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/SAMSKIP/955/2025 Dtd 21-06-2025

ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS (SH.038 & SH.039)

JUNE - 2025

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कोचीन शिपयार्ड लिमिटेड / COCHIN SHIPYARD LIMITED

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

SB-OSD/SAMSKIP/955/2025 **21st June - 2025**

निविदा सूचना / TENDER NOTICE

संक्षिप्त विवरण / BRIEF DETAILS:

निविदा जांच संख्या और तारीख **Tender enquiry No. and date**	**SB-OSD/SAMSKIP/955/2025 Dtd 21-06-2025**
कार्य का नाम **Name of work**	**ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS (SH.038 & SH.039)**
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)**	**11th July – 2025 at 15.00 Hrs IST**
पूर्व बोली बैठक की तारीख **Date of Pre bid meeting**	**01st July – 2025 at 11.00 Hrs IST**
भाग I (तकनीकी–वाणिज्यिक) बोली खोलने की तिथि और समय **Date & time of opening of Part I (Techno – Commercial) Bid**	**11th July – 2025 at 15.30 Hrs IST**
संपर्क व्यक्ति **Contact Person**	***For Commercial queries:*** Mr. Adarsh S, AM (Outsourcing), Mob No: 87146 30926. ***For Technical queries:*** Mr. Muhammed Faizy C E, AGM (EOF), Mob. No: 9895705126.

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 मुहरबंद प्रतिस्पर्धी निविदाएं निविदा जांच के अनुलग्नक में उल्लिखित नियम और शर्तों के अनुसार होनी चाहिए।
   The Sealed competitive tenders 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 **01.07.2025** को सीएसएल के योजना सम्मेलन कक्ष में पूर्वाह्न **11.00** बजे से आयोजित की जाएगी। पूर्व निविदा बैठक में भाग लेने के इच्छुक ठेकेदारों को अपने पूर्व निविदा प्रश्नों (यदि कोई हो) को दिनांक **30.06.2025** तक सकारात्मक रूप से सूचित और अग्रेषित करना चाहिए।
   The pre-bid meeting will be held on **01.07.2025** at CSL from **11.00 Hrs** to discuss the detail scope of work and other tender conditions. The Firms / Contractors interested to participate in Pre-bid meeting should inform and forward their Pre-bid queries (if any) by **30.06.2025** positively.

4. पूर्व निविदा बैठक में भाग लेने के लिए सूचना और पूछताछ, यदि कोई हो, तो निम्नलिखित मेल आईडी ashtal.antony@cochinshipyard.in & adarsh.s@cochinshipyard.in पर 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: ashtal.antony@cochinshipyard.in & adarsh.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 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** 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 are to be password protected separately and password is 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/SAMSKIP/955/2025"** 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/SAMSKIP/955/2025"** to:

   (i) ashtal.antony@cochinshipyard.in
   (ii) adarsh.s@cochinshipyard.in
   (iii) rajeevkumar.s@cochinshipyard.in

प्रतिलिपि / Copy to:

(i) madhu.pk@cochinshipyard.in

7. बोलियां दिनांक 11 जुलाई – 2025 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 11th July - 2025** and Part I Techno-Commercial Bid will be opened at **15.30 Hrs** on the same day.

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

   Late tenders / tenders with conditions will be summarily rejected.

9. 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.

10. सीएसएल दिए गए पासवर्ड में किसी भी त्रुटि के लिए जिम्मेदार नहीं होगा। निर्धारित समय सीमा के भीतर सही पासवर्ड जमा न करने पर बोली अस्वीकृत कर दी जाएगी।

    CSL will not be responsible for any error in the password provided. Failure to submit the correct password within the stipulated timeframe will result in rejection of the bid.

11. 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.

12. 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.

13. 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,VII** और परिशिष्ट – A, B, C, D,E,F,G,H,I & J 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,VII & Appendix- A, B, C, D,E,F,G,H,I & J 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.**

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

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

iii. 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).

14. पूर्व अनुबंध अखंडता संधि / PRE CONTRACT INTEGRITY PACT

निविदा में भाग लेने वाले बोलीदाताओं को पूर्व अनुबंध अखंडता समझौते पर हस्ताक्षर करना होगा, यदि बोली 1 करोड़ रुपए से अधिक है ।

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

15. **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.

16. 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.

17. सीएसएल के पास पूरा ऑर्डर देने या ऑर्डर की मात्रा का कुछ हिस्सा देने या काम को दो या दो से अधिक फर्मों/उपठेकेदारों 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 फर्म(फर्मों) के प्रति कोई दायित्व नहीं निभाएगा, सीएसएल की कार्रवाई के आधार के बारे में प्रभावित फर्म(फर्मों) को सूचित करने का कोई दायित्व नहीं होगा। 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.

18. 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.

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

ANNEXURE I

जांच की नियम और शर्तें / TERMS & CONDITIONS OF ENQUIRY

ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS

1. कार्य का विवरण / DESCRIPTION OF WORK

1.1. This tender enquiry pertains to the awarding of contract for **ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS** 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)

1.1.3. Enquiry specification (Annexure III)

1.2. The scope of work is Electrical Outfit Structural Works, which include the installation of entire Electrical Cableways, Cable coamings, and all Equipment seats including structural works related to under water equipments like ICCP System, Speed log and Echo sounder of both vessels in accordance with the enclosed Specifications and drawings, delivery schedule, CSL - Terms and conditions in all respects.

1.3. *Bidders* are requested to study the scope of work before submitting their offer. Clarification, if any, required may be obtained from **AGM (EOF)** before quoting.

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

The Bidder should qualify the following PQ Criteria:

2.1. **GENERAL**

2.1.1. Bidder shall be a single firm.

2.1.2. 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. The declaration of eligibility at Annexure VII shall be submitted in this regard.

2.1.3. All the qualifying documents indicated in the tender shall be strictly in the name of bidding firm. Qualifying documents submitted in the name of any other than bidding firm will not be considered for bidding firm's qualification.

2.2. TECHNICAL EXPERIENCE

Technical pre-qualification requirement is given below:

2.2.1. Technical requirement for cabling (whole ship)

a) The sub-contractor should have prior experience in the execution of electrical structural works in ships, corresponding to a Work Order value of minimum Rs.17,00,000/- (INR Seventeen 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.

b) The Sub-Contractor should deploy a minimum of 40 workmen. An undertaking which validates the above requirement has to be submitted by sub-contractor.

2.2.2. Documents to prove credentials of the firm to undertake the subject work. eg: Details of available equipment's & facilities, Skilled / qualified Manpower, Work experience of similar job, etc. The firm has to submit the documents which validate the above mentioned Clause 2.2.1 requirements. Work order for material supply will not be considered.

2.2.3. The similar works experience of parent company / subsidiary / Sister Company of the Bidder shall not be considered.

2.2.4. CSL reserves the right to demand hardcopies of any of the above documents and any other related documents, if required. Bidders shall comply with the same.

2.3. FINANCIAL CAPABILITY

2.3.1. The bidder shall have an average annual financial turnover of **Rs. 67 Lakhs** during the last three years ending on 31st March 2024.

2.3.2. The Bidder shall enclose with its Proposal, certificate issued by Chartered Accountant with their seal and signature, stating its turnover during the past three years. Certificate shall be as per the format placed at Appendix – B.

2.4. **OTHER CONDITIONS**

2.4.1. The bidding firm shall have key personnel having single point of contact with contract details. He/she shall have adequate and specialized experience capable of discharging their responsibilities.

2.4.2. The bidding firm should have valid PAN and GSTIN and details of PAN / GST Registration Number and current valid Tax Clearance Certificate shall be submitted along with the offer.

2.4.3. Bidder should submit duly signed compliance matrix placed at Appendix – A for technical deviation/queries if any along with the offer.

2.4.4. If required, the documents / certificates submitted by bidder will be verified with source directly by CSL. Misleading or false representations in the forms, statements and attachments submitted in proof of eligibility requirements will result in summarily rejection / disqualification of the submitted offer at any point of time whatever may be the status of the process. Also, the firm will not be considered for further tendering for a period of three (3) years henceforth.

2.4.5. RIGHT TO VERIFICATION: CSL has the right to verify the authenticity of bidder/ documents submitted by them and/or inspect the facilities if felt necessary. Based on this CSL reserves the right to accept and reject any and all bids, which in its opinion, appears to be most advantageous to CSL.

3. प्रस्ताव की वैधता / VALIDITY OF OFFER

3.1. 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.

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

4.1. Contract will be concluded with the Bidder qualifying to techno-Commercial conditions and emerging as L1 / bidder willing to match with L1 rate.

4.2. Considering the limited time period available for project completion, CSL reserves the right to split order at L1 rate as per clause 4.2.1 below;

4.2.1. ***If one bidder is willing to match L1 rate*:** The scope of work corresponding to Electrical Outfit Structural Works in Sea Shuttle Container Vessel SH.038 is assured for L1 bidder. Electrical Outfit Structural Works in other vessel SH.039 will be awarded to the bidder who is willing to match the L1 rate. Selection of this bidder will be in the sequence of ascending order of lowest rate quoted (L2, L3, L4….).

4.3. If no bidder is willing to match the L1 rate then 100% work will be awarded to L1.

4.4. Once work order is placed successful bidder should be able to start the works immediately.

4.5. CSL reserves the right to cancel the tender at any stage without assigning any reasons whatsoever based on CSL requirement. The decision of CSL regarding the same shall be final and conclusive.

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

5.1. All Works corresponding to each vessel should be completed approximately within 12 months for each vessel from the date of working area readiness from CSL.

5.2. **Tentative Start Date**

SH.038 – Mid July 2025

SH.039 – Early November 2025

5.3. The contractor in turn shall submit their detailed scheduled of completion of the work, in consultation with 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.

5.4. 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.

5.5. 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.

6. कार्य प्रक्रिया / WORK PROCEDURE

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

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

6.3. Contractor is to carry out the work as per the specifications / drawings supplied, and to the satisfaction of CSL.

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

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

7. अनुबंध की वैधता / VALIDITY OF CONTRACT

7.1. 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. निरीक्षण / INSPECTION

8.1. The complete work is 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 Shipyard.

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

9.1. **Technical Bid (Part –I)**

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

9.1.2. The technical bid as specified in the scope of work (Annexure III) duly signed shall be submitted along with the offer

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

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

9.1.2.3. Copy of un-priced bid format of works at Annexure V.

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

9.1.2.5. The declaration of eligibility at Annexure VII

9.1.2.6. All other documents relevant to this tender.

9.1.3. The non-submission of duly filled commercial checklist will lead to the rejection of the bids.

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

9.2.1. The bid shall be comprehensive of the nature of for **ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS (SH.038 & SH.039)** shall be inclusive for all the applicable charges envisaged under the scope of the contractor as specified in the technical specification Annexure III and other terms & conditions of this tender.

9.2.2. The rates quoted by the contractor are deemed to include for all costs and expanse, taxes, duties except GST in connection with the transportation under contract. No additional payment whatsoever shall be paid by CSL at any stage of this work. The payment of GST shall be paid as applicable.

9.2.3. 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 rate quoted will be considered as correct and the amount will be calculated accordingly. Conditional rebates & discounts, incomplete/ ambiguous offer will be rejected.

9.2.4. The price bid shall be all inclusive of scope of contractor on lump sum 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.

9.2.5. 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.

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

9.2.7. Currency: The price bids shall be prepared in Indian National Rupees (INR) for all bidders. Any deviation in this regard will not be acceptable.

9.2.8. As per tender condition, the price bid which were not opened will not be returned back at any reason.

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

10. <u>असामान्य रूप से कम उद्धृत दरें /ABNORMALLY LOW QUOTED RATES:</u>

10.1. 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.

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 will be released in 7 stages, for work completion stages and on certification by the Officer-in-charge based unit rates and actual work done as noted below:

Stage -1: Payment of 10% of total work order value after completion of 15% of works detailed in Annexure V.

Stage -2: Next 10% of total work order value after completion of 30% of works detailed in Annexure V.

Stage -3: Next 15% of total work order value after completion of 45% of works detailed in Annexure V

Stage -4: Next 15% of total work order value after completion of 60% of works detailed in Annexure V

Stage -5: Next 15% of total work order value after completion of 75% of works detailed in Annexure V

Stage -6: Next 15% of total work order value after completion of 90% of works detailed in Annexure V

Stage -7: Next 20% of total work order value after completion of 100% of works

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

12.3. 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

12.4. The same can also be accessed via Cochin Shipyard Website (https://cochinshipyard.in) as below;

12.5. Path: Cochin Shipyard Website --> Related Links --> Vendor Payment Info

12.6. 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.

12.7. 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.

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

12.9. 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. बयाना राशि /EARNEST MONEY DEPOSIT (EMD)

13.1. Bidders shall furnish Earnest Money Deposit (EMD) equivalent to **Rs. 1 Lakhs** by way of RTGS/NEFT to the following account of Cochin Shipyard Ltd, Kochi

Bank	State Bank of India
IFSC	SBIN0004062
Account No.	10319928321 of Cochin Shipyard Ltd.

13.2. The bidder shall submit the proof of such transfer along with the submission of technical bid.

13.3. This shall be returned after finalization of contract and upon receipt of Security deposit in accordance with clause 14 below, with respect to successful bidders; With respect to unsuccessful bidders, the same shall be returned within 15 days of issuance of PO/Contract.

13.4. Bidders belonging to Micro and Small Enterprises (MSE's) category are exempt from furnishing EMD subject to the bidders producing valid UDYAM Certificate and shall be duly verified by CSL. Bidders who fail to submit UDYAM Certificate along with the Techno-Commercial Offer shall not be considered eligible for EMD exemption.

13.5. In case the offer validity is extended on mutual consensus, the validity of EMD shall be mutually extended, EMD may be forfeited in the following cases:

a) Bidder withdraws, amends, impairs or derogates from the tender, agreed conditions in any respect within the period of validity of his offer.

b) Non-acceptance of order.

14. प्रतिभूति जमा / SECURITY DEPOSIT

14.1. 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/ Scheduled Indian Bank, valid till the satisfactory completion of the entire work. The Security Deposit will be released after satisfactory completion of the contract. The Security Deposit will not bear any interest.

15. निष्पादन गारंटी / PERFORMANCE GUARANTEE

15.1. 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 delivery of vessel. Any damage or failure due to defects in execution of the work for a period of 12 months from the date of delivery of vessel, 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.

15.2. 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.

15.3. Towards this, a performance guarantee equivalent to 5% of the total value of the contract to be furnished by the contractor within 15 days of receipt of work order, by way of a bank guarantee (in approved proforma of CSL) from a nationalized bank / Scheduled Indian Bank valid till the expiry of the guarantee period. (Payment will be released only on submission of either PBG or SD)

15.4. PBG will be returned to the Contractor on completion of 01 year after successful delivery of vessel on certification of nil liability to CSL by Officer-in charge.

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

16. परिसमापन क्षतिपूर्ति / LIQUIDATED DAMAGES

16.1. The progress of work will be monitored against the mutually agreed detailed schedule referred in clause. Liquidated damages for delays in execution of the work envisaged as per this order on account of the contractor, for any reason other than force majeure conditions, will be recovered at the rate of ½% (half percent) per week or part of the week of the total basic price of delayed work 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 him and the Security Deposit furnished by him is liable to be forfeited either in whole or in part.

17.2. In addition to above tender holiday will be imposed against the firm as per discretion of CSL.

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 him on the work. In this regard, he 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 Execution 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 he employs contract labour for executing the works.

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 period 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. 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

20.2. 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 Ernakulam, 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 विनियम /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 ESI 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 Compliance Certificate by means of uploading relevant documents such as Electronic Challan cum Receipt, Challans etc. as having remitted the contributions towards EPF/ESI in respect of their workers, in the goggle form provided for the purpose, every month so as to reach Welfare Section on or before 22nd of every month. Google form link: https://forms.gle/3GidCgsP4jHhXDJt9

22.5. 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.

22.6. 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.

22.7. 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.

22.8. 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.

22.9. 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 shall 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.

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

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

22.12. 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.)

22.13. 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.

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

23. आईएमएस दिशानिर्देश /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 of 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.

23.3. 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.

23.4. 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.

23.5. It is the sole responsibility of the contractor to assure that any sub-contractor/s 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.

23.6. 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.

23.7. 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.

23.8. 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.

23.9. Any clarification related to IMS requirements of the yard, may be obtained by the contractor from the DGM (In charge of work execution) or the authorized representative of the contract, prior to the commencement of work.

24. बिजली नियम और विनियमन / 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 between 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.

25.4. SECRECY, Titles: Maps, layouts and photographs of the unit/plant including its surrounding regions showing vital installation for national security of CSL country shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the CSL and upon execution of confidentiality agreements satisfactory to the CSL with such third parties prior to disclosure.

26. HEALTH, SAFETY & ENVIRONMENT CONTRACT GUIDELINES FOR OEMS /TURNKEY JOBS / SUB CONTRACT WORKS INSIDE CSL INTRODUCTION

26.1. CSL is the largest public sector shipyard in India in terms of dock capacity, and caters to clients engaged in the defence sector in India and clients engaged in the commercial sector worldwide.

26.2. CSL is committed to provide safe and healthy work environment for the prevention of work- related injury and ill health by following the best practices in safety. CSL is certified Occupational Health and Safety management System and Environmental Management system under ISO standards/international standard.

26.3. Many of the works of CSL at various sites are executed by the sub-contractors. During these works, sub-contractors personnel are likely to be exposed to different types of hazards. Similarly unsafe acts of contractor's personnel may create hazards for CSL staff or workmen of other contractors working at the site. Such unsafe acts may also pose danger to the existing installations and even to members of public.

26.4. CSL ensures that the requirements of its HSE Management System are convened by contractors and their workers. This guide is prepared to facilitate safe working during execution of contract works. The General guide lines and HSE requirements are given below for compliance in CSL.

GENERAL GUIDELINES

26.5. OEMs/Turnkey jobs /Contractors are selected to work inside the CSL based on their track record.

26.6. Along with the contract order/Registration, a copy of the HSE Safety Handbook (CSL/ QMS/S&F/SOP 02 – Refer CSL Website) of CSL is given to all contractors. The details of all HSE requirements to be followed in CSL for the various types of work are detailed in the hand book. The OEMs/Turnkey jobs /Contractors shall go through all

the details and strictly follow the relevant HSE guidelines for their work. In case of any doubt the same shall be clarified from Chief Safety Officer (CSO). Being ignorant of these HSE requirements will not be treated as an excuse for any HSE violations during course of work.

26.7. OEMs/Turnkey jobs /Contractors workmen are given a multilingual HSE induction and Emergency Response training. The individual passes for contractors and their workers are issued only after successful completion of this training. The passes are revalidated every year after successful completion of refresher training. Training requirements of other roles of the subcontractor's staff shall be complied as per the CSL requirements time to time.

26.8. Before start of any work, the CSL officer in charge explains the scope of work and the safety precautions, hazards, PPE usage as per PPE matrix of CSL, Work Instructions, SOPs, Emergency responses to the contractor and his workers. Only trained worker with necessary skills are allowed to work as per the requirement. Necessary PPEs for the work are to be arranged by the contractor.

26.9. Workmen shall have Cotton coverall with identifiable logo on the dress. Supervisors, fire watch man if required, safety staff and other workforce shall be deployed as per CSL guide lines.

26.10. The site work supervisor of the OEMs/Turnkey jobs /Contractors shall be ensured that works are being carried out by CSL HSE requirements on daily basis and till the completion of works. The safe start and safe end requirements shall be verified by the site work supervisor on daily basis.

26.11. OEMs/Turnkey jobs /Contractors HSE performance will be evaluated on HSE matters as per the CSL policies time to time.

26.12. During the course of work if any HSE violation is noticed the same is dealt as per the Rewards and Reprimand (R&R) Policy of CSL.

26.13. HSE Plan to be submitted to S&F Dept while commencing the work in CSL and shall be resubmitted in every year.

HSE REQUIREMENTS

26.14. The OEMs/Turnkey jobs /Contractors shall take all safety precautions during the execution of awarded work and shall maintain and leave the site safe at all times. At the end of each working day and at all times when the work is temporarily suspended, he shall ensure that all materials, equipment and facilities will not, cause damage to existing property, personal injury or interfere with the other works of the project or

Station.

