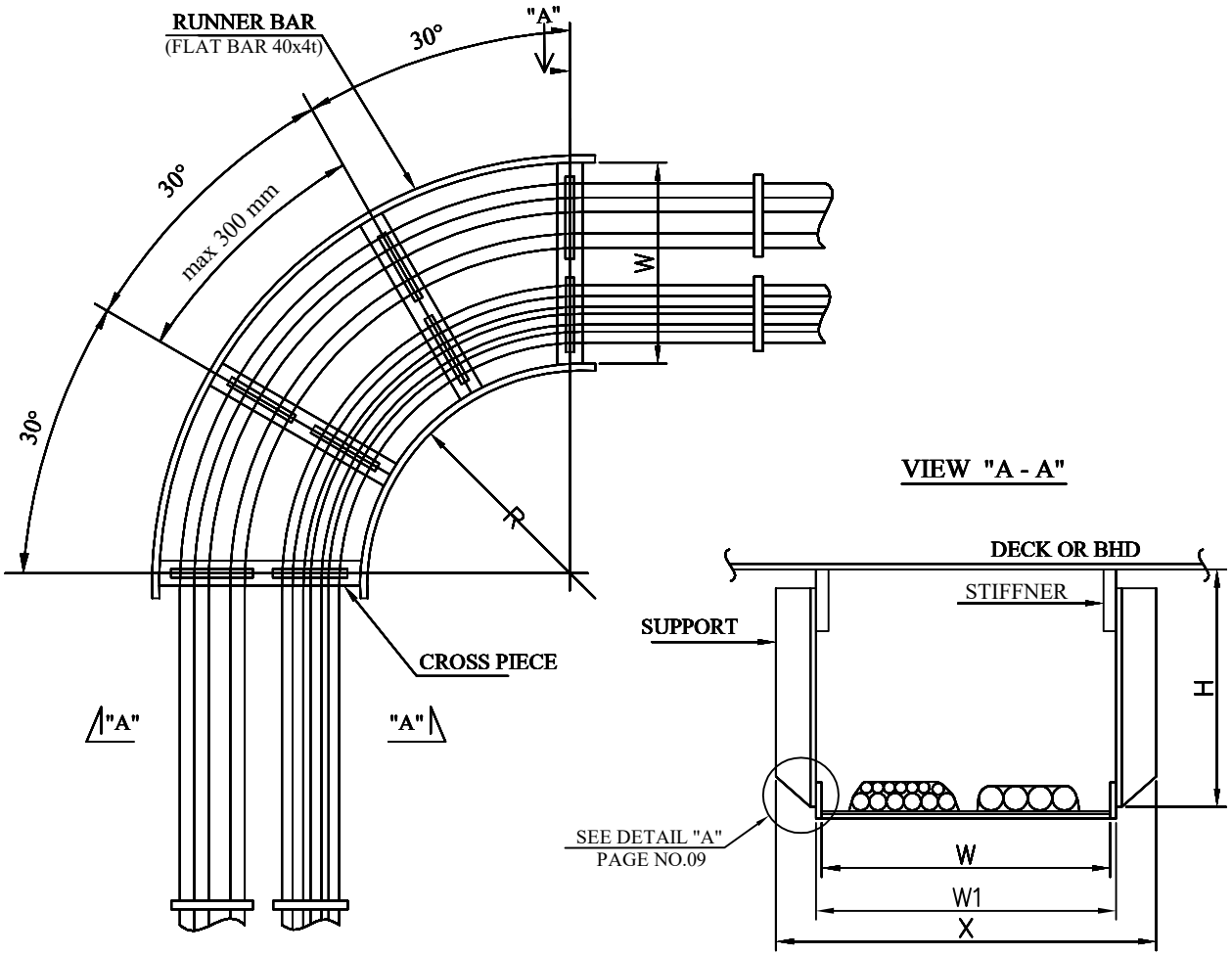
TYPE	CROSS PIECE	RUNNER BAR SIDE PLATE	W	W1	X
RLSA/B/C/D/E/F/G/H - 15	L - 15	40 X 4 F.B.	150	158	238
RLSA/B/C/D/E/F/G/H - 20	L - 20	"	200	208	288
RLSA/B/C/D/E/F/G/H - 30	L - 30	"	300	308	388
RLSA/B/C/D/E/F/G/H - 40	L - 40	"	400	408	488
RLSA/B/C/D/E/F/G/H - 50	L - 50	"	500	508	588
RLSA/B/C/D/E/F/G/H - 60	L - 60	"	600	608	688

R1

NOTE

1. ** SUPPORT
   1. FOR ALL CABLE TRAY : 40X40X5 MS ANGLE
   2. SPECIAL CASES AS INDICATED IN DRAWINGS.
   3. CABLE TRAYS ARE TO BE SUPPORTED WITH MAXIMUM SPAN OF 1600 MM .
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. CABLE WAY SUPPORT TO BE WELDED TO THE CABLE RACK ON RUNNER BARS.
4. CABLE WAY SUPPORTS TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.
5. TYPES - A,B,C,D,E,F,G & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "H" TYPE (2400 MM LENGTH) CABLE RACK

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.07	13/63
	CABLE RACK BEND TYPE	DRG NO: 037-K5700200	



W<300 : NO. OF *CROSS PIECE - 3 Nos AND W>300 : NO. OF #CROSS PIECE - 4Nos.

* W<500 R = 300, W≥500 R=400

MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE	HANGER	RUNNER BAR	W	W1	X	WEIGHT Aprox.(KG)
LSR15	L - 15	40 X 4t F.B.	150	158	238	2.24
LSR20	L - 20	"	200	208	288	2.65
LSR30	L - 30	"	300	308	388	3.38
LSR40	L - 40	"	400	408	488	4.56
LSR50	L - 50	"	500	508	588	5.41
LSR60	L - 60	"	600	608	688	6.25

NOTE

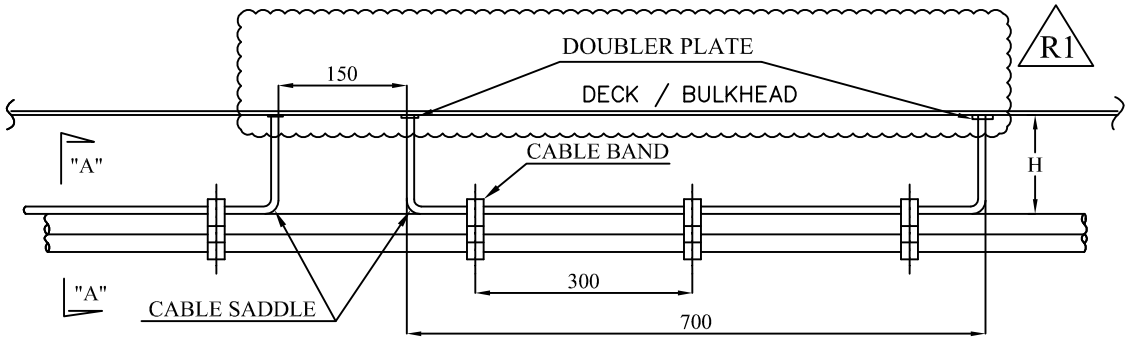
1. ** SUPPORT
   1. FOR ALL CABLE TRAY : 40X40X5 MS ANGLE
   2. SPECIAL CASES AS INDICATED IN DRAWINGS.

2.** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.

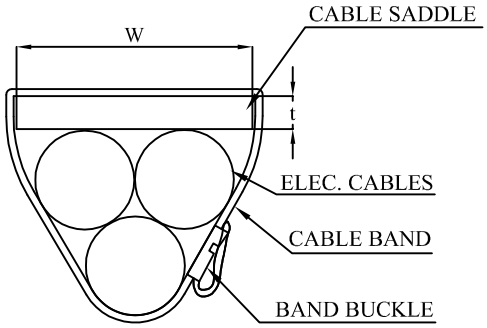
3. CABLE WAY SUPPORTS TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.

4. CABLE WAY SUPPORT TO BE WELDED TO THE CABLE RACK ON RUNNER BARS.

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.08	14/63
	CABLE SADDLE - "FB" TYPE	DRG NO: 037-K5700200	



SEC. "A - A"

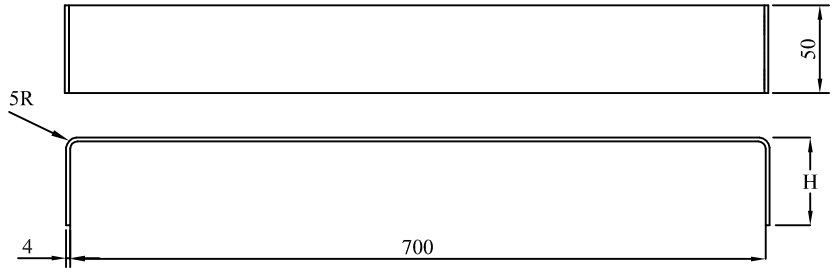


MATERIAL : STEEL IS 1079 + ONE(1) COAT OF EPOXY PRIMER +ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE		H	WEIGHT Aprox.(KG)	REMARK
FB3	-70H	70	1.48	SEE TYPE "1"
	-200H	200	1.94	
	-330H	330	2.40	
FB5	-70H	70	2.60	SEE TYPE "2"
	-200H	200	3.89	
	-330H	330	4.80	

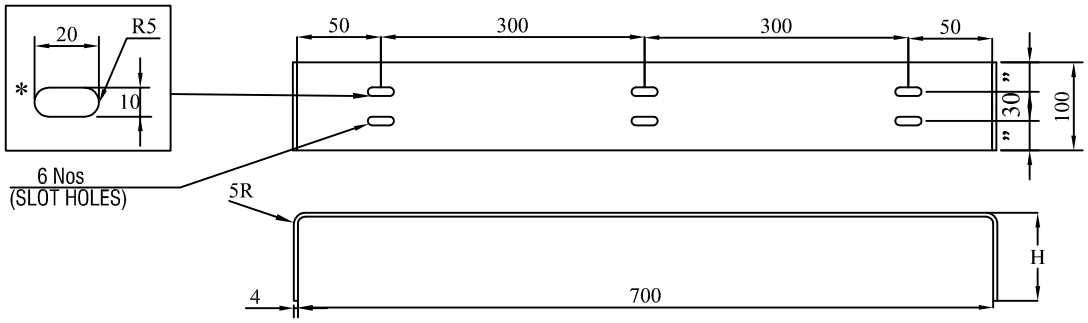
TYPE 1

1 "FB-3" TYPE CABLE SADDLE



TYPE 2

2 "FB-5" TYPE CABLE SADDLE



R1

1.CABLE SADDLES ARE USED TO SUPPORT ONE TO TEN CABLES.

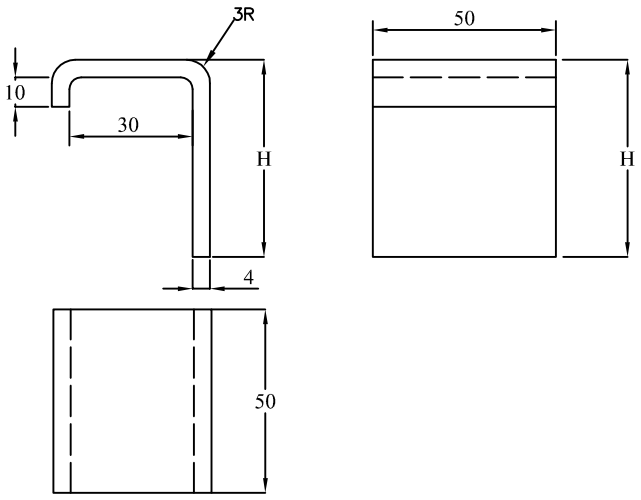
2. FLAT BAR "FB3,FB5 TO BE SUITABLY CUT AND USED AS PER THE DIMENSION ON CORRESPONDING FITTING ARRG DRG. THE CUTTING OF HEIGHT "H" TO BE DONE AS BELOW ONLY.
   H < 70MM - FB3-70H/FB5-70H TO BE USED
   H > 70 & < 200 - FB3-200H/FB5-200H TO BE USED
   H > 200 & < 330 - FB3-330H/FB5-330H TO BE USED

3. CABLE SADDLES TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE SADDLES ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.

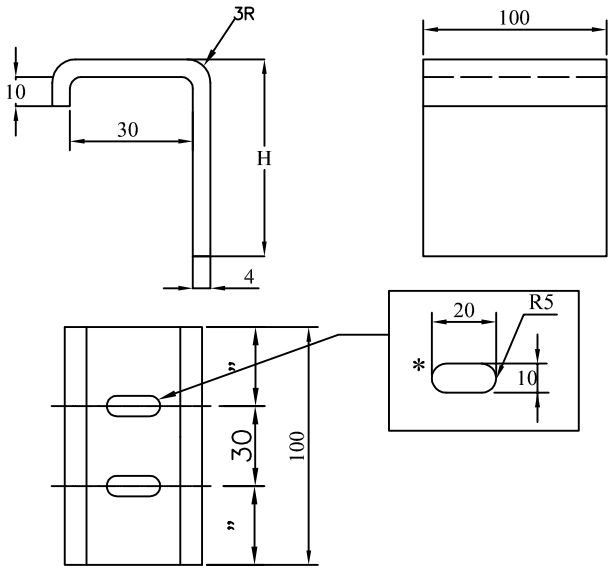
	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.09	15/63
	CABLE SADDLE - "SFG" TYPE	DRG NO: 037-K5700200	

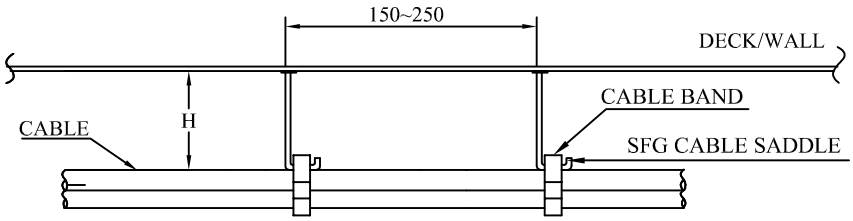
THIS "SFG" CABLE HANGER SHALL USUALLY BE USED AT CURVED AND/OR SHORT CABLE WAY.

TYPE 3
'SFG3' TYPE CABLE SADDLE



TYPE 4
'SFG5' TYPE CABLE SADDLE





MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE		H	WEIGHT Aprox.(KG)	REF DRG
SFG3	70H	70	0.19	SEE TYPE "3"
	200H	200	0.42	
	330H	330	0.65	
SFG5	70H	70	0.35	SEE TYPE "4"
	200H	200	0.75	
	330H	330	1.16	

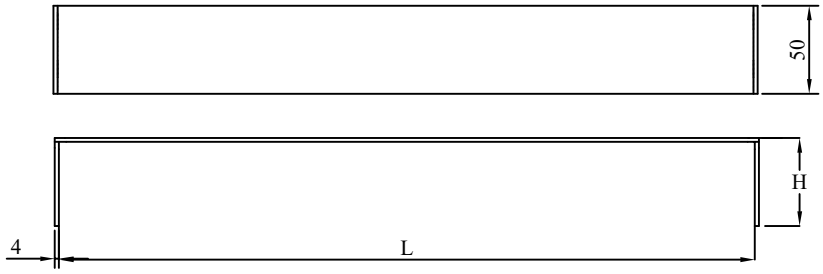
R1

1. CABLE SADDLES ARE USED TO SUPPORT ONE TO TEN CABLES. WHERE EVER THE OTHER ROUTING MATERIALS NOT USEBLE.
2. FLAT BAR "SFG3,SFG5 TO BE SUITABLY CUT AND USED AS PER THE DIMENSION ON CORRESPONDING FITTING ARRG DRG. THE CUTTING OF HEIGHT "H" TO BE DONE AS BELOW ONLY.
   H < 70MM - SFG3-70H/SFG5-70H TO BE USED
   H > 70 & < 200 - SFG3-200H/SFG5-200H TO BE USED
   H > 200 & < 330 - SFG3-330H/SFG5-330H TO BE USED
3. CABLE SADDLES TO BE WELDED TO THE STIFFNERS/GIRDERS AS FOR AS POSSIBLE. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE SADDLES ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.10	15A / 63
	CABLE SADDLE - "FB" TYPE	DRG NO: 037-K5700200	

TYPE 5

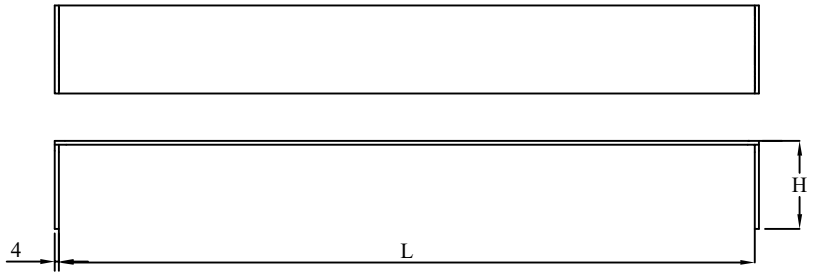
1 "FB-3" TYPE CABLE SADDLE

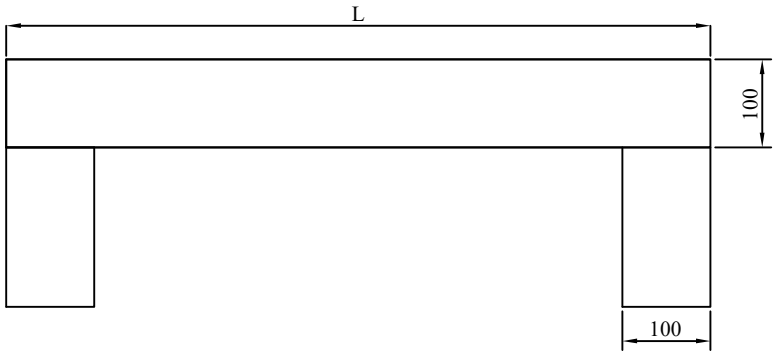


TYPE 6

1 "FB-5" TYPE CABLE SADDLE

R1





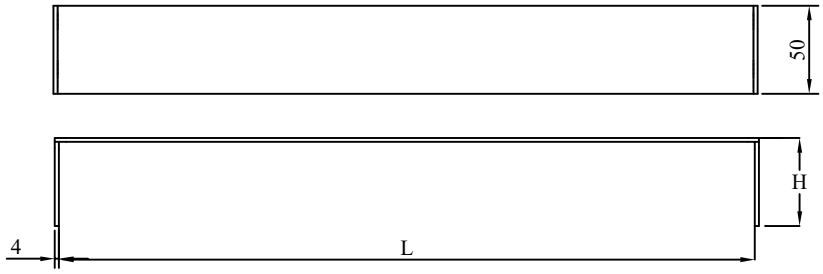
MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE	L	WEIGHT Aprox.(KG)	REF DRG
FB3A	750		SEE TYPE "5"
FB3B	1000		
FB3C	1200		
FB3D	1500		
FB5A	750		SEE TYPE "6"
FB5B	1000		
FB5C	1200		
FB5D	1500		

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.11	15B / 63
	CABLE SADDLE - "FB" TYPE	DRG NO: 037-K5700200	

TYPE 5

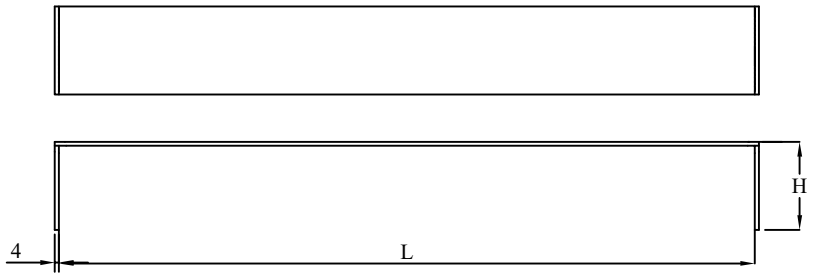
1 "FB-3" TYPE CABLE SADDLE

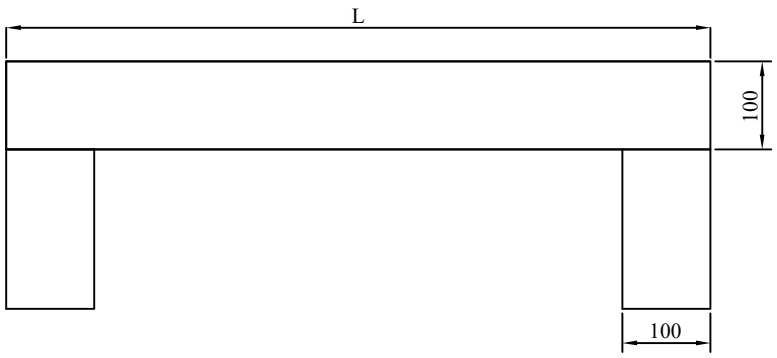


TYPE 6

1 "FB-5" TYPE CABLE SADDLE

R1





MATERIAL : STEEL IS 1079+ONE(1) COAT OF EPOXY PRIMER+ONE(1) COAT OF HB POLYURETHANE FINISH (OFF WHITE)

TYPE	L	WEIGHT Aprox.(KG)	REF DRG
FB3A	300		SEE TYPE "5"
FB3B	600		
FB3C	900		
FB5A	300		SEE TYPE "6"
FB5B	600		
FB5C	900		

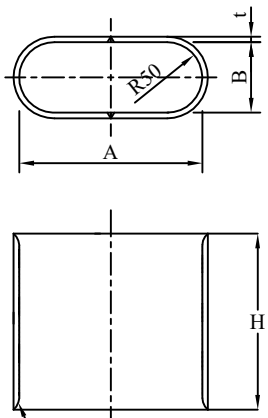
CABLE PENETRATION

PART NO: 06.01

CABLE COAMING

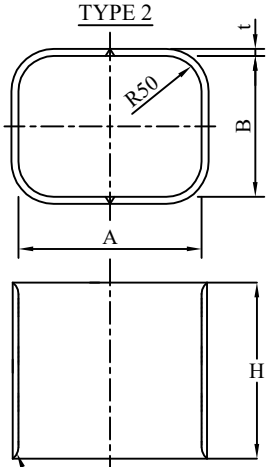
DRG NO: 037-K5700200

TYPE 1



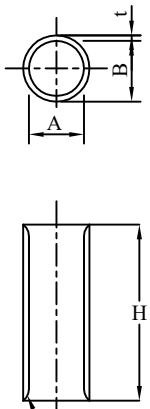
ROUND EDGE
TO AVOID DAMAGE TO CABLE

TYPE 2



ROUND EDGE
TO AVOID DAMAGE TO CABLE

TYPE 3



ROUND EDGE
TO AVOID DAMAGE TO CABLE

* "XX" : "DC" , "EC"

PIECE MARK	SIZE				TYPE	WEIGHT(kg)	REMARK
	A	B	t	H DC EC		DC EC	
XX - 1610	160	100	8	100	1	2.88	
XX - 2110	210	100	8	100	1	3.51	
XX - 2610	260	100	8	100	1	4.14	
XX - 2615	260	150	8	100	2	5.13	
XX - 2620	260	200	8	100	2	5.40	
XX - 3610	360	100	8	100	1	5.40	
XX - 3615	360	150	8	100	2	6.02	
XX - 3620	360	200	8	100	2	6.65	
XX - 4610	460	100	8	100	1	6.65	
XX - 4615	460	150	8	100	2	7.28	
XX - 4620	460	200	8	100	2	7.91	
XX - 4625	460	250	8	100	2	8.54	
XX - 5610	560	100	8	100	1	7.91	
XX - 5615	560	150	8	100	2	8.54	
XX - 5620	560	200	8	100	2	9.16	
XX - 6610	660	100	8	100	1	9.16	
XX - 6615	660	150	8	100	2	9.79	
XX - 6620	660	200	8	100	2	10.42	
XX - 6625	660	250	8	100	2	11.05	
XX - 7610	760	100	8	100	1	10.42	
XX - 7615	760	150	8	100	2	11.05	
XX - 7620	760	200	8	100	2	11.68	
XX - 8615	860	150	8	100	2	12.30	
XX - 8620	860	200	8	100	2	12.93	
SPECIAL							CASE BY CASE

XX - 50A	52.5	60.3	3.91	100	3	0.54	SCH. 40
XX - 80A	77.9	88.9	5.49	100	3	1.13	"
XX - 100A	102.3	114.3	6.02	100	3	1.60	"

XX - 50A	49.2	60.3	5.54	100	3	0.74	SCH. 80
XX - 80A	73.6	88.9	7.62	100	3	1.52	"
XX - 100A	97.18	114.3	8.56	100	3	2.23	"

	CABLE PENETRATION	PART NO: 06.02	17 / 63
	MARINE WATERTIGHT CABLE GLANDS BULKHEAD / DECK MOUNTED TYPE	DRG NO: 037-K5700200	

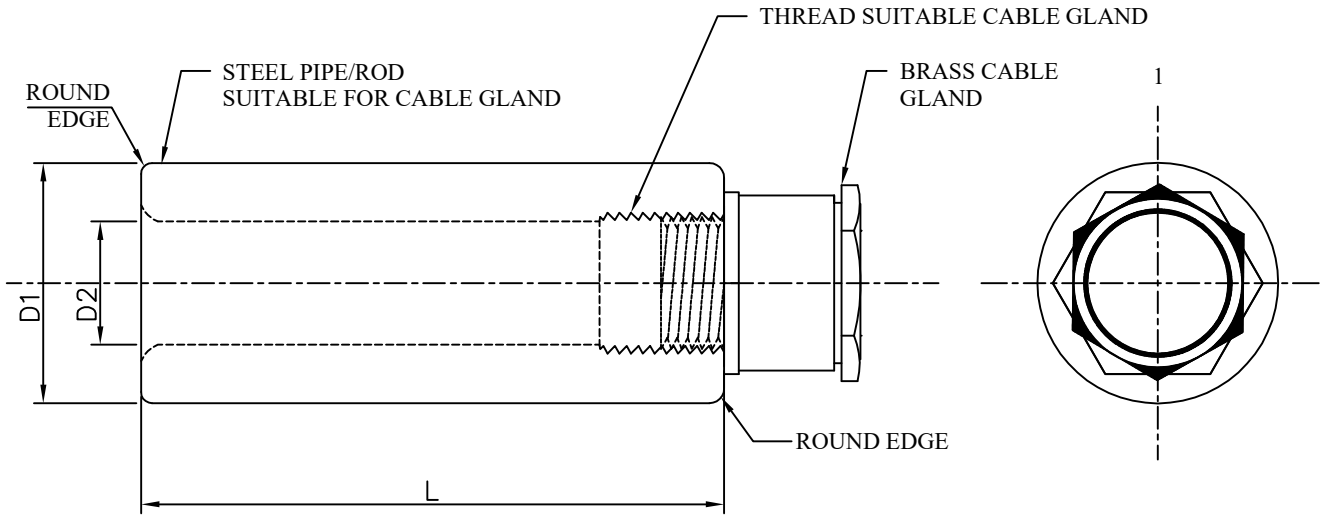


TABLE-1

NO.	*NAME	LENGTH (L) (MM)
1	M25-150	150
2	M25-050	50
3	M25-150	200
4	M25-200	200

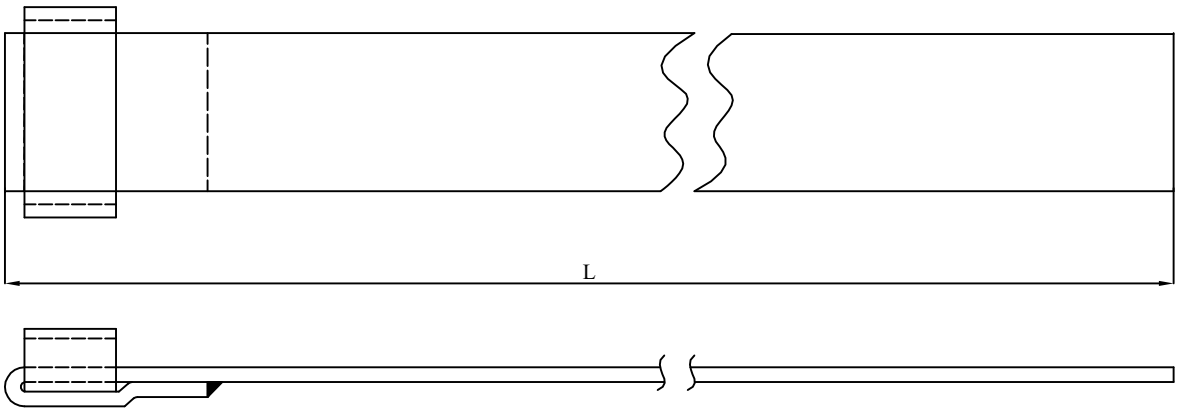
L= VARY AS PER THE THICKNESS OF INSULATION / OTHER REQUIREMENTS.

* M25, M1500, M200 MEANS THE GLAND SIZE USED FOR INSTALLATION

The cable glands penetrating to weather deck to be positioned below the cable entry point of the equipment to which it serve so as to prevent the water dripping into the equipment. Location of the pipe glands will be clearly indicated in the respective yard plans.

1. "L" SHALL BE DECIDED ACCORDING TO THE CONNECTION POINT OF THE EQUIPMENT,ETC

	CABLE INSTALLATION MATERIALS	PART NO: 07.01	18/63
	ELECTRIC CABLE BAND WITH BUCKLE (316 STAINLESS STEEL)	DRG NO: 037-K5700200	

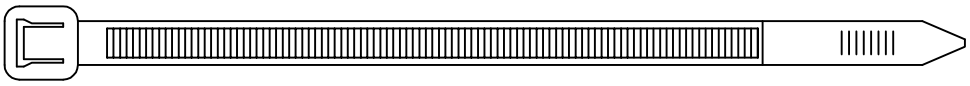


NOTE

1. MATERIAL : STAINLESS STEEL
2. LENGTH AND WIDTH : SHALL BE DECIDED BY THE CABLE SIZE

	CABLE INSTALLATION MATERIALS	PART NO: 07.02	19/63
	CABLE TIES	DRG NO: 037-K5700200	

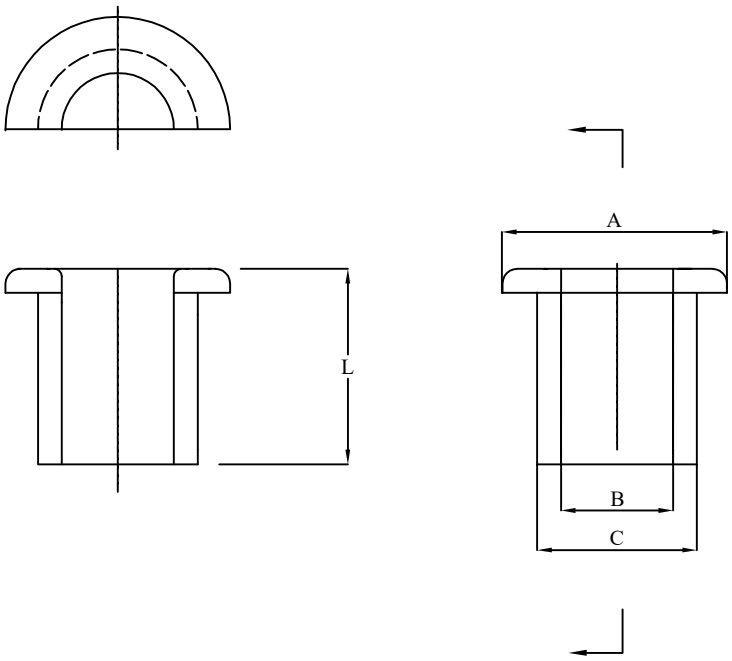
LOCKING CABLE TIE



NOTE

1. MATERIAL : WEATHER RESISTANT , UV RESISTANT NYLON.
2. LENGTH AND WIDTH : SHALL BE DECIDED BY THE CABLE SIZE
3. COLOUR : NATURAL OR BLACK
4. USED FOR TEMPORARY CABLE TYING (WHITE) AND TYING INSIDE ELECTRICAL CONTROL PANELS (BLACK).

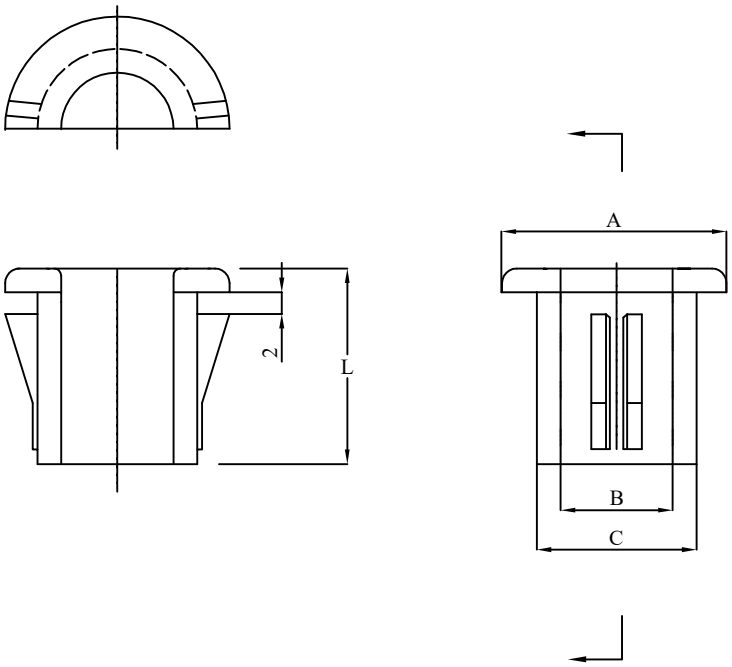
	CABLE INSTALLATION MATERIALS	PART NO: 07.03	20/63
	VINYL BUSHING	DRG NO: 037-K5700200	



MATERIAL : VINYL

1. LENGTH & WIDTH : SHALL BE DECIDED BY THE CABLE SIZE

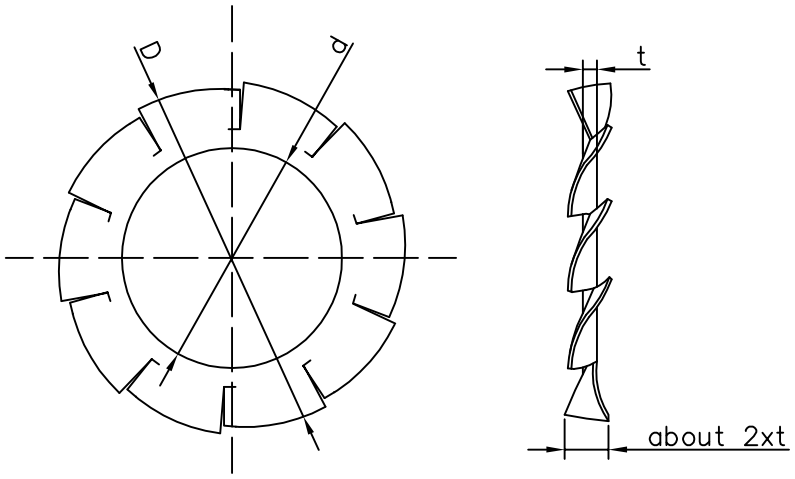
	CABLE INSTALLATION MATERIALS	PART NO: 07.04	21/63
	VINYL BUSHING(SPRING TYPE)	DRG NO: 037-K5700200	



MATERIAL : VINYL

1. LENGTH & WIDTH : SHALL BE DECIDED BY THE CABLE SIZE

	CABLE INSTALLATION MATERIALS	PART NO: 07.05	22/63
	TOOTHED LOCK WASHER FOR EARTHING	DRG NO: 037-K5700200	



MATERIAL: SPRING STEEL

DESIGNATION	NOMINAL SIZE	d		D		t		NO.OF TOOTH	WEIGHT (gm)
		PREFERRED DIMENSION	TOLERANCE	PREFERRED DIMENSION	TOLERANCE	PREFERRED DIMENSION	TOLERANCE		
LW	4	4.4	+ 0.30	11	− 0.50	0.63	±0.040	12	1.2
	8	8.4		15		0.80	±0.050		2
	10	10.5	+ 0.40	18		0.90			2.5
	12	12.5		21	−0.60	1.00	±0.055		3

INSTALLATION OF CABLES:-

GENERAL

This part covers the description of items used for the installation of cables onboard ships, various methods for the installation of cables and precautions to be taken considering various standards and rule requirements.

PRACTICE FOR INSTALLATION OF CABLES

Cables in ships are subjected to rigorous environmental conditions such as excessive heat, exposure to accumulation of oil or water and risk of mechanical and chemical damage.

Following general points to be noted while designing the cable installations:-

- All cables shall be effectively supported and secured without damaging the outer covering of the cables.

- Deck cables and cable exposed to mechanical damage are protected by means of galvanized solid drawn steel pipe.

- Cables shall be provided with heat shrinkable tubes to seal the cable and glands for all weather deck installation.

- During hot works, all cables exposed to sparks from welding/blow pipe works shall be properly protected by means of an incombustible carpet or curtain

- No cables shall generally be painted. Any paint and over-spray shall be cleaned off all cabling.

- Cables are not to be supportd on to the PE earth bar.

- Extra cable length is not allowed for termination. cable inside the panel except for spare cables.

- Cables to be terminated just after passing the cable glands.

R1

- Wires to be guided through suitable cable ducts.

- Suitable extra length for wires should be only made for connecting the spare wires.

R1

- Terminals with bottom connections to be used to avoid the over length in connecting the wires.

- Cables for essential/emergency power for lighting, internal communication or signals shall be routed clear of galley, laundry, machinery spaces and other area of high risk fire.

- The minimum internal bending radius for power and control cables shall be in accordance with the manufacturers recommendations.

- Clips, saddles bands and supports shall not present any sharp edges against the cables.

- Where duplicate supply is required for the same service, the routes are to be different.

- All the cables must be with corresponding cable tags and for core identification,ferules can be used

The general practice of laying cable is on cable Hangers for main cable ways. Cable saddles are used for less number of cables. Angle supports are used for supporting cable hangers and racks to the main structure.

Cables are held in position on hangers racks and cable saddles by means of metallic/non metallic material Clips.The metal should be of Stainless steel. Inside panel boards nylon cable ties can be used for dressing Cables exposed to weather deck shall secured with stainless steel band with buckles .

Cables shall be supported so close to an enclosure entry through cable gland to avoid mechanical stress cable gland.

	GENERAL REFERENCE	PART NO: 08.01	25 / 63
	INSTALLATION OF CABLES	DRG NO: 037-K5700200	

- INSTRUCTION FOR FIXING CABLES

1. Power cables larger than 35mm² below/on top of cable trays
   Large strips = 1 SS - 2 Nylon

2. Cables on cable racks in machinery area = 1 SS - 2 Nylon

3. Cables on cable racks in accommodation area = 1 SS - 2 Nylon

4. Cables on cable racks in expossed area = metalic (stainless steel)

5. Cables on flat bar in machinery area = 1 SS - 2 Nylon

6. Cables on flat bar in accommodation area = 1 SS - 2 Nylon

7. Fibre optic cables shall be fastened with Nylon cable ties all the way.

8. When control cables and fibre optic cables are bunched together shall be fastened with Nylon cable ties all the way.

- CABLE BUNDLES:

Power cable of maximum 6 cables or signal cables of maximum 15 cables shall be bunched together by one clamp.
If bunching of larger formations is used for cables expected shall be under full load simultaneously, a correction factor of 0.85 shall be applied.

	GENERAL REFERENCE	PART NO: 08.02	26 / 63
	TYPICAL ARR'T OF ELECTRICAL APPARATUS IN ACCOMMODATION	DRG NO: 037-K5700200	

- HEIGHT OF RECEPTACLE ;

  THE HEIGHT OF RECEPTACLES SHALL BE AS FOLLOWS;

  A) 1200mm ABOVE THE FLOOR TO BOTTOM FOR WALL MOUNTED EQUIPMENTS

  B) FOR DRINKING WATER FOUNTAIN, REFRIGERATOR : 300mm ABOVE EQUIP, OR INSIDE COVERING BOX

  C) FOR IRON IN LAUNDRY : 300mm ABOVE IRON BOARD AND 100mm OFF FROM THE END OF THE IRON BOARD.

  D) FOR ELEC. SHAVER : BUILT IN THE LIGHTING FIXTURE OR TOILET CABINET.

  E) FOR TOASTER,RANGE,COFFEE POT : 400mm ABOVE TABLE.

- JUNCTION BOX :
  TO BE LOCATED WHERE ACCESSIBLE FOR CHECKING.

- BUZZER AND CALLING PUSH BUTTON :

  A) PUSH BUTTON FOR PROVISION/COLD STORE : 1400mm ABOVE FLOOR.

NOTE: THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

INSTALLATION PRACTICE ON EARTHING:-

GENERAL

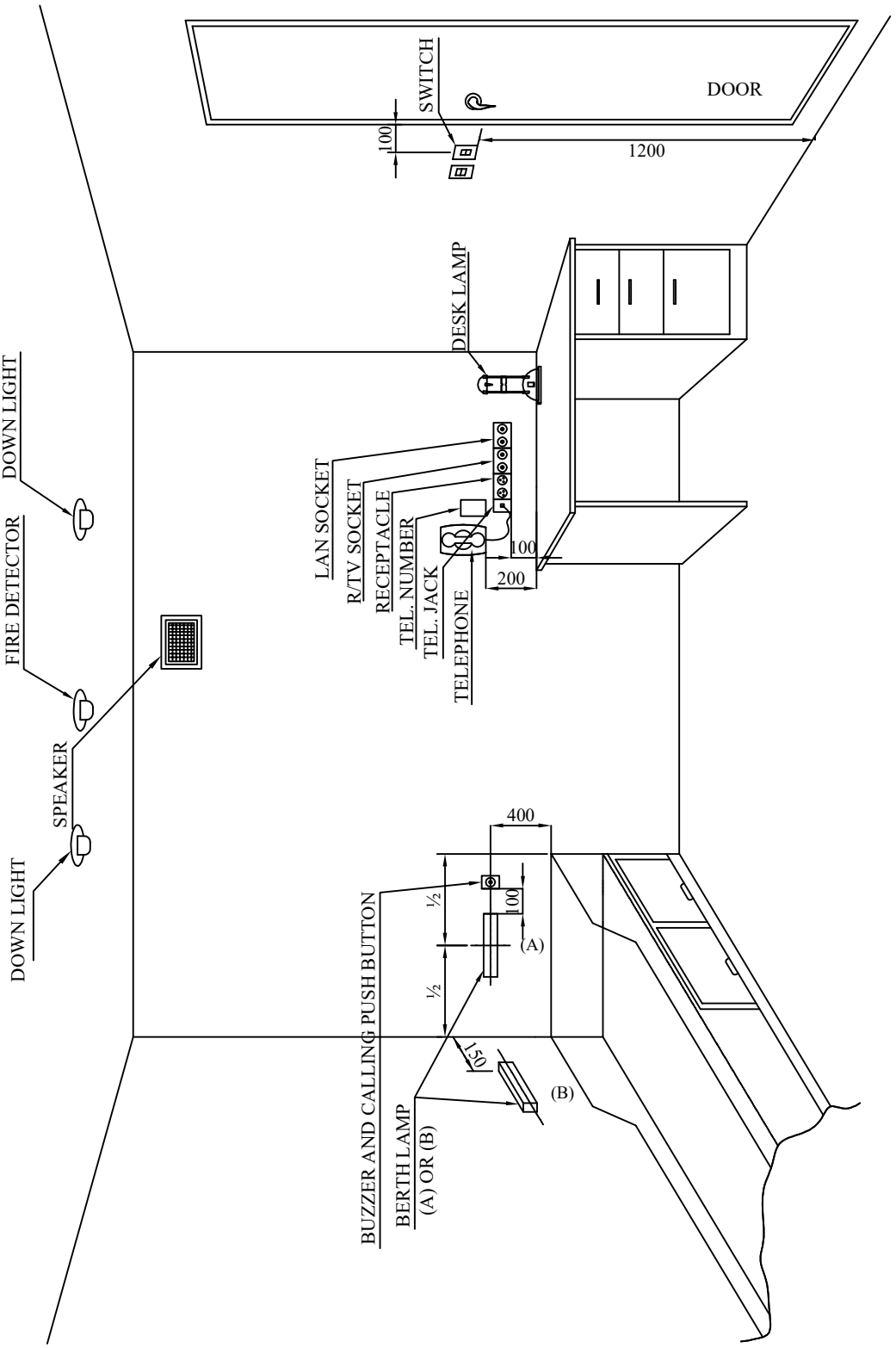
Generally all metal parts of the electrical installation, other than current carrying parts be earthed. Earthing may however be omitted for double insulated equipment, low voltage equipment etc.

The connection of earth conductors to the earth bar and to the hull, shall be made by corrosion-resistant screws or clamps. Cross section shall correspond to the earth conductor

Earthing of instrumentation and communication cable screens shall be done according to makers requirement. For these cables with only one screen the cable screen shall be earthed in both ends.

	GENERAL REFERENCE	PART NO: 08.04	28 / 63
	TYPICAL LAYOUT-TYPE "A"	DRG NO: 037-K5700200	

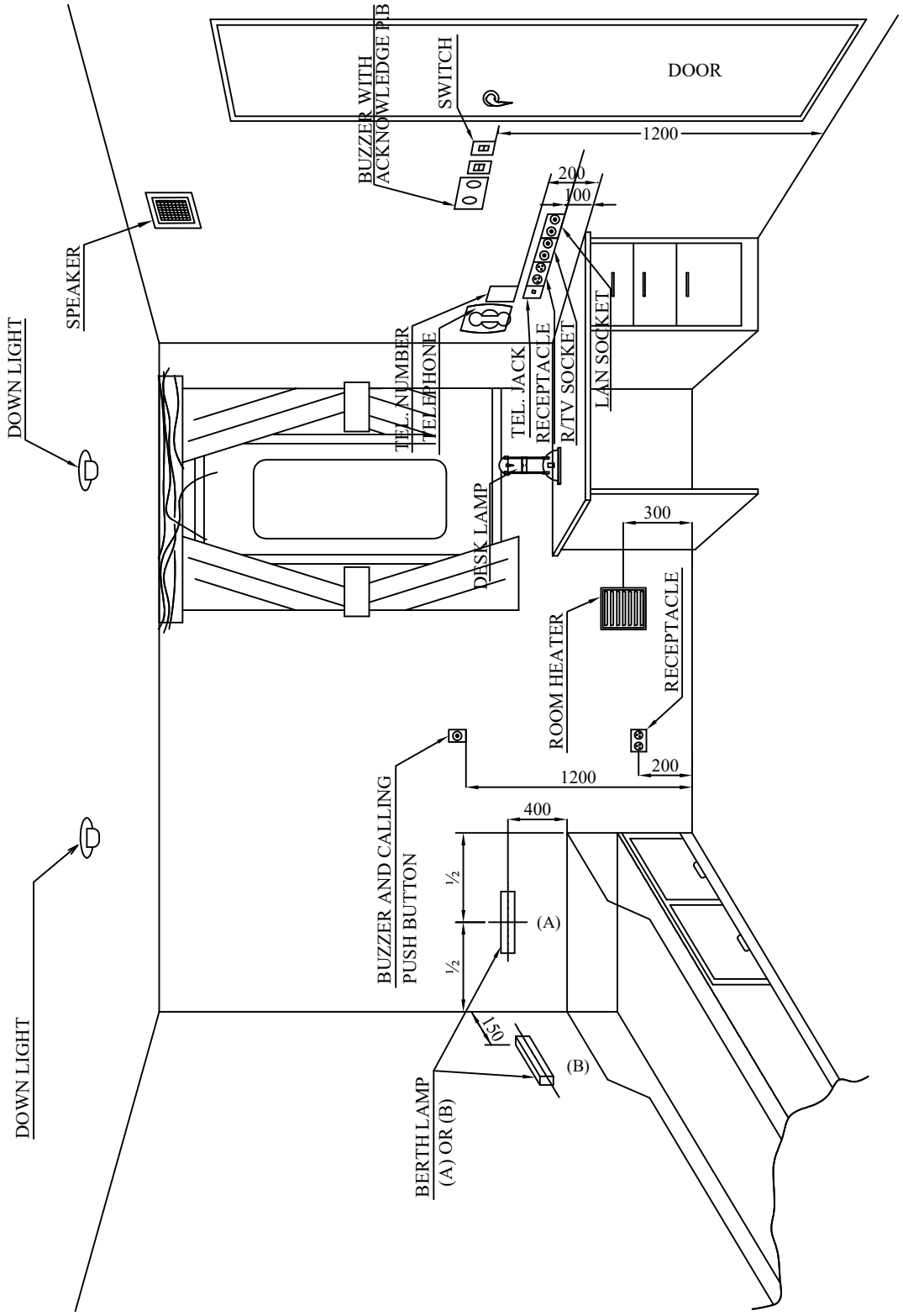
(CABIN)



NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

	GENERAL REFERENCE	PART NO: 08.05	29/63
	TYPICAL LAYOUT-TYPE "B"	DRG NO: 037-K5700200	

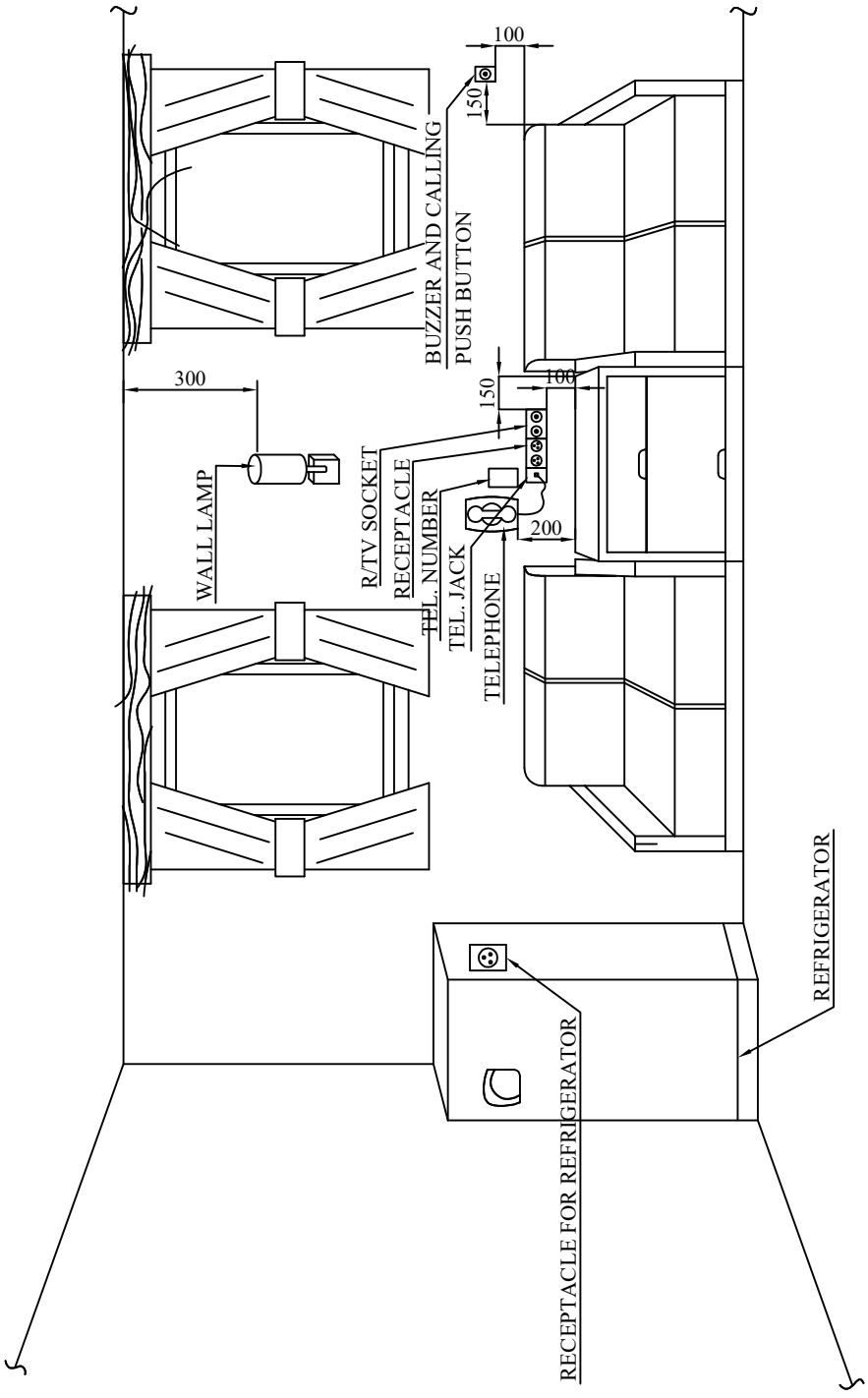
(CABIN)



NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

	GENERAL REFERENCE	PART NO: 08.06	30/63
	TYPICAL LAYOUT-TYPE "C"	DRG NO: 037-K5700200	

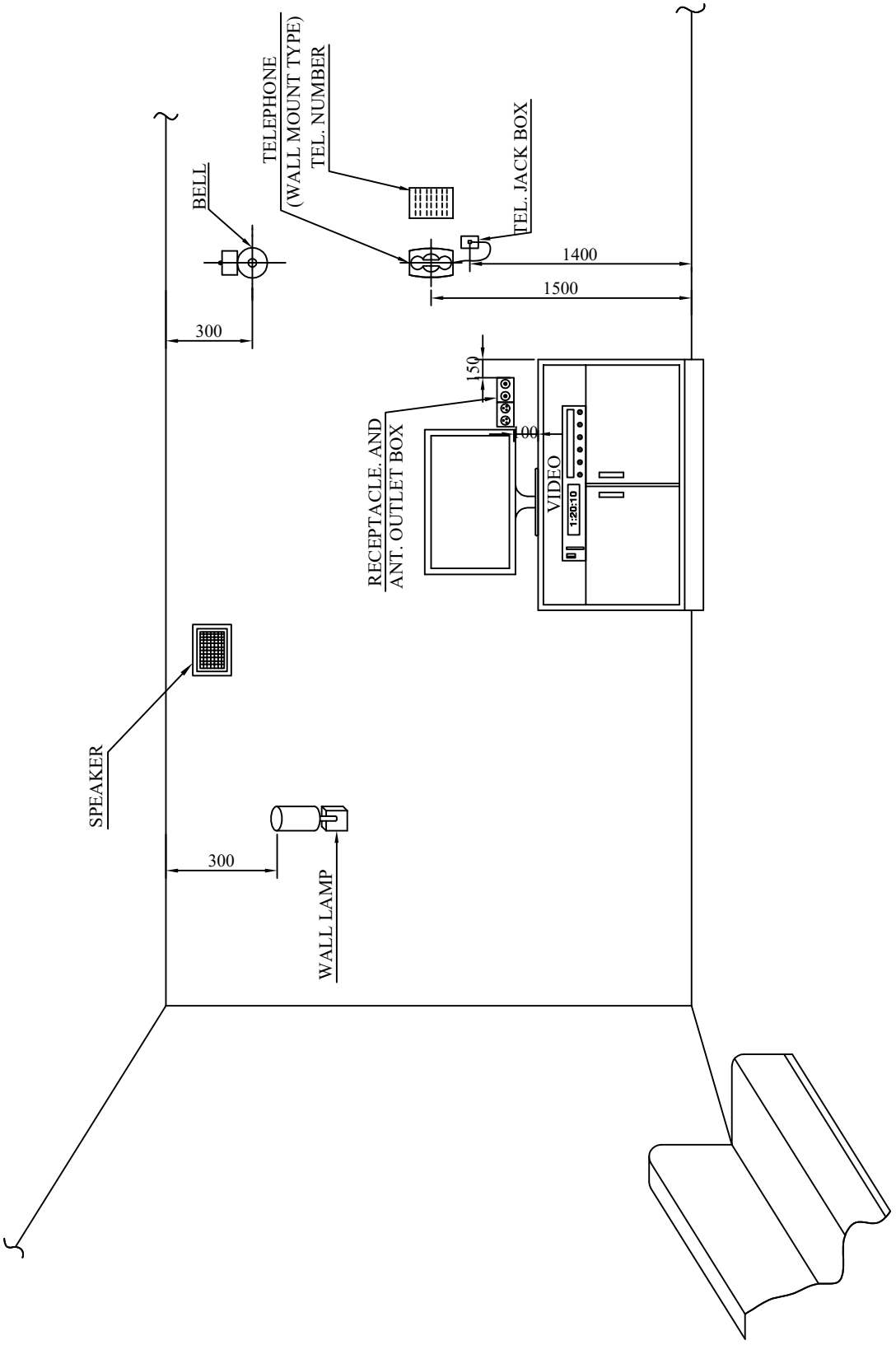
(MESS & DAY ROOM)



NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

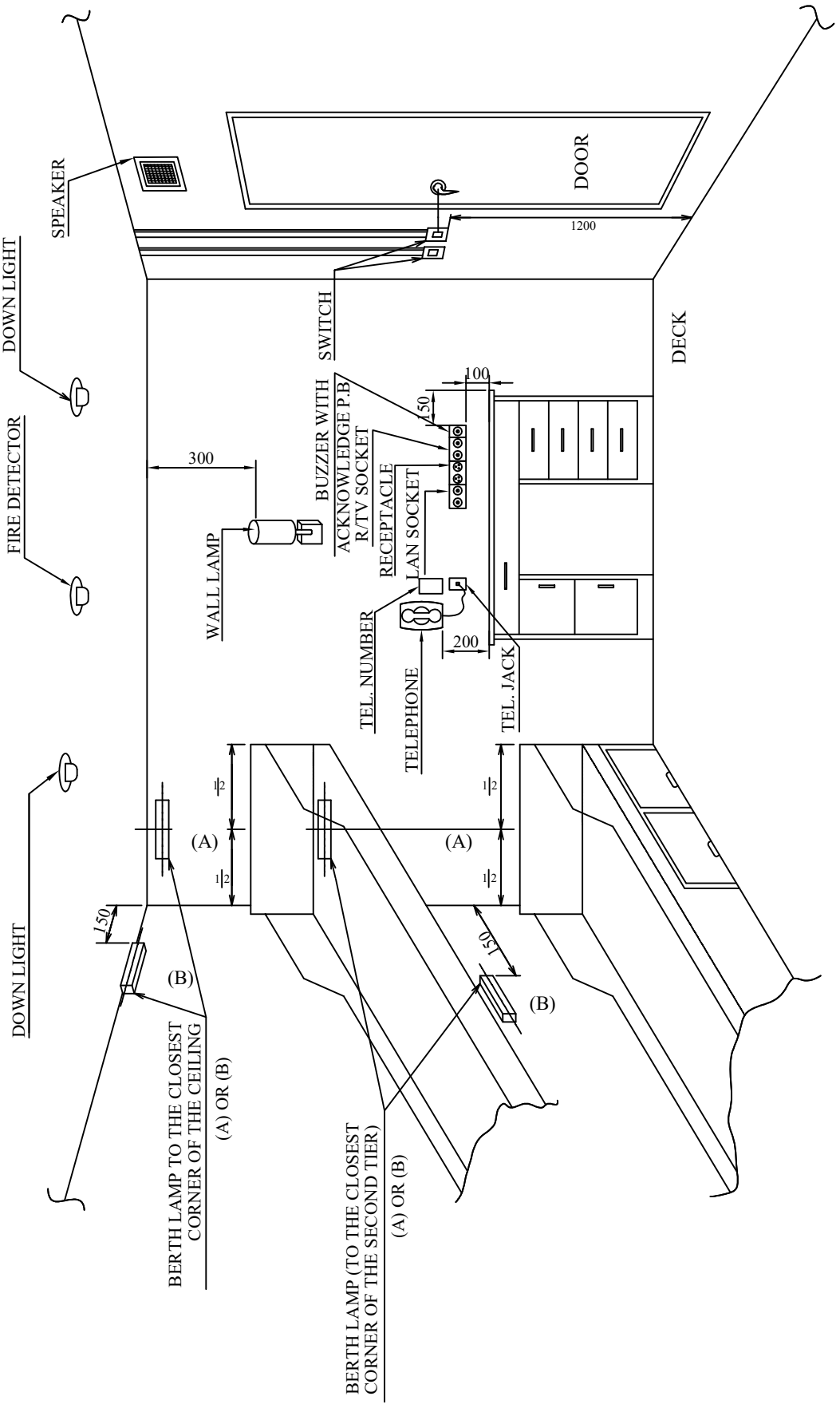
	GENERAL REFERENCE	PART NO: 08.07	31/63
	TYPICAL LAYOUT-TYPE "D"	DRG NO: 037-K5700200	

(MESS & DAY ROOM)



NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

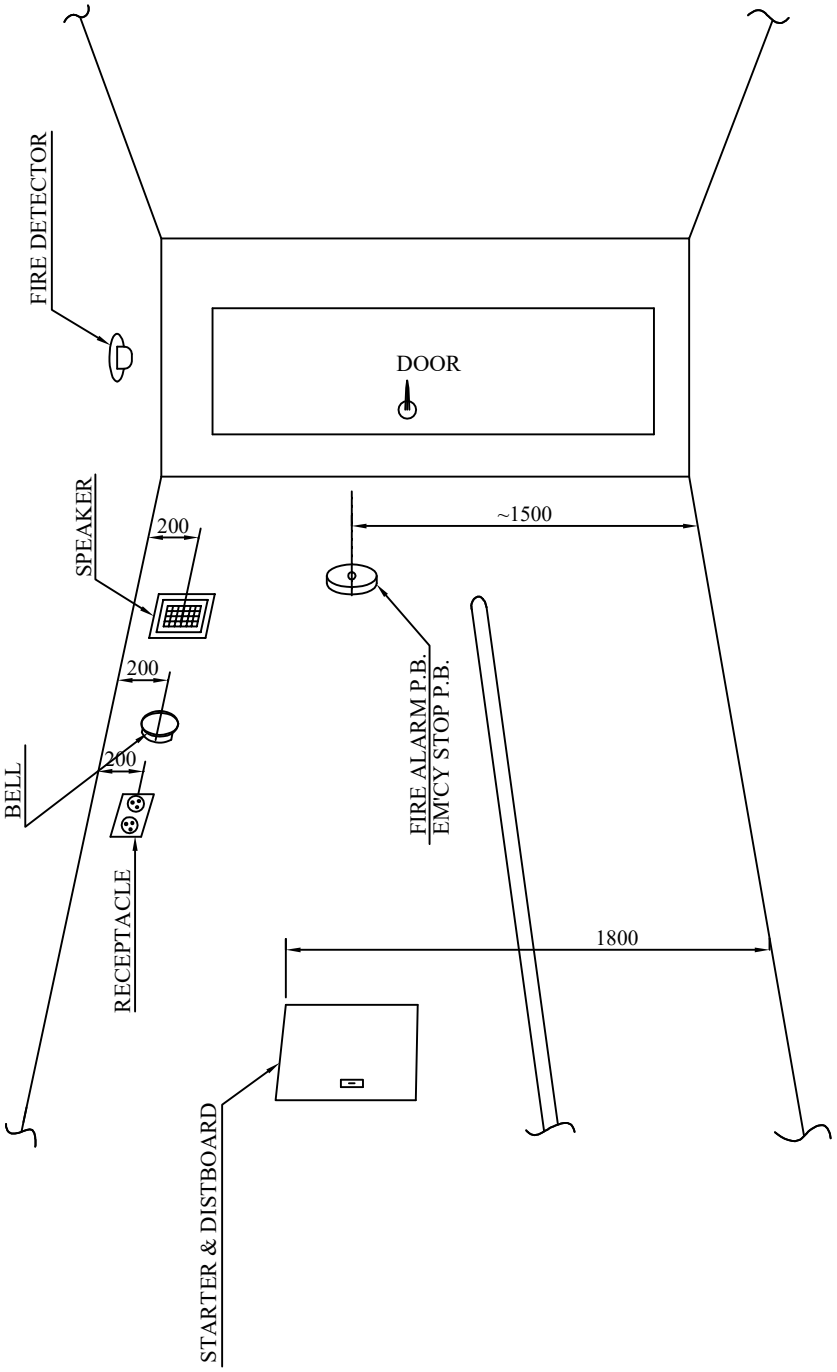
	GENERAL REFERENCE	PART NO: 08.08	32/63
	TYPICAL LAYOUT-TYPE "E"	DRG NO: 037-K5700200	



THE BERTH LAMP SHALL BE FITTED AT POSITION (A) OR (B).

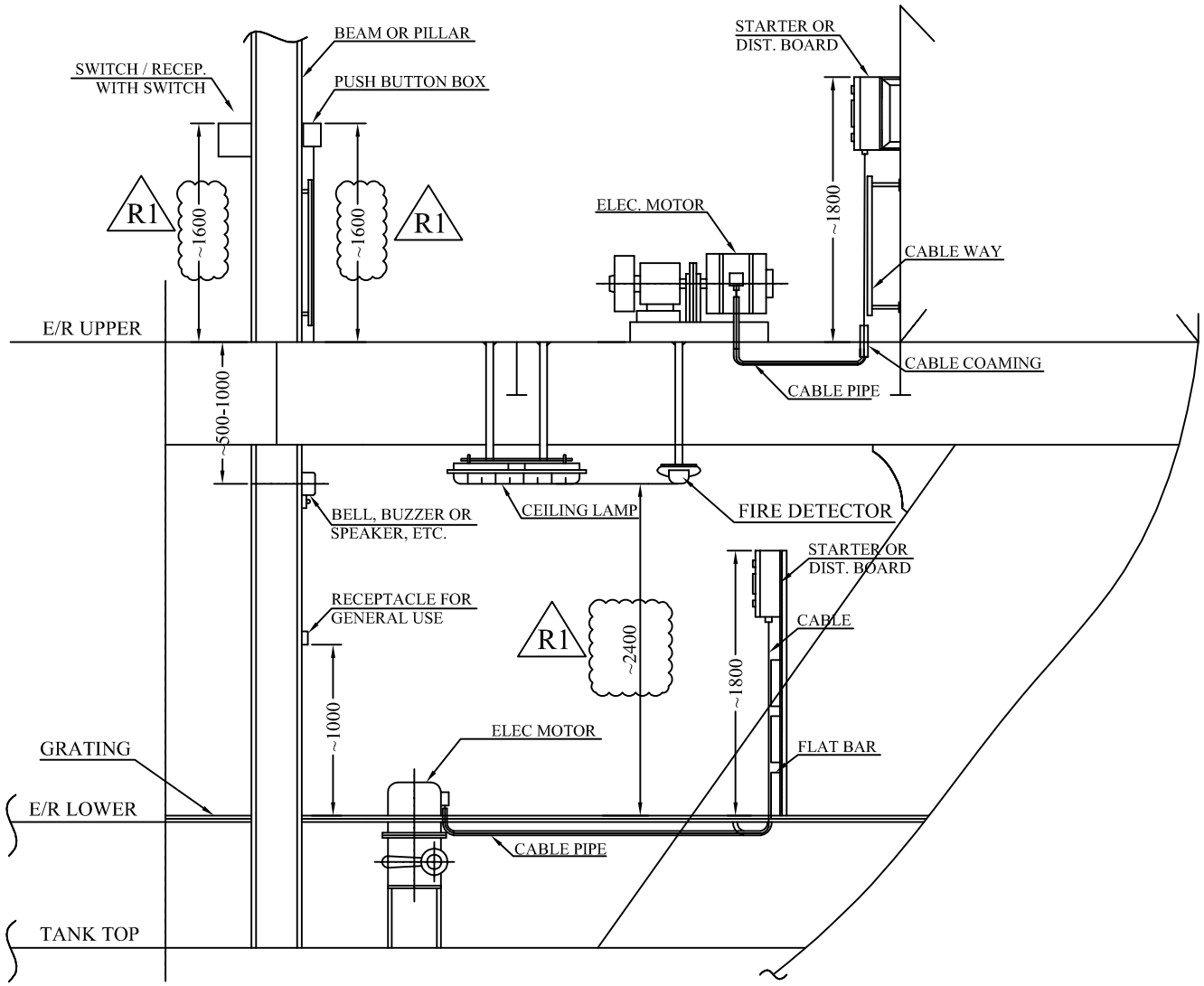
NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

	GENERAL REFERENCE	PART NO: 08.09	33 / 63
	APPARATUS IN ACCOM. PASSAGE-TYPICAL LAYOUT	DRG NO: 037-K5700200	



NOTE:- THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.