26.15. The OEMs/Turnkey jobs /Contractors shall provide and maintain all type of lights, guards, fencing, warning signs, caution boards and other safety measures for vigilance as and where necessary or as required by the CSL officer-in-charge or Safety staff. The caution boards shall also have appropriate symbols.

26.16. Where Permit to work (PTW) is required, the work has not started without obtaining the necessary permit and the PTW requirements are followed strictly throughout the work.

26.17. For Project specific or non-routine work on the existing installations, separate Job Safety Assessment (JSA) is to be prepared by the contractor, cleared by the Dept in charge and approval obtained from CSO before start of work. The work shall be executed through Notification Control Procedure (NCS).

26.18. A separate HSE plan will be required for the new projects in the yard or any turnkey projects. It shall be in line with CSL HSE requirements and same shall be routed through respective S&F dept and approved by respective HOD.

26.19. OEMs/Turnkey jobs /Contractors shall hold toolbox talks with his workers on daily basis to convey matters regarding the Safety aspects of the work.

26.20. The OEMs/Turnkey jobs /Contractors shall plan his operations so as to avoid interference with other Departmental works and other Sub-Contractors at the site. In case of any interference, requires, coordination shall be sought by the contractor from the Department for safe and smooth execution of work. This shall be done through CSL executing officer.

26.21. The OEMs/Turnkey jobs /Contractors shall at all times keep their work spot, site office and surroundings clean and tidy from rubbish, scrap, surplus materials and unwanted tools and equipment. Welding cables, hoses and electrical cables shall be so routed as to allow safe way to all concerned.

26.22. All waste generated in course of the work shall be segregated as per the yard requirements and shall be disposed at the respective collection pallets / points of the work areas as the case may be. Any kind of pollution made by the subcontractor shall attract the reprimand proceedings.

26.23. All necessary precautions shall be taken to prevent outbreak of fires at the work site. Adequate provisions shall be made to prevent the possibility of fires and ensure the availability of fire extinguishers at site.

26.24. The OEMs/Turnkey jobs /Contractors shall be held responsible for non-compliance of any of the safety measures and delays, implications, injuries, fatalities and

compensation arising out of such situations of incidents including statutory obligations.

27. सामान्य शर्तें / GENERAL CONDITIONS

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

27.2. 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.

27.3. 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.

27.4. Damages caused to the Shipyard 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.

27.5. Cochin Shipyard Limited 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 Cochin Shipyard Limited on this account.

27.6. 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 Cochin Shipyard 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.

27.7. 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.

27.8. It is also to be understood by the Contractor that Cochin Shipyard Limited 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.

27.9. The Contractor shall also be governed by the General Conditions of Contract of CSL,

General Safety Rules and other relevant labour laws.

27.10. 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.

27.11. 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.

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

27.13. 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.

27.14. 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.

27.15. 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.

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

27.17. 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.

28. अधिलेखन और सुधार / OVERWRITING & CORRECTIONS

28.1. 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.)

28.2. 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.

28.3. 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 / Deputy General Manager
आउटसोर्सिंग विभाग / Outsourcing Department

ANNEXURE-II

कोचीन शिपयार्ड लिमिटेड / COCHIN SHIPYARD LIMITED
कोच्ची / KOCHI-682015
आउटसोर्सिंग विभाग / OUTSOURCING DEPARTMENT

सामान्य शर्तें / GENERAL CONDITIONS

1. 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.
2. 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.
3. Contractor shall carry out the complete work in accordance with Shipyard's approved drawings. Any minor modifications from drawing or any other work or supply of material, which is not specified hereunder, but is considered incidental and essential for the successful completion of the job shall be carried out by the Contractor without any additional charge.
4. 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
5. 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.
6. 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.
7. Any particulars/literature/information/certificates required by the Shipyard in connection with the work is to be forwarded free of cost.
8. All correspondence with the Shipyard to be in English language. All documents and plans to be in English language and in metric units.

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

ANNEXURE III

कार्य क्षेत्र / SCOPE OF WORK

ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS (SH.038 & SH.039)

1. INTRODUCTION

Cochin Shipyard Ltd (Yard) is constructing 02 numbers of Sea shuttle Short Sea Zero Emission Container vessels with yard numbers SH 038 & SH039 for M/s SAMSKIP Designer – Naval Dynamics AS. The project is one of the world's first zero emission feeder container vessel that will be powered using hydrogen fuel cells ultimately, with green hydrogen. Yard intends to outsource the Electrical Outfit Structural Works of both Sea shuttle Short Sea Zero Emission Container vessels as detailed below to competent subcontractors.

2. VESSEL DETAILS

Main Particulars of vessels
No. of vessel: Two

Length overall	138.00 m
Length b.p.p	132.00 m
Breadth mld	23.00 m
Depth mld	10.20 m
Draft Summer	5.30 m
Dead weight at max draft	5900 ton
Gross Tonnage (approx)	8075 ton
Service Speed over ground	13.00 knots

3. CLASSIFICATION

a. **Type of vessel**: Sea shuttle short sea zero emission container vessel.

b. The vessel shall be designed and constructed in accordance with the regulations of **DNV** class.

c. **Ship type:** Sea shuttle short sea zero emission container vessels.

d. **Class notations**: The vessel, including its hull, machinery and equipment, shall be built under DNV class with notation.

e. +1A, Container Ship, Hatch coverless, Battery (Safety), E0, FC (Power), RP (2,50%), Naut (AW), LCS, Clean, ER(SCR), Recyclable , BWM, DG(P), RSCS+, BIS, R0."

f. **Registry**: The vessel shall be registered under Norwegian Flag (NIS)

.

4. SCOPE OF WORK

The work shall be carried out based on the contract specification, general arrangement drawing, CSL mentioned standards design drawings. The scope of contractor involves Installation of Cable ways & Electrical Equipment Seats as noted below:

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

b) Installation of seats for entire Electrical equipments/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.

c) 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.

d) CSL shall supply the required number of pads for cable trays & fitting seats and contractor has to fit the same while welding trays/ equipments to tanks & bulkheads/deck (exposed to weather) as per installation drawings.

e) Welding of earth bolts where ever required is under the scope of the sub contractor.

f) The free ends of all angle bar or flat bar used for cable tray supports to be rounded or canted and brake sharp edges.

g) Customization of cable rack types A, B, C, D, E & F from "G" type (2.5 meter length) is under scope of subcontractor. Cable trays of 2.5 Meter length with different widths will be provided by CSL and for smaller lengths (A, B, C, D, E & F) the contractor has to cut and use from 2.5 Meter length cable tray.

h) The contractor will be responsible for one time safe removal of the bolted cable trays/saddles and refitting it back to original position for blasting/painting of blocks.

i) Special Earthing/ Brazing required for MF-HF antenna is in the scope of subcontractor.

j) Hot works related to under water equipment's like ICCP, Speed Log & Echo Sounder is contractors scope (refer Appendix – I & J). 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 seat is to be carried out by qualified welders with WPS 264 or WPS recommended by CSL.

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

l) Welding shall be carried out only by qualified welders to CSL standard welding procedure. Mainly WPS 264 certified welders to be arranged by contractor for welding of underwater equipment seats.

m) Owner 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.

n) 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.

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

p) 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.

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

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

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

t) Minor staging up to 3m 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.

u) Total estimated quantity of items per vessel is indicated in the Price Format. Since ship's design modeling works are in progress, the quantity of items indicated is approximate only. Hence upward or downward variation in the quantity shall be anticipated. The payment shall be made on pro-rata basis.

5. NOTES

a) Details for the execution of works are mentioned in the drawings issued by. CSL Design Department as per Appendix D.

b) Re-works on the installation have to be expected in considering the outfitting of items, and the changes has to be carried out as per the site conditions and drawings issued by design department from time to time.

c) Reworks up to 3% of total work order value shall be under contractor's scope. For re-works more than 3% 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.

6. OTHER RESPONSIBILITIES OF THE OUTSOURCED FIRM FOR ALL CATEGORIES OF WORKS

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 standards provided.

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

d) Qualified Manpower, equipments, testing tools with valid certification, tools including winches for cabling through pipes 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 lights/DBs etc. shall be arranged by Yard based on availability.

h) Mobilizing own equipments, 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.

7. METHODOLOGY OF WORKING

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

b) The subcontractor shall deploy/nominate a person who will be in charge of the work for the entire period of project execution. He 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 yard personnel, structural contractors and Piping/Painting subcontractors 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 Yard 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, 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) 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

everyday all the waste, scrap, debris etc. generated by his workmen while working on board the ship and other locations and deposit the same suitably at specified location at his cost to the complete satisfaction of Yard. In case of any failure on his part to comply with the requirement, Yard will arrange the required cleaning entirely at the contractor's cost.

j) The firm / 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.

k) Contractor / firm are required to work round the clock / Sundays/ holidays as per the requirement of concerned department in order to complete the work in time.

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

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

8. SCOPE OF YARD (CSL)

a) The design & supply of materials for Electrical Installation for the mentioned scope of work.

b) Estimated quantities of welding consumables, grinding and cutting wheels.

c) Estimated quantities of paints, thinner and primer.

d) Power supply, Water, compressed air (at available pressure) and cutting gases at centralized points.

e) Services of CSL cranes and forklifts will be provided subject to availability.

f) Required space for fabrication & working inside the Yard (as on available area).

g) Power and water supply to office space / container / room, at free of cost.

h) Staging above 3m height.

i) Necessary items like fire cloth, polythene/silpaulin sheets, Bubble sheets etc required for protection of equipments.

j) Fabrication of Cable tray supports, pads, cable coamings and Equipment seats are under CSL scope.

9. 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 the execution 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 / Deputy General Manager
आउटसोर्सिंग विभाग / Outsourcing Department

ANNEXURE- IV

तकनीकी वाणिज्यिक जांच सूची / TECHNO COMMERCIAL CHECK LIST

(To be submitted by the bidder)

TENDER NO. SB-OSD/SAMSKIP/955/2025 Dtd: 21-06-2025

(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 & two price bids are submitted in separate PDFs?	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 with offer	Submitted/Not submitted	
5	Submission of MSME and NSIC registration document with offer	Submitted/Not submitted	
a	Specify the current position of the firm	MSME/MSE/Startup	
6	Offer Validity (date)	90days - Agreed as per tender/Do not agree	
7	Completion period as mentioned in the tender enquiry is acceptable	Yes/ No	
8	Taxes & Duties	Specified/included in Price	
9	Payment terms - confirm		
a	Stage Payment	Agreed as per tender/Do not agree	
b	Any others (Specify details)		

10	Price shall remain firm and fixed and No Escalation in prices after awarding of contract	Agreed as per tender/Do not agree	
11	Security Deposit & Performance Guarantee Clause	Agreed as per tender/Do not agree	
12	Termination of contract/risk purchase as per relevant clause in the terms & conditions of tender enquiry is acceptable	Yes / No	
13	Force Majeure	Agreed as per tender/Do not agree	
14	Liquidated damages and cancellation of contract	Agreed as per tender/Do not agree	
15	Arbitration & Jurisdiction clauses	Agreed as per tender/Do not agree	
16	Confirm all other terms and conditions of our enquiry are acceptable.	Confirmed/Not confirmed	
17	Confirm, un-priced price bid (price bid without price) is submitted with Part – I bid	Confirmed/Not confirmed	
18	Mode of submission of tender	Direct / Email	
19	Fully aware about the safety, general rules, regulations, standards, validity of offers and price, entry pass eligibilities.	Yes / No	
20	Is your firm registered under TReDS	Yes/No	
21	Is your firm registered as vendor in CSL	Yes/No	
22	Annual turnover requirement, during last 3 years, ending 31st March of the previous financial year	Agreed as per tender/Do not agree	
23	Do your firm have valid registration under statutory schemes such as ESI / EPF	Yes/No	
24	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/SAMSKIP/955/2025 Dtd : 21-06-2025

ELECTRICAL OUTFIT STRUCTURAL WORKS IN SEA SHUTTLE CONTAINER VESSELS (SH.038 & SH.039)

Sl. No.	Particulars	Type	Approximate Quantity (No's)/Vessel. (A)	Unit price (INR) (B)	Total Amount (C)=(A)*(B) in INR
1	Cable Tray/Hanger	ZSA/ZSB/ZSC/10/15/20/30	415		
2		ZSA/ZSB/ZSC/40/50	475		
3		ZSA/ZSB/ZSC/60	75		
4		ZSD/ZSE/ZSF/ZSG/10/15/20/30	135		
5		ZSD/ZSE/ZSF/ZSG/40/50	90		
6		SZS 10/15/20/30	1125		
7		SZS 40/50/60	1450		
8	Flat Bar	FB2-070/200/330H	2496		
9		FB5-070/200/330H	714		
10		FB4 - 070/200/330H	750		
11		SFG2-070/200/330H	4080		
12		SFG5-070/200/330H	1509		

13	Cable Coaming	EC/DC/ECA/DCA-1610/2110/2030	81		
14		EC/DC/ECA/DCA-3615/3545/3610/3515	120		
15		EC/DC/ECA/DCA-4615/3015/4020/4030/5020/5040/4040/4530/3020/4620/3620/4730	175		
16		EC/DC/ECA/DCA-6042/6624/5530/6042/6340/6624/5630	166		
17		EC/DC/DCA/ECA-50A/100A	144		
18	Gland with Pipe	G20-100/G25-100	30		
19	Goose Neck	40/80/100 NB	70		
20	Equipment Seat	Machinery Area (Below Main Deck), FWD area, Main Deck Exposed Area and Cargo Hold Area.(Kg)	15000 Kg		
21	Lump sum rate for Structural works related to underwater equipment - Speed Log, Echo Sounder and ICCP system.				
22	**SUB TOTAL AMOUNT FOR ONE VESSEL (SUM OF SL.No. 1 *to* SL.No. 21)**				
23	**GST …….% HSN CODE…….**				
24	**TOTAL AMOUNT FOR ONE VESSEL (SUM OF SL.No. 22 + SL.No. 23)**				

25	**GRAND AMOUNT FOR TWO VESSEL (2 * SL.No. 24)**	

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

NOTE:

A. L1 will be determined based on Sub total amount SL. No. (22) Excluding GST.
B. GST as per the prevailing rate will be paid.
C. L1 declaration will be based on the price bid verification by CSL finance dept as per the calculation specified.
D. 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.
E. Unit quoted shall be inclusive of labor costs, handling charge, Equipment's, Tools & tackles, consumable charges and any other cost included for the satisfactory completion of all works as specified in the scope of work.
F. Quantity mentioned in the price format is only indicative. Downward or upward variation of quantity shall be anticipated. Payment will be made as per the actual quantity installed against each type of item.

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 SHIPYARD 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 and other corrupt practices and the PRINCIPAL will commit to prevent corruption, in any form, by its officials by following transparent procedures.

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

1. 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.

1.3 The officials of the PRINCIPAL will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

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.

2. 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:-

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.

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.

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.

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 in the bid and the payments have to be in Indian Rupees only.

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.

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.

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.

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

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.

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

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

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.

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.

3. Previous Transgression

3.1 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.

3.2 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.

4. **Earnest Money (Security Deposit)**

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

(i) Bank Draft of 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).

4.2 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.

4.3 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.

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

5 Sanctions for Violations

5.1 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 encash 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) 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 middleman 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.

5.1 The PRINCIPAL will be entitled to take all or any of the actions mentioned at para 6.1(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.

5.2 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.

6 Fall Clause

6.1 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.

7 Independent Monitor

7.1 The PRINCIPAL has appointed Independent Monitor (hereinafter referred to as Monitor) for this Pact in consultation with the Central Vigilance Commission.

(1) Dr. Rajan S Katoch, IAS (Retd) A-91,
Alkapuri, Bhopal (MP) - 462022.
Mobile: 8800919222
Email: rkatoch@nic.in

(2) Dr. Vinod Bihari Mathur, IFoS (Retd.)
D302, Arborea Luxury Homes,
Tarla Nagal, Near Doon Helidrome,
Dehradun, Uttarakhand - 248001
Mobile: 9412054648
Email: vbm.ddn@gmail.com

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

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

7.4 Both the parties accept that the Monitor has the right to access all the documents relating to the project/procurement, including minutes of meetings.

7.5 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.

7.6 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.

7.7 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.

7.8 The Monitors 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.

8 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.

9 Law and Place of Jurisdiction

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

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

10 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.

11 Validity

11.1 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.

11.2 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 **Cochin Shipyard Limited** **(Office Seal)**	**For & on behalf of BIDDER** **(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.

ANNEXURE-VII

DECLARATION

I hereby declare that the details furnished in this tender proposal are true and correct to the best of my knowledge and belief. In case any of the information is found to be false or untrue or misleading or misrepresenting, I am aware that I will be held liable for it and CSL is free to take any legal / commercial action not limited to barring / blacklisting.

We hereby declare that we are not under a declaration of ineligibility / blacklisting /debarring/ tender holiday from doing business issued by Govt. of India / State govt. / Public Sector Undertakings etc.

Yours faithfully,

_____

(Signature & Seal of Authorised Signatory)

APPENDIX- A

COMPLIANCE MATRIX

Clause No.	Compliance/ Deviation

Notes:

1. If offer is not fully conforming to the requirements given in any clause of this specification, the deviation shall be stated in detail against the particular clause in the Compliance matrix.

APPENDIX - B

FORMAT FOR FINANCIAL CAPABILITY

Sl. No.	Last three Financial Year	Annual Turnover
1	Year 2021-22	
2	Year 2022-23	
3	Year 2023-24	

To be signed by the Authorized Signatory of the Applicant with Name, Designation, seal and date.

Certificate from Chartered Accountant:

This is to certify that _____ (name of the Applicant) has received the payments shown above against the respective years and that the net worth is as computed.

Name of the Authorized Signatory representing Auditing firm:
Designation:
Name of firm (Chartered Accountant):

Signature of the Authorized Signatory:

Seal of Audit firm

APPENDIX - C

UNDERTAKING

I, Shri …….....in my capacity as Managing Partner / Chairman & Managing Director / Proprietor of M/s. ……do hereby give an undertaking that we shall provide Man power as per the clause 2.2.1 (c) of Annexure I of the tender enquiry no. SB-OSD/SAMSKIP/955/2025 Dtd: 21.06.2025.