	GENERAL REFERENCE	PART NO: 08.10	34 / 63
	TYPICAL LAYOUT ENGINE ROOM	DRG NO: 037-K5700200	



NOTE:- FLOOR LEVEL CAN BE TAKEN AS CHEQUERED PLATE LEVEL,ONLY IF THERE IS CHEQUERED PLATE;
THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED
AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS
BEST SUITING THE LOCATION.

	GENERAL REFERENCE	PART NO: 08.11	35 / 63
	CABLE PENETRATION	DRG NO: 037-K5700200	

WHILE ELEC. CABLE INSTALLATION IS CARRIED OUT, IT BECOMES ESSENTIAL THAT ELEC. CABLES HAVE TO BE PENETRATED THROUGH THE HULL STRUCTURE, FOR INSTANCE; BULKHEAD, STEEL WALL, DECK, WEB BEAM ETC.

WITH FOLLOWING CONCEPT.

1. CABLE PENETRATION TO BE MADE AND INSTALLED, NOT TO DAMAGE ELEC. CABLES.

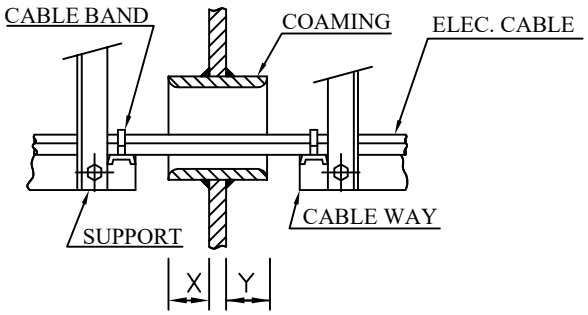
2. WHERE CABLES PASS THROUGH WATER TIGHT, FIRE PROOF AND GAS TIGHT BULKHEADS OR DECKS, PROPER PENETRATION METHOD TO BE APPLIED NOT TO AFFECT THE INTEGRITY OF SUCH BULKHEADS OR DECK. .

FOLLOWING FIGURES INDICATE TYPICAL METHOD OF CABLE PENETRATION RESPECTIVELY.

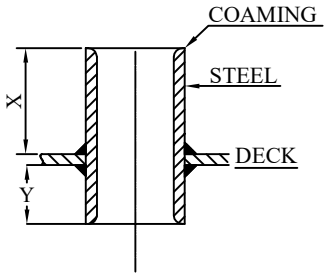
1) FOR NON-WATERTIGHT PENETRATION.

IN CASE THAT ELEC.CABLES PASS THROUGH NON CLASSIFIED STRUCTURE, I.E. NON-GASTIGHT, NON-FIRETIGHT OR NON WATERTIGHT, BELOW METHODS SHALL BE APPLIED.

A)BULKHEAD PENETRATION



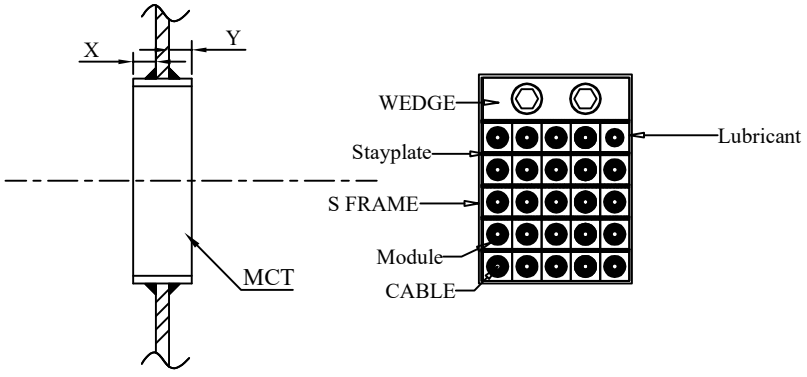
B) DECK PENETRATION



2) WATER TIGHT BULKHEADS/DECKS PENETRATION

I. BULKHEAD PENETRATION

A) MULTI CABLE TRANSIT (MCT)

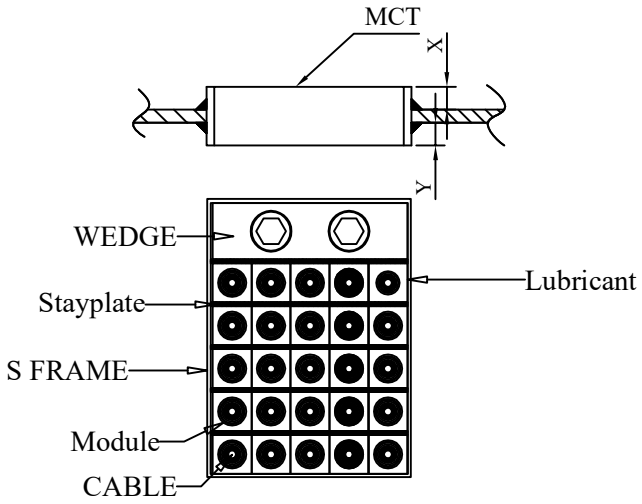


X,Y DIMENSIONS WILL BE AS INDICATED IN THE FIT. ARRG. DRG.

	GENERAL REFERENCE	PART NO: 08.12	36/63
	CABLE PENETRATION	DRG NO: 037-K5700200	

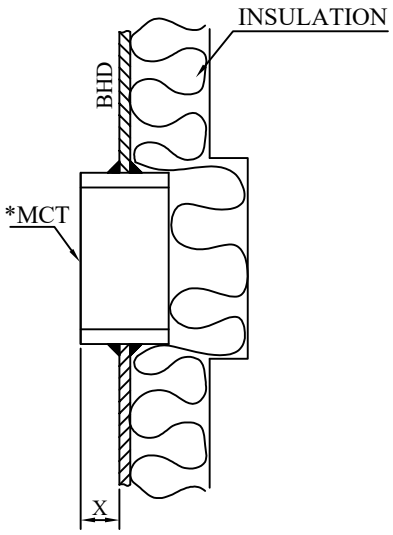
II. DECK PENETRATION

A) MULTI CABLE TRANSIT (MCT)

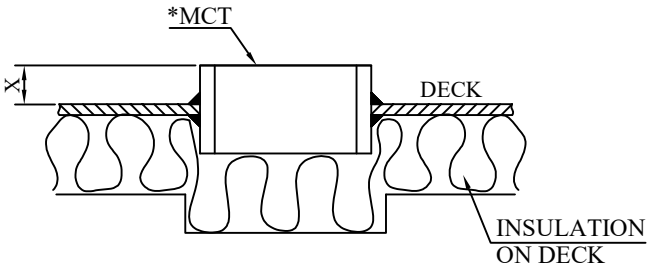


III.) IN CASE OF INSULATION / FLOATING FLOOR

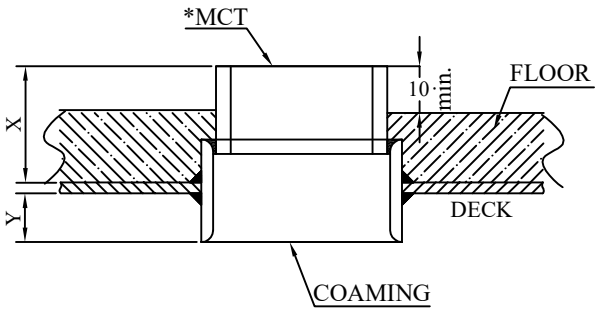
A. BULKHEAD PENETRATION



II. DECK PENETRATION-1



II. DECK PENETRATION-2



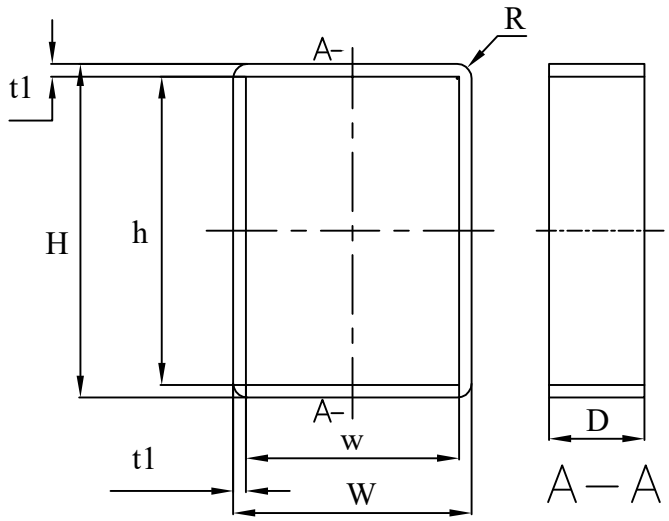
* MCT FIXING IS AS PER THE FIT. ARRG. DRG.

B.) INSULATION TO BE PROVIDED OVER MCT AS REQUIRED BY THE TYPE APPROVAL CERTIFICATE DETAILS

COAMING END TO BE FITTED 10MM FROM THE HEAT RESISTING SURFACE.

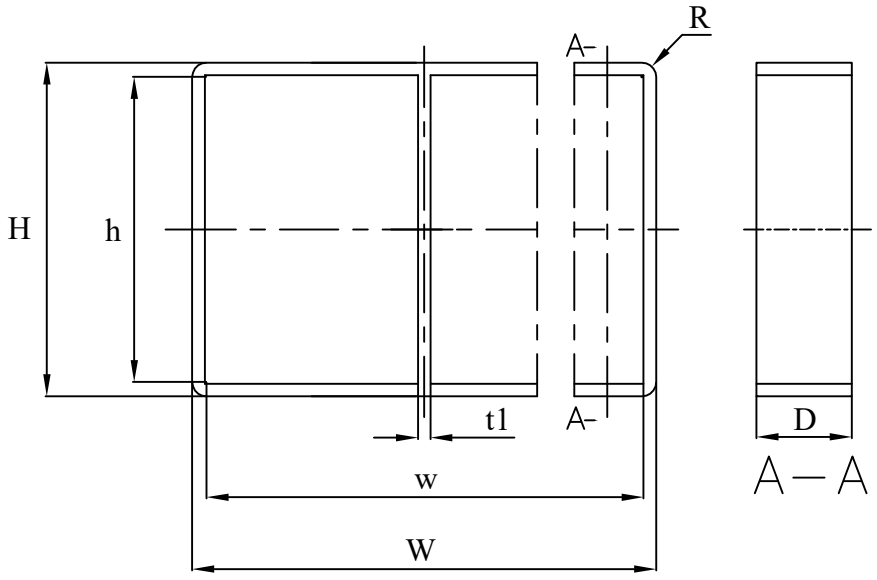
X,Y DIMENSIONS WILL BE AS INDICATED IN THE FIT. ARRG. DRG.

	GENERAL REFERENCE	PART NO: 08.12	37/63
	MCT FRAME	DRG NO: 037-K5700200	



SZx1

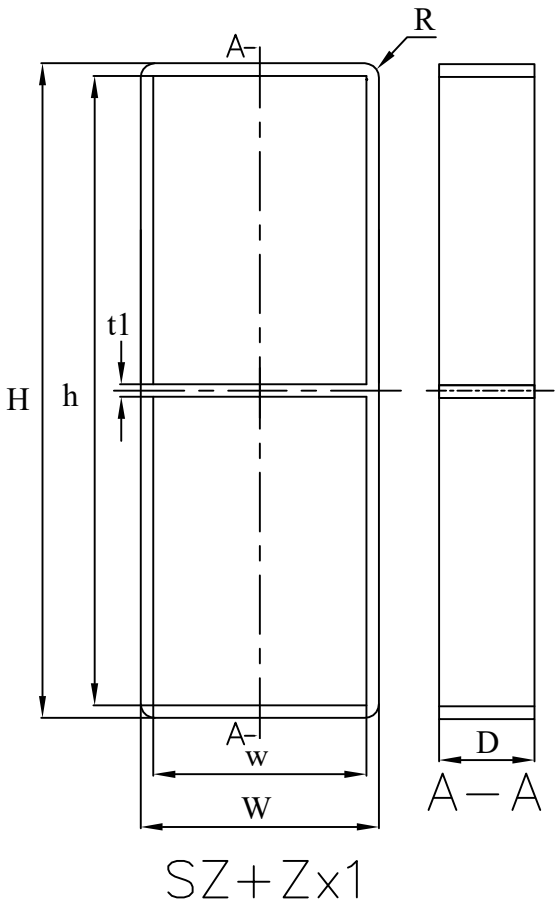
Z=Frame size
N=Number of Horizontal openings



SZxN

Pos	h	w	D	t1	t2	R
mm	H-20	W-20	60	10	20	R 10

	GENERAL REFERENCE	PART NO: 08.12	38 / 63
	MCT FRAME	DRG NO: 037-K5700200	

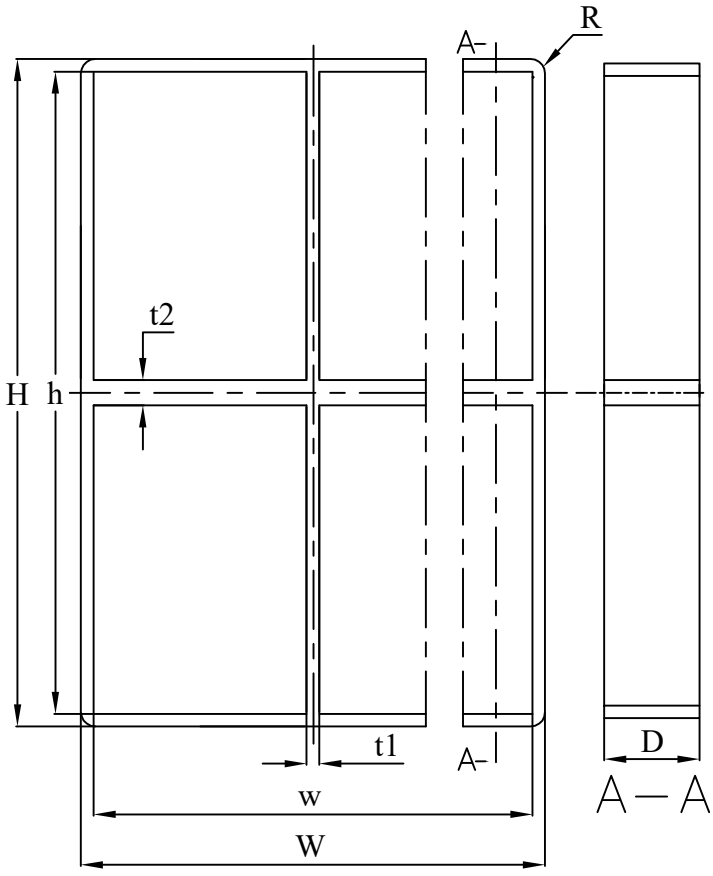


SZ+Zx1

Z=Frame size

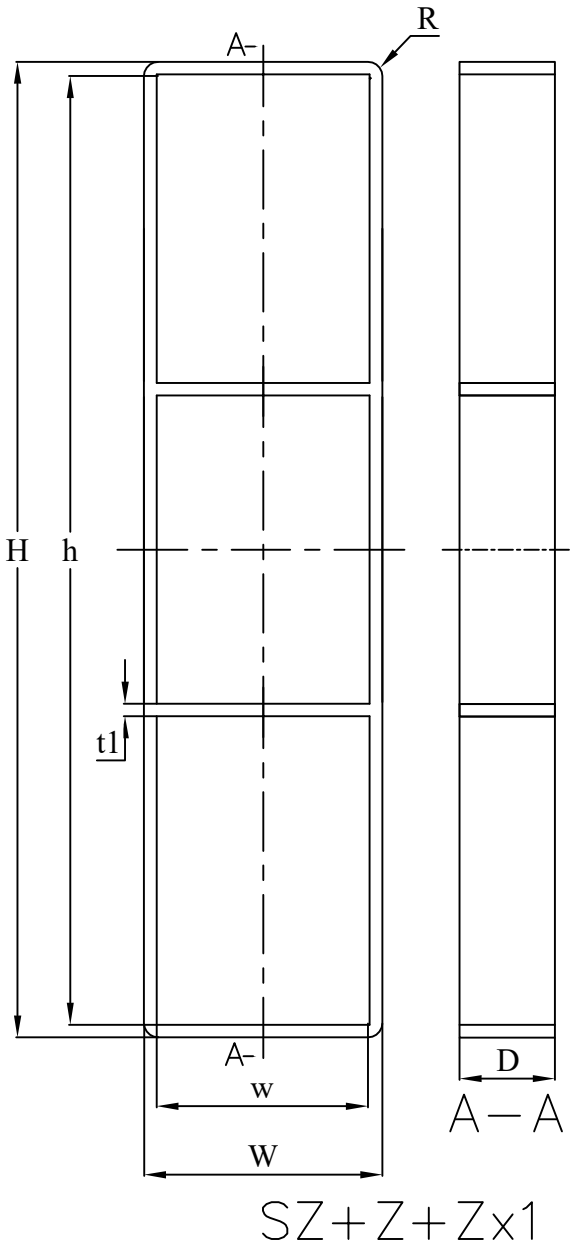
N=Number of Horizontal openings

Pos	h	w	D	t1	t2	R
mm	H-20	W-20	60	10	20	R 10



SZ+ZxN

	GENERAL REFERENCE	PART NO: 08.12	39/63
	MCT FRAME	DRG NO: 037-K5700200	

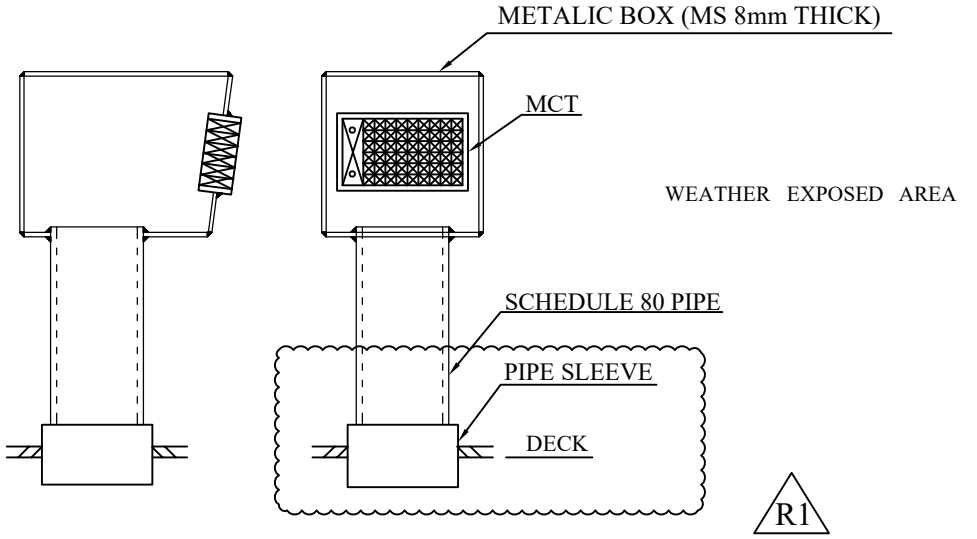


Z=Frame size

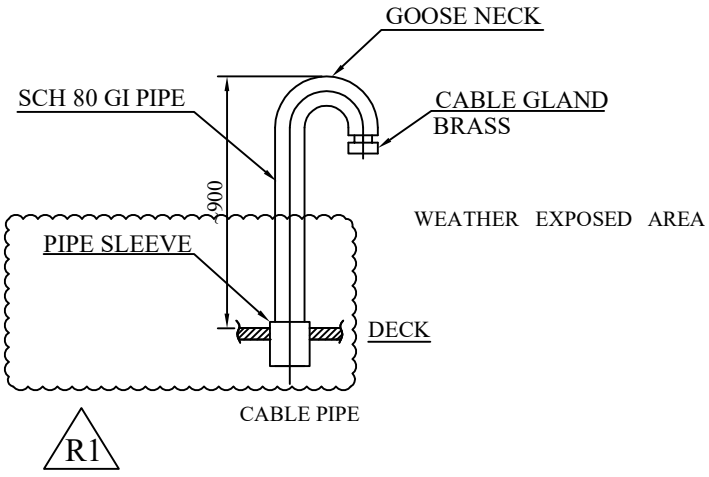
Pos	h	w	D	t1	t2	R
mm	H-20	W-20	60	10	20	R 10

	GENERAL REFERENCE	PART NO: 08.13	40 / 63
	CABLE PENETRATION TO WEATHER EXPOSED AREA	DRG NO: 037-K5700200	

CABLE PENETRATION PIPE



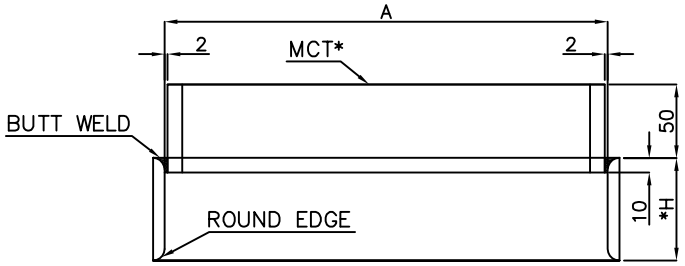
GOOSE NECK

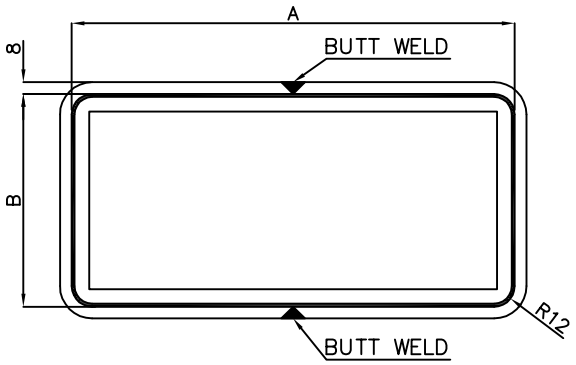


* CAN BE USED MCT FOR MULTIPLE CABLE INSTALLATION

	GENERAL REFERENCE	PART NO: 08.14	41/63
	CABLE COAMING WITH MCT	DRG NO: 037-K5700200	

CABLE COAMING WITH MCT IS USED WHERE FLOATING FLOOR IS THERE IN DECK





MATERIAL: 8 THICK STEEL PLATE

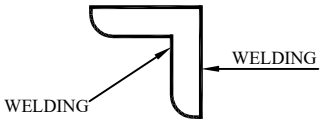
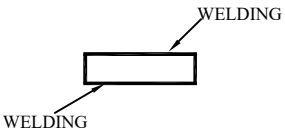
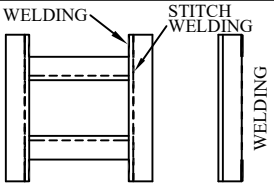
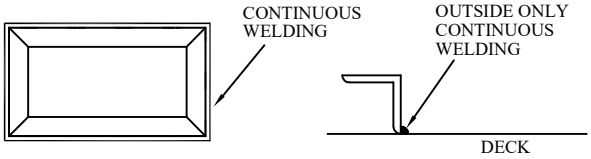
PIECE MARK	DIMENSIONS		MCT	REMARKS
	A	B		
DCS2x1_H	125	145	S2x1	DECK PENETRATION
DCS4X1_H	184	145	S4x1	– do –
DCS6x1_H	242	145	S6x1	– do –
DCS6x2_H	242	275	S6x2	– do –
DCS8x1_H	302	145	S8x1	– do –
DCS8x2_H	302	275	S8x2	– do –
DCS6+6x1_H	470	145	S6+6x1	– do –
DCS8+8x1_H	590	145	S8+8x1	– do –

* "H" DEPENDS UPON THE THICKNESS OF THE FLOATING FLOOR.

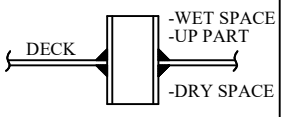
	GENERAL REFERENCE	PART NO: 08.15	42/63
	WELDING METHOD	DRG NO: 037-K5700200	

1. THE SUPPORT FOR ELECTRIC EQUIPMENT SUCH AS CABLE HANGER, ELECTRIC LIGHTING, STARTER, PANEL TO BE WELDED AS FOLLOWS.

1) ALL AREA (DRY SPACE, WEATHER & WET SPACE ETC.)

ITEM	WELDING METHOD	WELDING		APPLICATION AREA
		LEG LENGTH	METHOD	
ANGLE TYPE SUPPORT		t < 8 : 3.5 t ≥ 8 : 4.5	BOTH SIDE FULL WELDING	ALL AREA
FB TYPE SUPPORT		t< 8 : 3.5 t ≥8 : 4.5	BOTH SIDE FULL WELDING	ALL AREA
DIRECT WALL TYPE SEAT		t< 8 : 3.5 t≥ 8 : 4.5	ENDSIDE BOTH WELDING OUTSIDE STITCH WELDING	ALL AREA
DECK MOUNTING TYPE SEAT (MSB, ECC, ETC-)				WHEEL HOUSE ENGINE CONTROL RM & SIMILAR SPACE ENGINE S/G RM OPEN AREA AND SIMILAR SPACE

2. WELDING FOR CABLE PENETRATION PIECE
THE CABLE PENETRATION PIECES FITTED TO INNER DECK OR BULKHEAD INCLUDING "A" OR "B" CLASS FIRE DIVISION ARE WELDED ON DECK BOTH SIDES AS FOLLOWING.

TYPE	INTERNAL DECK	INTERNAL BULKHEADS
COAMING & COLLAR		

R1

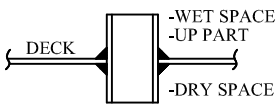
3. PADS TO BE PROVIDED FOR FOLLOWING ELECTRICAL EQUIPMENT SEATS & CABLE TRAY SUPPORTS

1. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, CABLE WAY SUPPORTS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.

2. IF THE STIFFNERS/GIRDERS NOT AVAILABLE, EQUIPMENT SEATS ARE TO BE WELDED TO THE DECK/BHD, DOUBLER PLATES ARE TO BE PROVIDED.

	GENERAL REFERENCE	PART NO:	42A / 63
	WELDING METHOD	DRG NO: 037-K5700200	

3. WELDING FOR CABLE PENETRATION PIECE
THE CABLE PENETRATION PIECES FITTED TO INNER DECK OR BULKHEAD INCLUDING "A" OR "B" CLASS FIRE DIVISION ARE WELDED ON DECK BOTH SIDES AS FOLLOWING.

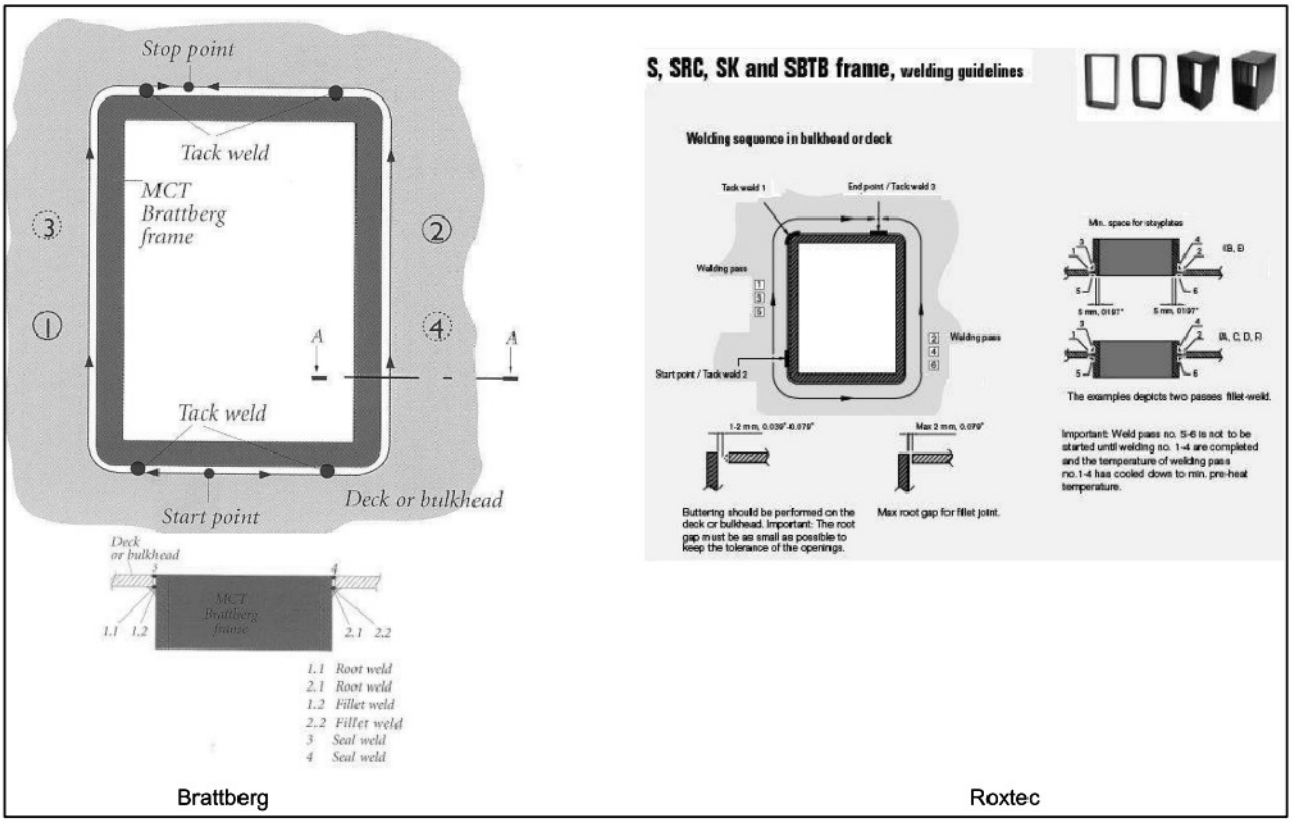
TYPE	INTERNAL DECK	INTERNAL BULKHEADS
COAMING & COLLAR		

4. WELDING FOR MCT FRAMES

2.5.1.2 Welding instructions

Another issue which is very important to take into account are the instructions for welding such MCT frames.

If the welding instructions are not followed there might be a change that the frame is deformed. In that case the penetration cannot be fully closed and tightened. All penetrations have to be through welded at both sided.