Signature of Contractor/authorized signatory of firm or agency:

Name of contractor:

Designation of authorized signatory of firm/agency:

Address:

Contact No:

APPENDIX - D

LIST OF DRAWINGS TO BE ISSUED BY CSL

SL No	Drawing to be issued	Remarks
1	Electrical outfitting practice and standards	
2	Fitting arrangement of electrical equipment seat and cable way	
3	Fabrication Drawing of electrical equipment seat and cable way Supports	
4	Material List of Fittings – F Items	

APPENDIX-E

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

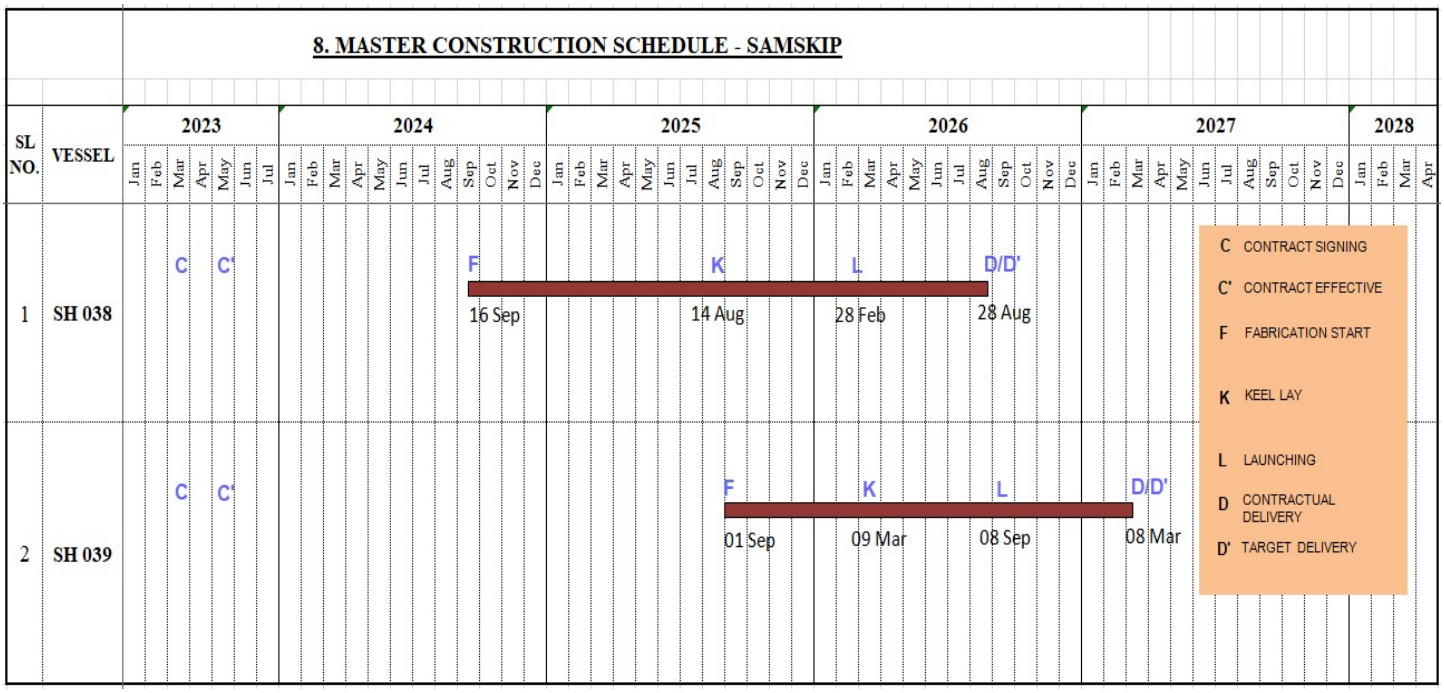
Timely Completion as per Project schedule	Completion of work within stipulated time, including class surveys & till submission of proper quotation. (No Reworks/Survey failures)
Work Planning & Co-ordination	Planning of (material, labour & machinery) for smooth execution of work, coordination with multiple 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 especially based on Number of Unsafe acts/ near misses ,use of PPEs, commitment & continuing practices for good housekeeping at site including waste management, 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 & Designation	

COCHIN SHIPYARD LTD

APPENDIX - F

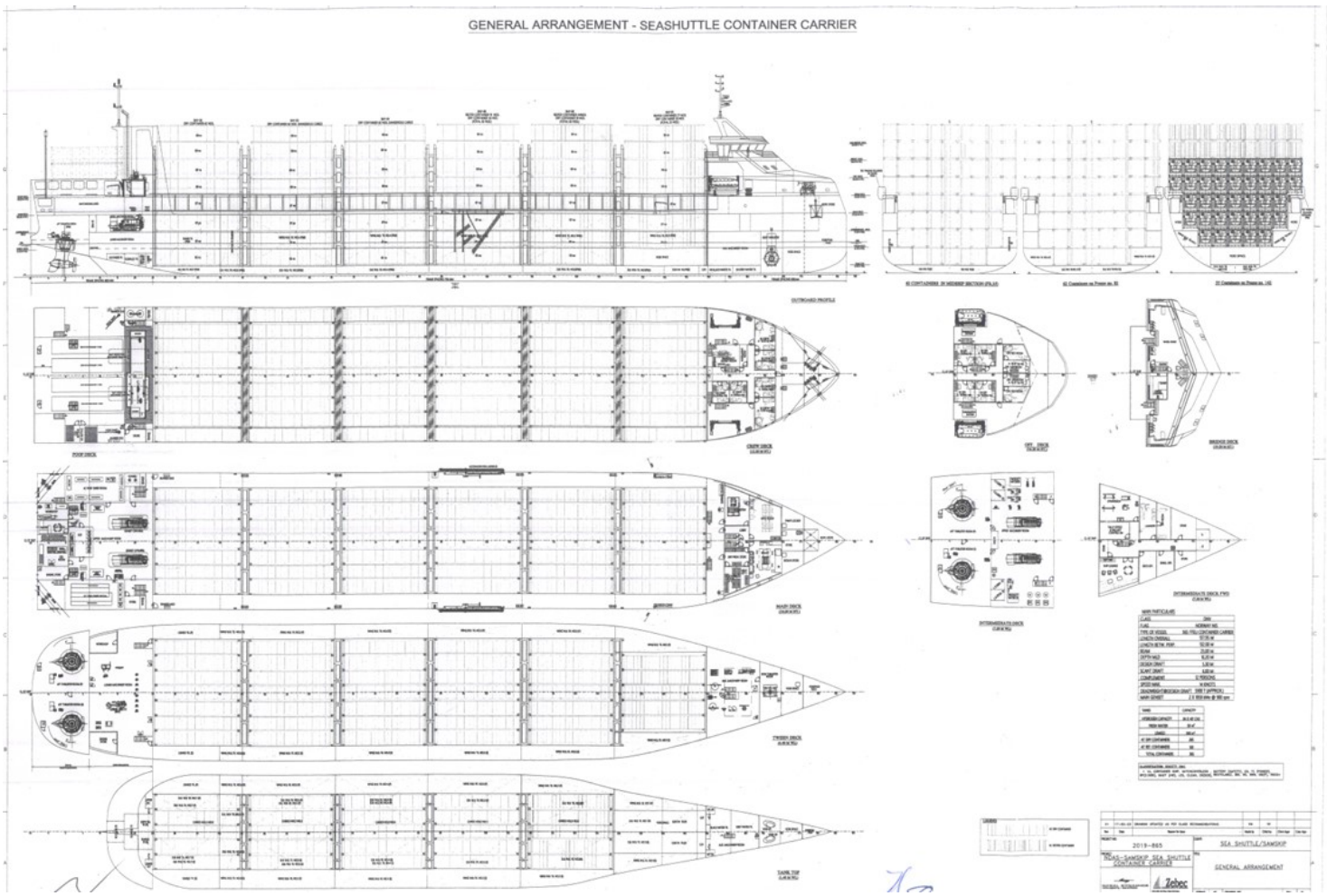
MASTER CONSTRUCTION SCHEDULE



COCHIN SHIPYARD LTD

APPENDIX - G

GENERAL ARRANGEMENT (GA) OF VESSEL



APPENDIX - H

TOTAL 83 PAGES INCLUDING COVER; A4-83 SHEETS

COCHIN SHIPYARD LTD

A GOVERNMENT OF INDIA ENTERPRISE
COCHIN-682015 , INDIA.

CSLYARD NO:	SHIP 038-039
CLASS	DNV
OWNER	NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS
APPROVED	MANOJ S
REVIEWED	SUMESH RAJAN
CHECKED	LISHA K KOSHI
PREPARED	ABHIJITH S

SAMSKIP SEA SHUTTLE CONTAINER CARRIER

ELECTRICAL OUTFITTING PRACTICE AND STANDARDS

DATE :	30.04.2025	SCALE: NTS	DRG NO: 038- K5700200	A

ISSUED TO	DEPT.	PLG.	IQC	EOF		
	No.	05	1	1		

PLAN HISTORY

YARD NO:SH 038-039 | 02 / 83

DRG NO: 038-K5700200 A

DATE	REV. NO	MARK	DESCRIPTION	DRAWN BY	CHECKED BY	REVIEWED BY	APPROVED BY
31.07.2023	0		FIRST ISSUE	SREERAJ V	LISHA K KOSHI	SUMESH RAJAN	MANOJ S
30.04.2025	A		1. Types of cableways updated 2. Size of flatbar used for supports changed from 40x3 to 40x6 3. Thickness of plate used for pads changed from 4mm to 5mm 4. RM plate updated	ABHIJITH S	LISHA K KOSHI	SUMESH RAJAN	MANOJ S

GENERAL NOTE:

1. ALL DIMENSIONS ARE IN MM
2. ALL BURS AND SHARP EDGE PARTS ARE TO BE SMOOTHLY REMOVED BEFORE PAINTING.
3. MATERIALS NOT AS PER THIS STANDARD, BUT AVAILABLE IN SHIPYARD STORES CAN BE ALTERNATIVELY USED.
4. SWITCHBOARDS, DISTRIBUTION BOARDS, EQUIPMENT'S, CABLE TRAYS AND CABLES SHOULD INCLUDE A MINIMUM OF 20% SPACE FOR FUTURE EXTENSION.

INDEX

YARD NO:SH 038-039 | 03/83

DRG NO: 038-K5700200 A

INDEX

YARD NO:SH 038-039 | 04/83

DRG NO: 038-K5700200 A

INDEX

YARD NO:SH 038-039 | 05/83

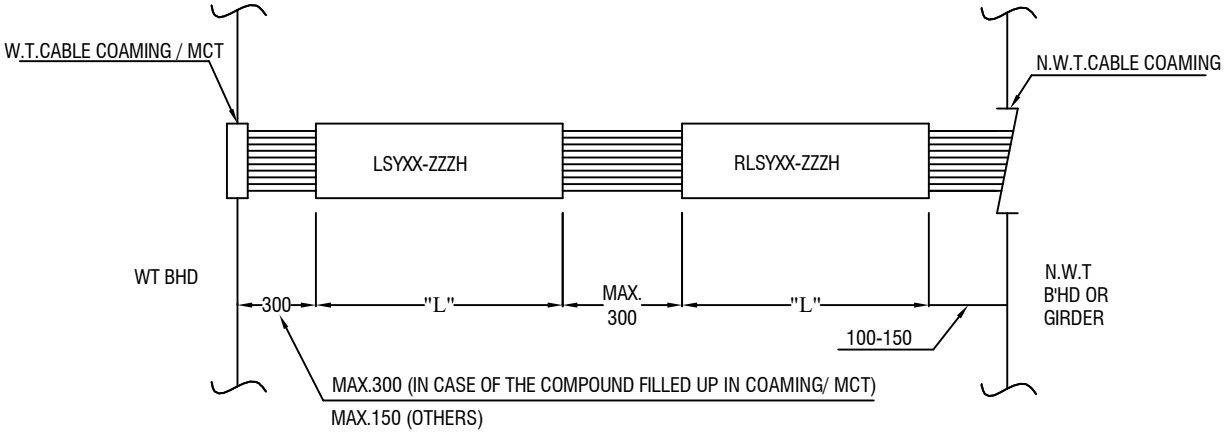
DRG NO: 038-K5700200 A

INDICATION METHOD FOR CABLE WAY

YARD NO:SH 038-039 | 06/83

CABLE WAY INDICATION METHOD

DRG NO: 038-K5700200 A



REPRESENTATION OF CABLEWAY

LS / RLS
LD / RLD
LT / RLT — Y — XX — ZZZ(H)

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

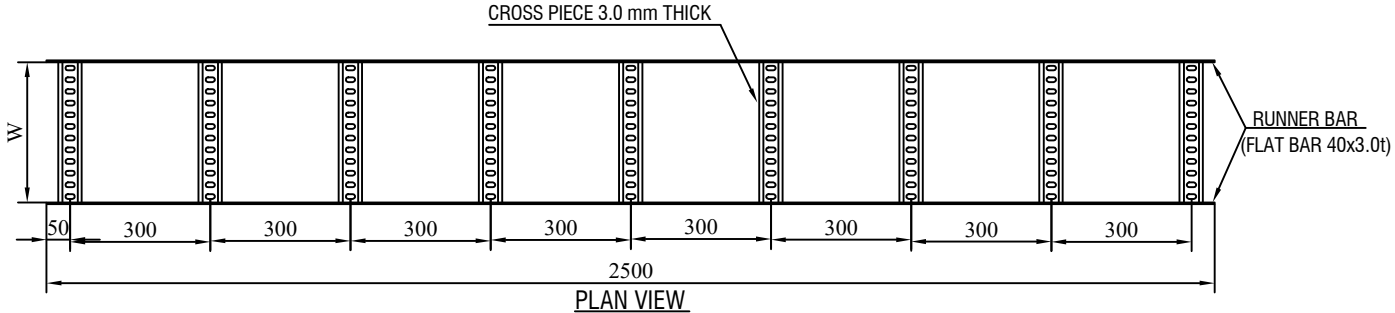
PIECE MARK EX : LSA40 - 300H
PIECE MARK EX : RLSA40 - 300H

LS	A	40		300H
RLS	A	40	—	300H

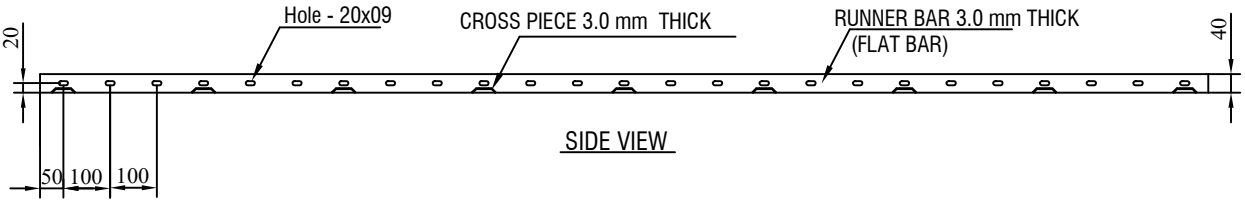
- 300H: DISTANCE FROM DECK(H)
- 40: CROSS PIECE OF WIDTH 400mm
- A: RUNNER BAR OF LENGTH 700mm
- LS: SINGLE TIER CABLE RACK (LS)
- RLS: SINGLE TIER REVERSE TYPE CABLE RACK (RLS)

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

SYMBOL	A	B	C	D	E	F	G	S
LENGTH (L)	700	1000	1300	1600	1900	2200	2500	*SPECIAL



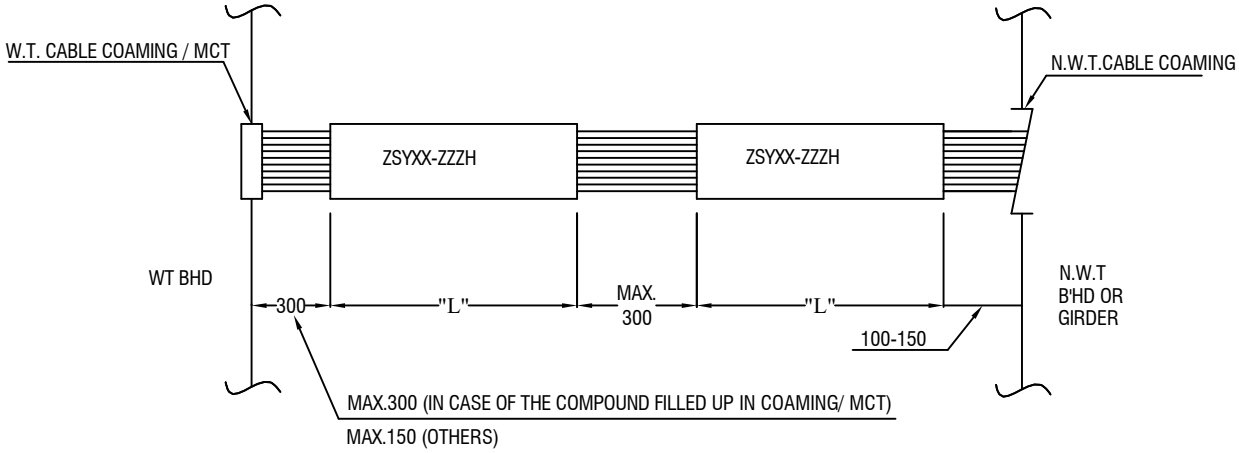
PLAN VIEW



SIDE VIEW

*TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK

	INDICATION METHOD FOR CABLE WAY	YARD NO:SH 038-039	07 / 83
	CABLEWAY INDICATION METHOD FOR Z TYPE	DRG NO: 038-K5700200 A	



REPRESENTATION OF CABLEWAY

ZS (ZD) (ZT) — Y — XX (RXX) — ZZZ(H)

- ZZZ(H): DISTANCE FROM DECK(H)
- XX (RXX): CROSS PIECE SIZE (WIDTH) (BEND TYPE CABLE RACK)
- Y: CABLE RUNNER BAR LENGTH "L"
- ZS (ZD) (ZT): Z - TYPE CABLE RACK / SINGLE TIER CABLE RACK / (DOUBLE TIER CABLE RACK) / (TRIPLE TIER CABLE RACK)

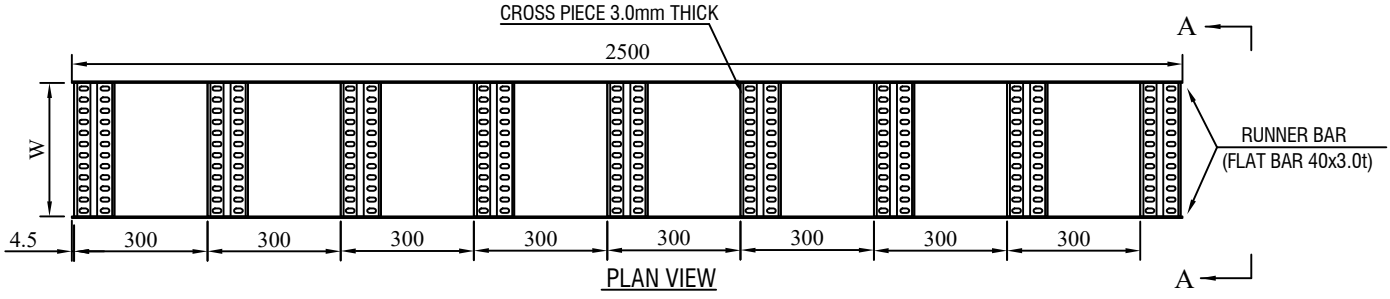
PIECE MARK EXAMPLE : ZSA40-300H

ZS — A — 40 — 300H

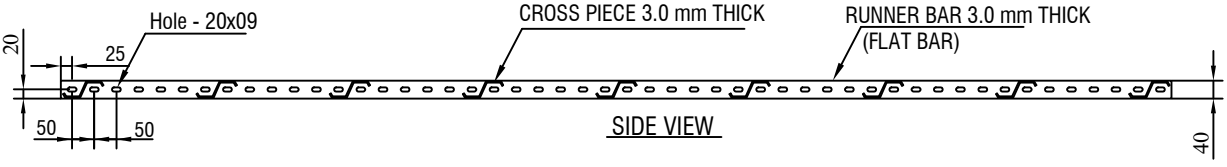
- 300H: DISTANCE FROM DECK(H)
- 40: CROSS PIECE OF WIDTH 400mm
- A: CABLE RUNNER BAR OF LENGTH 700mm
- ZS: Z TYPE CABLE RACK

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

SYMBOL	A	B	C	D	E	F	G	S
LENGTH (L)	700	1000	1300	1600	1900	2200	2500	*SPECIAL



PLAN VIEW



SIDE VIEW

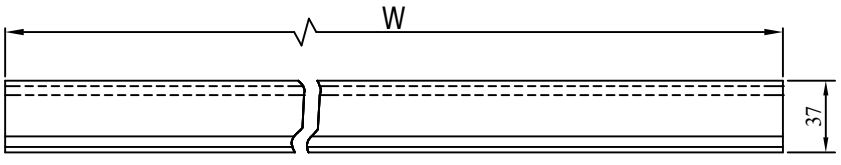
*TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK

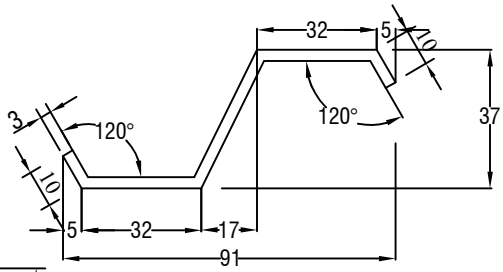
CABLE WAY INSTALLATION MATERIALS

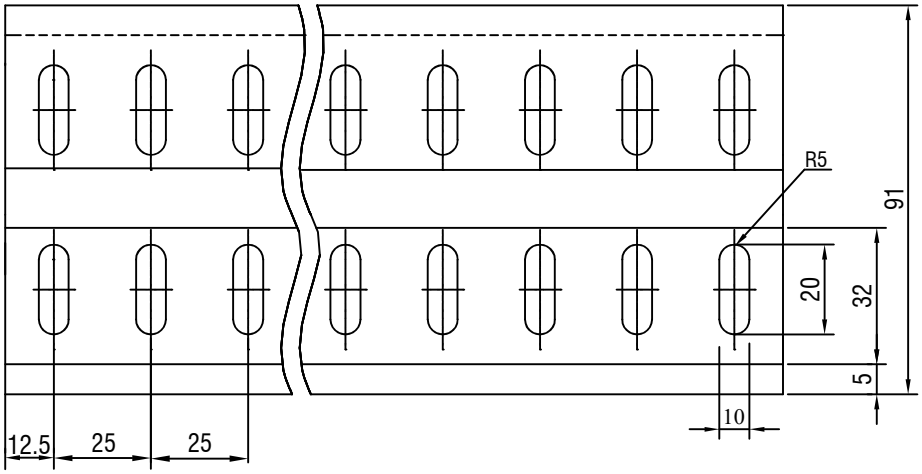
YARD NO:SH 038-039 | 08/83

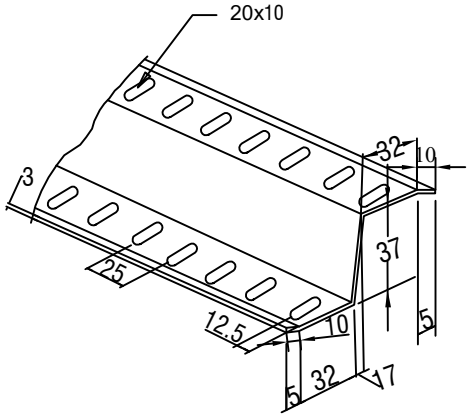
CROSS PIECE (Z TYPE)

DRG NO: 038-K5700200 A









WELDING DETAILS OF CROSS PIECE

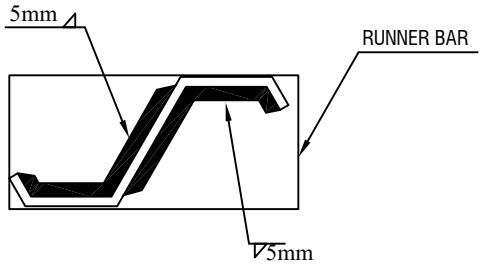
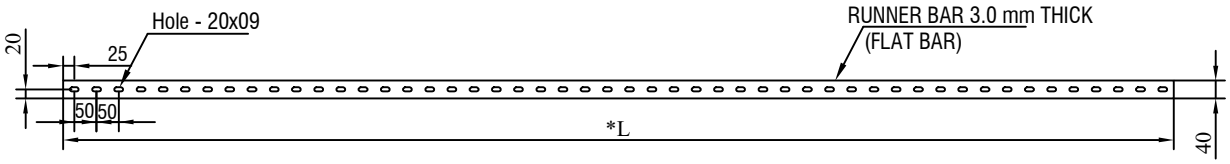


TABLE-1 MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE	W	NO. OF SLOTS /CROSS PIECE	WEIGHT(kg)	PAINT
Z - 10	100	8	0.26	ZINC HOT DIP GALVANISED
Z - 15	150	12	0.39	
Z - 20	200	16	0.52	
Z - 30	300	24	0.78	
Z - 40	400	32	1.04	
Z - 50	500	40	1.30	
Z - 60	600	48	1.56	

	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	09/83
	RUNNER BAR Z TYPE (FLAT BAR)	DRG NO: 038-K5700200 A	



SIDE VIEW

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

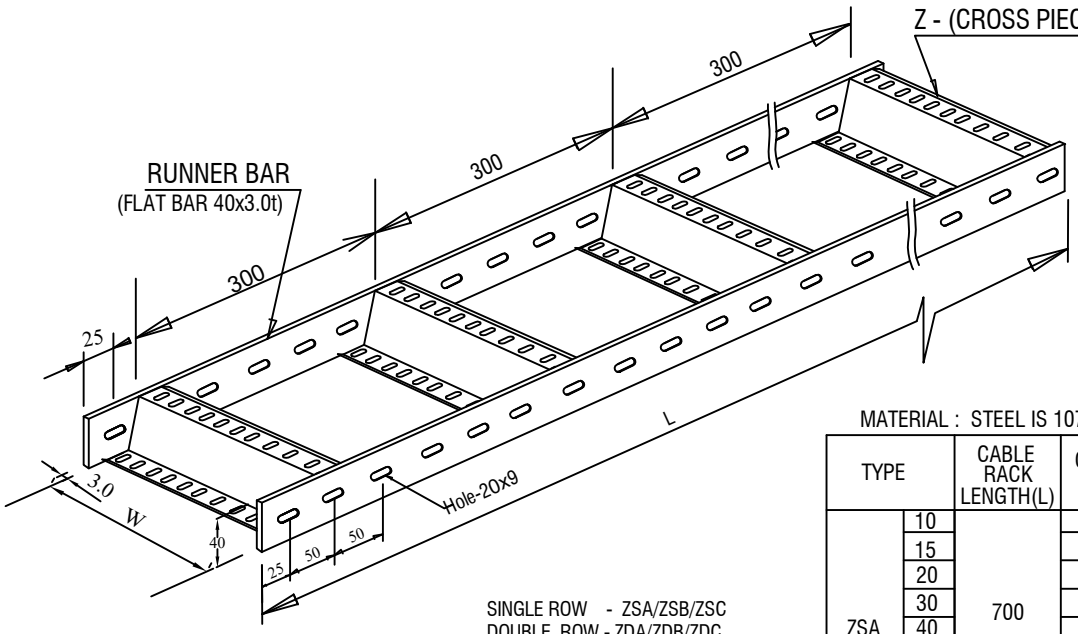
SYMBOL	A	B	C	D	E	F	G	S
LENGTH (L)	700	1000	1300	1600	1900	2200	2500	*SPECIAL

TABLE-1 MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE	LENGTH (L)	FITTING HOLE	WEIGHT(kg)	REMARKS
A	700	20X09X4.5R	0.61	ZINC HOT DIP GALVANISED
B	1000	20X09X4.5R	0.87	
C	1300	20X09X4.5R	1.13	
D	1600	20X09X4.5R	1.38	
E	1900	20X09X4.5R	1.64	
F	2200	20X09X4.5R	1.90	
G	2500	20X09X4.5R	2.16	
*SPECIAL	VARIABLE	20X09X4.5R		

*TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	10 / 83
	CABLE RACK Z TYPE - STEEL	DRG NO: 038-K5700200 A	

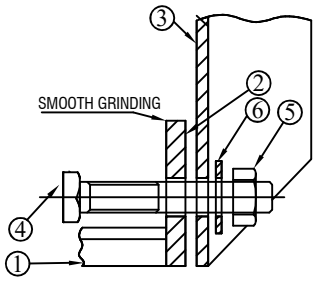


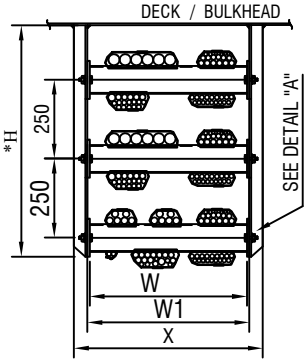
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE		CABLE RACK LENGTH(L)	CROSS PIECE	W	W1	WEIGHT (Kg)
ZSA	10	700	Z-10	100	106	1.99
	15		Z-15	150	156	2.38
	20		Z-20	200	206	2.78
	30		Z-30	300	306	3.56
	40		Z-40	400	406	4.34
	50		Z-50	500	506	5.12
	60		Z-60	600	606	5.90
ZSB	10	1000	Z-10	100	106	2.77
	15		Z-15	150	156	3.30
	20		Z-20	200	206	3.82
	30		Z-30	300	306	4.86
	40		Z-40	400	406	5.90
	50		Z-50	500	506	6.95
	60		Z-60	600	606	7.99
ZSC	10	1300	Z-10	100	106	3.55
	15		Z-15	150	156	4.21
	20		Z-20	200	206	4.86
	30		Z-30	300	306	6.16
	40		Z-40	400	406	7.46
	50		Z-50	508	506	8.77
	60		Z-60	608	606	10.77
ZSD	10	1600	Z-10	100	106	4.33
	15		Z-15	150	156	5.12
	20		Z-20	200	206	5.90
	30		Z-30	300	306	7.46
	40		Z-40	400	406	9.03
	50		Z-50	500	506	10.59
	60		Z-60	600	606	12.16
ZSE	10	1900	Z-10	100	106	5.11
	15		Z-15	150	156	6.03
	20		Z-20	200	206	6.94
	30		Z-30	300	306	8.76
	40		Z-40	400	406	10.59
	50		Z-50	500	506	12.41
	60		Z-60	600	606	14.24
ZSF	10	2200	Z-10	100	106	5.89
	15		Z-15	150	156	6.94
	20		Z-20	200	206	7.98
	30		Z-30	300	306	10.07
	40		Z-40	400	406	12.15
	50		Z-50	500	506	14.24
	60		Z-60	600	606	16.32
ZSG	10	2500	Z-10	100	106	6.67
	15		Z-15	150	156	7.85
	20		Z-20	200	206	9.02
	30		Z-30	300	306	11.37
	40		Z-40	400	406	13.71
	50		Z-50	500	506	16.06
	60		Z-60	600	606	18.41

SINGLE ROW - ZSA/ZSB/ZSC
DOUBLE ROW - ZDA/ZDB/ZDC
TRIPPLE ROW - ZTA/ZTB/ZTC

DETAIL "A"





ITEM NO.	DESCRIPTION	REMARK
1	CROSS PIECE	SEE PAGE 22 TABLE-1
2	RUNNER BAR	SEE PAGE 23 TABLE-1
3	SUPPORT	SEE NOTE
4	HEX BOLT	M8 x 25L
5	HEX NUT	M8
6	PLAIN WASHER	FOR M8

NOTE

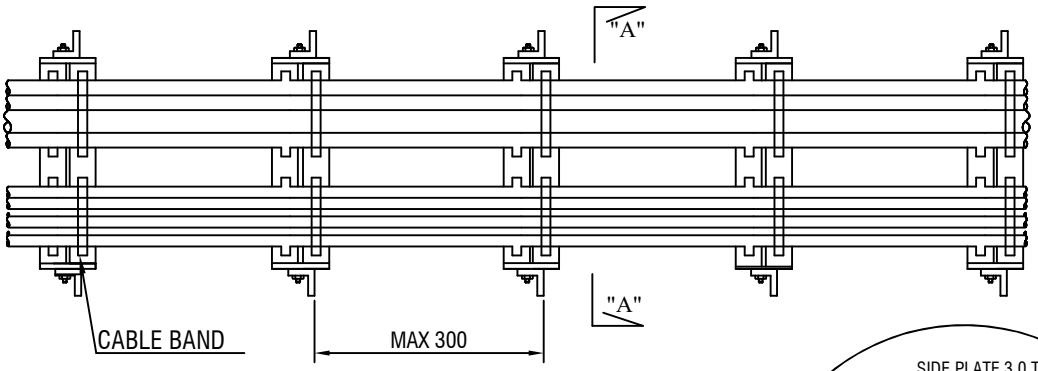
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. NO OF SUPPORTS PER RACK
   1. LENGTH (L) < 1500mm -2 PAIR OF SUPPORTS.
   2. LENGTH (L) > 1500mm-3 PAIR OF SUPPORTS.
3. IN NORMAL CASE CABLEWAY SUPPORT TO BE BOLTED TO THE CABLE RACK USING THE FIRST HOLES (ie. 25mm FROM BOTH ENDS) ON RUNNER BARS
4. TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK
5. IN SPECIAL CASE WHEN THE CABLE RACK's LENGTH IS CUT SHORT THEN THE HOLES NEAR TO THE CROSS PIECE CAN BE USED

CABLE WAY INSTALLATION MATERIALS

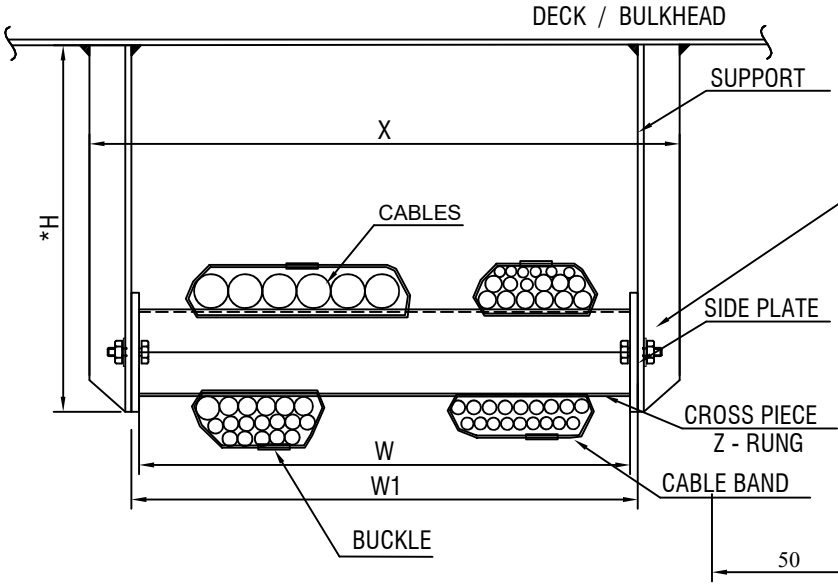
YARD NO:SH 038-039 | 11/83

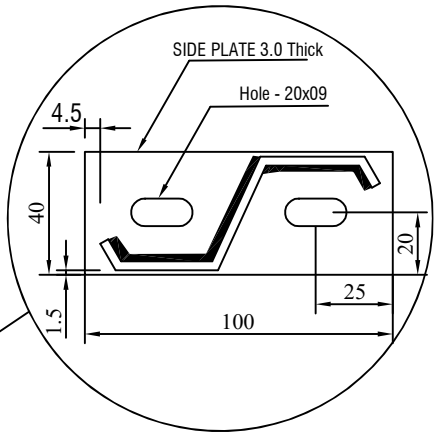
Z TYPE CABLE HANGER (STEEL)

DRG NO: 038-K5700200 A

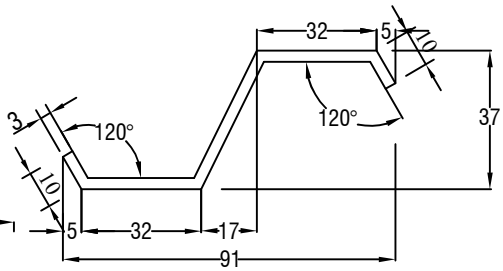


VIEW-A~A



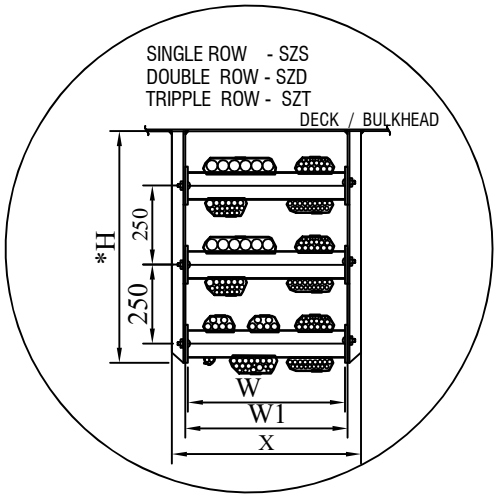


FABRICATION DETAILS OF CROSS PIECE - Z TYPE.



MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

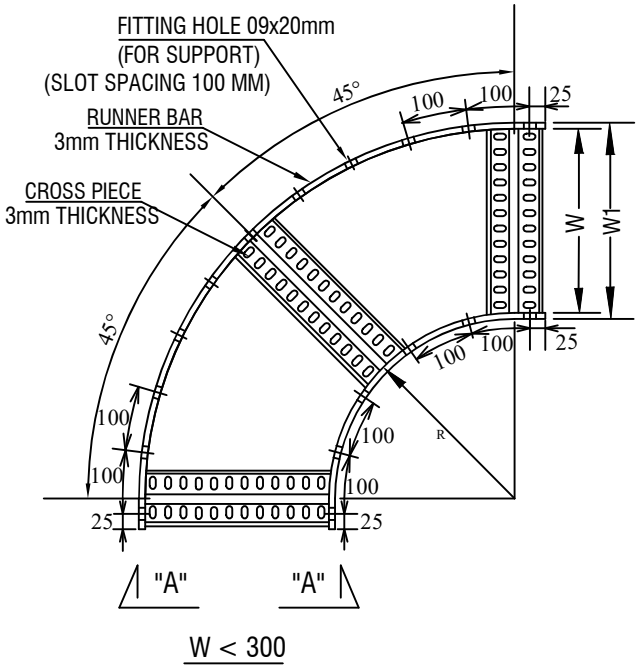
TYPE	CROSS PIECE	W	W1	X**		WEIGHT (kg)
				1	2	
SZS10	Z - 10	100	106	166	186	0.43
SZS15	Z - 15	150	156	216	236	0.56
SZS20	Z - 20	200	206	266	286	0.69
SZS30	Z - 30	300	306	366	386	0.96
SZS40	Z - 40	400	406	466	486	1.22
SZS50	Z - 50	500	506	566	586	1.48
SZS60	Z - 60	600	606	666	686	1.74



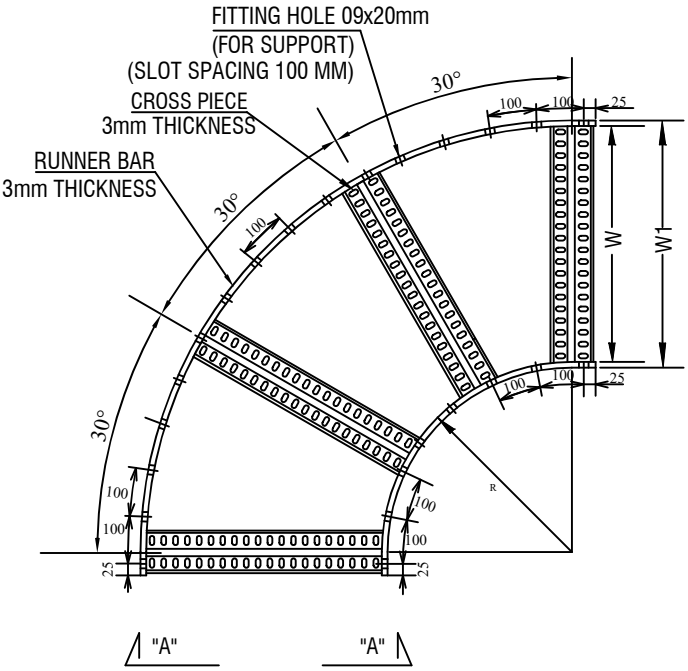
NOTE

1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.
      **CASE 1. IF ANGLE IS OF 30x30x3/32x32x3
      CASE 2. IF ANGLE IS OF 40x40x5
2. CABLES SHOWN ARE INDICATIVE ONLY.

	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	12 / 83
	Z TYPE CABLE RACK BEND TYPE (STEEL)	DRG NO: 038-K5700200 A	

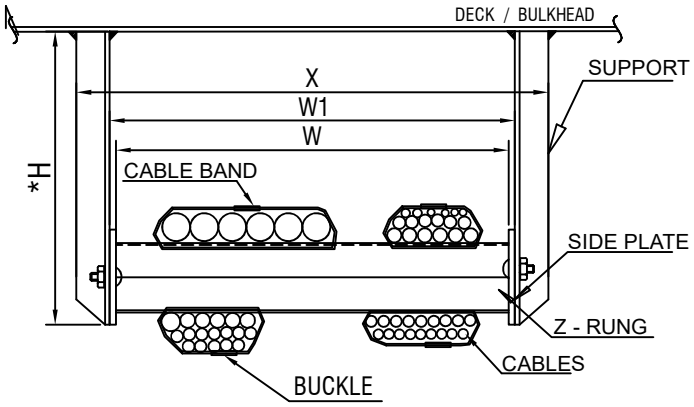


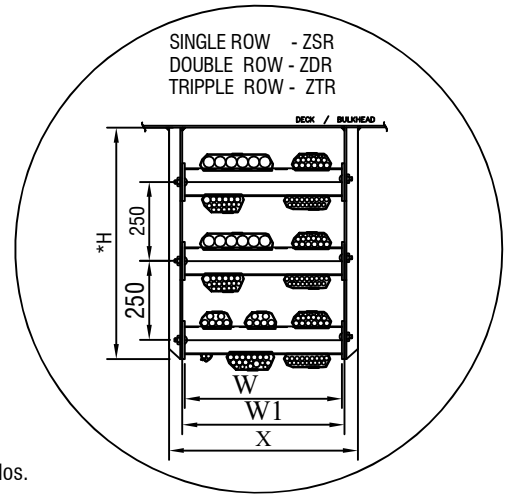
W < 300



W > 300

VIEW-A~A





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 + ZINC HOT DIP GALVANISED

TYPE	HANGER	RUNNER BAR			W	W1	X**		WEIGHT(kg)
		SIDE PLATE	FITTING HOLE	BOLT			1	2	
ZSR10	L - 10	40 X 3t F.B.	9 X 20X4.5R	M8 X 20 L	100	106	166	186	1.96
ZSR15	L - 15	"	"	"	150	156	216	236	2.42
ZSR20	L - 20	"	"	"	200	206	266	286	2.89
ZSR30	L - 30	"	"	"	300	306	366	386	3.81
ZSR40	L - 40	"	"	"	400	406	466	486	5.78
ZSR50	L - 50	"	"	"	500	506	566	586	7.25
ZSR60	L - 60	"	"	"	600	606	666	686	8.43

NOTE

1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/ 32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.