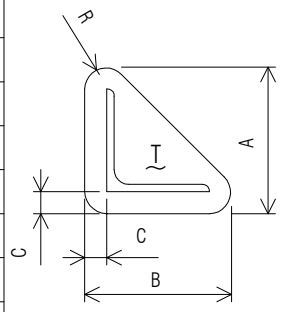


R1

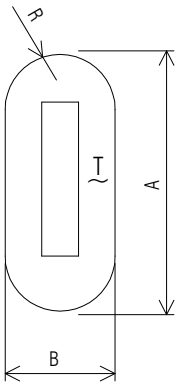
	GENERAL REFERENCE	PART NO: 08.16	43/63
	PAD DETAILS	DRG NO: 037-K5700200	

SCOPE:
THIS STANDARD COVERS PAD FOR CABLE RACK SUPPORTS AND GENERAL USE.
1. SHAPE AND DIMENSIONS.
Shall be as shown in following table.
2. MATERIAL
Steel plate IS 1079

ANGLE SUPPORT PAD DIMENSION

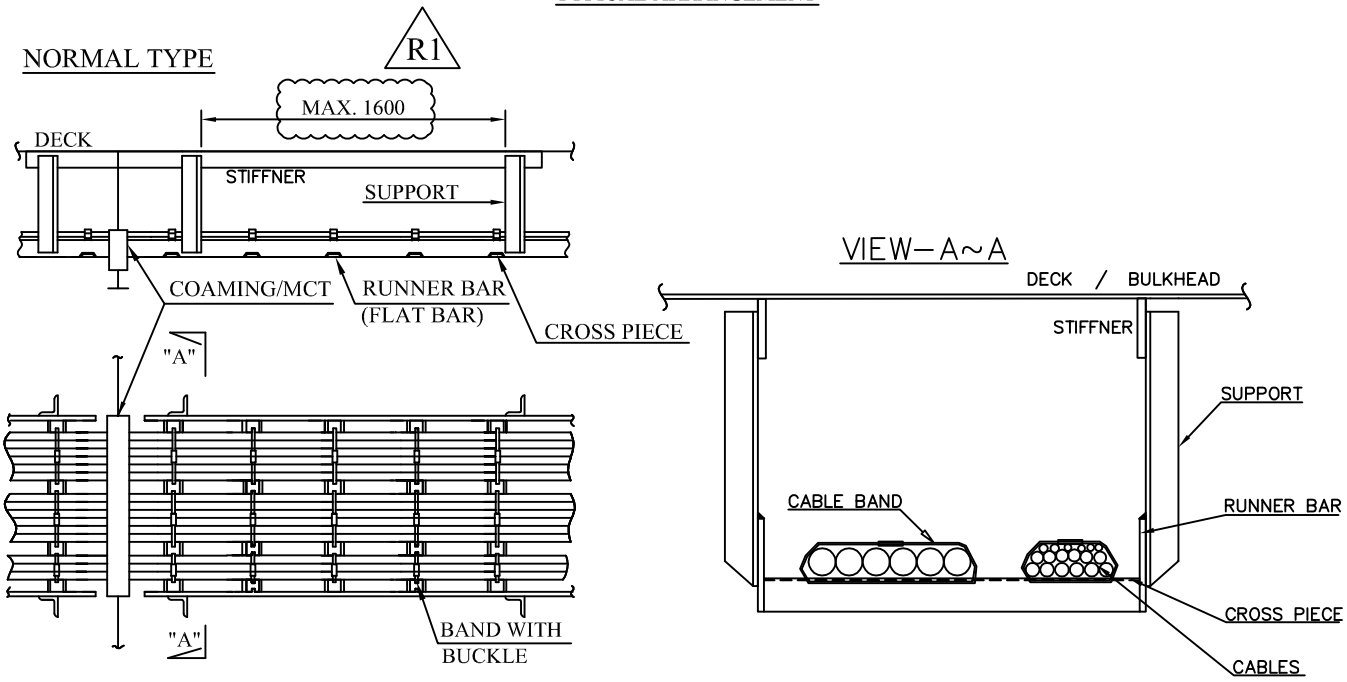
TYPE		DIMENSION					WEIGHT (Kg/M)	ANGLE DIMENSION
PIECE MARK	SKETCH	A	B	C	R	T		
L1		55	55	12	10	6	0.09	30X30X5, 30X30X3
L2		65	65	12	15	6	0.15	40X40X3, 40X40X5, 40X40X6
L3		70	70	12	15	6	0.17	45X45X5, 45X45X6
L4		75	75	12	15	6	0.20	50X50X6, 50X50X4
L5		85	85	12	15	6	0.24	60X60X6
L6		90	90	12	15	8	0.43	65X65X8, 65X65X6
L7		95	95	12	15	8	0.47	70X70X8
L8		100	100	12	15	8	0.53	75X75X9, 75X75X6, 75X75X8
L9		105	105	12	15	8	0.60	80X80X8
L10		115	115	12	15	12	0.93	90X90X10,90X90X7
L11		125	125	12	15	12	1.10	100X100X10
L12		155	155	12	15	12	1.70	130X130X12, 130X130X9
L13		175	175	12	15	12	2.16	150X150X15, 150X150X12

FLATBAR SUPPORT PAD DIMENSION

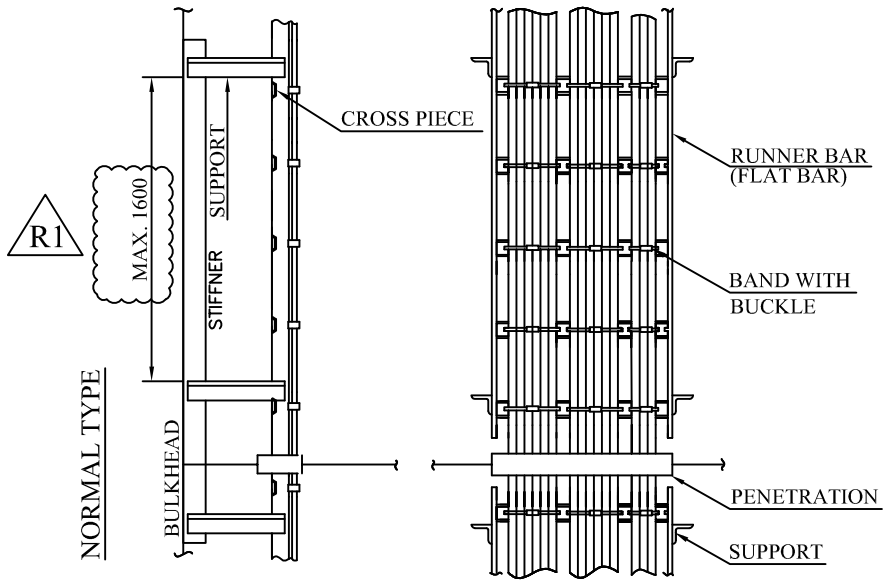
TYPE		DIMENSION				WEIGHT (Kg/M)	FLATBAR DIMENSION
PIECE MARK	SKETCH	A	B	R	T		
G1		60	32	16	6	0.09	26X6 FB
G2		70	32	16	6	0.10	38X4.5,35X6,38X6,40X6 FB
G3		80	32	16	6	0.11	50X6 FB
G4		100	32	16	6	0.14	65X6,65X8FB
G5		100	32	16	6	0.14	75X6
G6		140	38	16	6	0.24	100X6FB
H2		90	38	19	10	0.24	50X10FB
H3		110	38	19	10	0.30	65X10FB
H4		120	38	19	10	0.33	75X10FB
J2		100	50	25	12	0.42	50X12,50X16,50X19FB
J3		120	50	25	12	0.51	65X12,65X16,65X19FB
J4		130	50	25	12	0.56	75X12FB
J5		140	50	25	12	1.61	90X12FB
J6		150	50	25	12	1.66	100X12,100X10FB

	INSTALLATION OF CABLE WAY	PART NO: 09.01	44/63
	HORIZONTAL CABLE RACK	DRG NO: 037-K5700200	

TYPICAL ARRANGEMENT

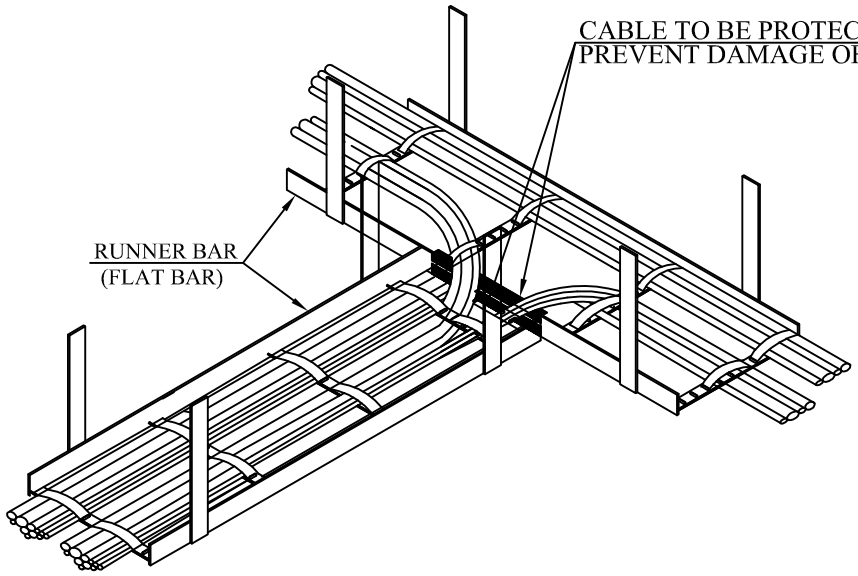


VERTICAL TYPE CABLE RACK



	INSTALLATION OF CABLE WAY	PART NO: 09.02	45/63
	TURNING METHOD OF MAIN CABLE WAY (TYPICAL)	DRG NO: 037-K5700200	

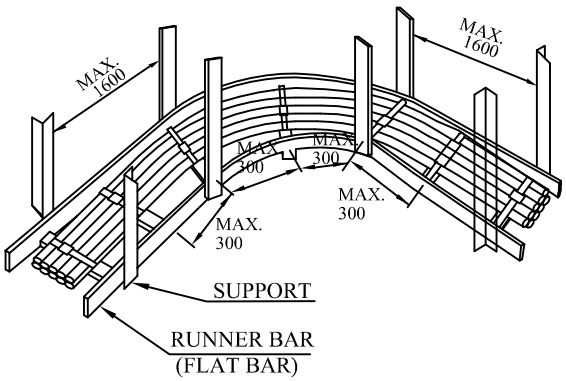
TURNING METHOD OF MAIN CABLE WAY



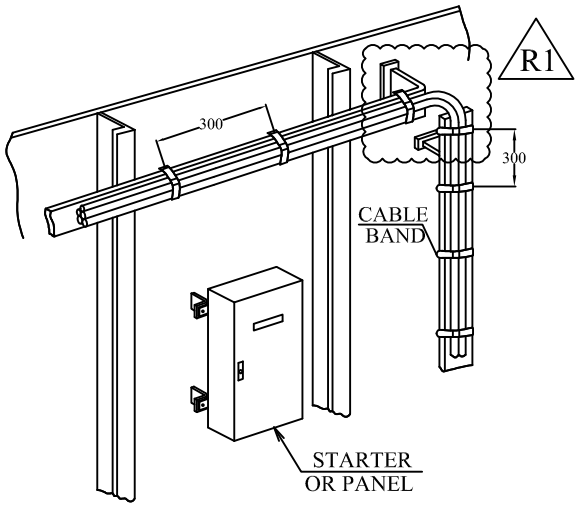
WHERE CABLE WAY CURVED

THE CABLE SHALL BE INSTALLED ON ADEQUATE HANGER SUPPORT AS SHOWN ON FOLLOWING FIGURE.

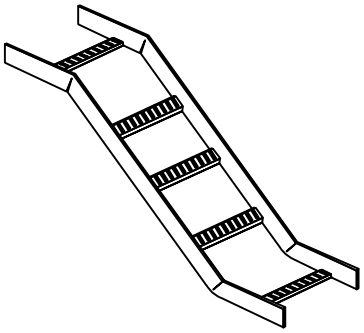
BENDING RADIUS OF HANGER ROUTE TO BE AS PER CABLE MAKERS DETAILS.



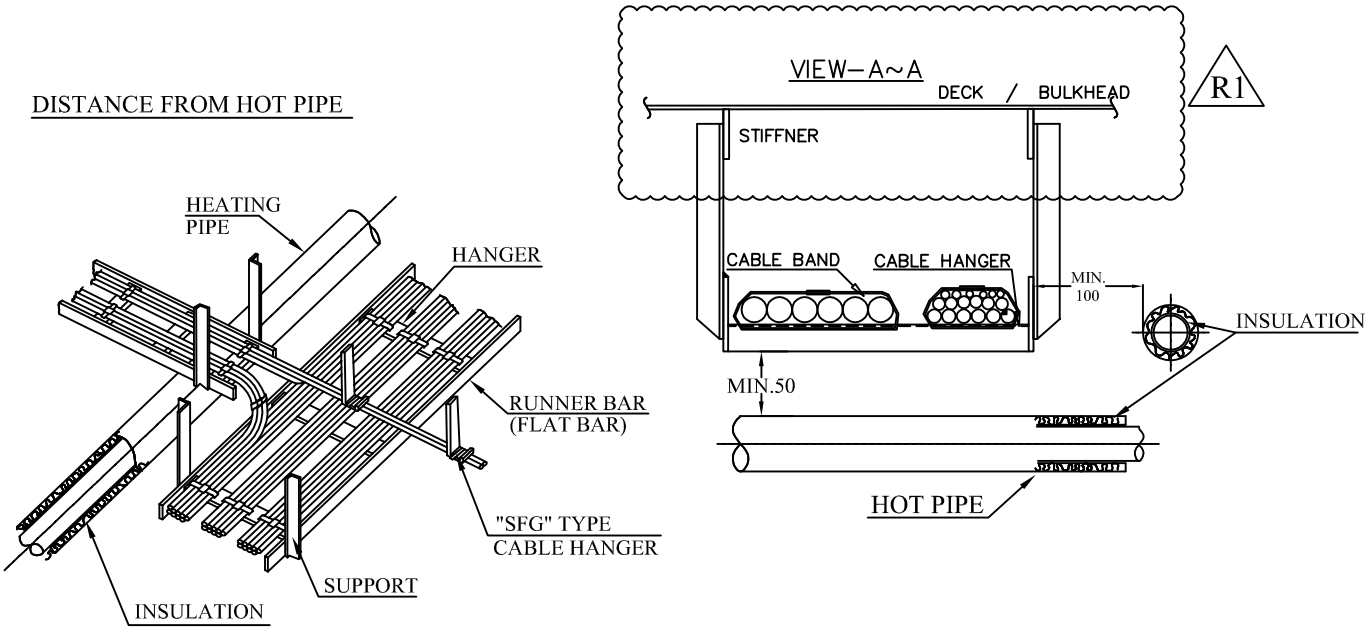
CURVED & BRANCH CABLE WAY



METHOD FOR CABLE WAY BENDING ~45°



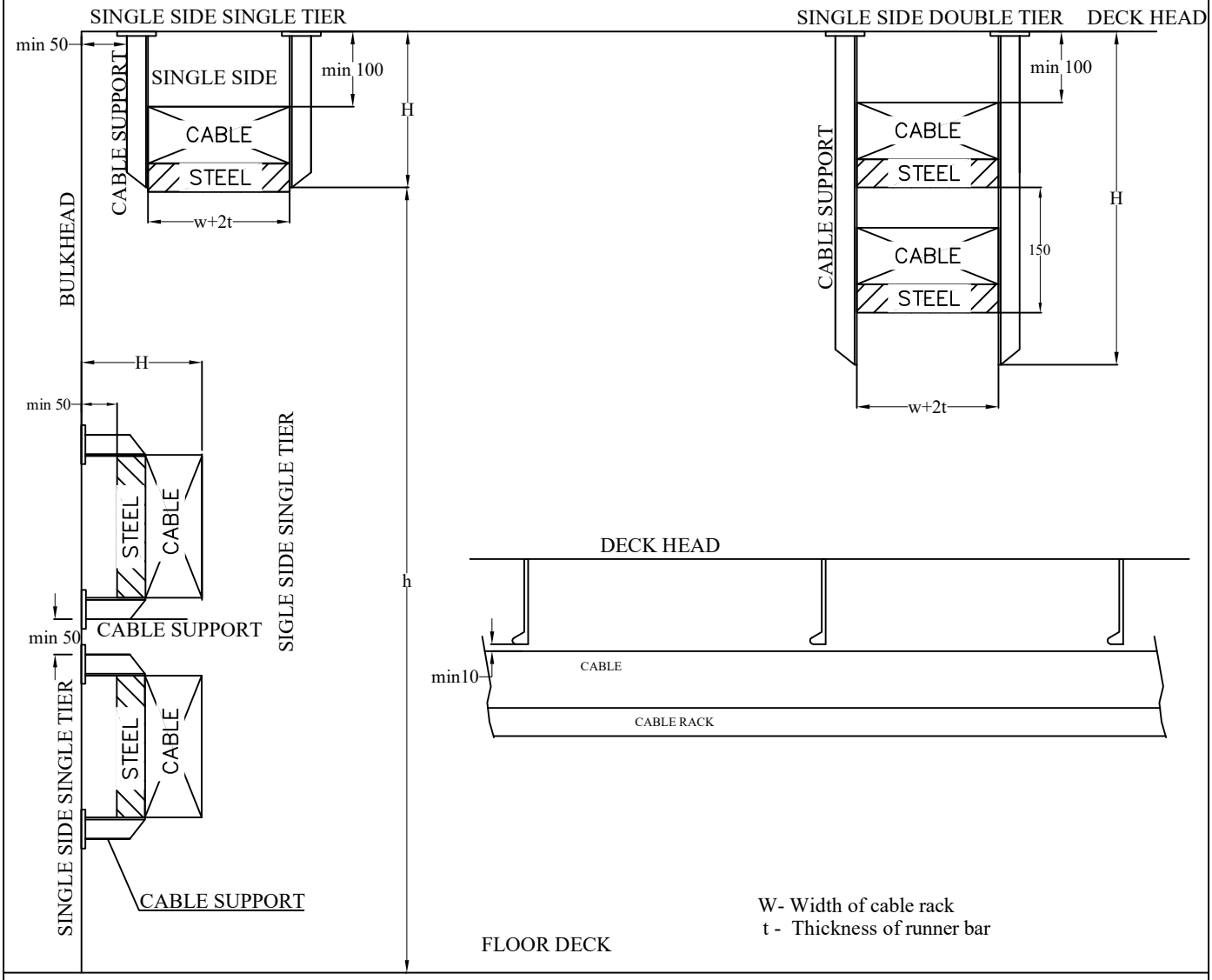
	INSTALLATION OF CABLE WAY	PART NO: 09.03	46/63
	CABLE WAY IN NEAR HOT PIPES	DRG NO: 037-K5700200	



NOTE

1. IN CASE THAT CABLES RUN ACROSS THE HEATING, STEAM & EXH. GAS PIPE, THE DISTANCE TO BE KEPT NOT LESS THAN 50mm AND IN CASE OF RUNNING PARALLEL, THE DISTANCE TO BE KEPT NOT LESS THAN 100mm.

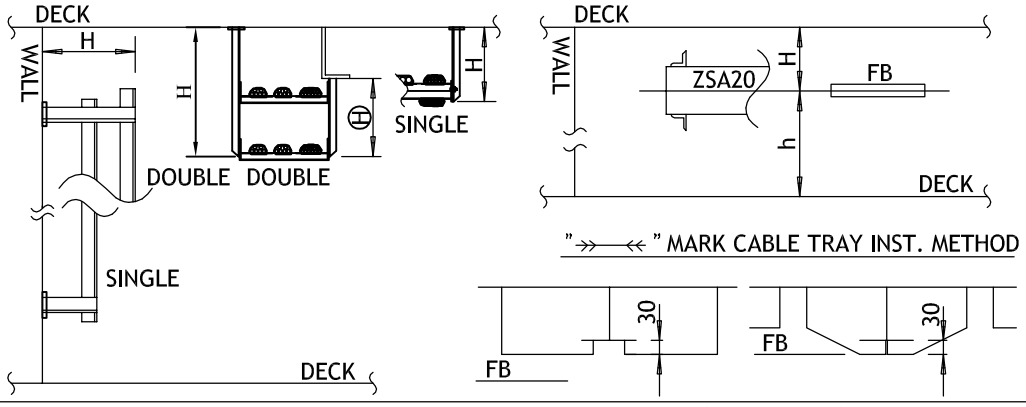
	INSTALLATION OF CABLEWAY	**PART NO: 09.04**	47 / 63
	INSTALLATION METHOD OF CABLE WAY	**DRG NO: 037-K5700200**	



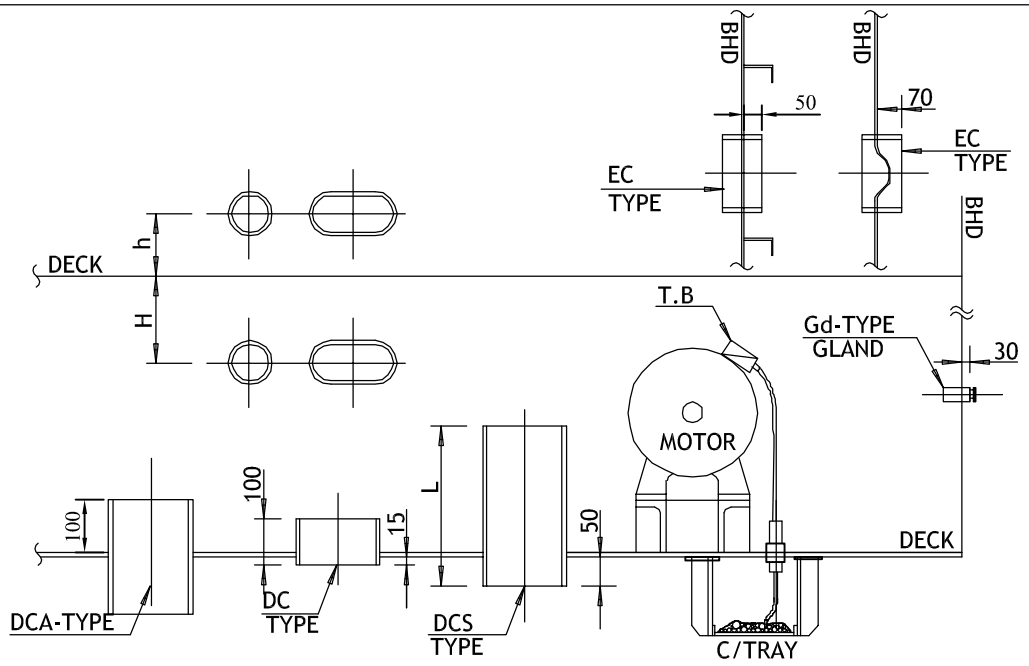
	INSTALLATION OF CABLEWAY	PART NO: 09.05	48 / 63
	STANDARD HEIGHTS	DRG NO: 037-K5700200	

STANDARD HEIGHTS

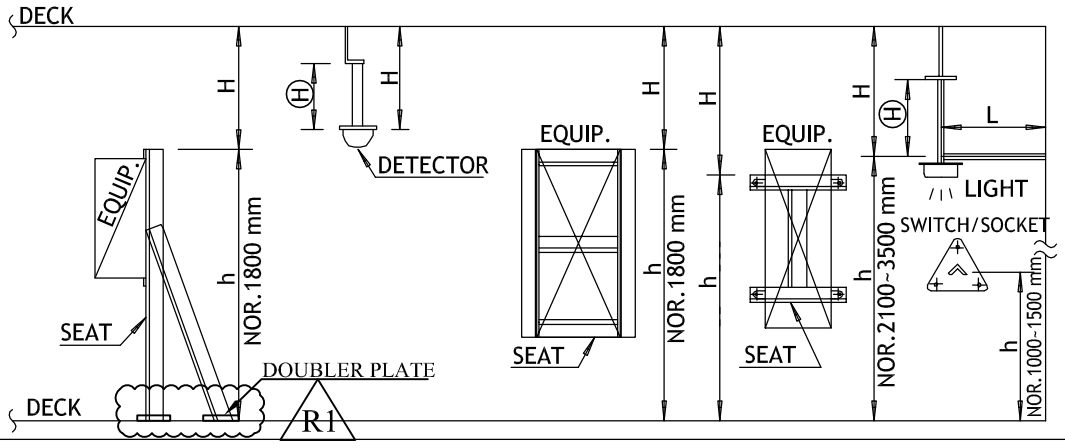
CABLE HANGER



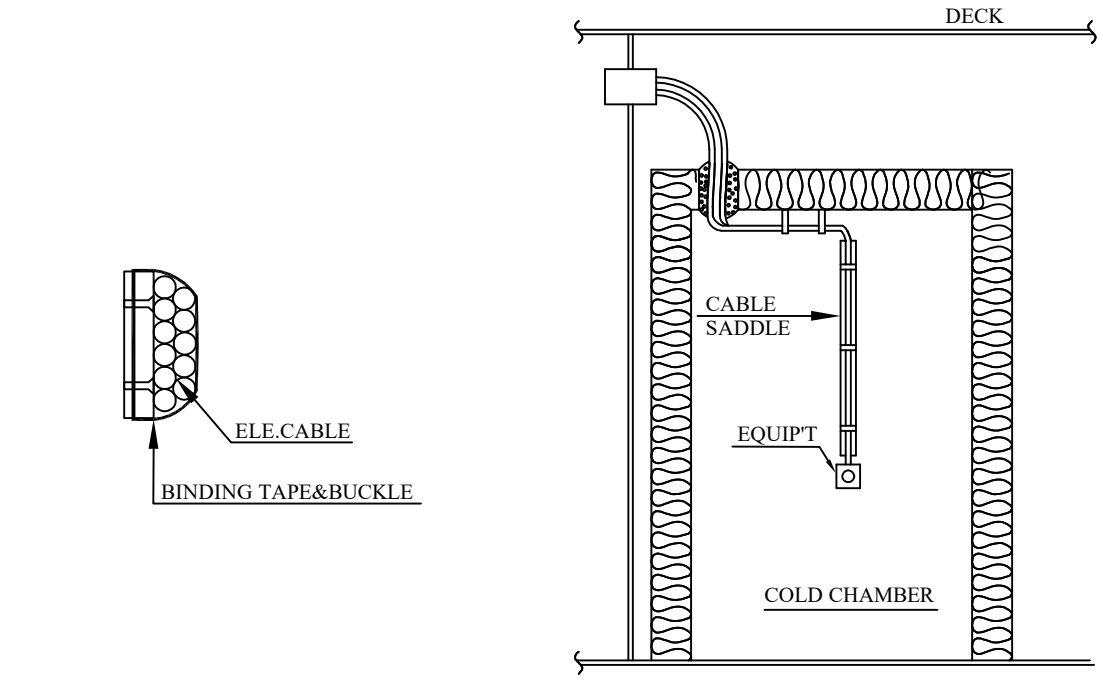
COAMING & GLAND

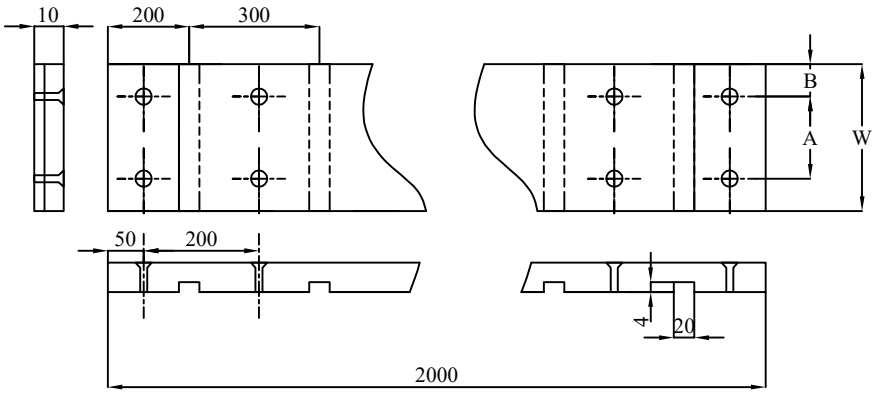


SEAT

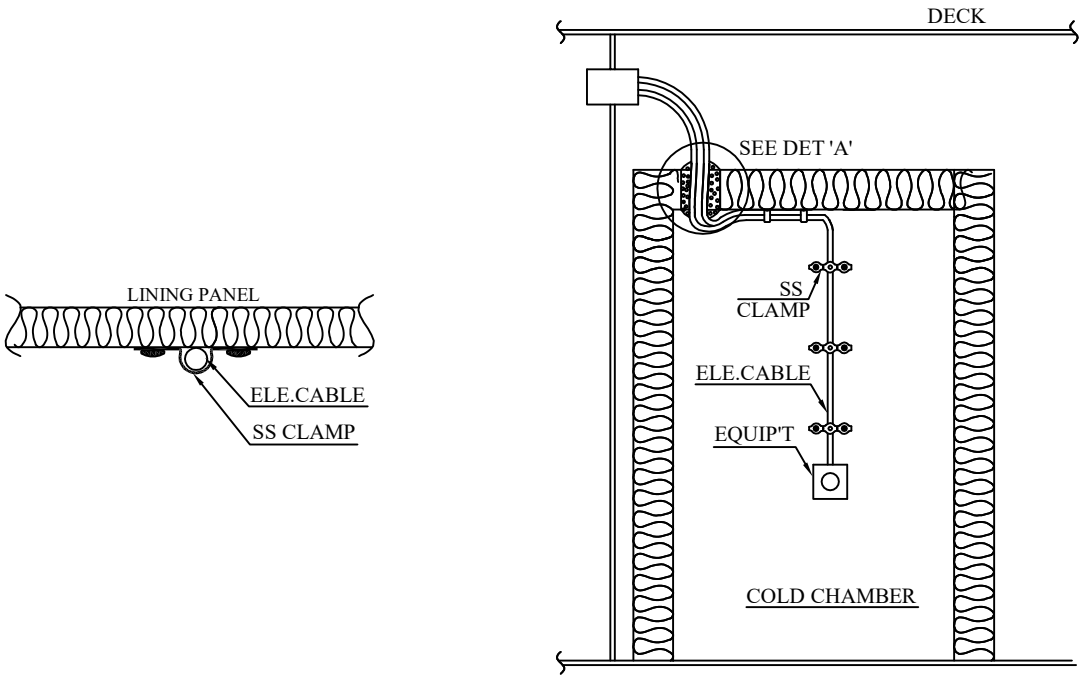


	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	**PART NO: 10.01**	49 / 63
	CABLE WAY- NYLON TYPE	**DRG NO: 037-K5700200**	

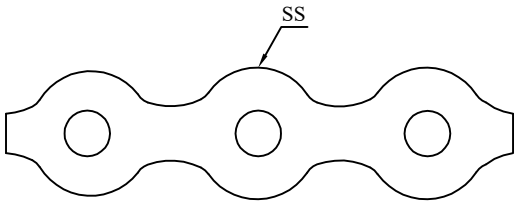


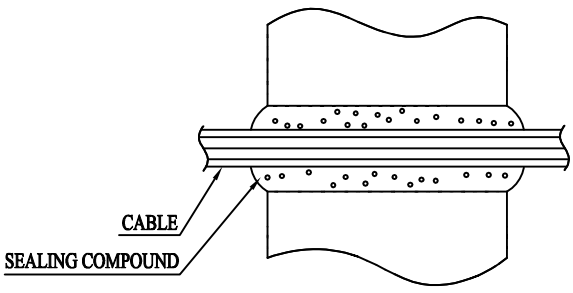


	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	**PART NO: 10.02**	**50 / 63**
	CABLE WAY- STAINLESS STEEL CLAMP TYPE	**DRG NO: 037-K5700200**	



1. STAINLESS STEEL CLAMP

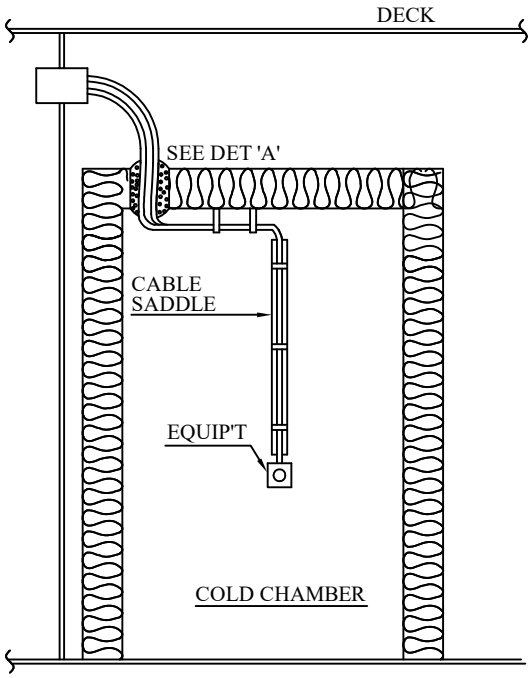




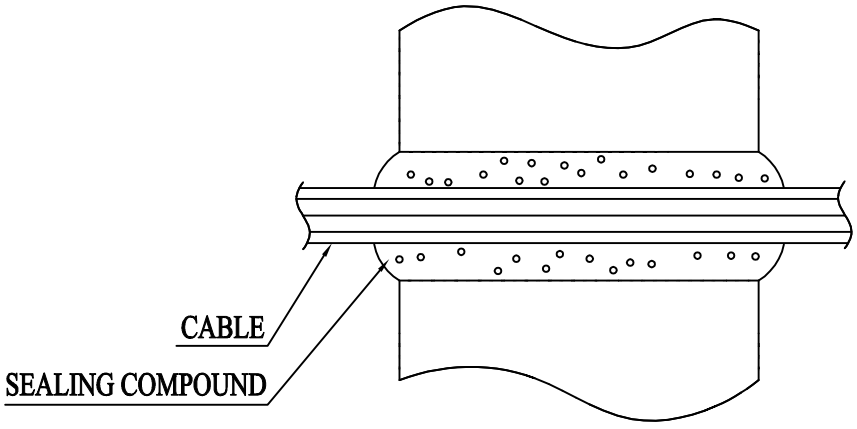
DETAIL 'A'

INSTALLATION METHOD

	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	**PART NO: 10.03**	**51 / 63**
	INSULATION PENETRATION	**DRG NO: 037-K5700200**	



INSTALLATION METHOD

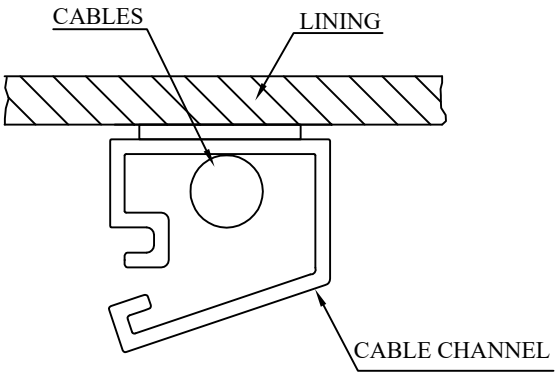


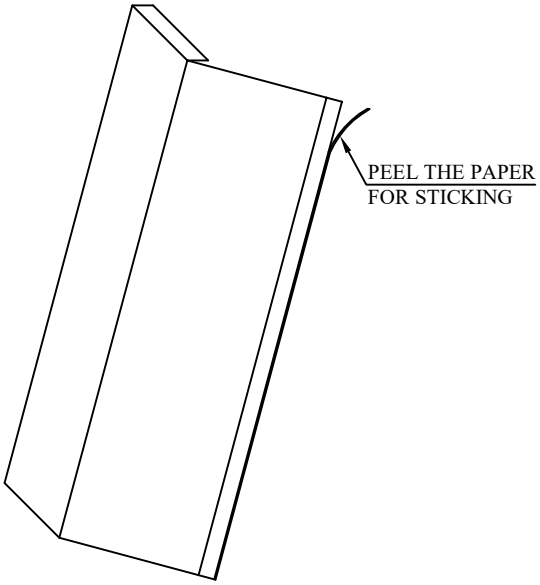
DETAIL 'A'

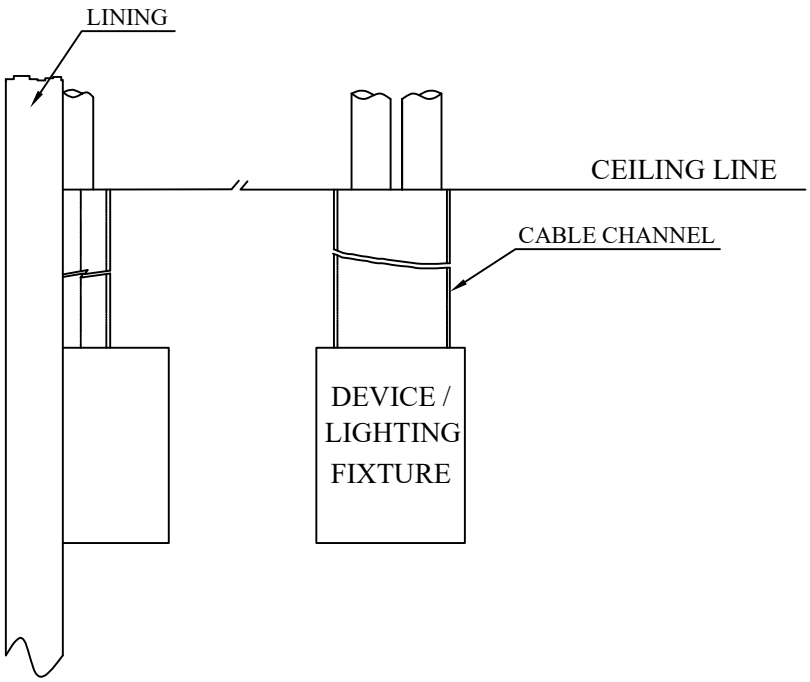
	INSTALLATION OF CABLE	PART NO: 11.01	52/63
	CABLE CHANNEL	DRG NO: 037-K5700200	

CABLE CHANNEL (STICKING TYPE)

Plastic cable channel or accommodation panelling channels shall be used for covering cables in accommodation spaces where cables can not be concealed.