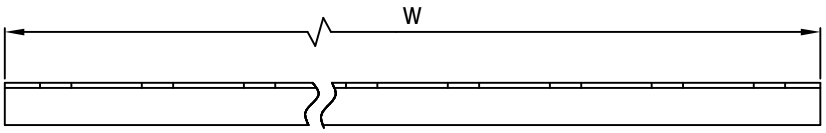
**CASE 1. IF ANGLE IS OF 30x30x3/32x32x3

CASE 2. IF ANGLE IS OF 40x40x5

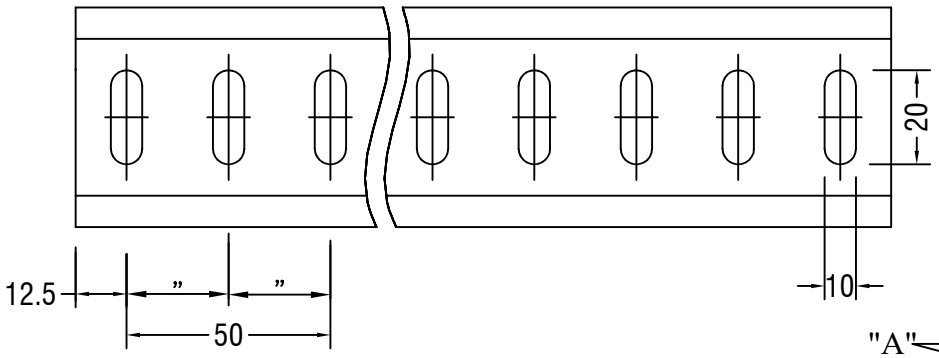
	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	13 / 83
	CROSS PIECE	DRG NO: 038-K5700200 A	

CROSS PIECE

ELEVATION



PLAN VIEW



VIEW - " A" ~ "A"

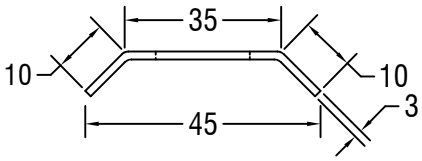
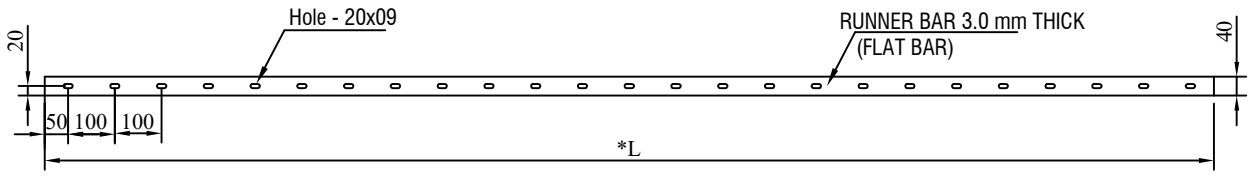


TABLE-1 MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE	W	NO. OF SLOTS / CROSS PIECE	WEIGHT(kg)	REMARK
L - 15	150	6	0.11	ZINC HOT DIP GALVANISED
L - 20	200	8	0.15	
L - 30	300	12	0.23	
L - 40	400	16	0.30	
L - 50	500	20	0.38	
L - 60	600	24	0.45	

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	14/83
	RUNNER BAR (FLAT BAR)	DRG NO: 038-K5700200 A	

RUNNER BAR DETAILS



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

SYMBOL	A	B	C	D	E	F	G	S
LENGTH (L)	700	1000	1300	1600	1900	2200	2500	*SPECIAL

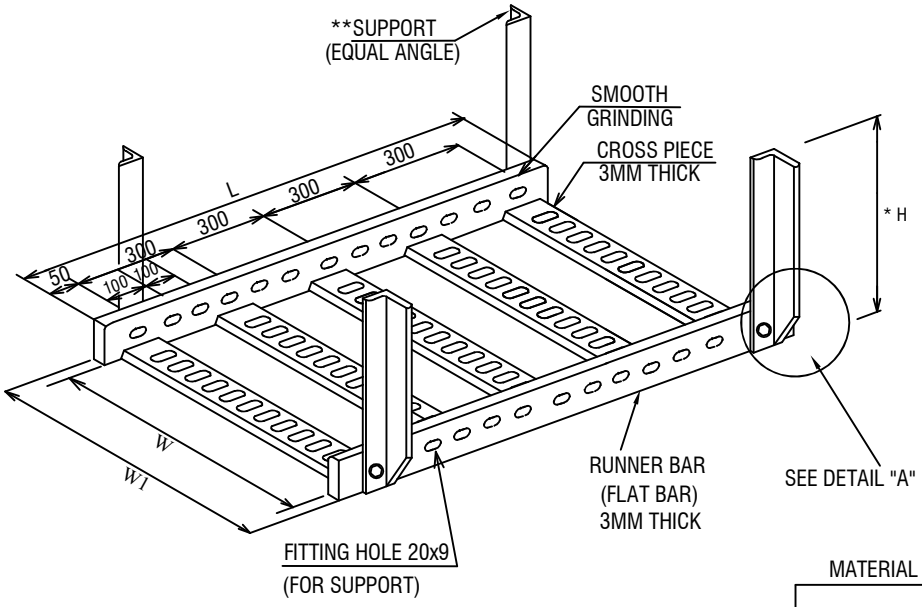
TABLE-1

MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

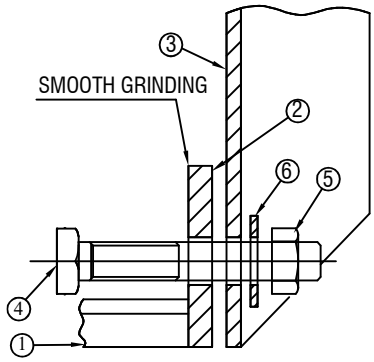
TYPE	LENGTH (L)	FITTING HOLE	WEIGHT(kg)	REMARKS
A	700	20X09X4.5R	0.63	ZINC HOT DIP GALVANISED
B	1000	20X09X4.5R	0.90	
C	1300	20X09X4.5R	1.17	
D	1600	20X09X4.5R	1.45	
E	1900	20X09X4.5R	1.72	
F	2200	20X09X4.5R	1.99	
G	2500	20X09X4.5R	2.26	
*SPECIAL	VARIABLE	20X09X4.5R	-	

*TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	15 / 83
	CABLE RACK (TYPICAL)- STEEL	DRG NO: 038-K5700200 A	



DETAIL "A"



ITEM NO.	DESCRIPTION	REMARK
1	CROSS PIECE	SEE PAGE 10 TABLE-1
2	RUNNER BAR	SEE PAGE 11 TABLE -1
3	SUPPORT	SEE NOTE
4	HEX BOLT	M8 x 25L
5	HEX NUT	M8
6	WASHER	FOR M8

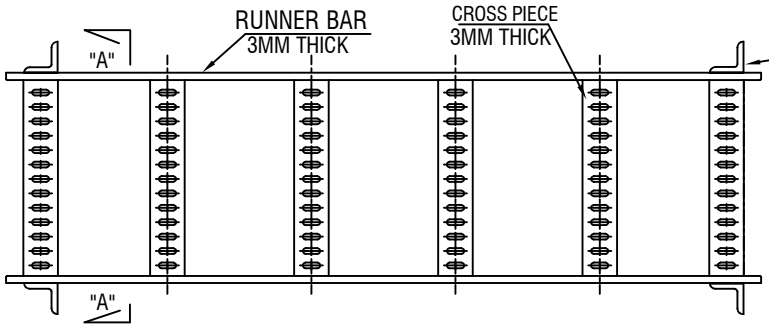
NOTE

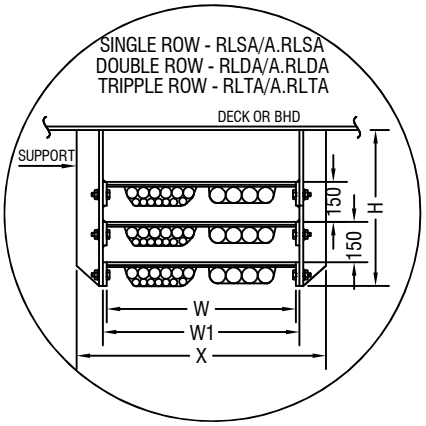
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. NO OF SUPPORTS PER RACK
   1. LENGTH (L) < 1500mm 2 PAIR OF SUPPORTS.
   2. LENGTH (L) > 1500mm 3 PAIR OF SUPPORTS.
4. IN NORMAL CASE CABLE WAY SUPPORT TO BE BOLTED TO THE CABLE RACK USING THE FIRST HOLES (ie. 50mm FROM BOTH ENDS) ON RUNNER BARS
5. TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK
6. IN SPECIAL CASE WHEN THE CABLE RACK's LENGTH IS CUT SHORT THEN THE HOLES NEAR TO THE CROSS PIECE CAN BE USED

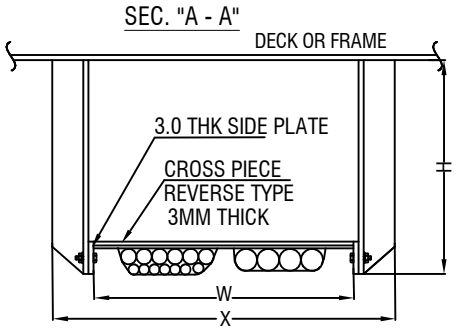
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE		CABLE RACK LENGTH(L)	CROSS PIECE	W	W1	WEIGHT (Kg)
LSA	15	700	L - 15	150	156	1.77
	20		L - 20	200	206	1.94
	30		L - 30	300	306	2.28
	40		L - 40	400	406	2.62
	50		L - 50	500	506	2.96
	60		L - 60	600	606	3.29
LSB	15	1000	L - 15	150	156	2.48
	20		L - 20	200	206	2.71
	30		L - 30	300	306	3.16
	40		L - 40	400	406	3.61
	50		L - 50	500	506	4.06
	60		L - 60	600	606	4.51
LSC	15	1300	L - 15	150	156	3.19
	20		L - 20	200	206	3.48
	30		L - 30	300	306	4.04
	40		L - 40	400	406	4.60
	50		L - 50	508	506	5.17
	60		L - 60	608	606	5.73
LSD	15	1600	L - 15	150	156	3.91
	20		L - 20	200	206	4.24
	30		L - 30	300	306	4.92
	40		L - 40	400	406	5.60
	50		L - 50	500	506	6.27
	60		L - 60	600	606	6.95
LSE	15	1900	L - 15	150	156	4.62
	20		L - 20	200	206	5.01
	30		L - 30	300	306	5.80
	40		L - 40	400	406	6.59
	50		L - 50	500	506	7.38
	60		L - 60	600	606	8.17
LSF	15	2200	L - 15	150	156	5.33
	20		L - 20	200	206	5.78
	30		L - 30	300	306	6.68
	40		L - 40	400	406	7.58
	50		L - 50	500	506	8.48
	60		L - 60	600	606	9.39
LSG	15	2500	L - 15	150	156	6.04
	20		L - 20	200	206	6.55
	30		L - 30	300	306	7.56
	40		L - 40	400	406	8.58
	50		L - 50	500	506	9.59
	60		L - 60	600	606	10.60

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	16/83
	CABLE RACK REVERSE TYPE - STEEL	DRG NO: 038-K5700200 A	







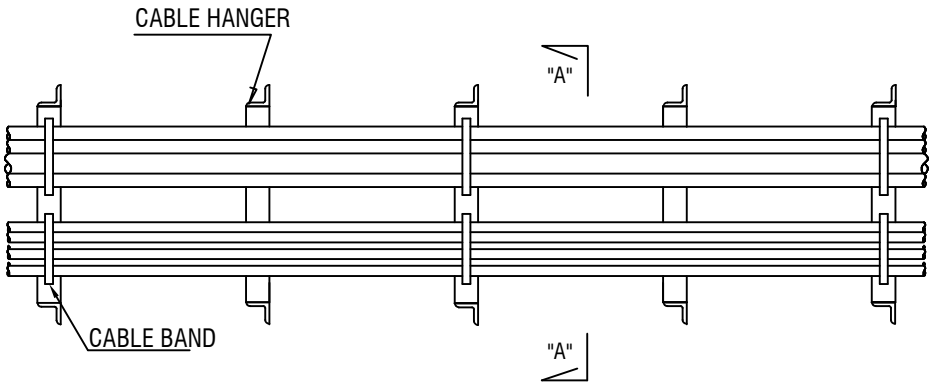
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

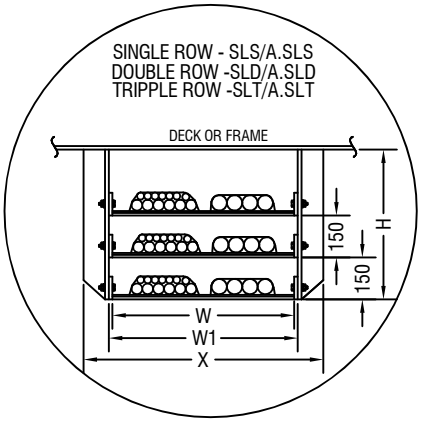
TYPE		CABLE RACK LENGTH(L)	*CROSS PIECE	W	W1	WEIGHT (Kg)
RLSA	15	700	L - 15	150	156	1.77
	20		L - 20	200	206	1.94
	30		L - 30	300	306	2.28
	40		L - 40	400	406	2.62
	50		L - 50	500	506	2.96
	60		L - 60	600	606	3.29
RLSB	15	1000	L - 15	150	156	2.48
	20		L - 20	200	206	2.71
	30		L - 30	300	306	3.16
	40		L - 40	400	406	3.61
	50		L - 50	500	506	4.06
	60		L - 60	600	606	4.51
RLSC	15	1300	L - 15	150	156	3.19
	20		L - 20	200	206	3.48
	30		L - 30	300	306	4.04
	40		L - 40	400	406	4.60
	50		L - 50	508	506	5.17
	60		L - 60	608	606	5.73
RLSD	15	1600	L - 15	150	156	3.91
	20		L - 20	200	206	4.24
	30		L - 30	300	306	4.92
	40		L - 40	400	406	5.60
	50		L - 50	500	506	6.27
	60		L - 60	600	606	6.95
RLSE	15	1900	L - 15	150	156	4.62
	20		L - 20	200	206	5.01
	30		L - 30	300	306	5.80
	40		L - 40	400	406	6.59
	50		L - 50	500	506	7.38
	60		L - 60	600	606	8.17
RLSF	15	2200	L - 15	150	156	5.33
	20		L - 20	200	206	5.78
	30		L - 30	300	306	6.68
	40		L - 40	400	406	7.58
	50		L - 50	500	506	8.48
	60		L - 60	600	606	9.39
RLSG	15	2500	L - 15	150	156	6.04
	20		L - 20	200	206	6.55
	30		L - 30	300	306	7.56
	40		L - 40	400	406	8.58
	50		L - 50	500	506	9.59
	60		L - 60	600	606	10.60

NOTE

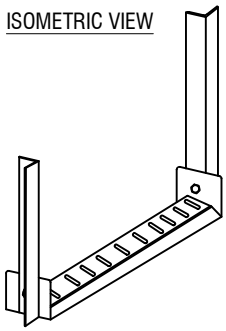
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.
2. ** SUPPORT HEIGHT(H) SHALL BE DECIDED AS PER THE FIT. ARRG. DRG.
3. NO OF SUPPORTS PER RACK
   1. LENGTH (L) < 1500mm 2 PAIR OF SUPPORTS.
   2. LENGTH (L) > 1500mm 3 PAIR OF SUPPORTS.
4. IN NORMAL CASE CABLEWAY SUPPORT TO BE BOLTED TO THE CABLE RACK USING THE FIRST HOLES (ie. 50mm FROM BOTH ENDS) ON RUNNER BARS
5. TYPES - A,B,C,D,E,F & SPECIAL (NON STANDARD LENGTH) CABLE RACKS SHALL BE CUSTOMIZED FROM "G" TYPE (2500 MM LENGTH) CABLE RACK
6. IN SPECIAL CASE WHEN THE CABLE RACK's LENGTH IS CUT SHORT THEN THE HOLES NEAR TO THE CROSS PIECE CAN BE USED

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	17/83
	CABLE HANGER	DRG NO: 038-K5700200 A	

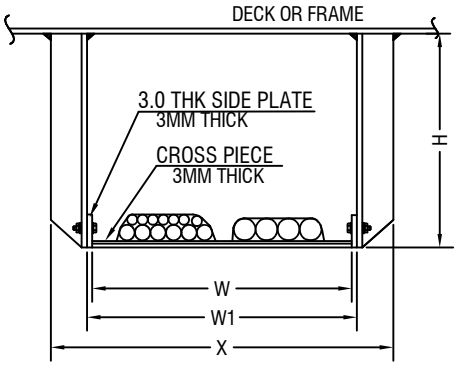


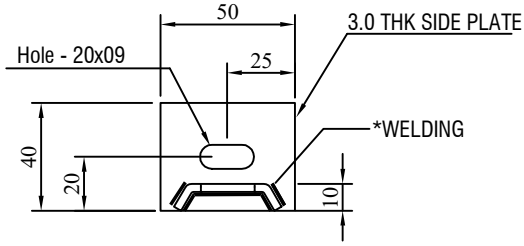


ISOMETRIC VIEW



SEC. "A - A"





Refer Page 07/94 for Cross piece details.

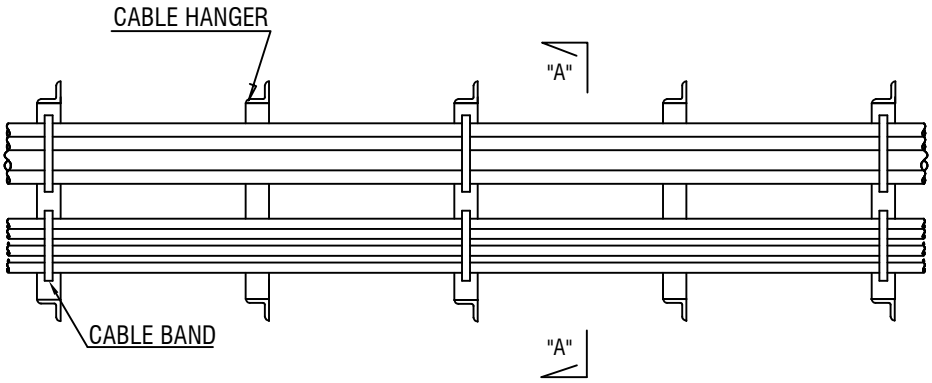
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

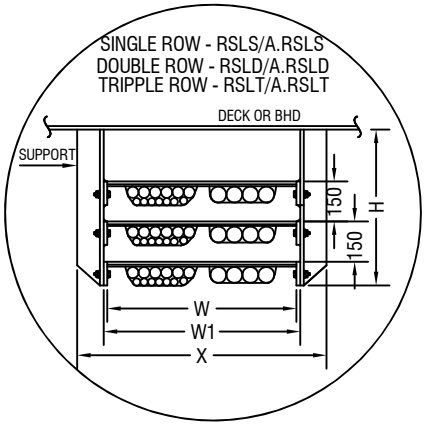
TYPE	CROSS PIECE	W	W1	X**		WEIGHT (kg)
				1	2	
SLS15	L - 15	150	156	216	236	0.26
SLS20	L - 20	200	206	266	286	0.31
SLS30	L - 30	300	306	366	386	0.42
SLS40	L - 40	400	406	466	486	0.54
SLS50	L - 50	500	506	566	586	0.65
SLS60	L - 60	600	606	666	686	0.76

NOTE

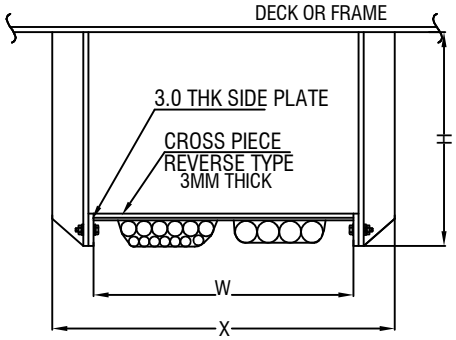
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.
      **CASE 1. IF ANGLE IS OF 30x30x3/32x32x3
      CASE 2. IF ANGLE IS OF 40x40x5
2. CABLES SHOWN ARE INDICATIVE ONLY.

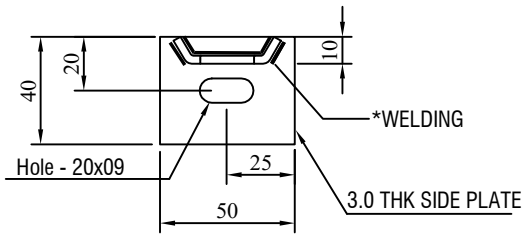
	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	18/83
	CABLE HANGER REVERSE TYPE	DRG NO: 038-K5700200 A	





SEC. "A - A"





MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

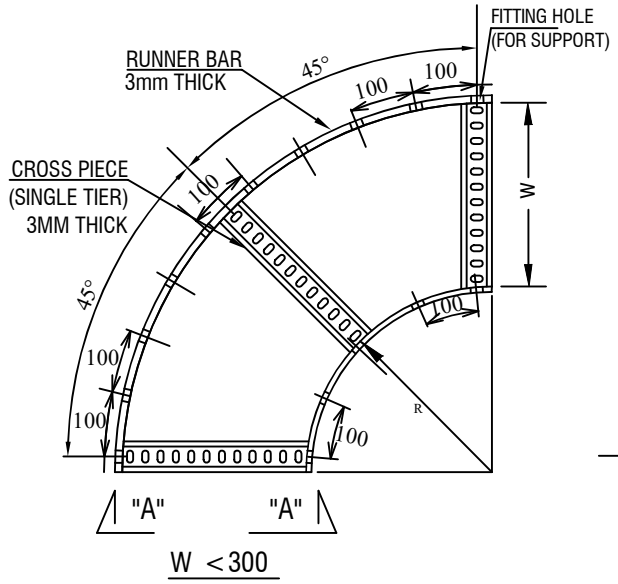
TYPE	CROSS PIECE	W	W1	X**		WEIGHT (kg)
				1	2	
RSLS15	L - 15	150	156	216	236	0.26
RSLS20	L - 20	200	206	266	286	0.31
RSLS30	L - 30	300	306	366	386	0.42
RSLS40	L - 40	400	406	466	486	0.54
RSLS50	L - 50	500	506	566	586	0.65
RSLS60	L - 60	600	606	666	686	0.76

NOTE

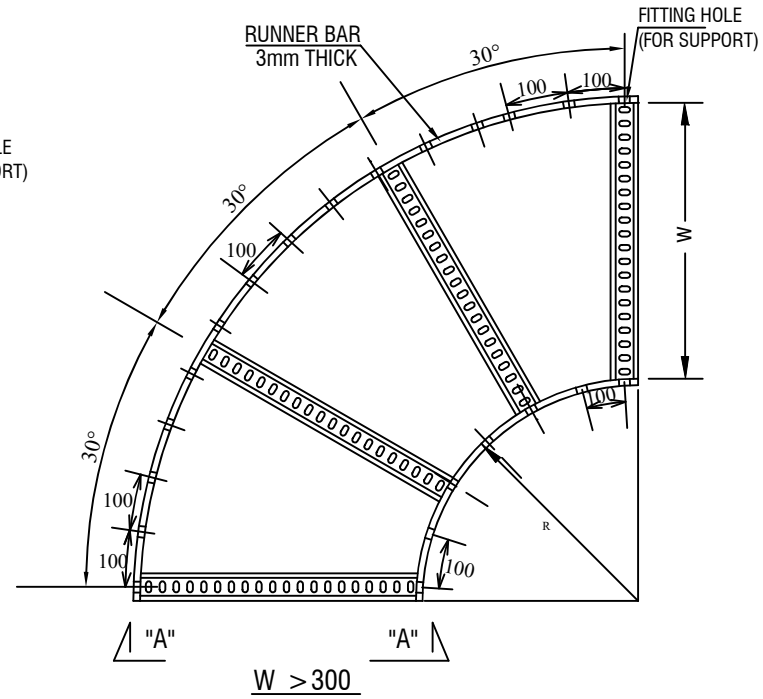
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.

   **CASE 1. IF ANGLE IS OF 30x30x3/32x32x3
   CASE 2. IF ANGLE IS OF 40x40x5
2. CABLES SHOWN ARE INDICATIVE ONLY.

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	19/83
	CABLE RACK BEND NORMAL-STEEL	DRG NO: 038-K5700200 A	

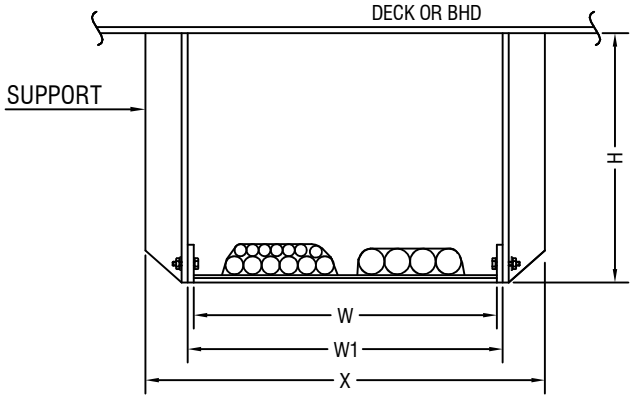


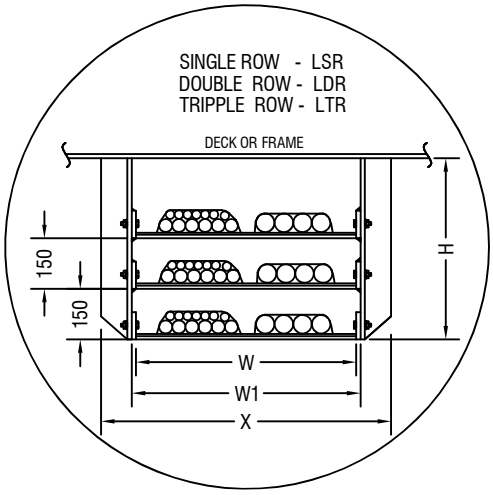
W <300



W >300

VIEW "A - A"





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 + ZINC HOT DIP GALVANISED

TYPE	HANGER	RUNNER BAR			W	W1	X**		WEIGHT(kg)
		SIDE PLATE	FITTING HOLE	BOLT			1	2	
LSR15	L - 15	40 X 3t F.B.	9 X 20X4.5R	M8 X 20 L	150	156	216	236	1.58
LSR20	L - 20	"	"	"	200	206	266	286	1.82
LSR30	L - 30	"	"	"	300	306	366	386	2.30
LSR40	L - 40	"	"	"	400	406	466	486	3.24
LSR50	L - 50	"	"	"	500	506	566	586	4.11
LSR60	L - 60	"	"	"	600	606	666	686	4.71

NOTE

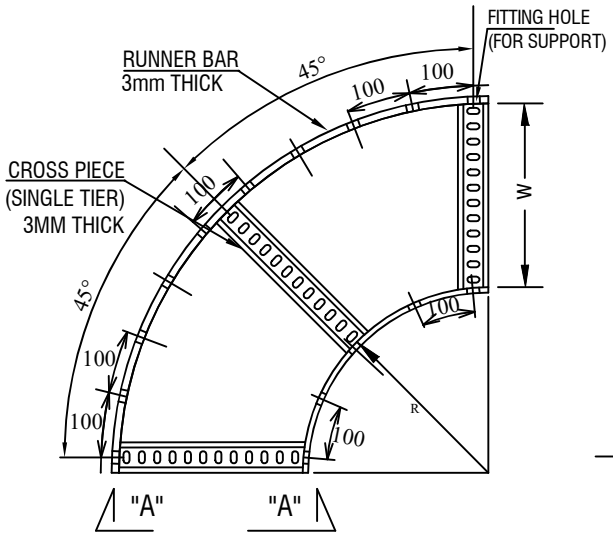
1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3/32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.

   **CASE 1. IF ANGLE IS OF 30x30x3//32x32x3

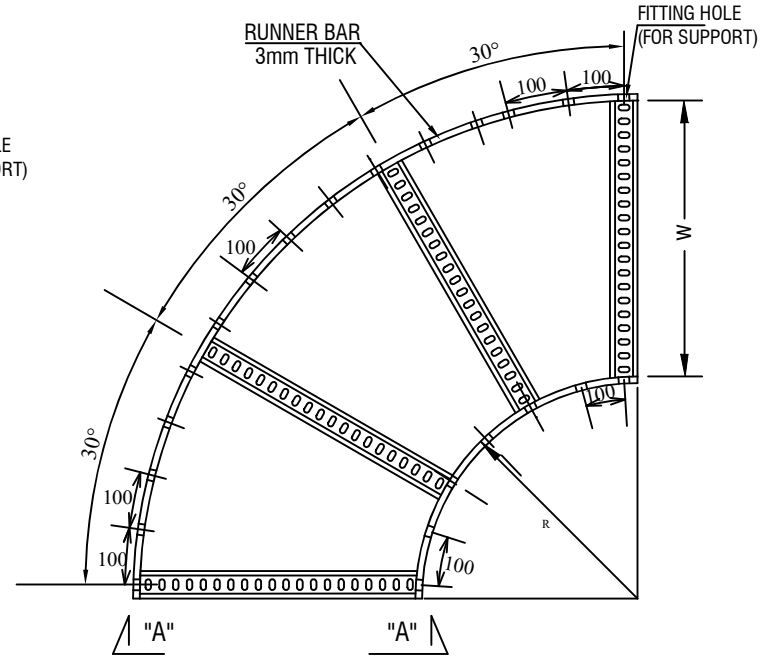
   CASE 2. IF ANGLE IS OF 40x40x5

2.CABLES SHOWN ARE INDICATIVE ONLY.

	CABLEWAY INSTALLATION MATERIALS	YARD NO:SH 038-039	20/83
	CABLE RACK BEND REVERSE TYPE-STEEL	DRG NO: 038-K5700200 A	

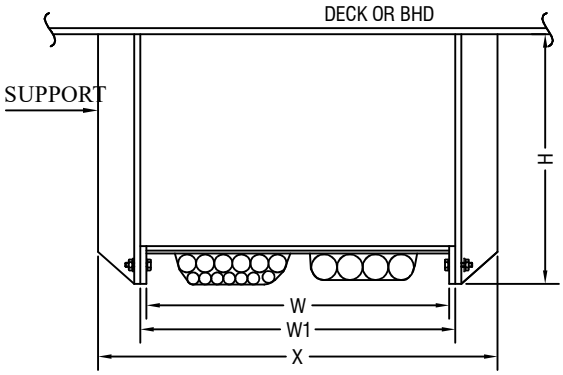


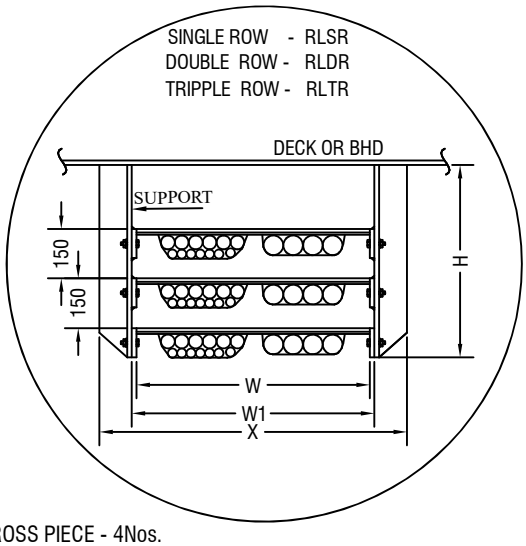
W < 300



W > 300

VIEW "A - A"





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 + ZINC HOT DIP GALVANISED

TYPE	HANGER	RUNNER BAR			W	W1	X**		WEIGHT(kg)
		SIDE PLATE	FITTING HOLE	BOLT			1	2	
RLSR15	L - 15	40 X 3t F.B.	9 X 20X4.5R	M8 X 20 L	150	156	216	236	1.58
RLSR20	L - 20	"	"	"	200	206	266	286	1.82
RLSR30	L - 30	"	"	"	300	306	366	386	2.30
RLSR40	L - 40	"	"	"	400	406	466	486	3.24
RLSR50	L - 50	"	"	"	500	506	566	586	4.11
RLSR60	L - 60	"	"	"	600	606	666	686	4.71

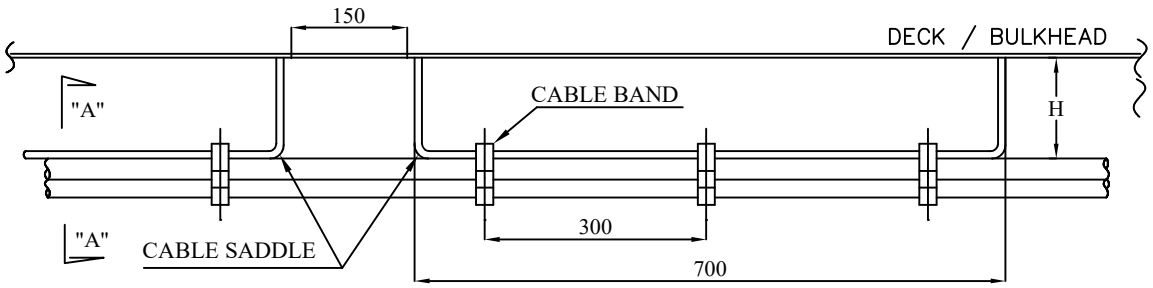
NOTE

1. ** SUPPORT
   1. H <= 250 & RACK WIDTH <=200 OR H <=150& RACK WIDTH = 500 : 40X6 MS FLATBAR
   2. H <= 500 & RACK WIDTH <=500 : 30X30X3 / 32X32X3 MS ANGLE
   3. FOR ALL OTHER : 40X40X5 MS ANGLE
   4. SPECIAL CASES AS INDICATED IN DRAWINGS.

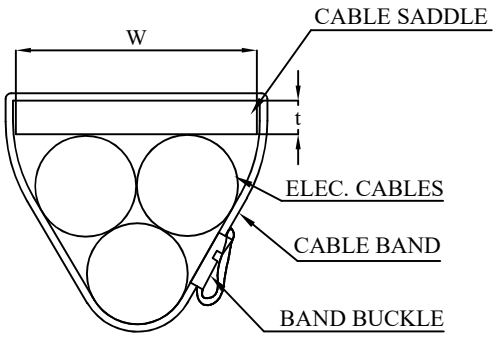
   **CASE 1. IF ANGLE IS OF 30x30x3/32x32x3

   CASE 2. IF ANGLE IS OF 40x40x5
2. CABLES SHOWN ARE INDICATIVE ONLY.

	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	21/83
	CABLE SADDLE - "FB" TYPE	DRG NO: 038-K5700200 A	



SEC. "A - A"



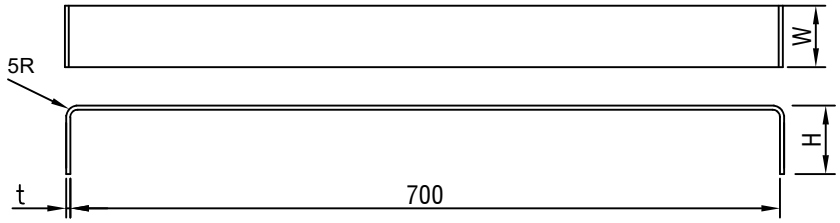
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE		H	WEIGHT	W	t	L	REMARK
FB2	-50H	50	0.95	40	3.0	700	SEE NOTE"1.1"
	-70H	70	1.19				
	-100H	100	1.23				
	-150H	150	1.26				
	-200H	200	1.55				
	-250H	250	1.65				
	-300H	300	1.87				
	-330H	330	1.92				
FB4	-50H	50	2.35	75	3.0	700	SEE NOTE"1.2"
	-70H	70	2.60				
	-100H	100	2.64				
	-150H	150	2.68				
	-200H	200	3.89				
	-250H	250	3.99				
	-300H	300	4.30				
	-330H	330	4.80				
FB5	-50H	50	1.24	100	3.0	700	SEE NOTE"1.3"
	-70H	70	1.47				
	-100H	100	1.82				
	-150H	150	3.14				
	-200H	200	3.52				
	-250H	250	3.77				
	-300H	300	4.5				
	-330H	330	4.80				

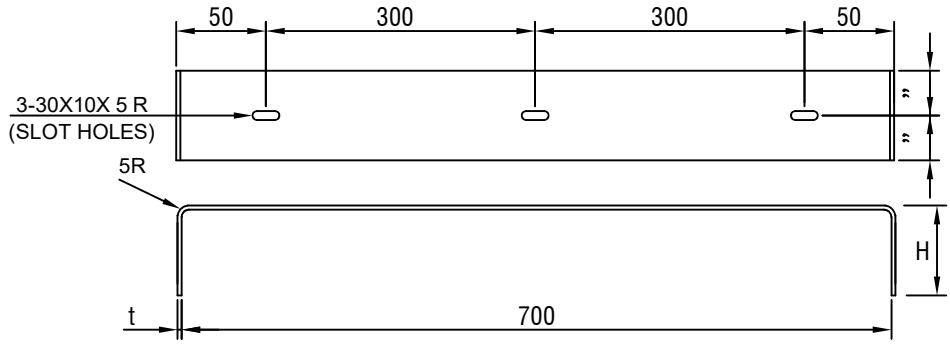
	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	22/83
	CABLE SADDLE - "FB" TYPE	DRG NO: 038-K5700200 A	

NOTE 1

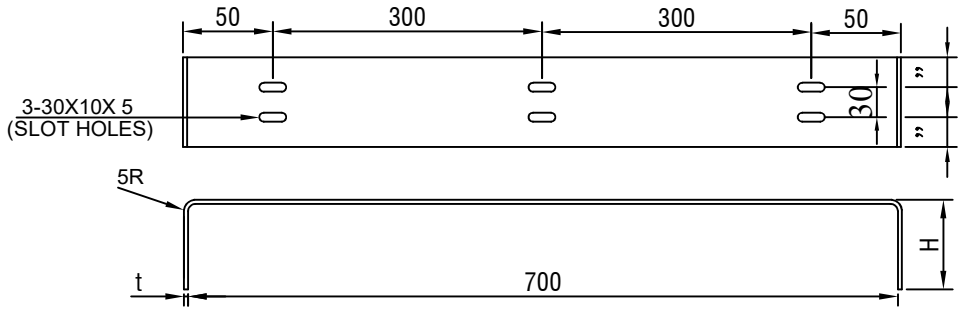
1.1 "FB-2" CABLE SADDLE TO BE MADE AS FOLLOW.



1.2 "FB-4" CABLE SADDLE TO BE MADE AS FOLLOW.



1.3 "FB-5" CABLE SADDLE TO BE MADE AS FOLLOW.(FB-5 ONLY)



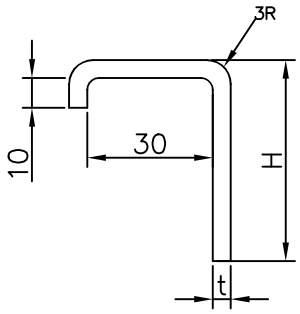
1.ALL BURRS AND SHARP EDGE PARTS ARE TO BE SMOOTHLY REMOVED BEFORE PAINTING/GALVANIZING.