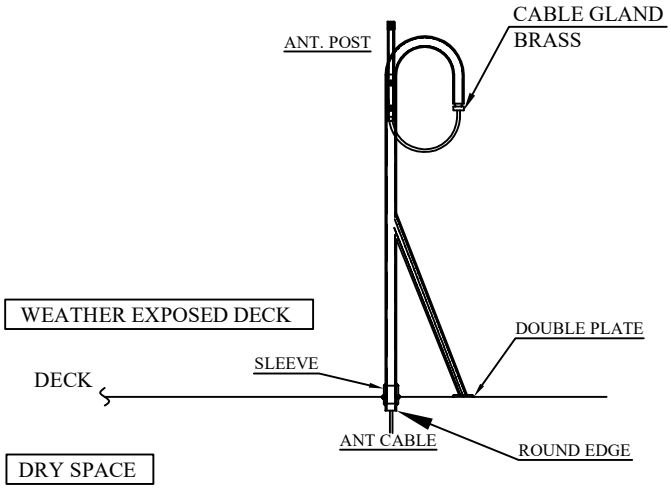


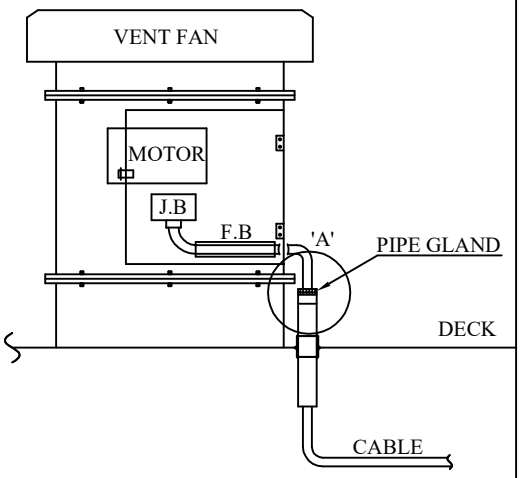


CHANNELS SHOULD BE FREE FROM SCRATCHES
IMPRESSIONS ETC TO BE SUPPLIED IN FINE FINISH.

	INSTALLATION OF CABLE	PART NO: 11.02	53/63
	BRANCHED CABLE- WEATHER EXPOSED AREA	DRG NO: 037-K5700200	

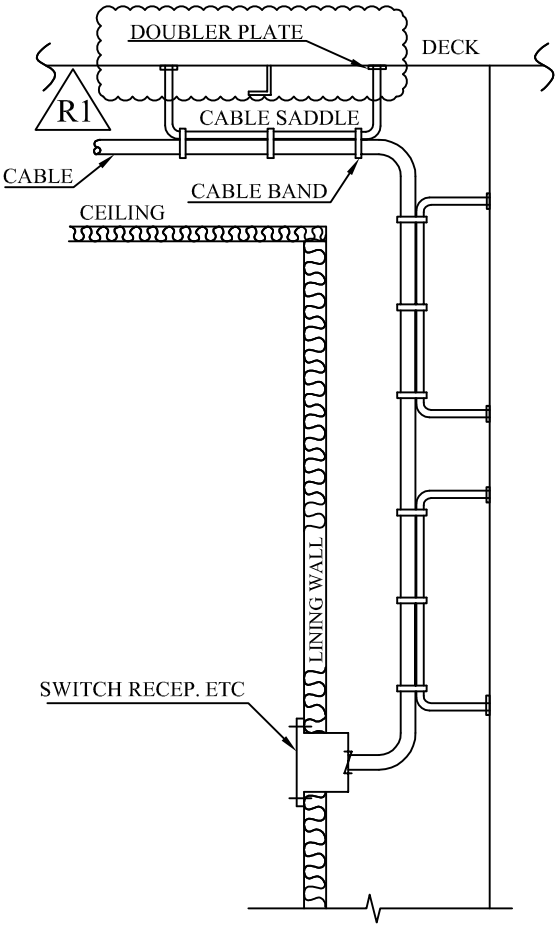
2. ANTENNA CABLE AT WEATHER EXPOSED AREA



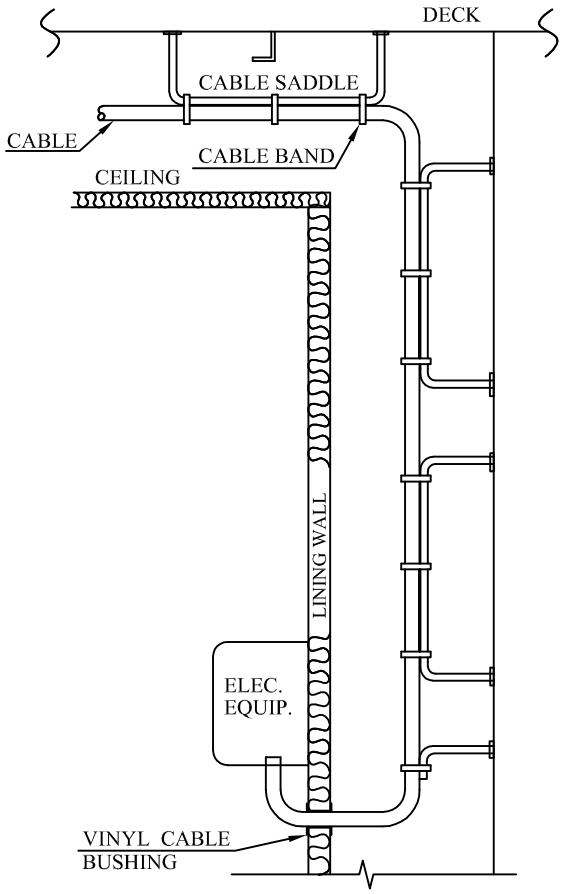


	INSTALLATION OF CABLE	PART NO: 11.03	54/63
	BRANCHED CABLE - ACCOM. SPACE	DRG NO: 037-K5700200	

1. BRANCH CABLE WAY BETWEEN STEEL BULKHEAD AND LINING WALL

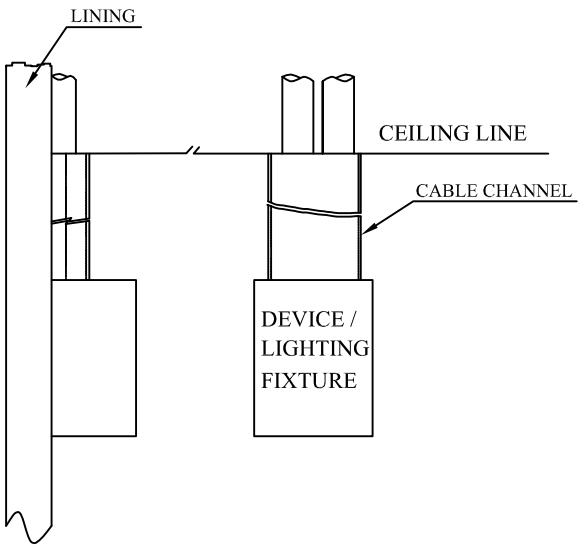


FLUSH TYPE EQUIP

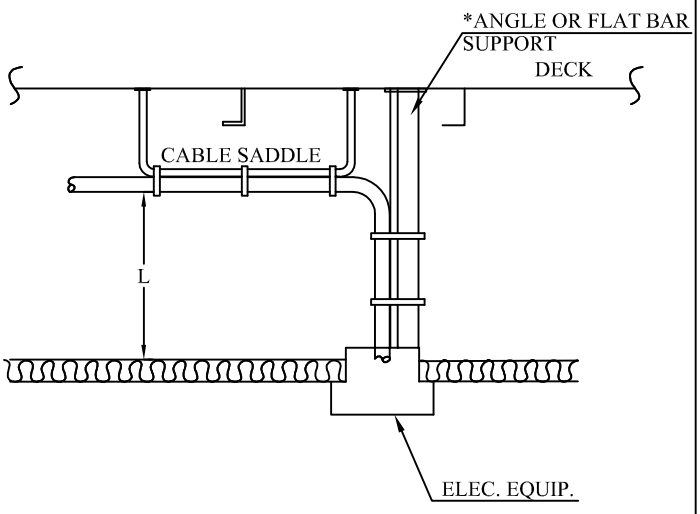


SURFACE TYPE

2. BRANCH CABLE WAY IN LINING PANEL



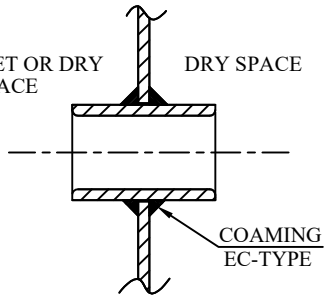
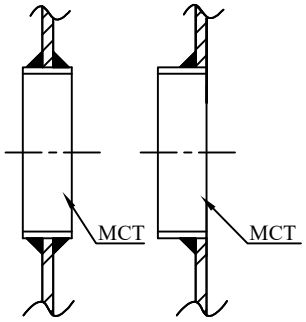
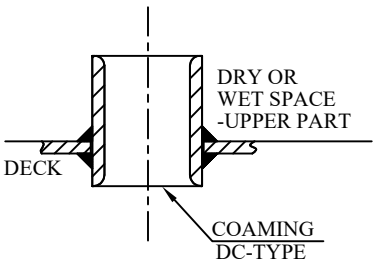
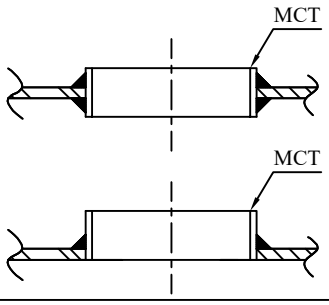
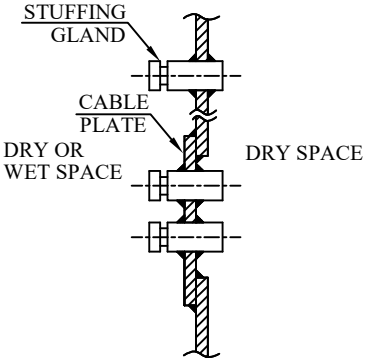
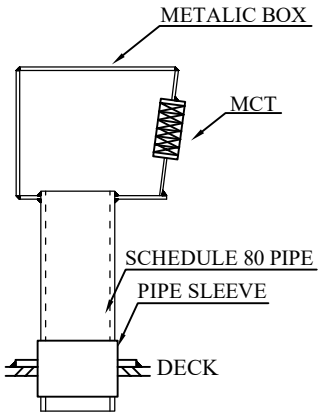
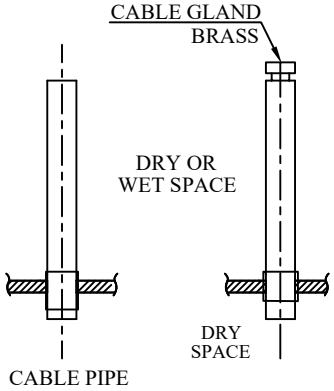
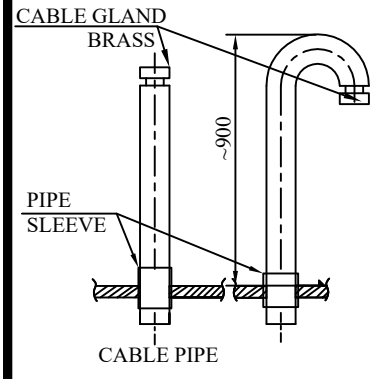
3. BRANCH CABLE WAY IN CEILING



*IF 'L' IS MORE THAN 500 MM,ONLY CEILING PANEL SUPPORT CAN BE USED FOR SUPPORTING CABLES.

	INSTALLATION PRACTICE ON PENETRATIONS	PART NO: 12.01	55/63
	INSTALLATION METHOD OF CABLE COAMING	DRG NO: 037-K5700200	

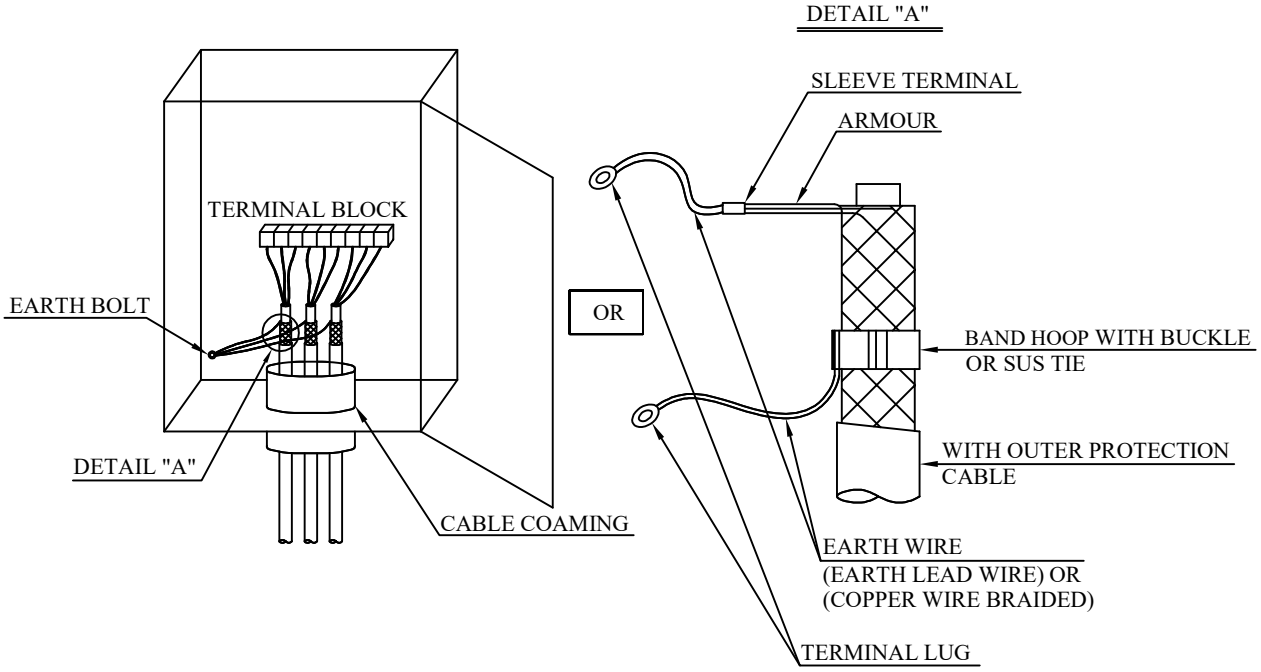
ALL FILLET WELDING (SIDE OF WELD = MINIMUM 4.0mm)

TYPE	BOTH SIDES		BOTH SIDES	
	FIG	AREA	FIG	AREA
GIRDER BEAM/ BHD		ACC. E/R NWT BHD		WT BHDS / DECKS (A60) CLASS DIVISION
DECK		ACC. E/R NWT DECKS		WT BHDS / DECKS (A60) CLASS DIVISION
DECK BULKHEAD GIRDER BEAM		ACC. E/R (A,B) CLASS DIVISION WEATHER EXPOSED AREA WT BHDS / DECKS (A60) CLASS DIVISION		WEATHER EXPOSED AREA
DECK (CABLE PIPE)		ACC. E/R (A,B) CLASS DIVISION		WEATHER EXPOSED AREA

	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	56 / 63
	GENERAL DESCRIPTION	DRG NO: 037-K5700200	

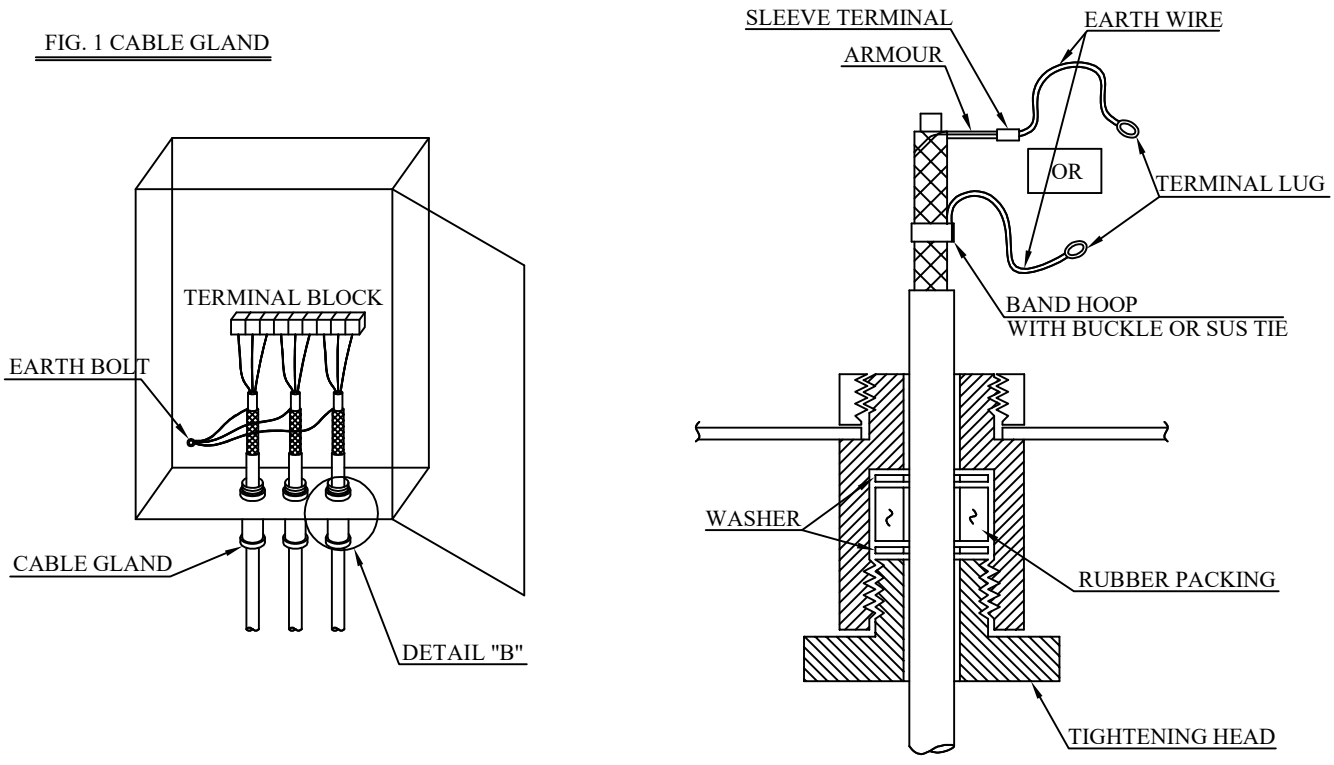
1) EARTHING METHOD OF CABLE COAMING SIDE

FIG. 1 CABLE COAMING
(WITH OUTER PROTECTION CABLE)



2) EARTHING METHOD OF CABLE GLAND SIDE(WITH OUTER PROTECTION)

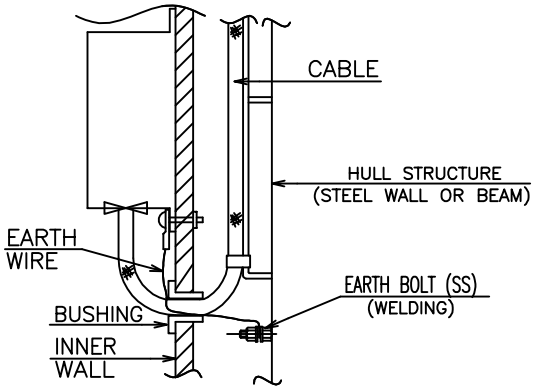
FIG. 1 CABLE GLAND



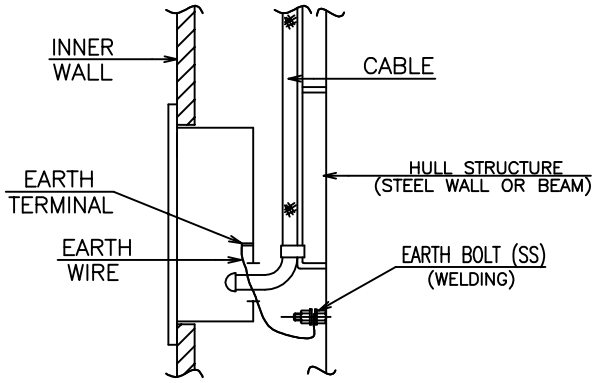
	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	57 / 63
	GENERAL DESCRIPTION	DRG NO: 037-K5700200	

3) EARTHING METHOD OF EQUIPMENT INSTALLED ON PANELLING.
EARTHED BY SEPARATE EARTH CONDUCTOR IN CABLE OR FOLLOWING METHOD.

EARTHING METHOD OF
SURFACE TYPE EQUIPMENT

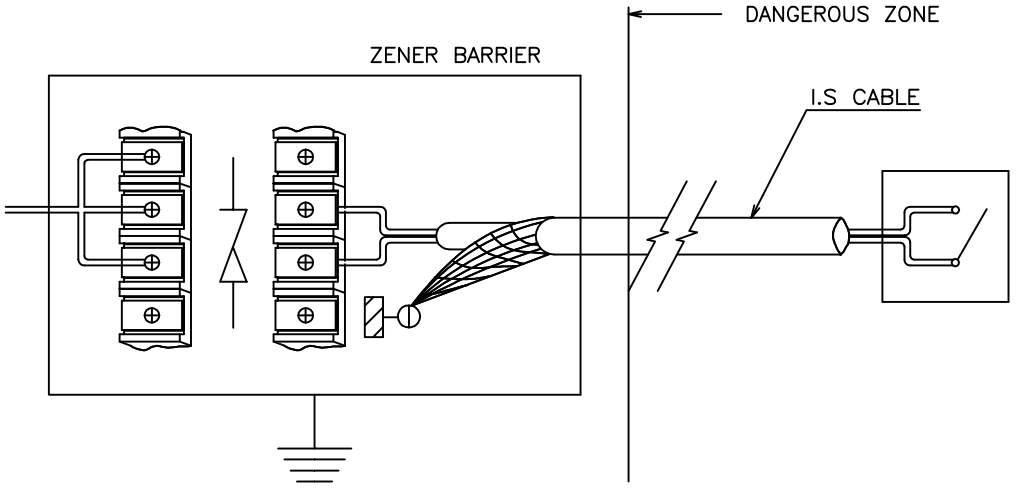


EARTHING METHOD OF
FLUSH TYPE EQUIPMENT



NOTE ; EARTH PIECE FOR EARTH WIRE MAY BE FITTED ON THE STEEL SEAT OF EQUIPMENT OR CABLE TRAY AND HULL STRUCTURE.

4) CABLES BELONG TO INTRINSICALLY SAFE CIRCUITS SHALL HAVE THEIR SCREENING (OR ARMOURING) EARTHED GENERALLY ONLY IN ONE LOCATION ACCORDING REQUIREMENTS OF INTRINSICALLY SAFE BARRIERS MANUFACTURERS.



5) EARTHING WIRE METHOD.

i) NON CURRENT CARRYING METAL PARTS OF ELECTRIC EQUIPMENT ARE EARTHED THROUGH CONDUCTORS I.E, EARTH WIRES(EARTHING LEAD WIRE WITH GREEN/YELLOW PVC COATING OR COPPER WIRE BRAIDED).

ii) FOR MAIN SWITCHBOARD, GROUP STARTER PANELS OR OTHER PANELS,EACH ONE(1) PIECE AND EARTHING WIRE SHOULD BE PROVIDED FOR EACH PANELS.

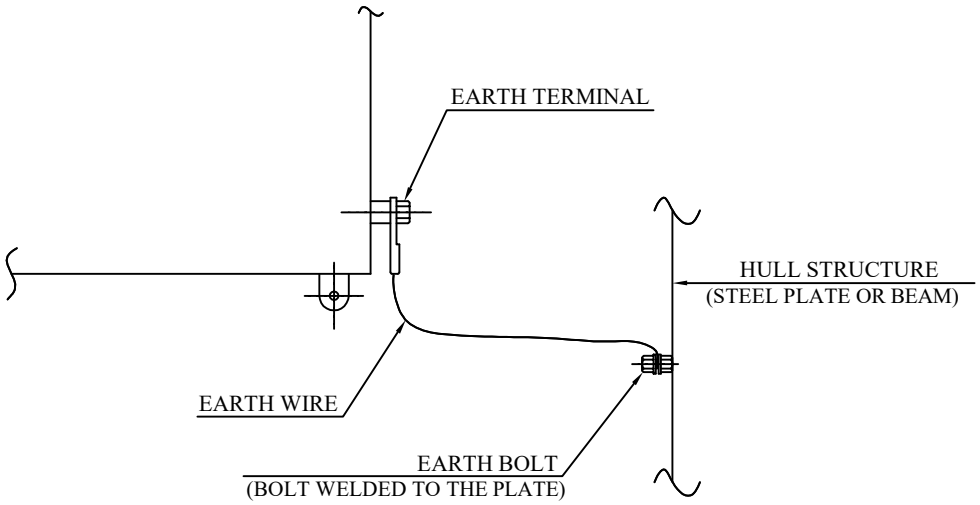
iii) WHERE AN EARTH TERMINAL IS PROVIDED ON THE EQUIPMENT, EARTH PIECE SHOULD BE FITTED CLOSE TO ON EARTH TERMINAL.

iv) SIZE OF EARTHING WIRE

SIZE OF EARTHING-LEAD WIRE SHOULD BE APPLIED IN ACCORDANCE WITH THE SIZE OF MAIN CABLE FOR EQUIPMENT AS INDICATED IN TABLE 1.

TABLE -1

ARRANGEMENT OF EARTH CONDUCTOR	CROSS-SECTION(Q) OF ASSOCIATED CURRENT CARRYING CONDUCTOR (ONE PHASE OR POLE)mm^2	MINIMUM CROSS-SECTION OF COPPER EARTHING CONDUCTOR
1. A) INSULATED EARTH CONDUCTOR IN CABLE FOR FIXED INSTALLATION.	$Q \leq 16$	Q
B) COPPER BRAID OF CABLE FOR FIXED INSTALLATION. C) SEPARATELY INSULATED EARTH CONDUCTOR FOR FIXED INSTALLATION.	$16 < Q$	1/2 OF THE CURRENT CARRYING CONDUCTOR BUT NOT LESS THAN $16mm^2$



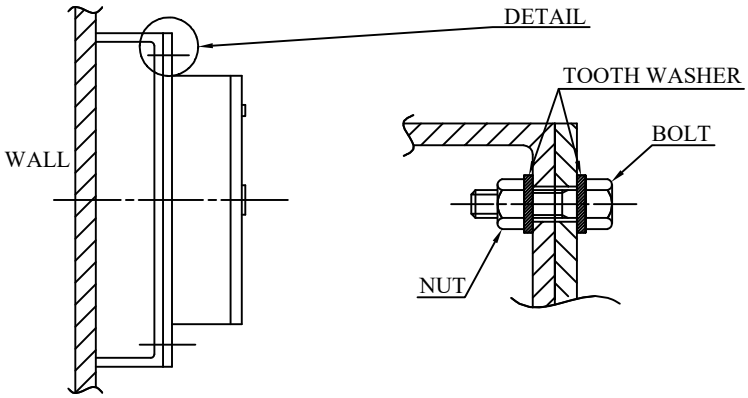
NOTE ; EARTH BOLT FOR EARTH WIRE MAY BE FITTED ON THE STEEL SEAT OF EQUIPMENT, CABLE TRAY OR HULL STRUCTURE.

	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	59 / 63
	GENERAL DESCRIPTION	DRG NO: 037-K5700200	

6) METALLIC CONTACT METHOD.

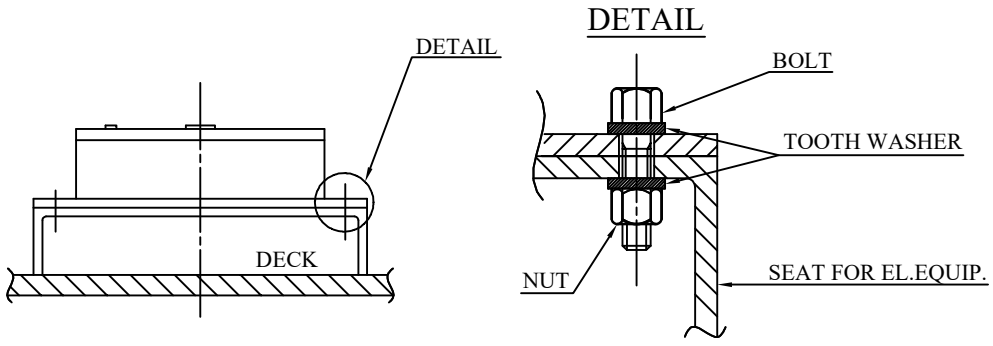
i) METHOD THAT METAL FRAMES OR ENCLOSURES OF ELECTRICAL EQUIPMENT ARE IN METALLIC CONTACT WITH VESSEL'S STRUCTURE.

ii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL WALL.



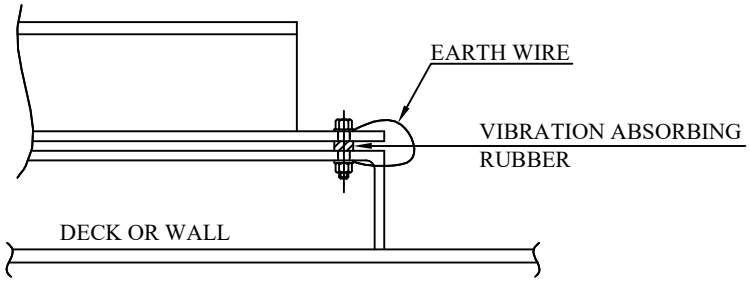
NOTE ; 1 POINT SHALL BE EARTHED.

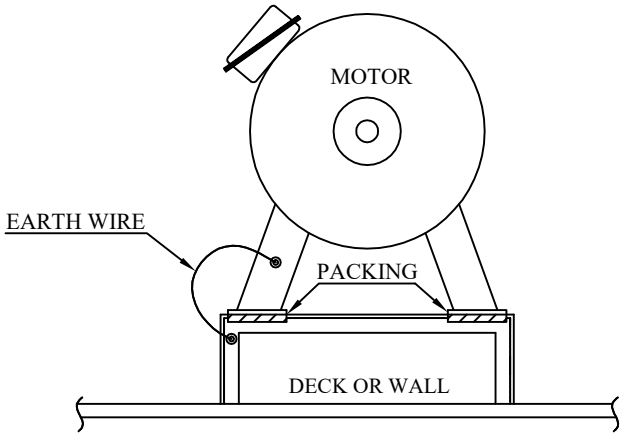
iii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL DECK.



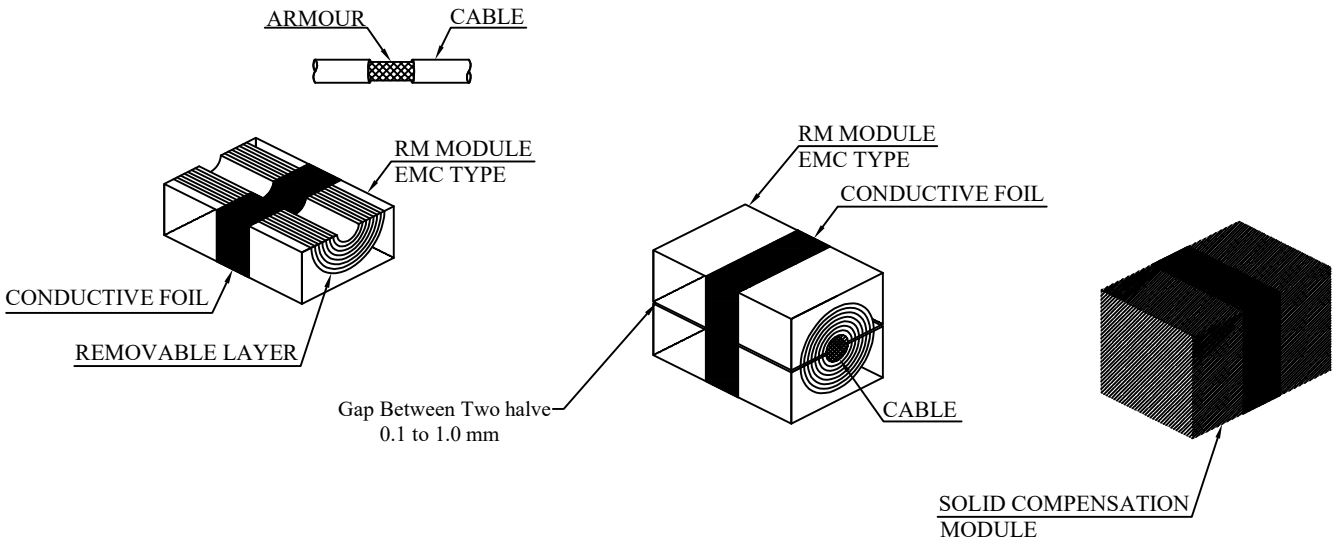
NOTE ; 1 POINT SHALL BE EARTHED.(TOOTH WASHER)

iv) EARTHING FOR AN EQUIPMENT WITH VIBRATION ABSORBING RUBBER OR CORROSION PREVENTING PACKING.





	MCT EMC MODULE	PART NO: 13.02	61/63
	CABLE PENETRATION	DRG NO: 037-K5700200	



EARTHING INSIDE MCTS

. The Module contains a conductive foil which establishes a full 360 degree low transfer impedence contact with the cable screen. Do not lubricate the conductive foil.