2. FLAT BAR "FB2, FB4 AND 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 - FB2-70H/FB5-70H TO BE USED
   H > 70 & < 200 - FB2-200H/FB5-200H TO BE USED
   H > 200 & < 330 - FB2-330H/FB5-330H TO BE USED

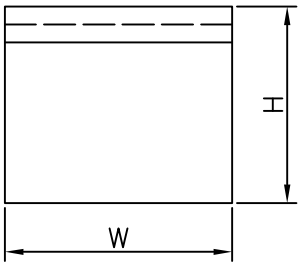
	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	23 / 83
	CABLE SADDLE - "SFG" TYPE	DRG NO: 038-K5700200 A	

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

TYPE-A

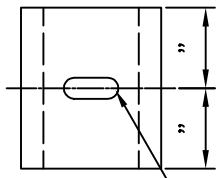


ELEVATION



LEFT SIDE VIEW

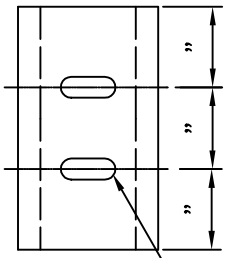
TYPE-A-1



PLAN

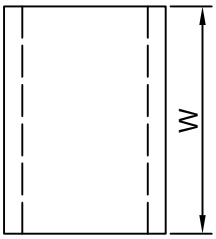
BIND HOLE
7x20xR3.5
(SFG-4 ONLY)

TYPE-A-2

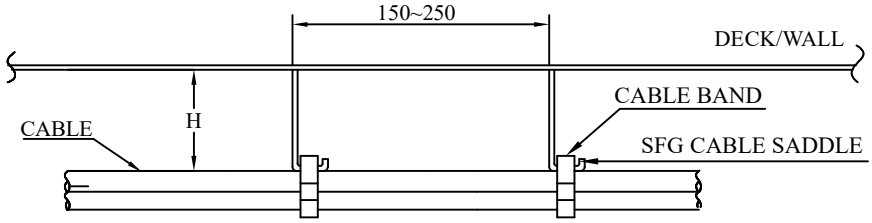


PLAN

BIND HOLE
7x20xR3.5
(SFG-5 ONLY)



PLAN



MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE		H	WEIGHT	W	R	t	REMARK
SFG2	-50H	50	0.1	40	3.0	3.0	TYPE-A
	-70H	70	0.14				
	-100H	100	0.2				
	-150H	150	0.27				
	-200H	200	0.30				
	-250H	250	0.35				
	-300H	300	0.46				
	-330H	330	0.48				
SFG4	-50H	50	0.13	75	3.0	3.0	TYPE-A-1
	-70H	70	0.35				
	-100H	100	0.63				
	-150H	150	0.7				
	-200H	200	0.75				
	-250H	250	1.01				
	-300H	300	1.12				
	-330H	330	1.16				
SFG5	-50H	50	0.35	100	3.0	3.0	TYPE-A-2
	-70H	70	0.37				
	-100H	100	0.75				
	-150H	150	0.79				
	-200H	200	0.83				
	-250H	250	1.02				
	-300H	300	1.15				
	-330H	330	1.16				

	CABLE WAY INSTALLATION MATERIALS	YARD NO:SH 038-039	24 / 83
	FITTING MATERIAL	DRG NO: 038-K5700200 A	

TABLE-1

DESCRIPTION		DRY SPACE (ENCLOSE AREA)		WEATHER EXPOSED DECK (WET SPACE)		UNDER LIQUID
ITEM	TYPE	MATERIAL	PAINT/GALV.	MATERIAL	PAINT/GALV.	(IN TANK)
CABLE HANGER LADDER TYPE	CROSS PIECE	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	
	SUPPORT	MS (IS 2062)	SHOP PRIMER (WITH FINAL PAINT)	MS (IS 2062)	SHOP PRIMER (WITH FINAL PAINT)	
	CUP SQUARE NECK BOLT	STEEL	GI	SS 316L		
	NUT	STEEL	GI	SS 316L		
	FLAT WASHER	STEEL	GI	SS 316L		
	RUNNER BAR	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	
CABLE SADDLE OTHERS	F.B	MS IS 1079	ZINC HOT DIP GALV. (WITH FINAL PAINT)	MS IS 1079	ZINC HOT DIP GALV. (WITH FINAL PAINT)	
	SFG	MS IS 1079	ZINC HOT DIP GALV. (WITH FINAL PAINT)	MS IS 1079	ZINC HOT DIP GALV. (WITH FINAL PAINT)	
CABLE COAMING	EC	STEEL SHEET IS 1079	SHOP PRIMER (WITH FINAL PAINT)	STEEL SHEET IS 1079	SHOP PRIMER (WITH FINAL PAINT)	
	DC					
	PIPE COAMING	SCH.40	SHOP PRIMER (WITH FINAL PAINT)	SCH.40	SHOP PRIMER (WITH FINAL PAINT)	
	MCT	AS PER MCT MAKER STANDARD				
BOLT,NUT & WASHER	BOLT,NUT	STEEL	GI	SS 316L		SS 316L
	FLAT WASHER	STEEL	GI	SS 316L		SS 316L
	SPRING WASHER	STEEL	GI	SS 316L		SS 316L
	WING BOLT & NUT	STEEL	GI	SS 316L / BRASS		SS 316L

NOTE

1. GALVANISED CABLE WAY MATERIALS WILL BE CUT AT SITE TO SUIT THE INSTALLATION REQUIREMENTS. SUCH CORRECTIONS WILL BE APPLIED WITH AREA PAINT CODE AFTER MODIFICATION.
2. IS : INDIAN STANDARD

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	25 / 83
	CABLE WAY SUPPORT-STANDARD NAMING	DRG NO: 038-K5700200 A	

PIECE MARK DETAILS →

1	2	3	4	5	6	7	8	9	10*	11
*	*	*	*	*	*	*	*	*		

DIGIT - 1 →

A	ANGLE BAR
F	FLAT BAR

DIGIT - 2 →

0	FLAT BAR 40x6
1	EQUAL ANGLE 30x30x3/32x32x3
2	EQUAL ANGLE 40x40x5
3	EQUAL ANGLE 45x45x5
4	EQUAL ANGLE 50x50x5
5	EQUAL ANGLE 65x65x6

3,4 →

T1	→	TYPE 1	Support With Pad for Single Tier Cable way
T2	→	TYPE 2	Support With out Pad for Single Tier Cable way
T3	→	TYPE 3	Support With Pad for Two Tier Cable way
T4	→	TYPE 4	Support With out Pad for Two Tier Cable way
T5	→	TYPE 5	Support With Pad for Three Tier Cable way
T6	→	TYPE 6	Support With out Pad for Three Tier Cable way
T7	→	TYPE 7	U -Shape Support With Pad
T8	→	TYPE 8	U -Shape Support With out Pad
S	→	SPECIAL TYPE	Special Type Support

5,6,7&8 →

X	X	X	X	Support Height in mm.

9 →

M	Mild Steel	Support Material ID

10,11 * →

W	1	Width 506mm
W	2	Width 556mm
W	3	Width 606mm
W	4	Width 656mm
W	5	Width 706mm

EXAMPLE PIECE MARK →

A	1	T	1	0	1	0	0	M	W*	1

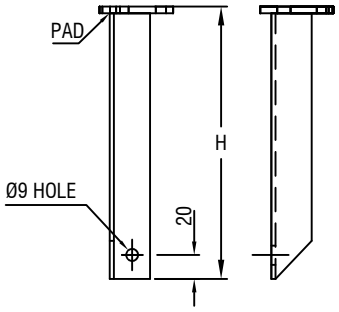
A - Angle support,
1 - 30mmx30mmx3mm,
T1 - With pad for single tier cable way,
0100 - 100mm Height.
M - Mild Steel
W1 - For Width 506mm

⊛ - Applicable only for U-Shape (T7 & T8)

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	26/83
	CABLE WAY SUPPORT DETAILS	DRG NO: 038-K5700200 A	

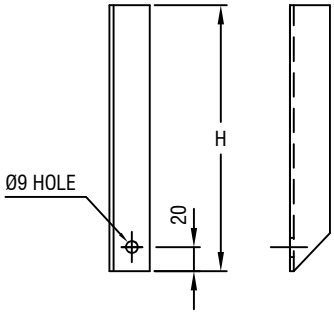
TYPE-1

SINGLE TIER CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



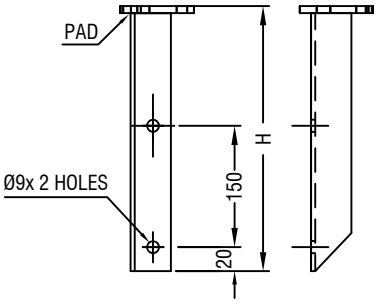
TYPE-2

SINGLE TIER CABLE RACK/HANGER SUPPORT WITH OUT PAD
ANGLE BAR / FLATBAR



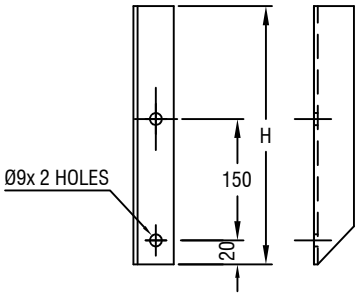
TYPE-3

DOUBLE TIER CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



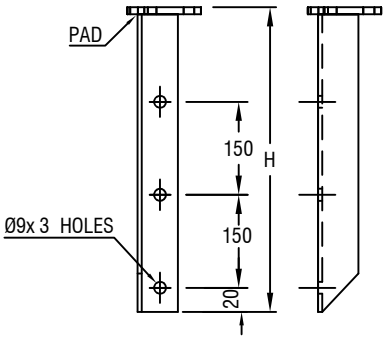
TYPE-4

DOUBLE TIER CABLE RACK/HANGER WITH OUT PAD
ANGLE BAR / FLATBAR



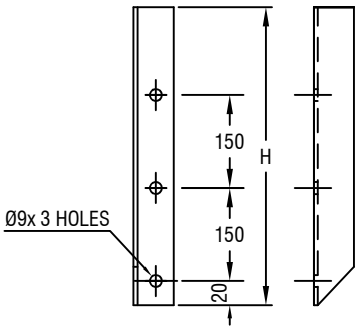
TYPE-5

THREE TIER CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



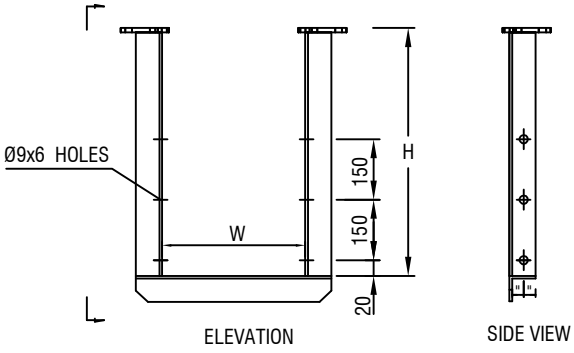
TYPE-6

THREE TIER CABLE RACK/HANGER SUPPORT WITH OUT PAD
ANGLE BAR / FLATBAR



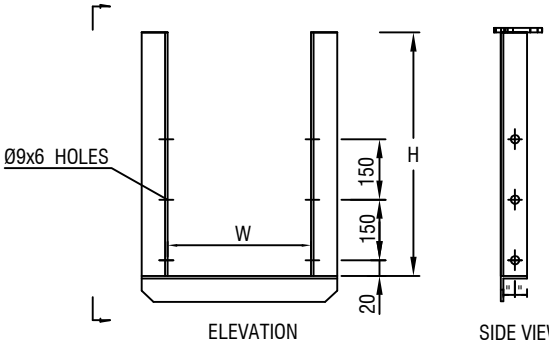
TYPE-7

CABLE RACK SUPPORT U-SHAPE WITH PAD.
ANGLE BAR



TYPE-8

CABLE RACK SUPPORT U -SHAPE WITHOUT PAD.
ANGLE BAR



NOTE:

1. SHARP EDGES OF ANGLE BARS TO BE TRIMMED.

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	27/83
	CABLE WAY SUPPORT-STANDARD NAMING	DRG NO: 038-K5700200 A	

PIECE MARK DETAILS →

1	2	3	4	5	6	7	8	9
*	*	*	*	*	*	*	*	*

DIGIT - 1 →

A	ANGLE BAR
F	FLAT BAR

DIGIT - 2 →

0	FLAT BAR 40x6
1	EQUAL ANGLE 30x30x3/32x32x3
2	EQUAL ANGLE 40x40x5
3	EQUAL ANGLE 45x45x5
4	EQUAL ANGLE 50x50x5
5	EQUAL ANGLE 65x65x6

3,4 →

Z1	→	TYPE 1	Support With Pad for Single Tier Z-Type Cable way
Z2	→	TYPE 2	Support With out Pad for Single Tier Z-Type Cable way
Z3	→	TYPE 3	Support With Pad for Two Tier Z-Type Cable way
Z4	→	TYPE 4	Support With out Pad for Two Tier Z-Type Cable way
Z5	→	TYPE 5	Support With Pad for Three Tier Z-Type Cable way
Z6	→	TYPE 6	Support With out Pad for Three Tier Z-Type Cable way
S	→	SPECIAL TYPE	Support Details Will be send with corresponding Fab. Drg.

5,6,7& 8 →

X	X	X	X	Support Height in mm.

9 →

M	Mild Steel	Support Material ID

EXAMPLE PIECE MARK →

A	1	Z	1	0	4	0	0	M

A - Angle Support,

1 - 30mm x 30mm x 3mm,

Z1 - With Pad for Single Tier Z-Type Cable way,

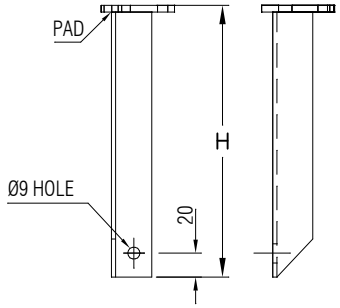
0400 - 400mm Height.

M - Mild Steel

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	28 / 83
	CABLE WAY SUPPORT DETAILS	DRG NO: 038-K5700200 A	

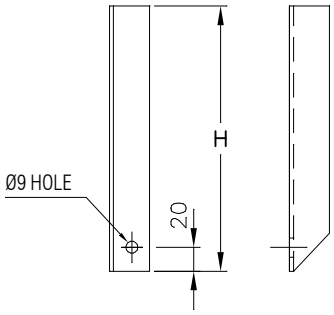
TYPE-Z1

SINGLE TIER Z-TYPE CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



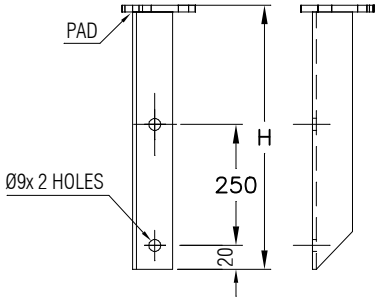
TYPE-Z2

SINGLE TIER Z-TYPE CABLE RACK/HANGER SUPPORT WITH OUT PAD
ANGLE BAR / FLATBAR



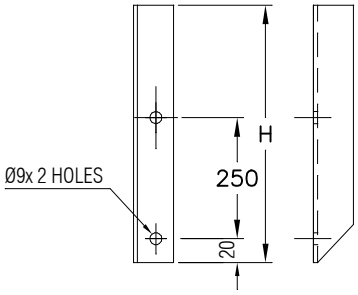
TYPE-Z3

DOUBLE TIER Z-TYPE CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



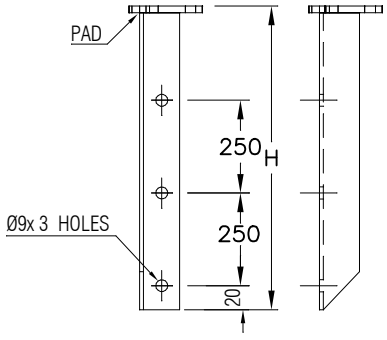
TYPE-Z4

DOUBLE TIER Z-TYPE CABLE RACK/HANGER WITH OUT PAD
ANGLE BAR / FLATBAR



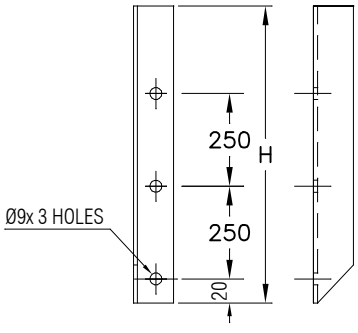
TYPE-Z5

THREE TIER Z-TYPE CABLE RACK/HANGER SUPPORT WITH PAD
ANGLE BAR / FLATBAR



TYPE-Z6

THREE TIER Z-TYPE CABLE RACK/HANGER SUPPORT WITH OUT PAD
ANGLE BAR / FLATBAR



NOTE:

1.SHARP EDGES OF ANGLE BARS TO BE TRIMMED.

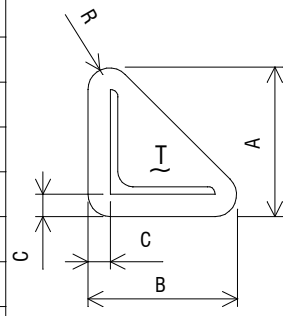
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	29 / 83
	PAD DETAILS	DRG NO: 038-K5700200 A	

SCOPE:

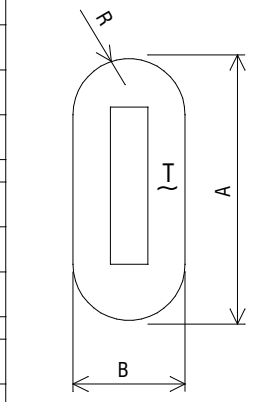
THIS STANDARD COVERS PAD FOR CABLE RACK SUPPORTS AND GENERAL USE.