	INSTALLATION METHOD FOR LIGHTING FIXTURE	PART NO: 14.01	62/63
	DECK MOUNTING TYPE	DRG NO: 037-K5700200	

DECK MOUNTING

APPLICATION

- ACCOMMODATION
- CASING
- FOR SIGHT GLASS LIGHTING
- LOW VIBRATION AREA
- E/R FLOOR UNDER GRATING
- ESCAPE TRUNK ETC

APPLICATION OF FITTING LEG

L ≥ 1000 50x50x3t EA

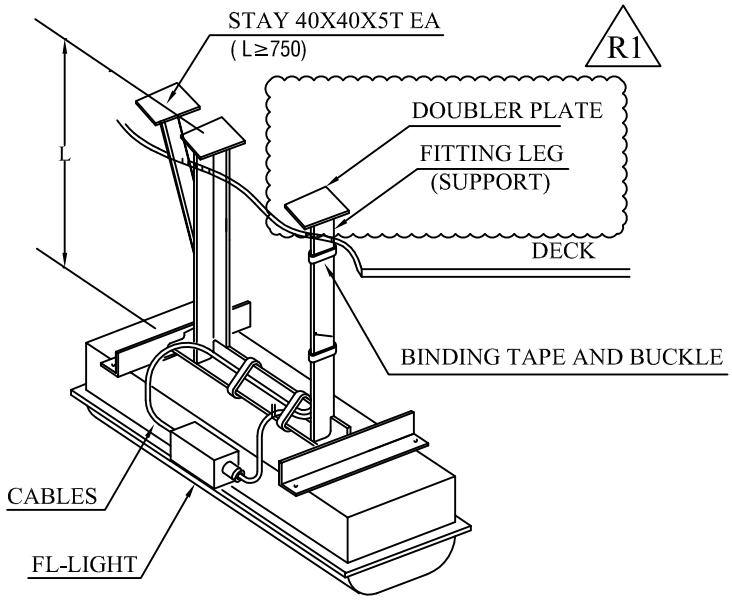
1000 > L 40x40x5t EA

APPLICATION OF STAY

- L≤ 750: NO STAY
- L>750:40X40X5T EA

DECK MOUNTING

L : LIGHTING SUPPORT LENGTH



NOTE: LIGHT FITTING BELOW MAIN DECK AND IN MACHINERY AREA TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENTION

	INSTALLATION METHOD FOR LIGHTING FIXTURE	PART NO: 14.02	63 / 63
	WALL MOUNTING TYPE	DRG NO: 037-K5700200	

WALL MOUNTING

APPLICATION

- ACCOMMODATION
- CASING
- FOR SIGHT GLASS LIGHTING
- LOW VIBRATION AREA
- E/R FLOOR UNDER GRATING
- ESCAPE TRUNK ETC

APPLICATION OF FITTING LEG

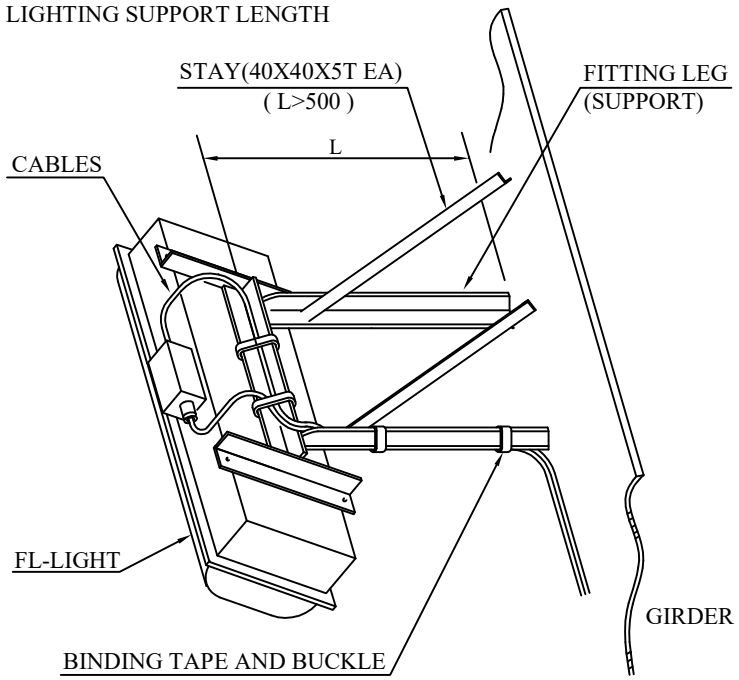
40x40x5t EA

APPLICATION OF STAY

- L≤ 500: NO STAY
- L>500: 40X40X5T EA

WALL MOUNTING

L : LIGHTING SUPPORT LENGTH



NOTE: LIGHT FITTING BELOW MAIN DECK AND IN MACHINERY AREA TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENTION

TOTAL 03 PAGES INCLUDING COVER.
A4-02 SH, A1-01 SH

COCHIN SHIPYARD LTD

A GOVERNMENT OF INDIA ENTERPRISE
COCHIN-682015 , INDIA.

CSLYARD NO	SHIP 037
PROJECT	
CLASS	LRS/IRS
OWNER	DCI
APPROVED	Kiran S Raj
REVIEWED	Akshatha
CHECKED	Vineeth
PREPARED	ARJUN V V

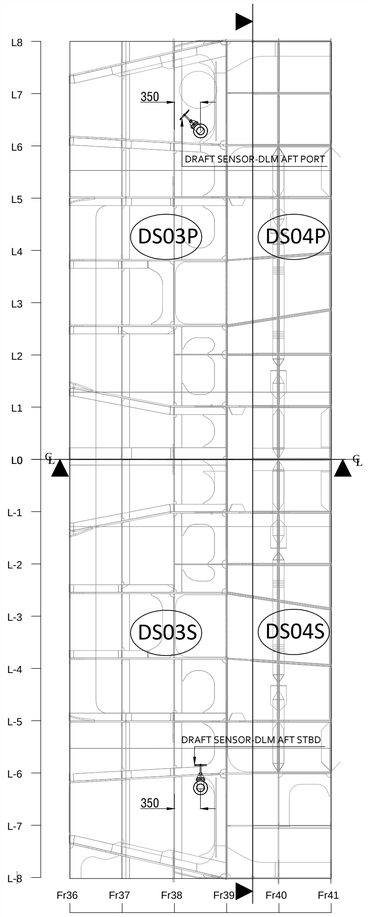
TRAILING SUCTION HOPPER DREDGER

FITTING ARRANGEMENT - BOTTOM EQUIPMENTS

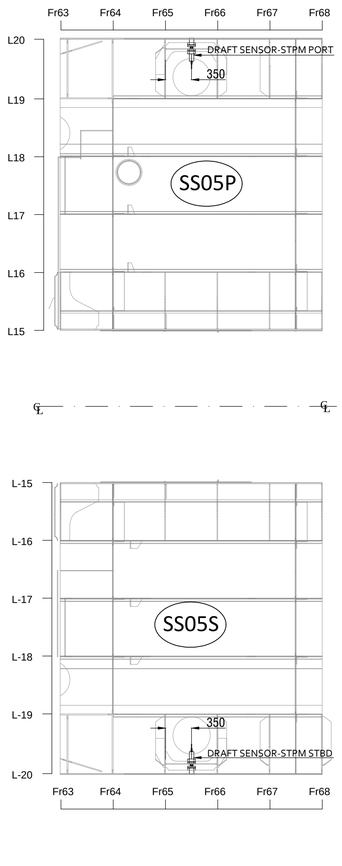
DATE: 02.05.2024	SCALE: NTS	DRG NO: 037-S5ZES-0001	REV : R0

	PLAN HISTORY	HULL No.	SHIP-37	02 / 03
		DWG. No.	037-S5ZES-0001	

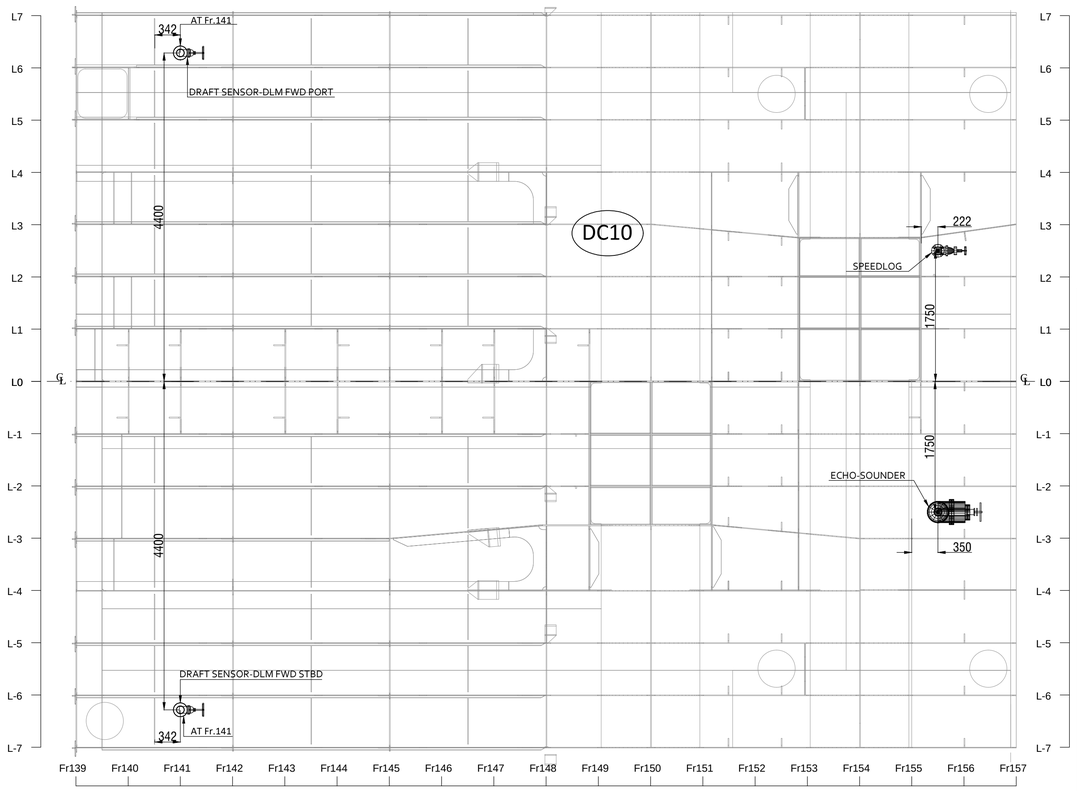
DATE	REV.	MARK	DESCRIPTION	DRAWN	CHECKED	REVIEWED	APPROVED
02.05.2024	0		FIRST ISSUE	ARJUN VV	VINEETH	AKSHATHA	KIRAN



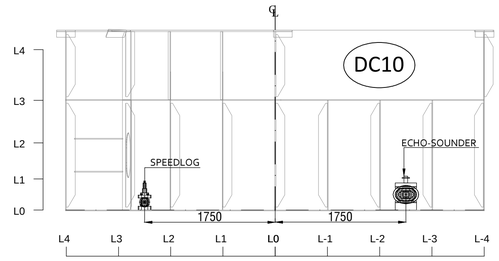
PLAN VIEW



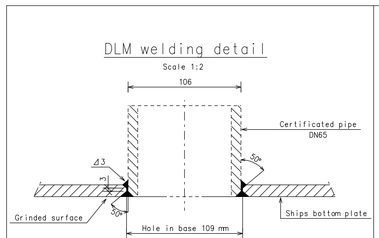
PLAN VIEW

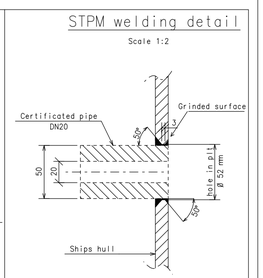


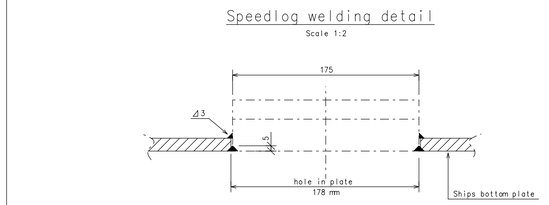
PLAN VIEW

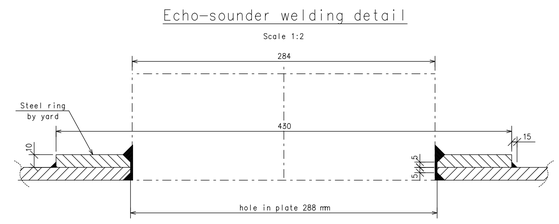


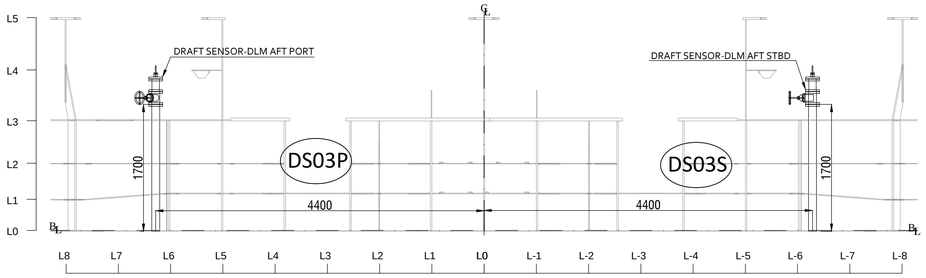
TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.155 - Fr.157)



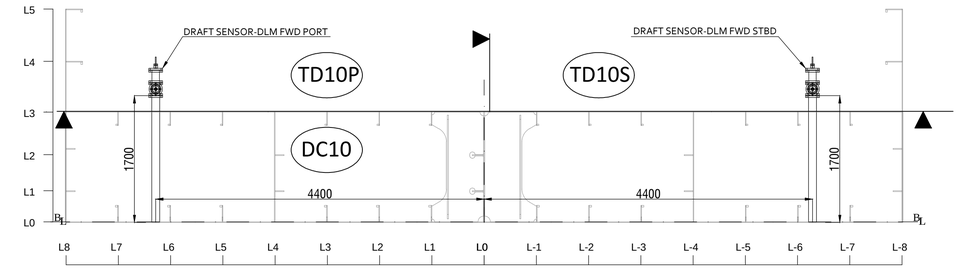




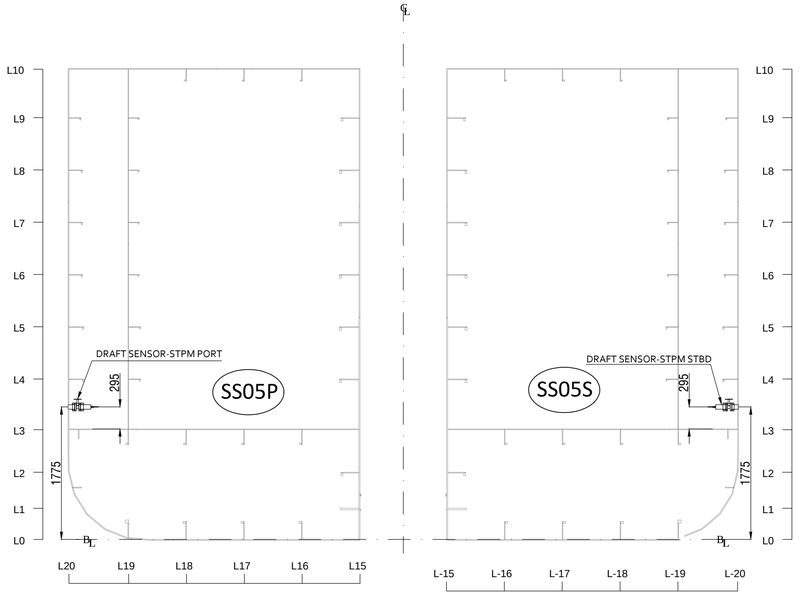




TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.38 - Fr.39)



TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.140 - Fr.142)



TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.65 - Fr.66)

NOTES:

SHELL PENETRATION TO BE:

1. WELDED FULL PENETRATION TO THE SHELL.
2. MATERIAL QUALITY OF WELDED FLANGE TO BE AT LEAST EQUAL TO MATERIAL QUALITY OF SHELL PLATING.
3. EQUIPMENT TO BE SUITABLY STIFFENED TO PREVENT HARD POINTS.
4. ALL PARTS FLUSH WITH HULL.
5. PARTS ARE TO BE PAINTED ACCORDING SUPPLIER INFO.
6. MAKE SURE WELD PARTS ARE POSITIONED CORRECTLY ACCORDING TO THE LEVEL FORE/AFT DIRECTION.
7. ALL PIPE CONNECTIONS WITH SHELL USE CERTIFICATED PIPE.
8. AFTER WELDING OF ELEMENTS IN HULL OF THE VESSEL A MEASUREMENT REPORT SHOULD BE MADE FOR EXACT LOCATIONS.
9. FOR MOUNTING DETAILS REFER ANNEXURE : I FOR DRAUGHT SENSOR(STPM), ANNEXURE : I FOR DRAUGHT SENSOR(DLM), ANNEXURE : III FOR ECHO SOUNDER, ANNEXURE : IV FOR SPEED LOG

REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:
0	02-05-24	FIRST ISSUE	ARJUN V V	VINEETH	AKSHATHA	KIRAN

COCHIN SHIPYARD LTD
P.O. Bag - 1653, COCHIN - 682 015

OWNER : DCI

TRAILING SUCTION HOPPER DREDGER

TITLE : FITTING ARRANGEMENT - BOTTOM EQUIPMENTS

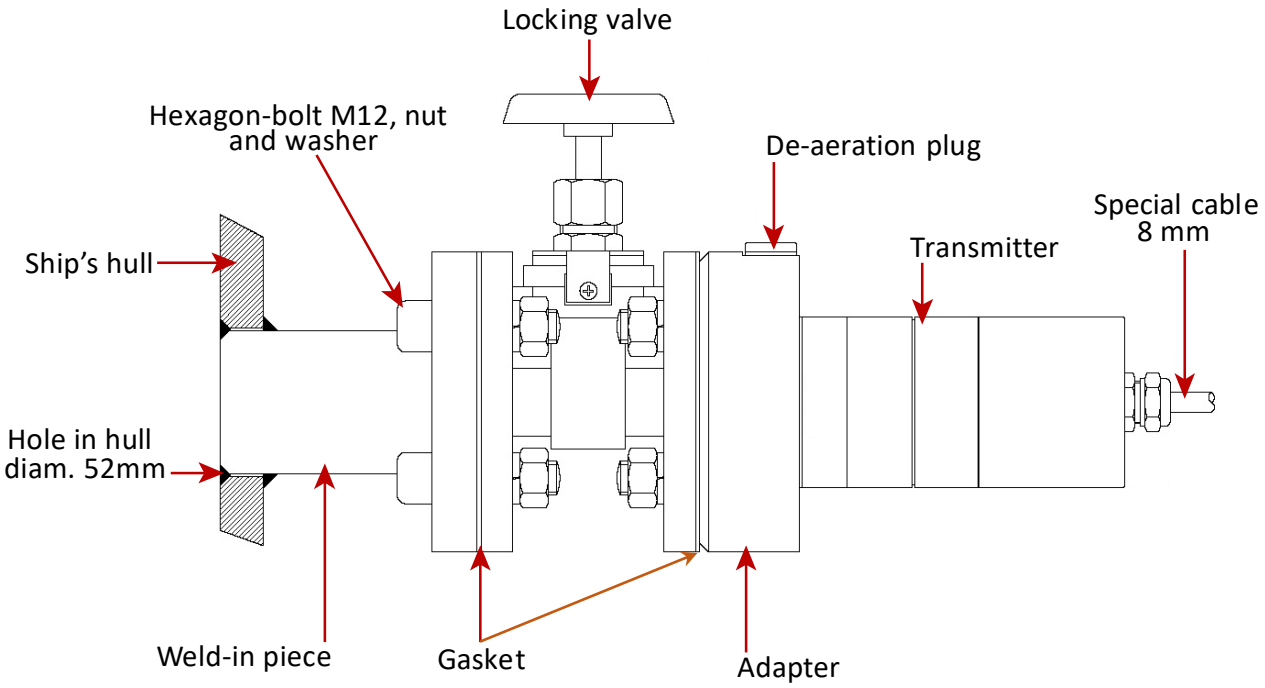
CSL YARD No.	SHIP 037	SCALE :	1:40
CLASS	LRS/IRS		
APPROVED	KIRAN S RAJ		REV:0
REVIEWED	AKSHATHA	FORMAT :	A1
CHECKED	VINEETH V R	CSL DWG. NO.	037-S5ZES-0001
DRAWN	ARJUN V V		PAGE:03 OF 03

Location on board

Draught gauging of vessels deals with a number of factors and conditions which are mostly dependent on the structure of the mentioned vessel.

In particular, correct positioning and careful mounting of the transmitters and its peripherals are very important for the accuracy of the monitoring system read-outs. Therefore care has to be taken to create the optimal conditions. Many years of accurate and liable data of the ship's draught and easy maintenance always appears to be more valuable than the one-off investment for a correct adaption of the ship’s hull.

Therefore it is important to meet the guide-lines of this installation instructions as close as possible. In case of vessel specific deviant circumstances: don't hesitate to contact our company for tuning your installation. To guarantee the accuracy of the total system(s), it is required to make the best possible installation.
For a general arrangement of the draught measurement, see the figure “General arrangement”.



General arrangement

Longitudinal positioning

On a CSD the transmitter should be mounted in such a way that the draught of the pontoon is measured at the ladder pivot (trunnion). This means that the transmitter position should be chosen as close as possible to the virtual perpendicular through the ladder pivot. See figure “Position of transmitter”, area 1.

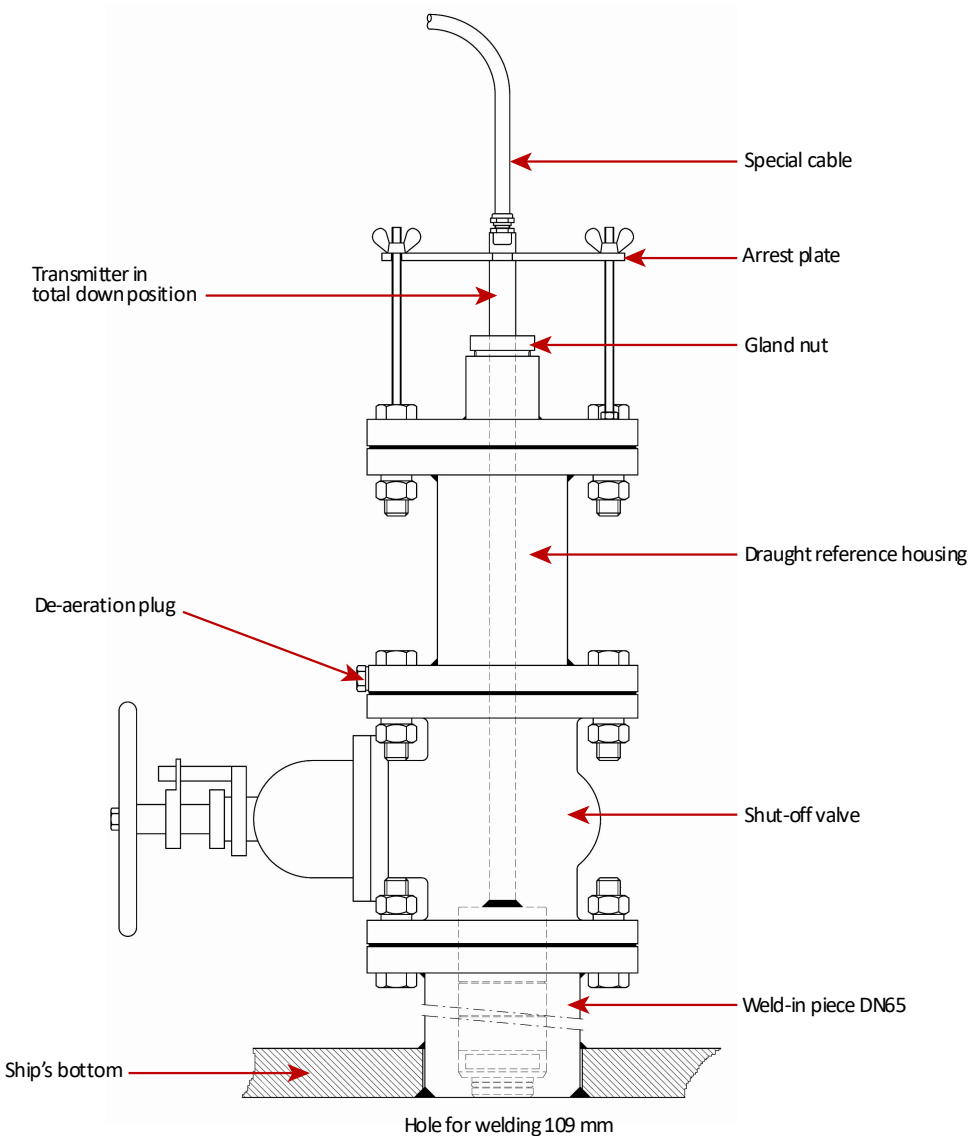
Location on board

Draught gauging of vessels deals with a number of factors and conditions which are mostly dependent on the structure of the mentioned vessel.

In particular correct positioning and carefull mounting of the transmitters and its peripherals is very
important for the accuracy of the monitoring system read-outs. Therefore care has to be taken to create the optimal conditions. Many years of accurate and liable data of the ship's draught and loading and easy maintenance always appears to be more valuable than the one-off investment for a correct adaption of the ships bottom.

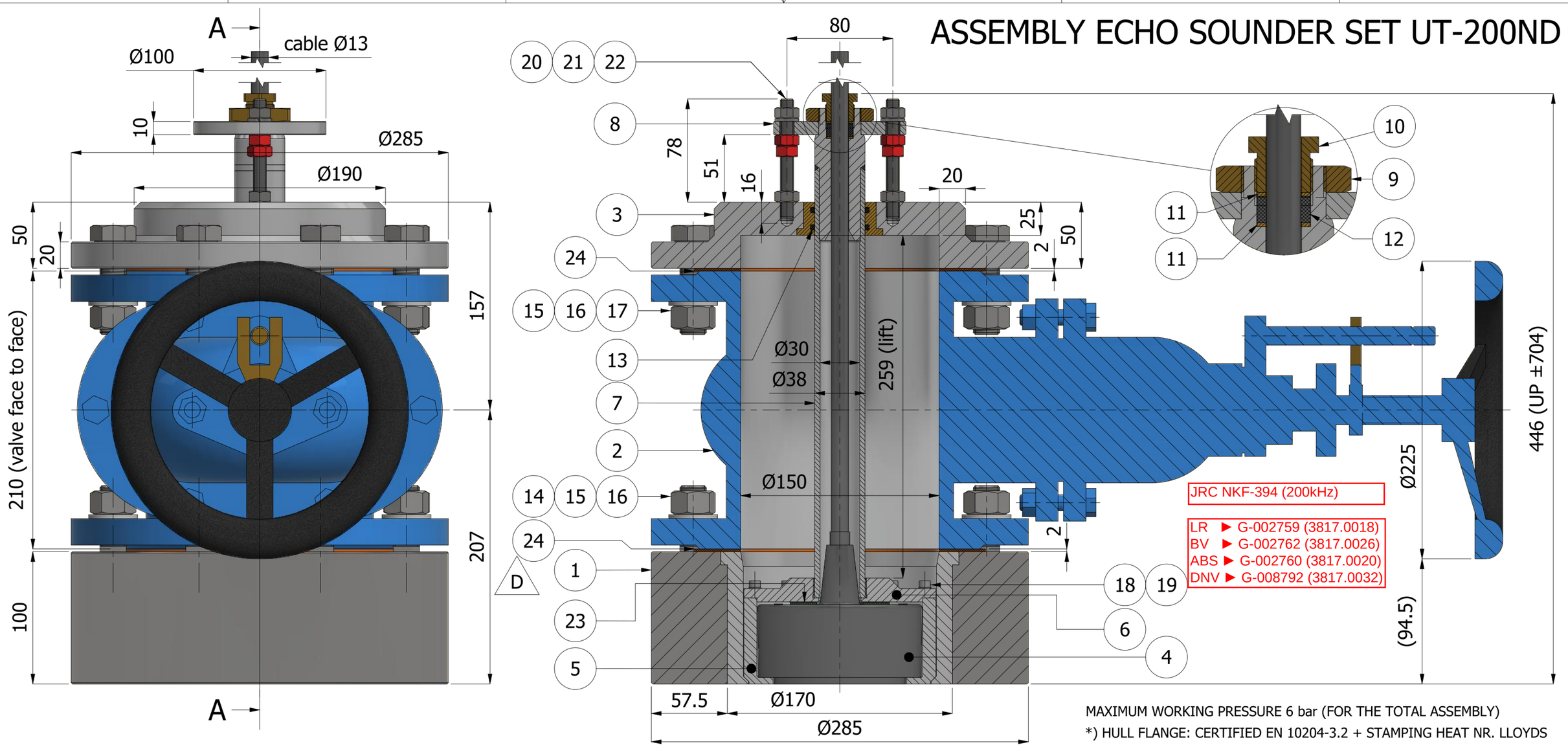
Therefore it is important to meet as close as possible the guide-lines of this technical manual. In case of vessel specific deviant circumstances: don't hesitate to contact our company for tuning your installation. To warrant the accuracy of the total system(s) it is required to make the best possible installation.

The HC…. transmitter is mounted in bottom element BOTE65. For a general arrangement of the bottom element assembly, see the figure “Bottom element assembly BOTE65” below.



ANNEXURE III

ASSEMBLY ECHO SOUNDER SET UT-200ND



WEIGHT: 60 KG (EXCL. VALVE / EXCL. TRANSDUCER)
VALVE WEIGHT: 45 KG

---	24	2	GASKET RING	FIBRE PLATE	DN150-2 MM	ERIKS code 10002929
---	23	1	SPACER RING	RX NEO/40	Ø75xØ35x3	ERIKS code 12747124
---	22	2	SPRING WASHER	A2	M10	DIN 127B
---	21	8	HEX NUT	A2-70	M10	DIN 934
---	20	2	STUD	A2-70	M10 x 90	DIN 976
---	19	10	SPRING WASHER Ø HEAD	A4	M5	DIN 7980
---	18	10	SOCKET HEAD SCREW	A4-70	M5 x 16	DIN 912
---	17	8	HEX HEAD BOLT	A2-70	M20 x 70	DIN 931
---	16	16	HEX NUT	A2-70	M20	DIN 934
---	15	16	WASHER	A2	M20	DIN 125A
---	14	8	STUD, 1.25xD	A2-70	M20 x 50	DIN 939
---	13	2	O-RING	NBR	ID Ø38 x 3.5	
D36813	12	1	GLAND SEAL	NBR	Ø20xØ13x10	
D36813	11	2	GLAND RINGS	CuZn39Pb3		Ø20xØ13.5x1.5
DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS

MAXIMUM WORKING PRESSURE 6 bar (FOR THE TOTAL ASSEMBLY)
*) HULL FLANGE: CERTIFIED EN 10204-3.2 + STAMPING HEAT NR. LLOYDS

D36813	10	1	GLAND	CuZn39Pb3	Ø26.5 x 21	M22 x 1.5 - KEY 24
D36812	09	1	LOCK NUT	CuZn39Pb3	Ø51x10	M32 x 1.5 - KEY 46
D36812	08	1	PULL/LOCK FLANGE	AISI-304 (1.4301)	Ø100xØ32x10	
C36811	07	1	TUBE	AISI-316L (1.4404)	Ø38 - L370	M40 x 1.5
C36810	06	1	COVER SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH18	M40 x 1.5
C36808	05	1	SENSOR HOLDER	AISI-316 (1.4401)	Ø145xH65	
---	04	1	TRANSDUCER	RUBBER LINED	Ø125xH60	JRC TYPE UT-200ND
C36807	03	1	COVER FLANGE	AISI-304 (1.4301)	Ø285 x 50	DN150-PN16
---	02	1	GATE VALVE	GJS-400-15	DN150-PN16	ECON, FIG. 317M-NOD
C36806	01	1	HULL FLANGE *)	STEEL 52.3N	Ø285 x H100	DN150-PN16 - UNCOATED
DRAWING	PART	QTY	DESCRIPTION	MATERIAL	DIMENSION	REMARKS

SURFACE FINISH Ra IN µm ACC. TO ISO 1302
DIMENSIONAL TOLERANCES ACC. TO ISO 129-1
FORM AND POSITIONAL TOLERANCES ACC. TO ISO 1101

Dimensions without tolerance symbols: 0-100 ± 0.2; 100-300 ± 0.4; >300 ± 0.6 — AMERICAN PROJECTION

Scale: *1:3* | Date: *10-7-2015*
Drawn by: *RW* | Approved by: *JLB*

ALPHATRON Marine

REVISION DATE: 30-09-2019
DESCR.: ERIKS code for ITEM 24 CHANGED

Figure No.: 317M-NOD SPECIAL

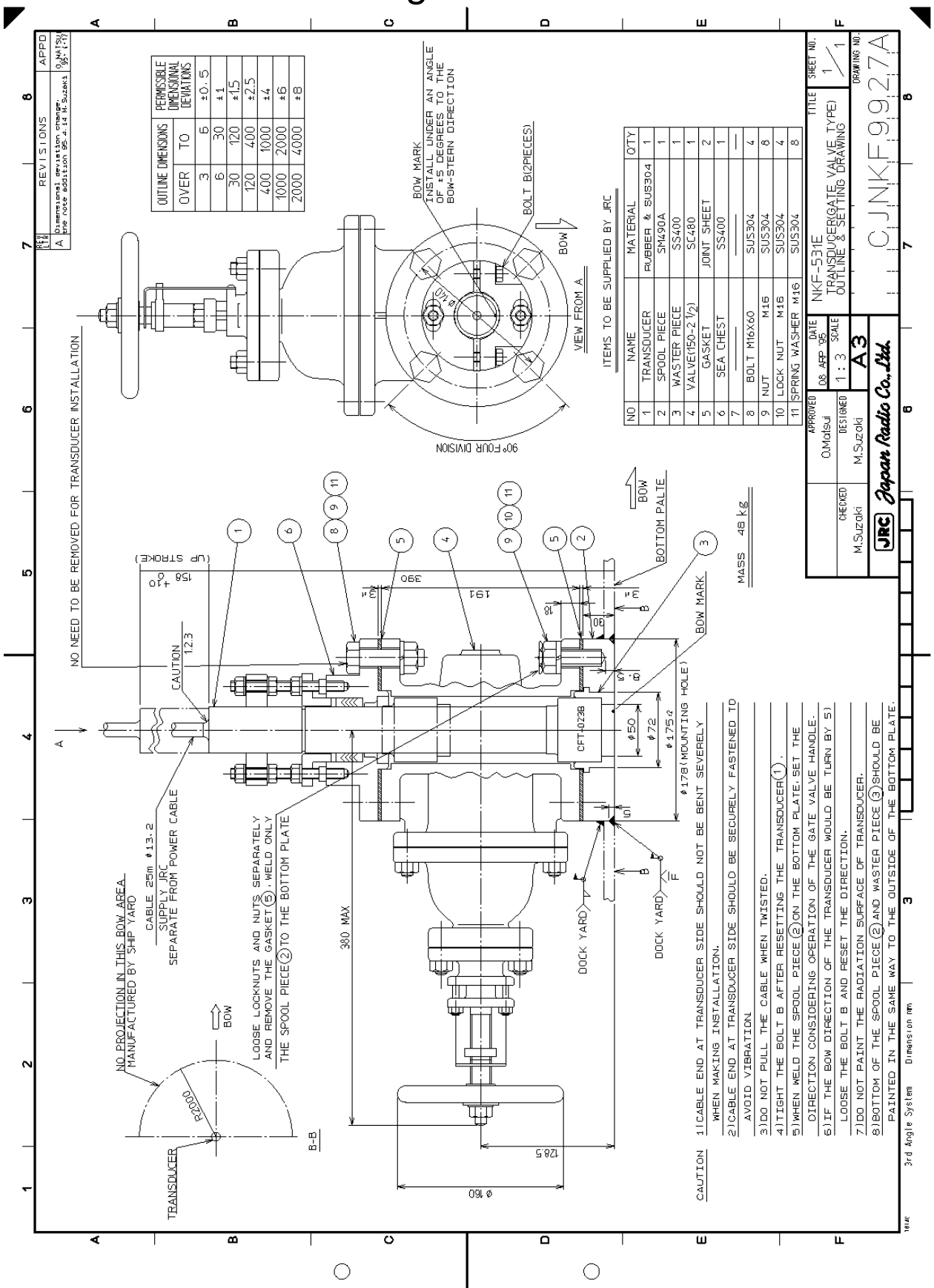
Size: DN150
Connection:

Drawing No.: C36792

REV.: D

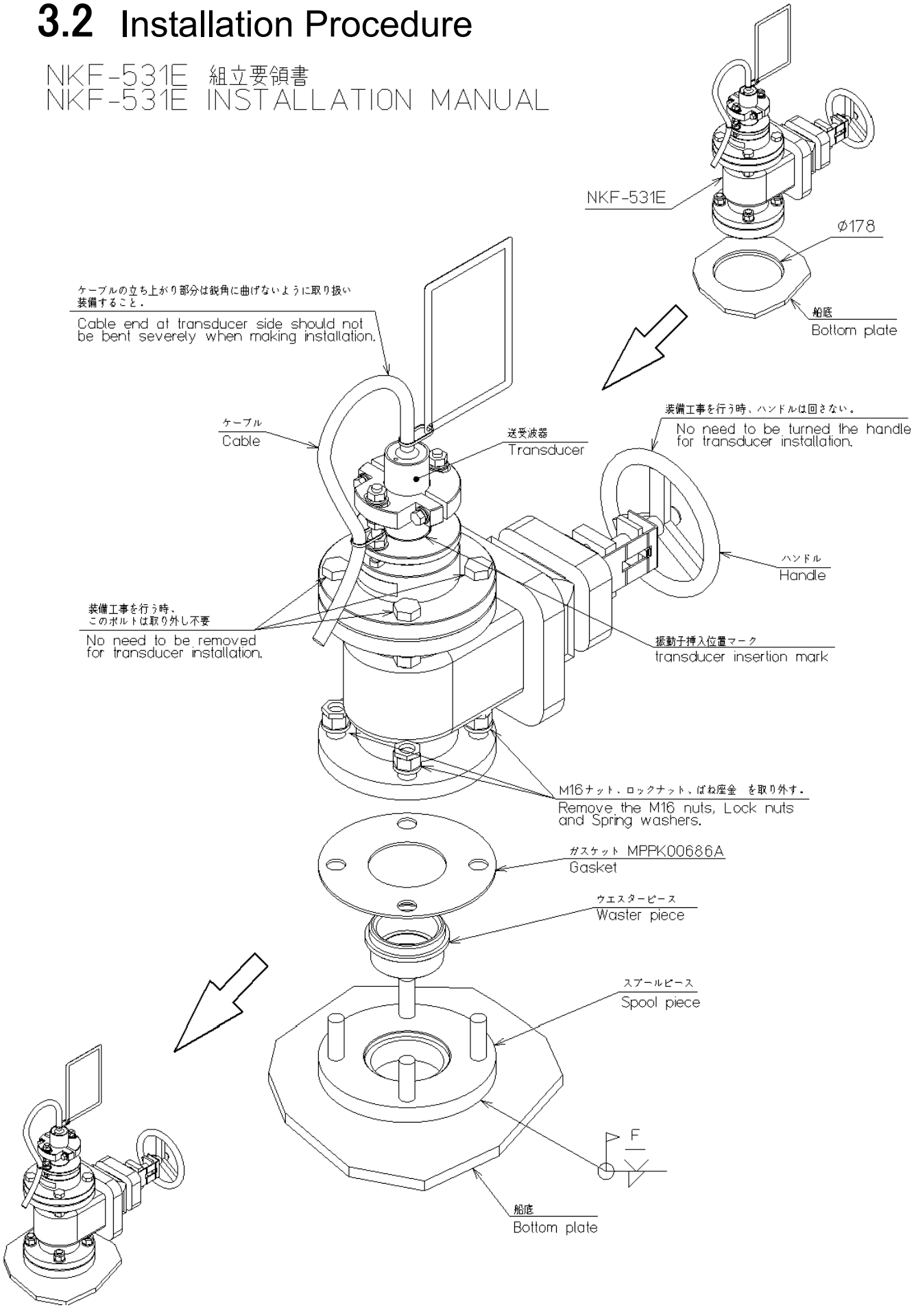
3. Installing of NKF-531

3.1 Installation Drawing



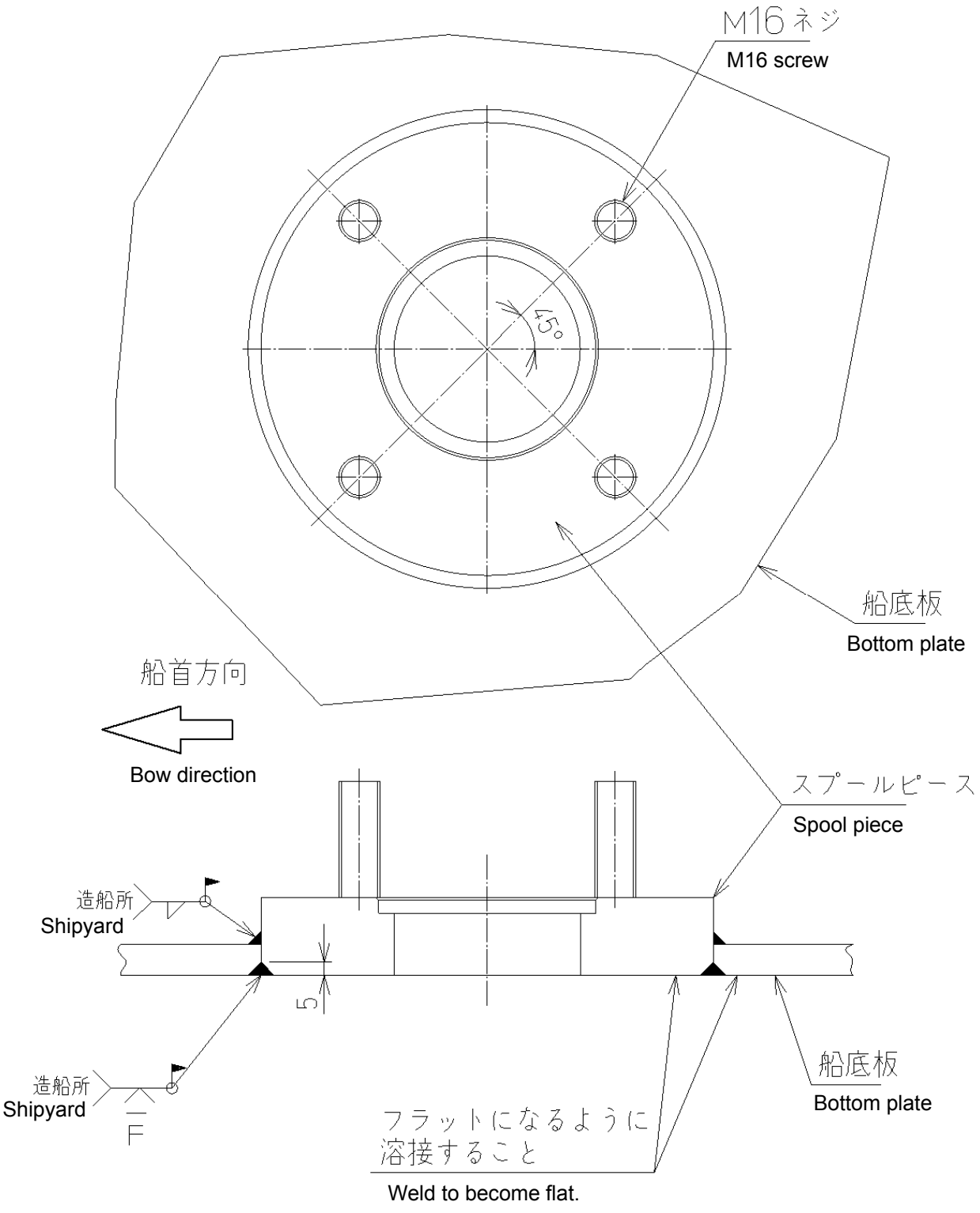
3.2 Installation Procedure

NKF-531E 組立要領書
NKF-531E INSTALLATION MANUAL

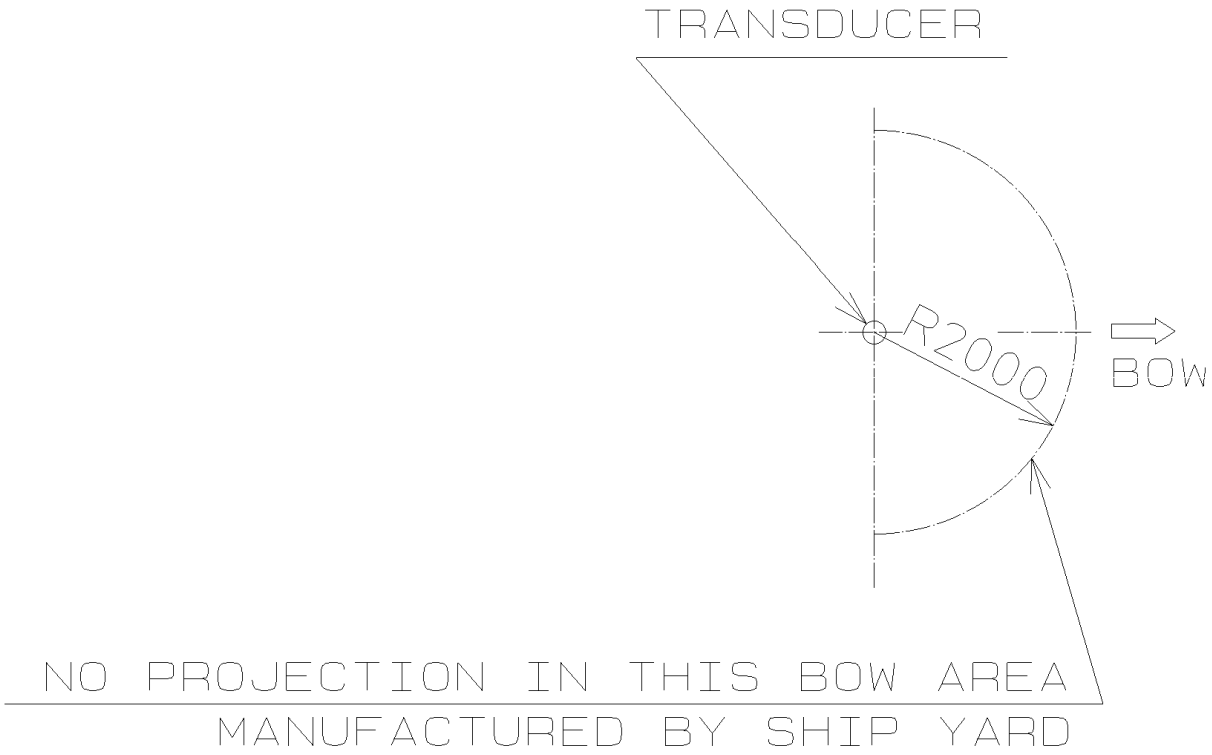


3.3.3 Welding

- Weld so that the lower side of spool piece and bottom plate become the flat same sides.
- Weld noting the direction of the M16 screw to the direction of the bow because the direction of handle of the gate valve is decided in the direction where spool piece is welded.
- Weld the spool piece of NKF-531E in the place that becomes the horizontal toward the sea bottom.
- Design open ahead and doubling on the bottom plate side in the shipyard according to the classification.



- Remove an umbo of 2mm or more (welding character, joint connecting, outlets, and cover of another equipment etc.) within the range of 2m forward of the transducer.

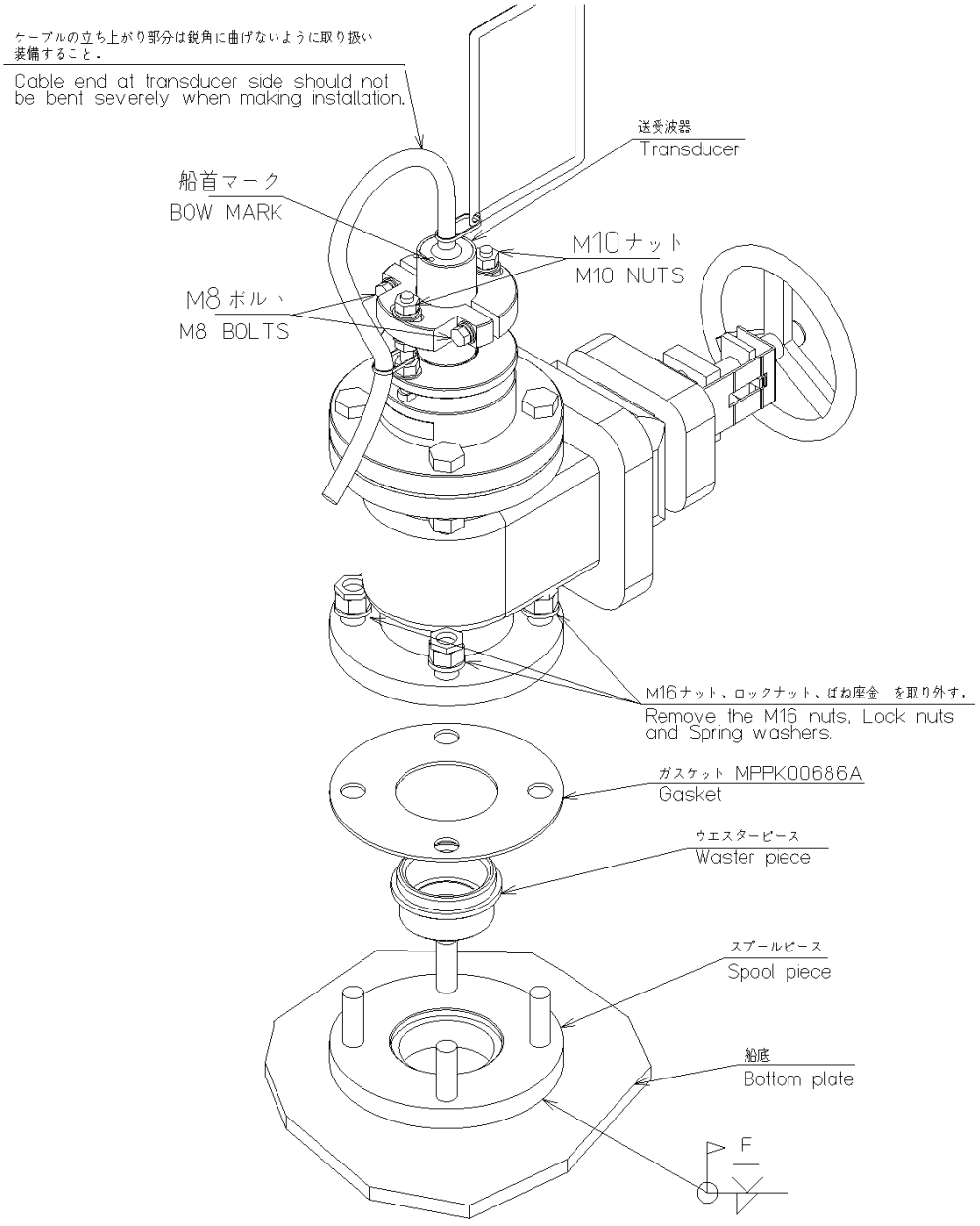


3.4 Mounting Guide of the Transducer

- After putting the waster piece and the gasket in spool piece welded on the bottom plate, install the gate valve including transducer.
- There is no problem in the watertight even if only the gasket is used. However, you may spread the liquid seal material.
- Handle it noting so as not to add the impact to the transducer point.
- Handle the cable standing up part of transducer carefully so as not to bend it the acute angle.
- Do not lift the main body of NKF-531E gate valve by gripping the cable.
- Do not turn the handle of the gate valve.
- Install it noting the direction of the bow.

< Changing method of the transducer bow direction>

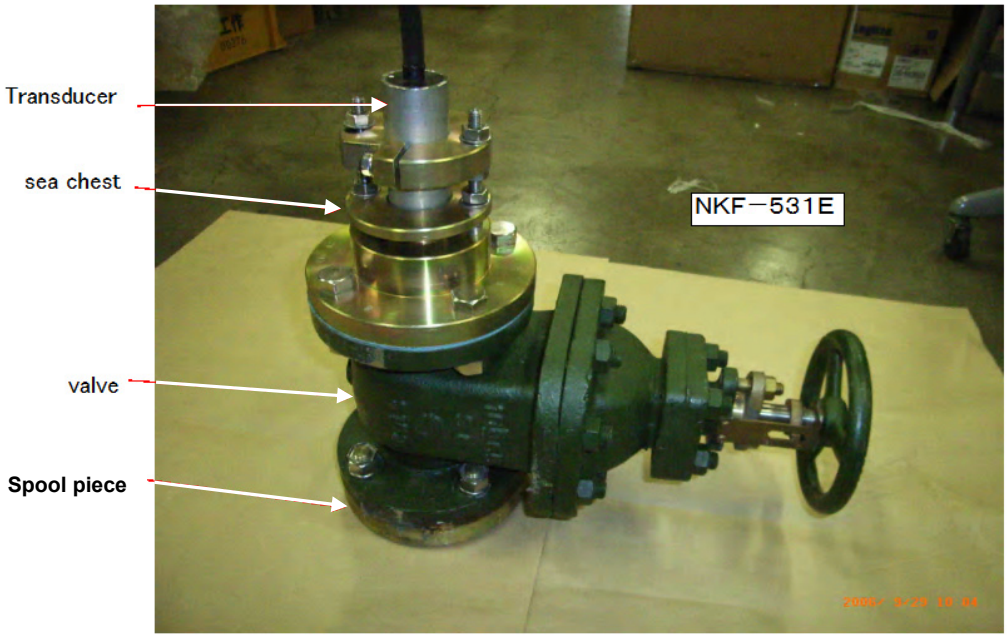
※ After the M10 nut (only two upper part) and the M8 bolt (2 pieces) are loosened, tighten the M10 nut and the M8 bolt again after adjusting it angling arbitrary rotating transducer.



※ Note that the gasket doesn't keep airtight though it keeps watertight.

3.7 Replacing Guide of the Transducer

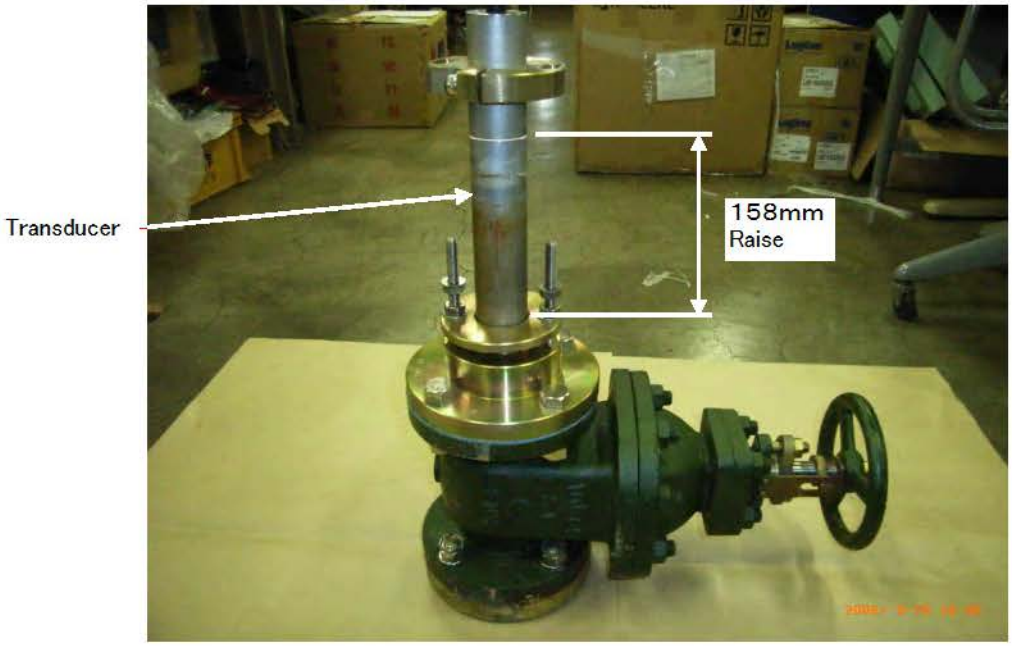
This chapter shows the procedure when exchanging it in the sea for the transducer damage after beginning to operate it.
Carry the gas detector to confirm enough oxygen is secured when it goes down to the bottom of a ship.



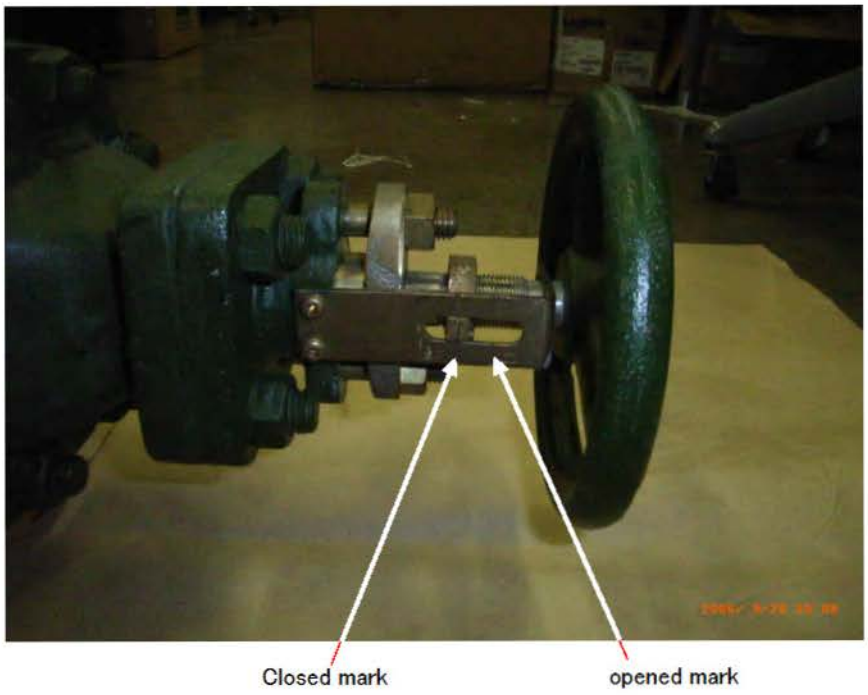
1. Check the mark. :Check the transducer insertion mark. And check the opened mark of valve.

2. Remove the nut :Remove the nuts of sea chest.

3. Raise a Transducer, and it is 158mm



4. Close the valve. Check the mark



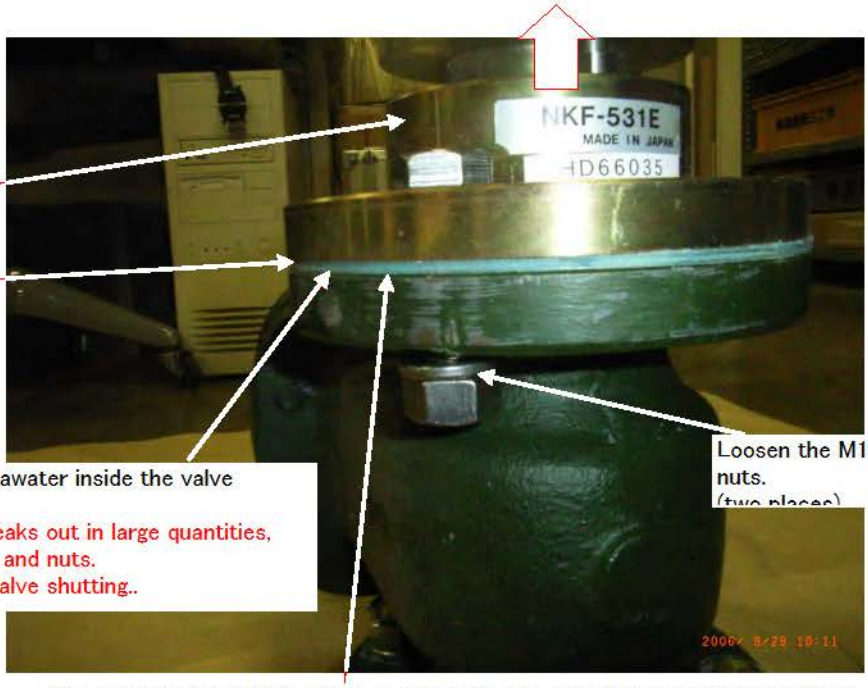
※ There is no change in externals size because the position of handle doesn't move even if handle is turned.

5. Remove bolts and nuts. : Remove only two places of bolt and nuts.

Only two places remove the M16 bolts and nuts.
Keep two places of opposite angle. For safety purposes, do not remove all place.

6. Remove the sea chest.:Lift up the sea chest.

Loosen the 2-M16 bolts and nuts, and lift up the sea chest.



sea chest

gasket

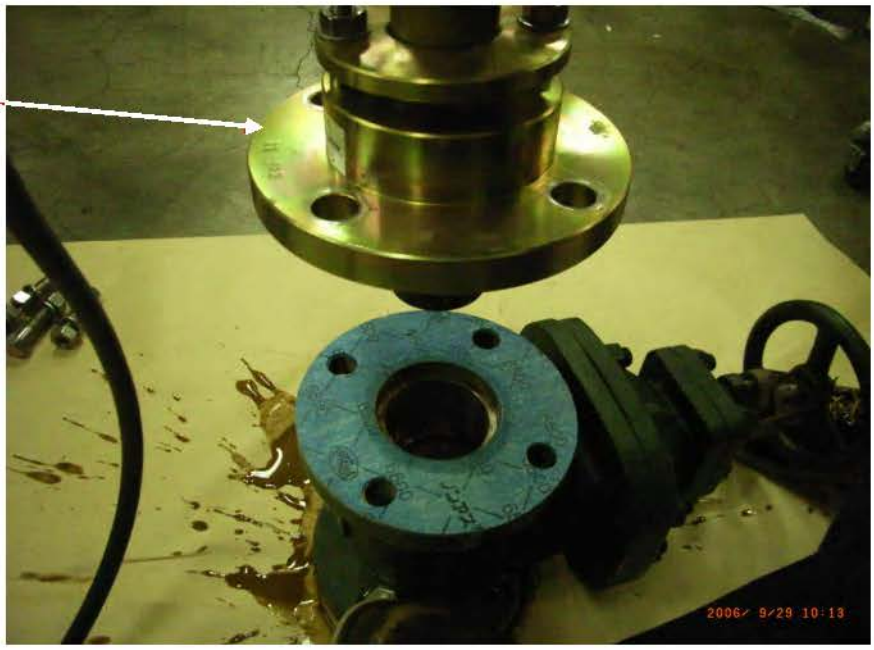
Loosen the M16 bolts and nuts.
(two places)

Make a gap. Seawater inside the valve appears.
When water breaks out in large quantities, close the bolts and nuts.
Then confirm valve shutting..

Sea chest and a gasket adhere, and there is the case that can not easily lift up.

7. Sea chest separation: remove sea chest completely.

Separate the sea chest.



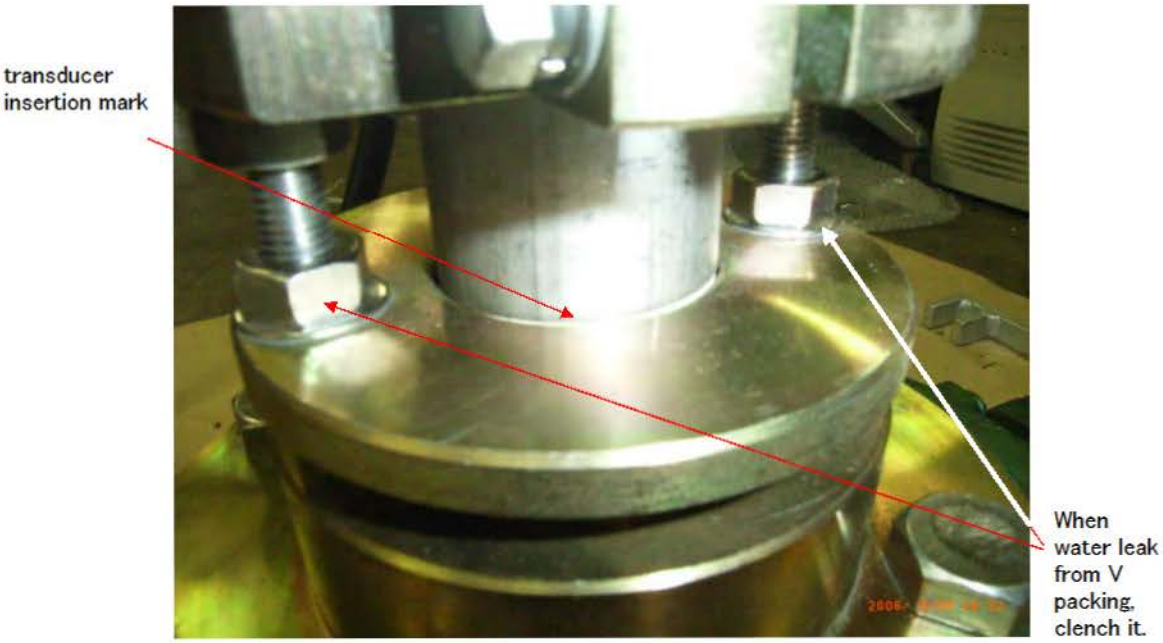
Change the gasket for a new one. (MPPK00686)

Paint the surface with fluid sealant materials.

8. Replace the transducer :Remove metal fittings.

9. Reassemble it: Change the transducer and assemble it again in a reverse procedure.

10. Last confirmation



necessary tool

- gasket MPPK00686A one
- jig for steering wheel one
- Fluid sealant materials one
  NIHON HERMETICS CO. , LTD
  HERME OIL SEAL NO.1
  equivalent
- spanner Two each
  M16(wrench NO.24)
  M20(wrench NO.30)

TOTAL 04 PAGES INCLUDING COVER.
A4-02 SH, A1-02 SH

COCHIN SHIPYARD LTD

A GOVERNMENT OF INDIA ENTERPRISE
COCHIN-682015 , INDIA.

CSLYARD NO	SHIP 037
PROJECT	
CLASS	LRS/IRS
OWNER	DCI
APPROVED	Kiran S Raj
REVIEWED	Akshatha
CHECKED	Vineeth
PREPARED	ARJUN V V

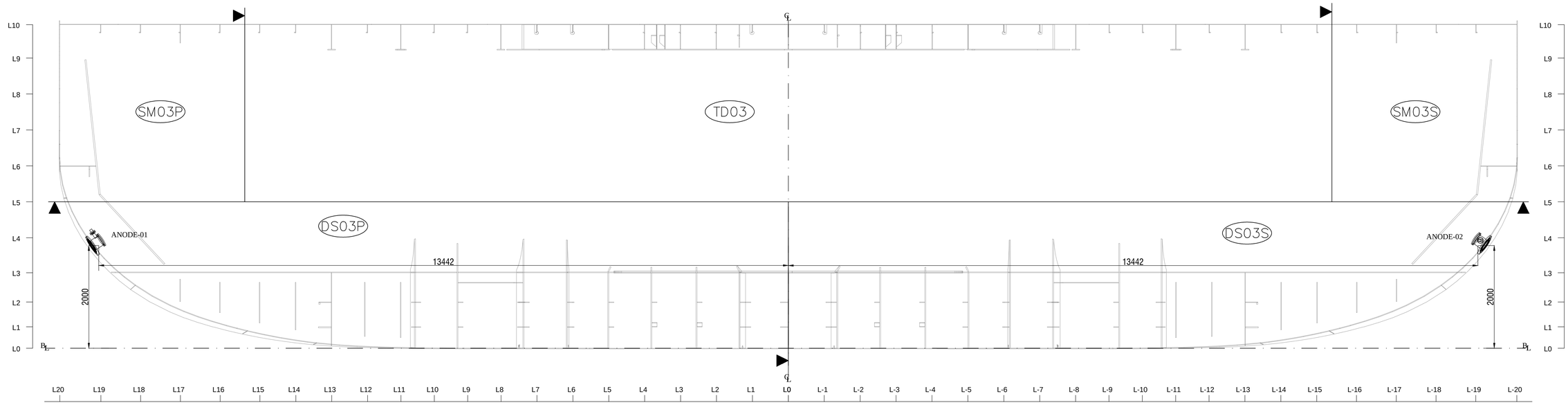
TRAILING SUCTION HOPPER DREDGER

FITTING ARRANGMENT - IMPRESSED CURRENT CATHODIC PROTECTION (ICCP)

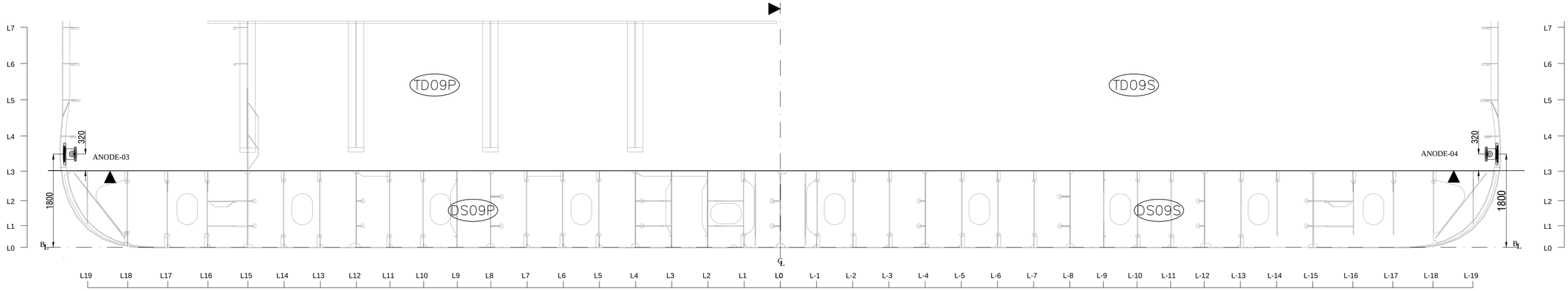
DATE: 02.05.2024	SCALE: NTS	DRG NO: 037-S5ZICP0001	REV : R0

	PLAN HISTORY	HULL No.	SHIP-37	02
		DWG. No.	037-S5ZICP0001	04

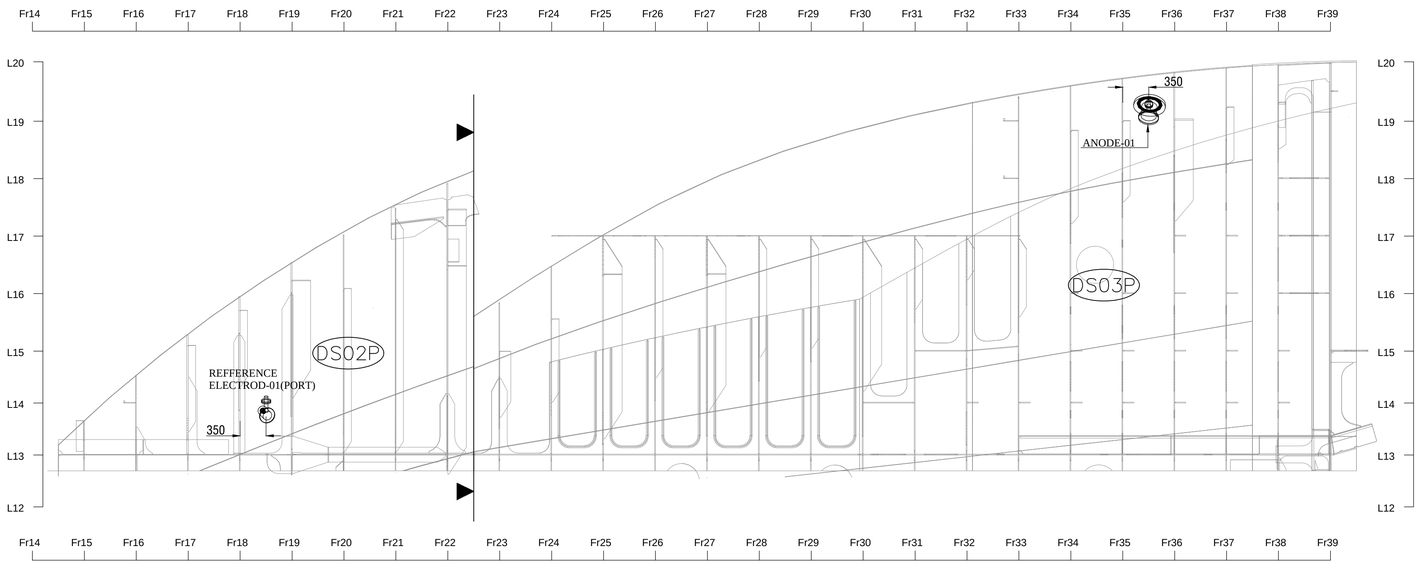
DATE	REV.	MARK	DESCRIPTION	DRAWN	CHECKED	REVIEWED	APPROVED
02.05.2024	0		FIRST ISSUE	ARJUN VV	VINEETH	AKSHATHA	KIRAN



TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.35 - Fr.36)



TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.124 - Fr.126)



PLAN VIEW

NOTES:

1. FINISH THE OUT SIDE HULL FLANGE WELDED PORTION WITH A GRINDER TO SMOOTH WATER-FLOW.
2. BETWEEN EVERY FLANGES GASKET MUST BE FITTED AND TO BE WATERTIGHT.
3. SCREWS, NUTS AND WASHERS TO BE MADE OF STAINLESS STEEL.
4. THE ANODES AND REFERENCE CELLS REMAIN SUBMERGED AT ALL TIMES.
5. THE DI-ELECTRIC SHIELD CAN BE APPLIED WITHOUT ANY INTERRUPTIONS.
6. ANODES PLACED ACCORDING SUPPLIERS INSTRUCTION.
7. NO SEAWATER IN OR OUTLET ARE IN AN AREA OF 2 M AROUND THE ANODE CENTER.
8. ANODE & REFERENCE CELL COFFERDAM TO BE FLUSH WELDED WITH THE HULL.
7. FOR MOUNTING DETAILS AND DI-ELECTRIC SHIELDING REFER ANNEXURE.

REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:
0	02.05.24	FIRST ISSUE	ARJUN V V	VINEETH	AKSHATHA	KIRAN

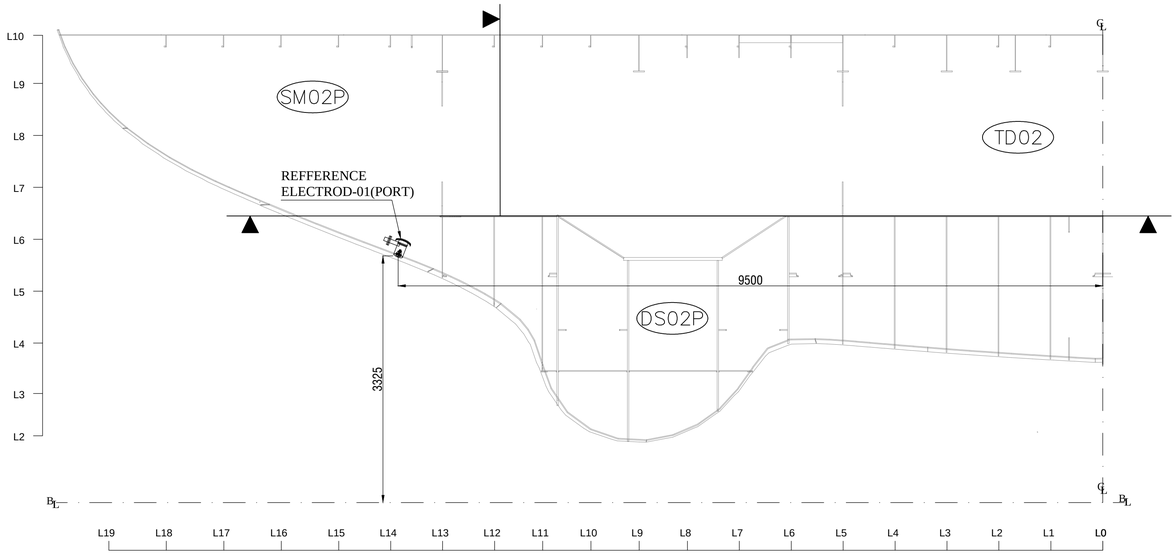
COCHIN SHIPYARD LTD
P.O. Bag - 1653, COCHIN - 682 015

OWNER : DCI

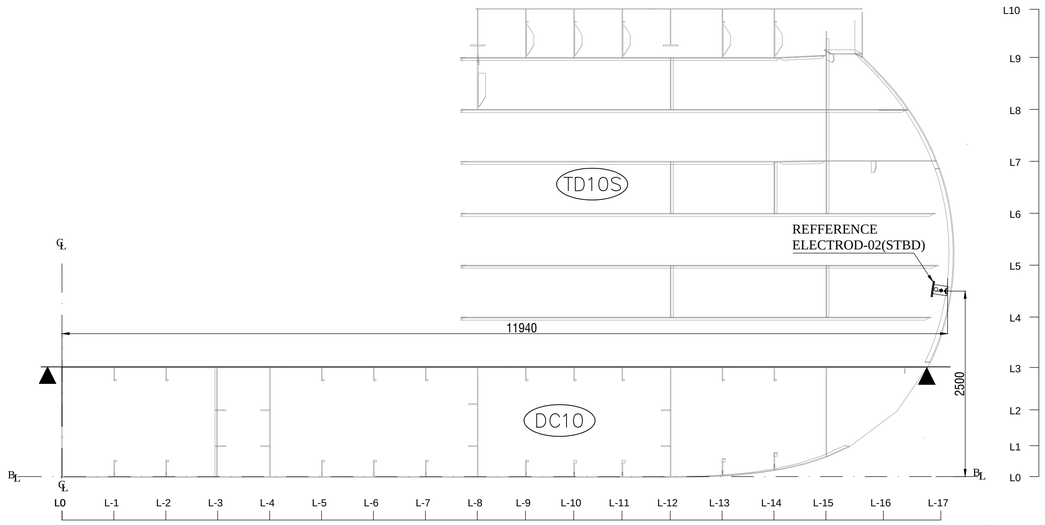
TRAILING SUCTION HOPPER DREDGER

TITLE : FITTING ARRANGMENT - IMPRESSED CURRENT CATHODIC PROTECTION (ICCP)

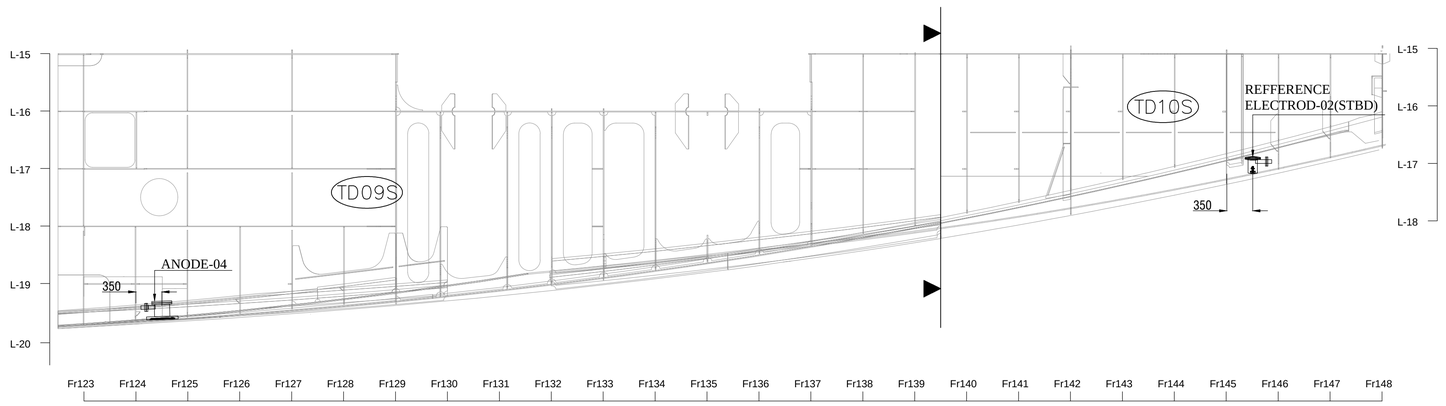
CSL YARD No.	SHIP 037	SCALE :	1:40
CLASS	LRS/IRS		
APPROVED	KIRAN S RAJ		REV:0
REVIEWED	AKSHATHA	FORMAT :	A1
CHECKED	VINEETH V R	CSL DWG. NO.	037-S5ZICP0001
DRAWN	ARJUN V V		PAGE:03 OF 04



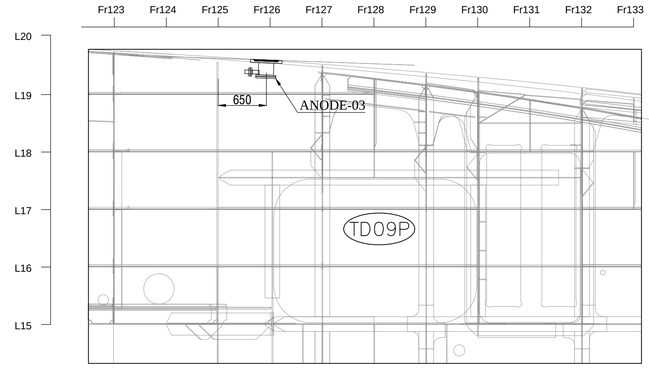
TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.18 - Fr.19)



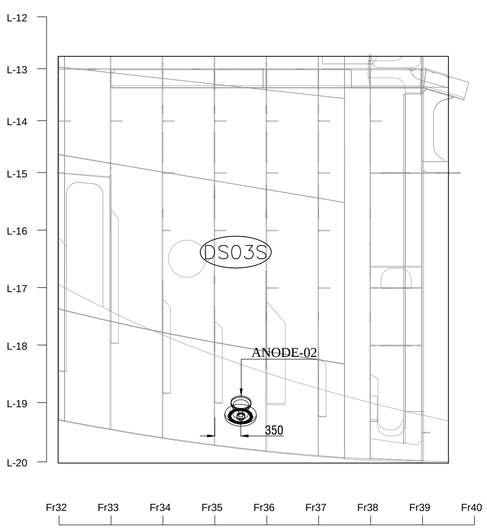
TRANSVERSE VIEW LOOKING FWD (BETWEEN Fr.145 - Fr.146)



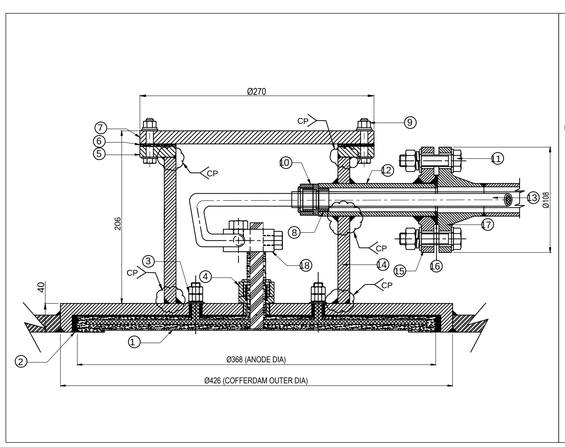
PLAN VIEW



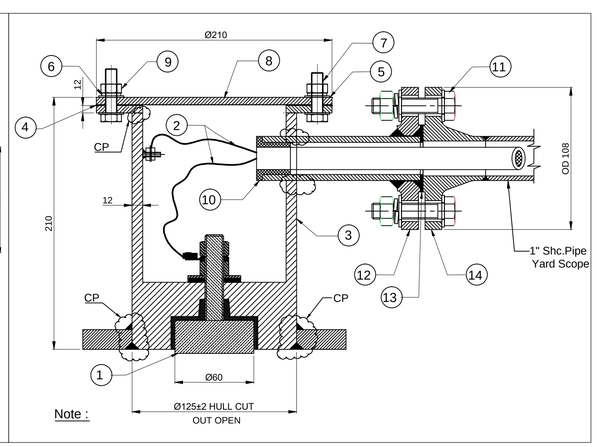
PLAN VIEW



PLAN VIEW



50A MMO-TI, DISC ANODE WITH
COFFERDAM ASSEMBLY



60D ZINC REFERENCE ELECTRODE
WITH COFFERDAM ASSEMBLY

NOTE: 'CP'-THE SYMBOL INDICATES COMPLETE PENETRATION WELD OR FULL PENETRATION WELD.

PART LIST FOR ANODE COFFERDAM ASSY

S.NO	PART ITEM	MATERIAL	QTY REQD.
1	ANODE	MMO-Ti	1
2	FILLER	EPOXY	-
3	M10 NUT	SS304 / 316	8
	M10 PLATE WASHER		4
	M10 SPRING WASHER		4
4	ANODE GLAND	BRASS NICKEL PLATED	1
5	BOTTOM COVER	MS IS2062	1
6	GASKET	NEOPRENE	1
7	TOP COVER	MS IS2062	1
8	GLAND BUSH	NEOPRENE	1
9	M8 BOLT & NUT	STEEL Gr. St8.8	6
	M8 PLATE WASHER		12
	M8 SPRING WASHER		6
10	CABLE GLAND	BRASS NICKEL PLATED	1
11	M12 BOLT & NUT	STEEL Gr. St8.8	4
	M12 PLATE WASHER		8
	M12 SPRING WASHER		4
12	CABLE CONDUIT PIPE	1" Sch.80	1
13	TAIL CABLE- 1C X 16 SQ.MM.	STD (FIRM SCOPE)	10 Mtrs
14	COFFERDAM SHELL	MS IS2062	1
15	FLANGE-SLIP-ON 150#	ASME/ANSI B-16.5	1
16	GASKET	NEOPRENE	1
17	FLANGE-WELD NECK150#	ASME/ANSI B-16.5 (YARD SCOPE)	1
18	CONNECTING BAR	BRASS NICKEL PLATED	1

PART LIST FOR ANODE ARRANGEMENT

S.NO.	PARTS	MATERIAL	QTY REQD.
1	REFERENCE ELECTRODE	ZINC 99.9% PURE	1
2	TAIL CABLE 3C x 2.5 sq.mm	STD (FIRM SCOPE)	-
3	COFFERDAM	MS, IS 2062	1
4	PACKING	NEOPRENE GASKET	1
5	M10 PLATE WASHER	STEEL Gr. St 8.8	8
6	M10 SPRING WASHER	STEEL Gr. St8.8	4
7	BOLT M10x45mm	STEEL Gr. St 8.8	4
8	COFFERDAM LID	MS, IS 2062	1
9	M10 NUT	STEEL Gr. St 8.8	6
10	CABLE GLAND	BRASS	1
11	M12 BOLT & NUT	STEEL Gr. St 8.8	4
	M12 PLAIN WASHER	STEEL Gr. St 8.8	8
	M12 SPRING WASHER	STEEL Gr. St 8.8	4
12	FLANGE	SLIP ON FLANGE 150#	1
13	GASKET	NEOPRENE	1
14	FLANGE	WELD NECK 150# (YARD SCOPE)	1

REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:
0	02-05-24	FIRST ISSUE	ARJUN V V	VINEETH	AKSHATHA	KIRAN

COCHIN SHIPYARD LTD
P.O. Bag - 1653, COCHIN - 682 015

OWNER : DCI

TRAILING SUCTION HOPPER DREDGER

TITLE : FITTING ARRANGMENT - IMPRESSED CURRENT CATHODIC PROTECTION (ICCP)

CSL YARD No.	SHIP 037
CLASS	LRS/IRS
APPROVED	KIRAN S RAJ
REVIEWED	AKSHATHA
CHECKED	VINEETH V R
DRAWN	ARJUN V V

SCALE : 1:40

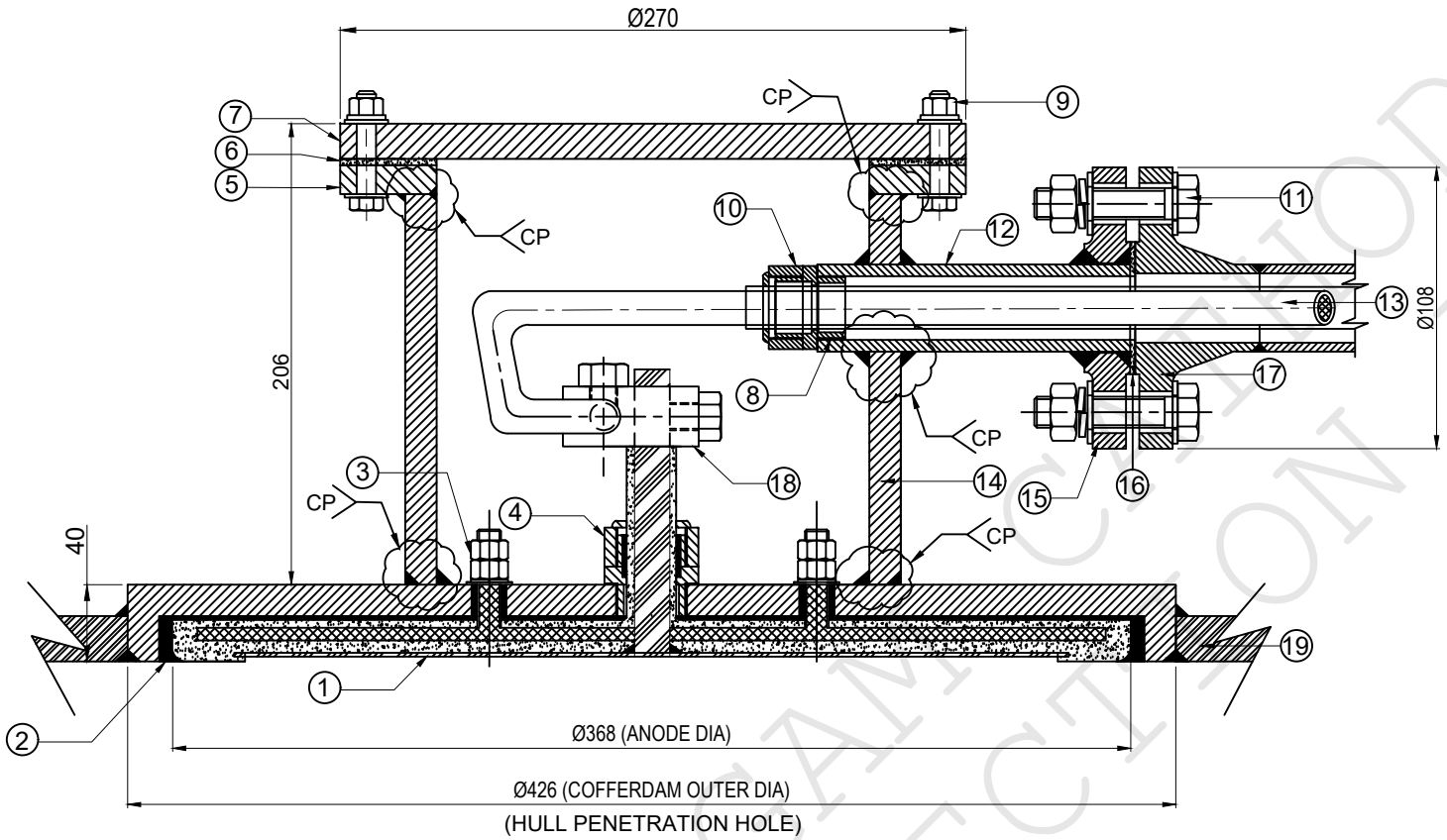
FORMAT : A1

CSL DWG. NO. 037-S5ZICP0001

REV:0

PAGE:04 OF 04

ANNEXURE



PART LIST FOR ANODE COFFERDAM ASSY			
S.NO	PART ITEM	MATERIAL	QTY REQD.
1	ANODE	MMO-Ti	1
2	FILLER	EPOXY	-
3	M10 NUT	SS304 / 316	8
	M10 PLATE WASHER		4
	M10 SPRING WASHER		4
4	ANODE GLAND	BRASS NICKEL PLATED	1
5	BOTTOM COVER	MS IS2062	1
6	GASKET	NEOPRENE	1
7	TOP COVER	MS IS2062	1
8	GLAND BUSH	NEOPRENE	1
9	M8 BOLT & NUT	STEEL Gr. St8.8	6
	M8 PLATE WASHER		12
	M8 SPRING WASHER		6
10	CABLE GLAND	BRASS NICKEL PLATED	1
11	M12 BOLT & NUT	STEEL Gr. St8.8	4
	M12 PLATE WASHER		8
	M12 SPRING WASHER		4
12	CABLE CONDUIT PIPE	1" Sch.80	1
13	TAIL CABLE- 1C X 16 SQ.MM.	STD (FIRM SCOPE)	10 Mtrs
14	COFFERDAM SHELL	MS IS2062	1
15	FLANGE-SLIP-ON 150#	ASME/ANSI B-16.5	1
16	GASKET	NEOPRENE	1
17	FLANGE-WELD NECK150#	ASME/ANSI B-16.5 (YARD SCOPE)	1
18	CONNECTING BAR	BRASS NICKEL PLATED	1
19	HULL	(YARD SCOPE)	-

Note :

1. Anode Cofferdam Weight : 42 Kgs.(approx.)
2. Dimensional Tolerances as per IS 2102-1:1993/ ISO 2768-1:1989 - Very Coarse.

3. CP - The Symbol Indicates Complete Penetration Weld or

Full Penetration Weld

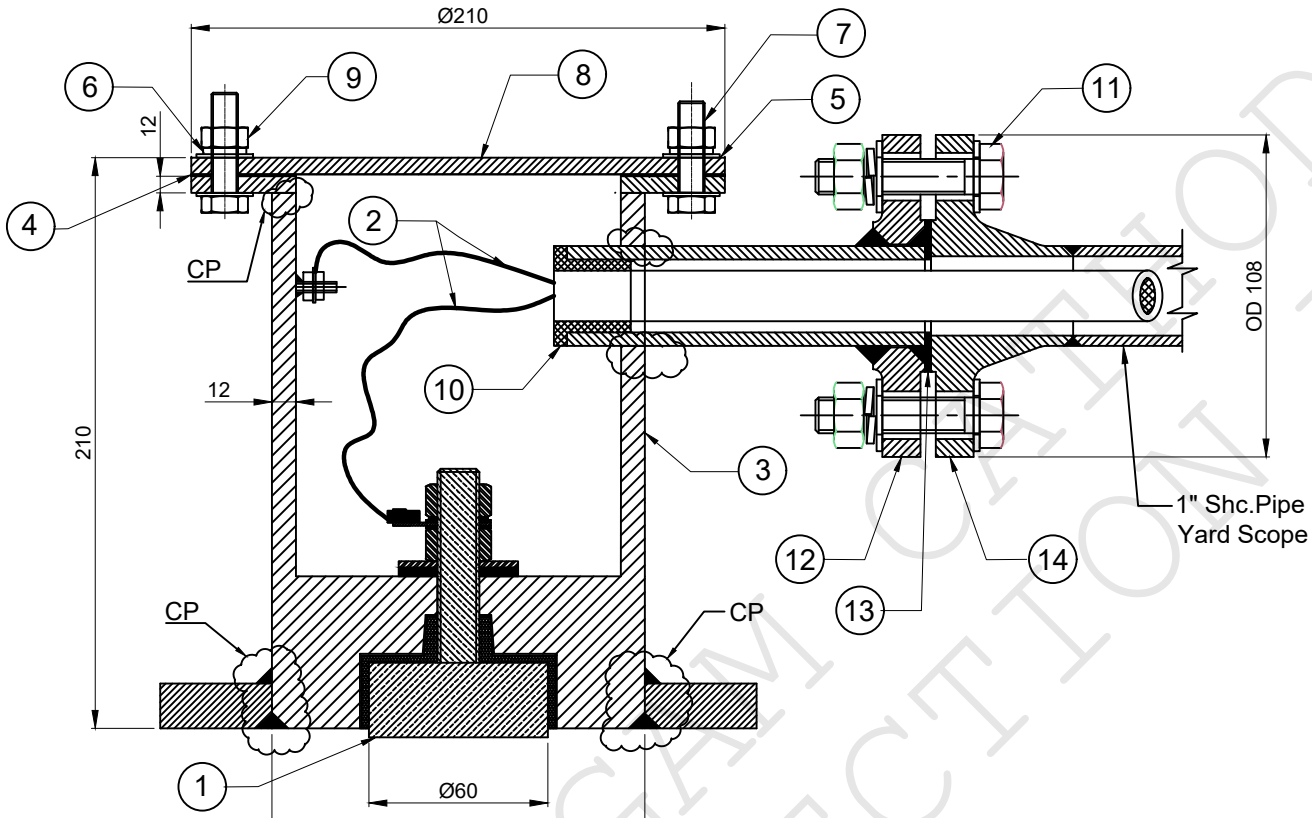
REV No.	DATE	BY	APP'D	DESCRIPTION
00	-	-	-	-

SARGAM CATHODIC PROTECTION LLP.
CHENNAI.

CLIENT: CSL

TITLE: 50A MMO-Ti, Disc Anode With Cofferdam Assembly (Wet Location)

ALL DIMENSION.	REV:	SIZE	DRAWN	DESIGN
mm	00	A4	RK	ATS
DATE. 04/07/2023		REVIEW. VB	APPROVED BY SA	
PROJECT. Beagle 12 Trailing Suction Hopper Dredger (Ship 037)				
DWG No. SCP-ICCP-00-03		SHEET 1 OF 1	SCALE. NTS	



PART LIST FOR ANODE ARRANGEMENT			
S.NO.	PARTS	MATERIAL	QTY REQD.
1	REFERENCE ELECTRODE	ZINC 99.9% PURE	1
2	TAIL CABLE 3C x 2.5 sq.mm	STD (FIRM SCOPE)	-
3	COFFERDAM	MS, IS 2062	1
4	PACKING	NEOPRENE GASKET	1
5	M10 PLATE WASHER	STEEL Gr. St 8.8	8
6	M10 SPRING WASHER	STEEL Gr. St8.8	4
7	BOLT M10x45mm	STEEL Gr. St 8.8	4
8	COFFERDAM LID	MS, IS 2062	1
9	M10 NUT	STEEL Gr. St 8.8	6
10	CABLE GLAND	BRASS	1
11	M12 BOLT & NUT	STEEL Gr. St 8.8	4
	M12 PLAIN WASHER	STEEL Gr. St 8.8	8
	M12 SPRING WASHER	STEEL Gr. St 8.8	4
12	FLANGE	SLIP ON FLANGE 150#	1
13	GASKET	NEOPRENE	1
14	FLANGE	WELD NECK 150# (YARD SCOPE)	1

Note :

1. Anode Cofferdam Weight : 25 Kgs.(approx.)
2. Dimensional Tolerances as per IS 2102-1:1993/ ISO 2768-1:1989 - Very Coarse.
3. CP - The Symbol Indicates Complete Penetration Weld or Full Penetration Weld

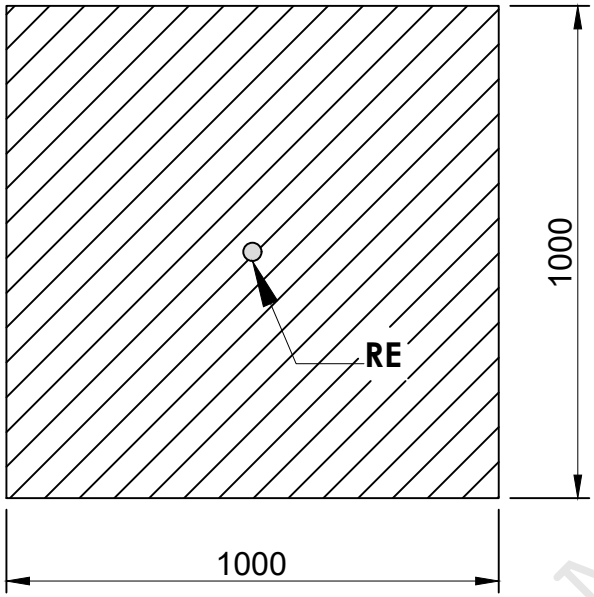
REV No.	DATE	BY	APP'D	DESCRIPTION
00	-	-	-	-

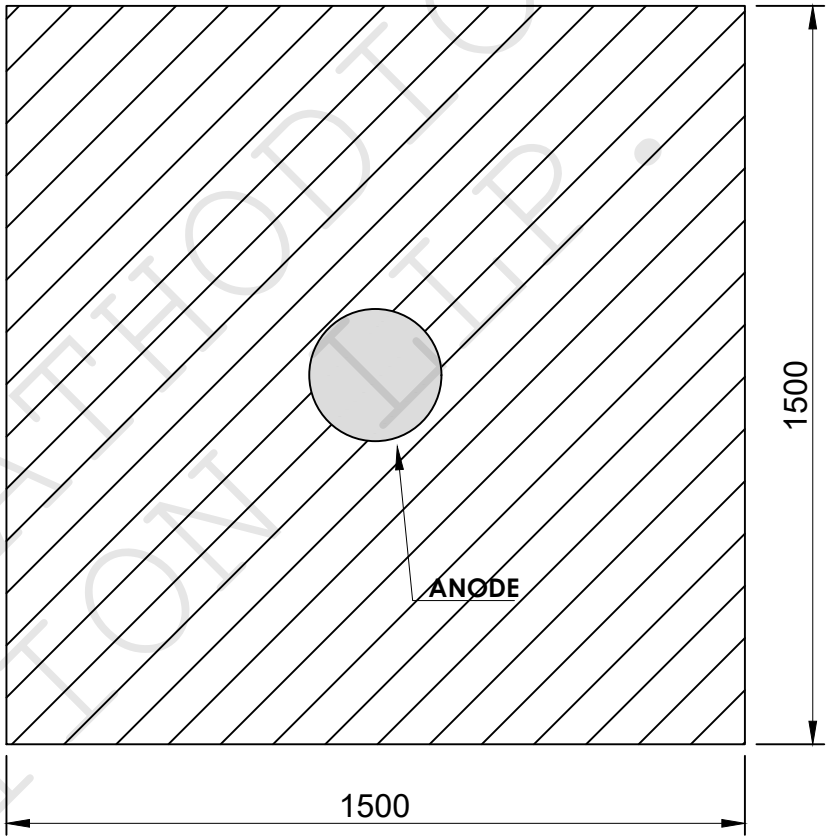
SARGAM CATHODIC PROTECTION LLP.
CHENNAI.

CLIENT: CSL

TITLE: 60D Zinc Reference Electrode With Cofferdam Assembly (Wet Location)

ALL DIMENSION.	REV:	SIZE	DRAWN	DESIGN
mm	00	A4	RK	ATS
DATE. 04/07/2023		REVIEW. VR	APPROVED BY SA	
PROJECT. Beagle 12 Trailing Suction Hopper Dredger (Ship 037)				
DWG No. SCP-ICCP-00-04		SHEET 1 OF 1	SCALE. NTS	





PROPERTIES OF HARDENER

Refractive Index	1.4 - 1.5
Water by KF	1% max.
Shear Strength	1.4 - 100 Kg/mm²

PROPERTIES OF CURED LAMINATE

MATERIAL USED	
Epoxy Resin LY556	10 Parts
Epoxy Hardener HY 951	1 Part
Glass Fibre Surface Mat	As required for even application.
Total Thickness	3 mm (approx)
PROPERTIES OF RESIN	
Viscosity at 25°C	3200-4200 mPas
Pot Life at 23°C	1.5 Hrs. min.

REV No.	DATE	BY	APP'D	DESCRIPTION
00	-	-	-	-

SARGAM CATHODIC PROTECTION LLP.
CHENNAI.

CLIENT: CSL

TITLE: DI-ELECTRIC SHIELDING FOR CIRCULAR ANODE AND RE

ALL DIMENSION.	REV:	SIZE	DRAWN	DESIGN
mm	00	A4	RK	ATS
DATE. 04/07/2023		REVIEW. VR	APPROVED BY SA	

PROJECT. Beagle 12 Trailing Suction Hopper Dredger (Ship 037)

DWG No. SCP-ICCP-00-06 | SHEET 1 OF 1 | SCALE. NTS