1. SHAPE AND DIMENSIONS: Shall be as shown in following table.
2. MATERIAL: Steel plate

ANGLE SUPPORT PAD DIMENSION

TYPE		DIMENSION					WEIGHT (Kg/M)	ANGLE DIMENSION
PIECE MARK	SKETCH	A	B	C	R	T		
L1		55	55	12	10	5	0.06	30X30X5, 30X30X3, 32X32X3
L2		65	65	12	15	5	0.10	40X40X3, 40X40X5, 40X40X6
L3		70	70	12	15	5	0.11	45X45X5, 45X45X6
L4		75	75	12	15	5	0.13	50X50X4, 50X50X5, 50X50X6
L5		85	85	12	15	6	0.24	60X60X6
L6		90	90	12	15	6	0.43	65X65X8, 65X65X6
L7		95	95	12	15	6	0.47	70X70X8
L8		100	100	12	15	6	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

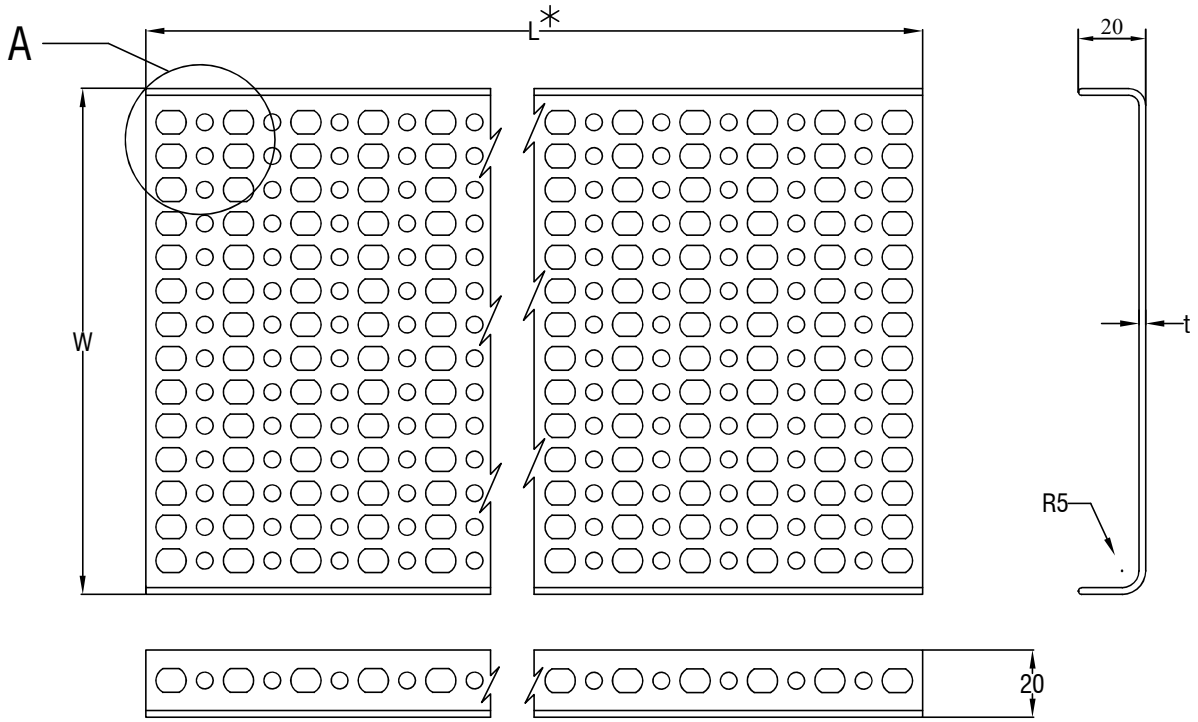
TYPE		DIMENSION				WEIGHT (Kg/M)	FLATBAR DIMENSION
PIECE MARK	SKETCH	A	B	R	T		
G1		60	32	16	5	0.06	26X4 FB, 26X6 FB
G2		70	32	16	5	0.07	38X4.5,35X6,38X6,40X3,40X6 FB
G3		80	32	16	5	0.07	50X4, 50x6 FB
G4		100	32	16	5	0.09	65X6,65X8FB
G5		100	32	16	5	0.09	75X6, 75X4FB
G6		140	32	16	5	0.16	100x3,100X4, 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

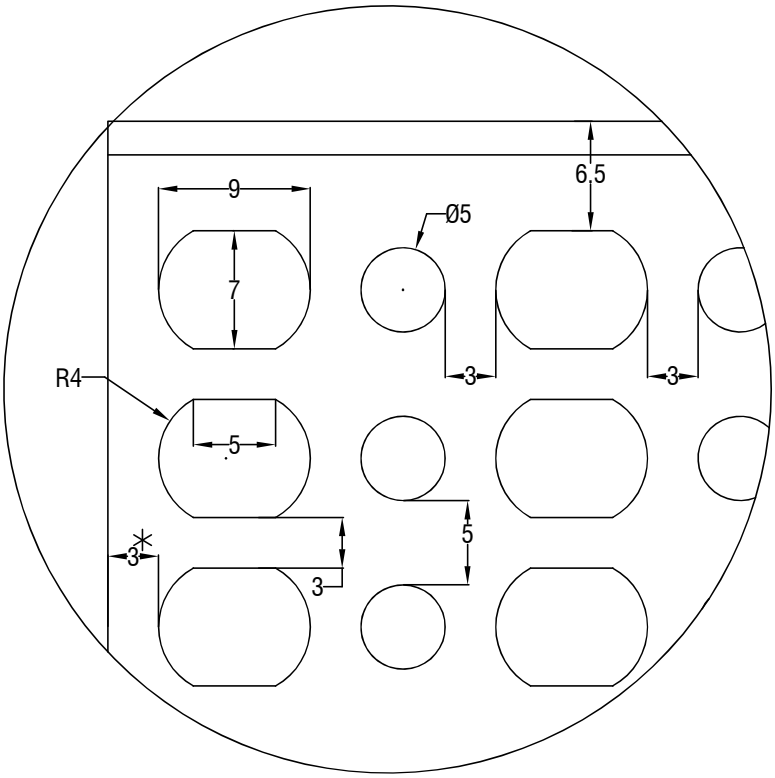
PAD APPLICATION

1. All cable routes and equipment seats on side shell, outer bulkheads/decks and tank boundaries.
2. Main cable routes on inner decks/bulkheads(400mm width and above).
3. Equipment seats except seat with perforated plates on inner bulkheads / decks.

	EQUIPMENTS INSTALLATION MATERIALS	YARD NO:SH 038-039	30 / 83
	PERFORATED PLATE	DRG NO: 038-K5700200 A	

PERFORATED PLATE IS USED FOR FIXING OF EQUIPMENTS





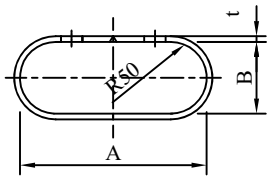
DETAIL- A

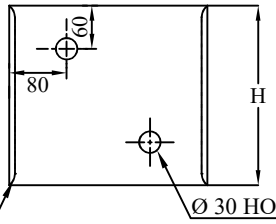
TABLE- 1 SL.NO.	PIECE MARK	WIDTH W (mm)	LENGTH L (mm)	THICK t (mm)
1	RM 150	150	1200	1.6
1	RM 200	200	1200	1.6
2	RM 300	300	1200	1.6
3	RM 400	400	1200	1.6
4	RM 500	500	1200	1.6
5	RM 600	600	1200	1.6

1) MATERIAL : STEEL IS 1079 + ZINC HOT GALVANISED FOR STEEL DECK/BULKHEAD

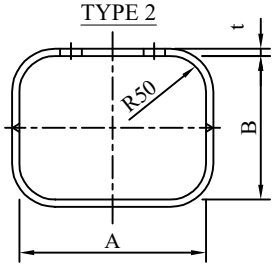
	CABLE PENETRATION	YARD NO:SH 038-039	31/83
	CABLE COAMING	DRG NO: 038-K5700200 A	

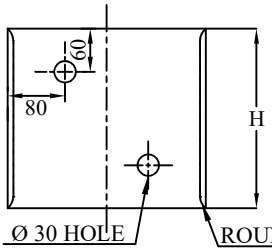
TYPE 1



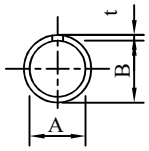


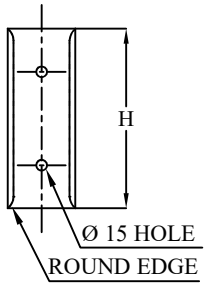
TYPE 2





TYPE 3





HOLES DIA 30 or DIA 15 REQUIRED ONLY FOR COAMINGS TYPE "ECA".

* "XX" : "DC" OR "EC" & "XXX" : "DCA" OR "ECA"

MATERIAL : STEEL PLATE

PIECE MARK	SIZE					TYPE	WEIGHT(kg)		REMARK
	A	B	t	H					
				DCA ECA	DC EC		DCA ECA	DC EC	
XX / XXX - 1610	160	100	8	200	100	1	7.79	3.89	
XX / XXX - 2110	210	100	8	200	100	1	9.04	4.52	
XX / XXX - 2610	260	100	8	200	100	1	10.30	5.15	
XX / XXX - 2615	260	150	8	200	100	2	11.56	5.78	
XX / XXX - 2620	260	200	8	200	100	2	12.81	6.41	
XX / XXX - 3610	360	100	8	200	100	1	12.81	6.41	
XX / XXX - 3615	360	150	8	200	100	2	14.07	7.03	
XX / XXX - 3620	360	200	8	200	100	2	15.32	7.66	
XX / XXX - 3632	360	320	8	200	100	2	18.34	9.17	
XX / XXX - 4610	460	100	8	200	100	1	15.32	7.66	
XX / XXX - 4615	460	150	8	200	100	2	16.58	8.29	
XX / XXX - 4620	460	200	8	200	100	2	17.84	8.92	
XX / XXX - 4625	460	250	8	200	100	2	19.09	9.55	
XX / XXX - 4632	460	320	8	200	100	2	20.85	10.42	
XX / XXX - 5610	560	100	8	200	100	1	17.84	8.92	
XX / XXX - 5615	560	150	8	200	100	2	19.09	9.55	
XX / XXX - 5620	560	200	8	200	100	2	20.35	10.17	
XX / XXX - 5632	560	320	8	200	100	2	23.36	11.68	
XX / XXX - 6610	660	100	8	200	100	1	20.35	10.17	
XX / XXX - 6615	660	150	8	200	100	2	21.60	10.80	
XX / XXX - 6620	660	200	8	200	100	2	22.86	11.43	
XX / XXX - 6625	660	250	8	200	100	2	24.12	12.06	
XX / XXX - 6632	660	320	8	200	100	2	25.87	12.94	
XX / XXX - 7610	760	100	8	200	100	1	22.86	11.43	
XX / XXX - 7615	760	150	8	200	100	2	24.12	12.06	
XX / XXX - 7620	760	200	8	200	100	2	25.37	12.69	
XX / XXX - 7632	760	320	8	200	100	2	28.39	14.19	
XX / XXX - 8615	860	150	8	200	100	2	26.63	13.31	
XX / XXX - 8620	860	200	8	200	100	2	27.88	13.94	
SPECIAL									CASE BY CASE

XX / XXX - 50A	52.7	52.7	3.9	200	100	3	1.08	0.54	SCH. 40
XX / XXX - 80A	78.1	78.1	5.5	200	100	3	2.25	1.13	"
XX / XXX - 100A	102.3	102.3	6	200	100	3	3.19	1.60	"

XX / XXX - 50A	49.2	60.3	5.54	100	250	3	0.74	1.48	SCH. 80
XX / XXX - 80A	73.6	88.9	7.62	100	250	3	1.52	3.04	"
XX / XXX - 100A	97.18	114.3	8.56	100	250	3	2.23	4.46	"

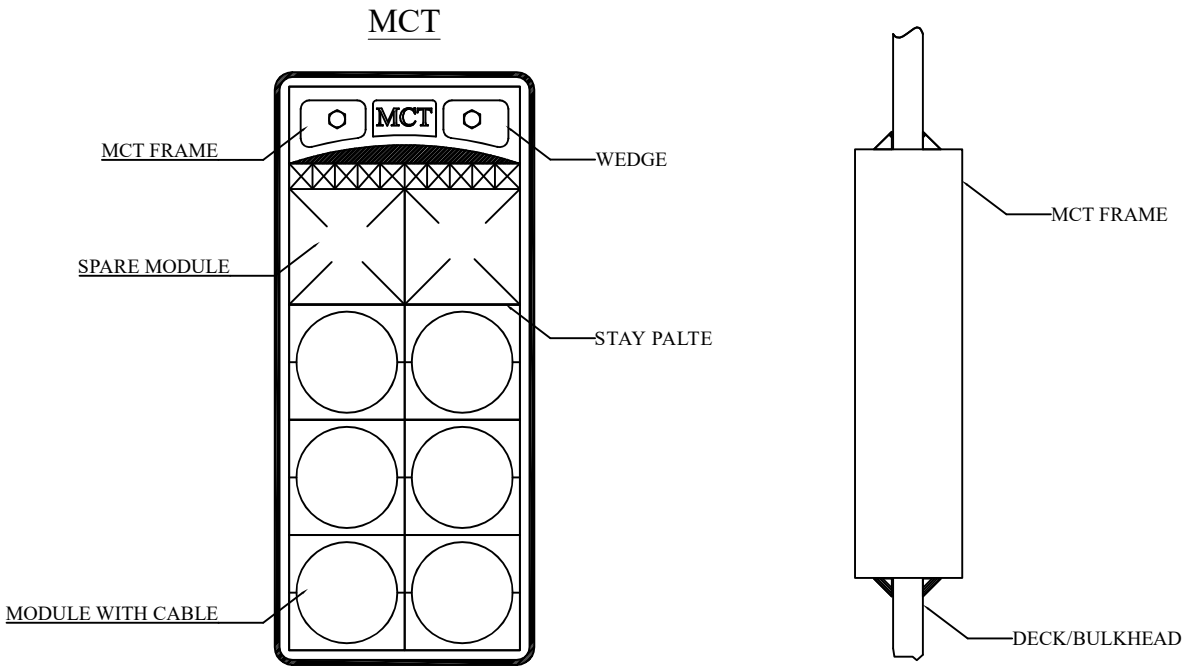
"ECA" - COAMINGS PROVIDED ON BULKHEAD (STEEL) (Fixing Horizontal Direction with Compound filling holes)

"EC" - COAMINGS PROVIDED ON BULKHEAD (STEEL) (Without holes for the use of RISE)

"DCA / DC" - COAMINGS PROVIDED ON DECK (STEEL) (Fixing on Vertical Direction - No Compound filling holes.)

	CABLE PENETRATION	YARD NO:SH 038-039	32 / 83
	MCT FRAME	DRG NO: 038-K5700200 A	

CABLE PENETRATION THROUGH WATER TIGHT BULK HEAD / DECK

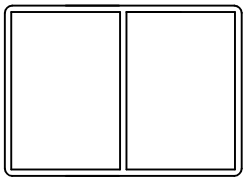


MCT AxB

A= Number of Horizontal Frames or openings
B= Number of Frames or openings per row

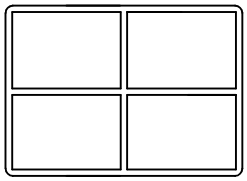
Example.

1.



MCT 2x1

2.



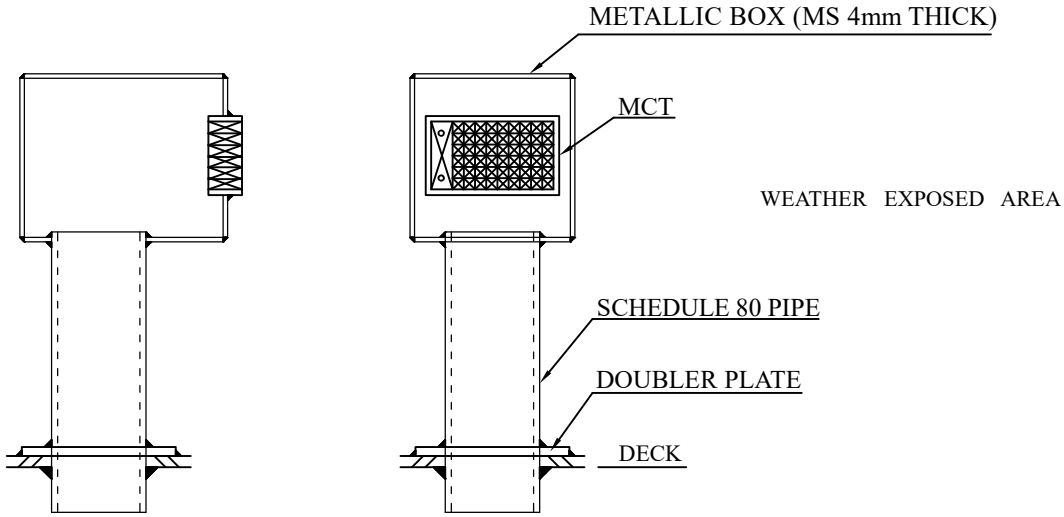
MCT 2x2

NOTE:

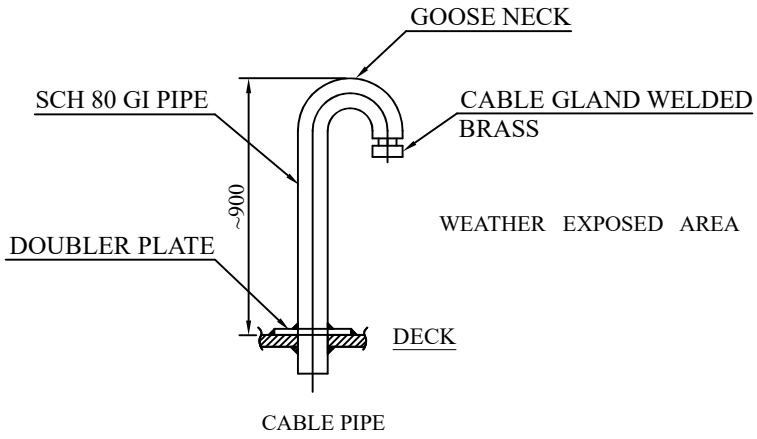
1. MATERIAL OF MCT FRAME: PRIMED STEEL FOR STEEL DECK/ BULKHEAD.
   INNER PART OF THE MCT SHALL NOT BE PAINTED

	CABLE PENETRATION	YARD NO:SH 038-039	33/83
	CABLE PENETRATION TO WEATHER EXPOSED AREA	DRG NO: 038-K5700200 A	

CABLE PENETRATION PIPE



GOOSE NECK



* CAN BE USED MCT FOR MULTIPLE CABLE INSTALLATION

	CABLE PENETRATION	YARD NO:SH 038-039	34/83
	MARINE WATERTIGHT CABLE GLANDS BULKHEAD / DECK MOUNTED TYPE	DRG NO: 038-K5700200 A	

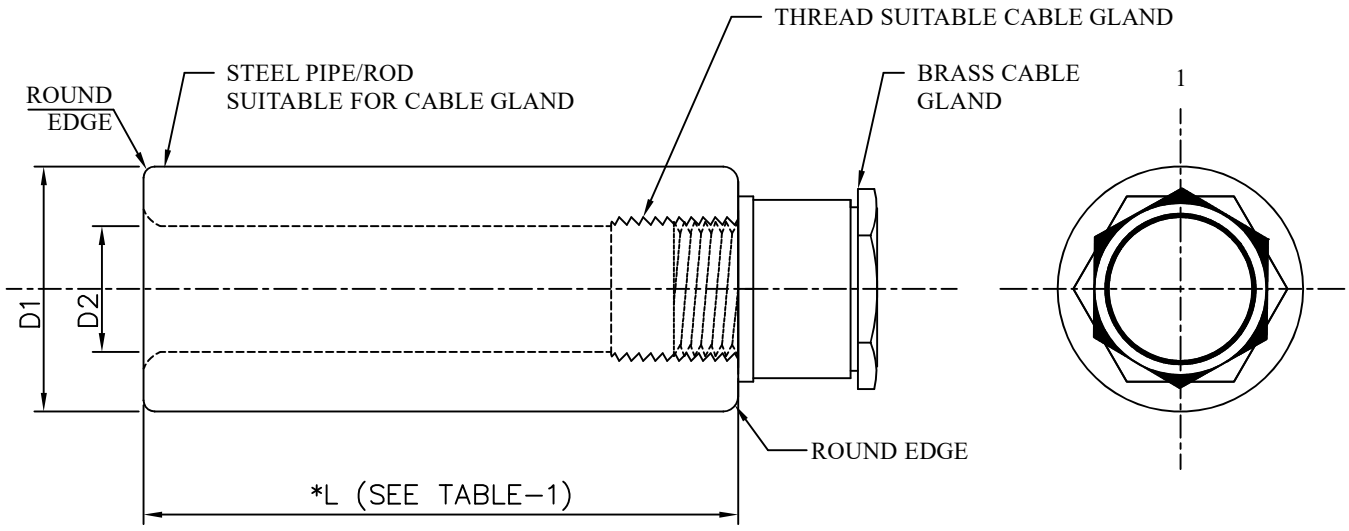


TABLE-1

NO.	NAME	*LENGTH (L) (MM)
1	G20*-30	300
2	G20-20	200
3	G20-10	100
3	G20-05	50

* G20 MEANS THE GLAND SIZE USED FOR INSTALLATION

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

DIMENSION TABLE

NOMINAL SIZE	PIPE THREAD		WASHER AND GASKET						GLAND												
	NOMINAL SIZE	THREAD DIA (d)	MARK	d1	d 5	D	t	t1	d2	D1	L	l	B1	b	d3	d4	D2	l1	l2	L1	
G 10	PF 3/8	16.662	A	8	7	14	1.6	8	10	22	19	14	17	4	10	15	20	15	5	100	
			B	9	8																
G 15	PF 1/2	20.955	A	10	9	18		9	15	28	21	16	22		15	18.7	25	17	6	100	
			B	11	10															330	
			C	12	11															750	
G 20	PF 3/4	26.441	A	13	12	23		12	20	34	22	17	28	6	20	24.2	32	18	8	100	
			B	15	13															330	
			C	17	15															750	
G 25	PF 1	33.249	A	18	16	29		14	25	42	25	19	34		25	30.3	38	20	10	100	
			B	20	18															330	
			C	22	20															750	
G 30	PF 1 1/4	41.910	A	24	22	38		15	30	50	28	28	42	8	30	39	48.6	21	11	100	
			B	26	24															330	
			C	28	26															750	
G 35	PF 1 1/2	47.803	A	30	28	44	2	16	35	56	29	21	48		40	44.9	57	22	12	100	
			B	32	30															330	
G 40			A	34	32				40											750	
			B	36	34															100	
G 45	PF 2	59.614	A	38	36	55		19	45	70	34	24	60	10	50	56.7	70	25	14	330	
			B	40	38																
			C	42	40															100	
G 50			A	44	42				50											330	
			B	46	44																
G 55	PF 2 1/2	75.184	A	48	46	73		24	55	86	39	29	76		60	72.3	82.6	30	16	100	
			B	50	48															330	
			C	52	50																
G 60			A	54	52				60											100	
			B	56	54															330	
			C	58	56																

CABLE INSTALLATION MATERIALS

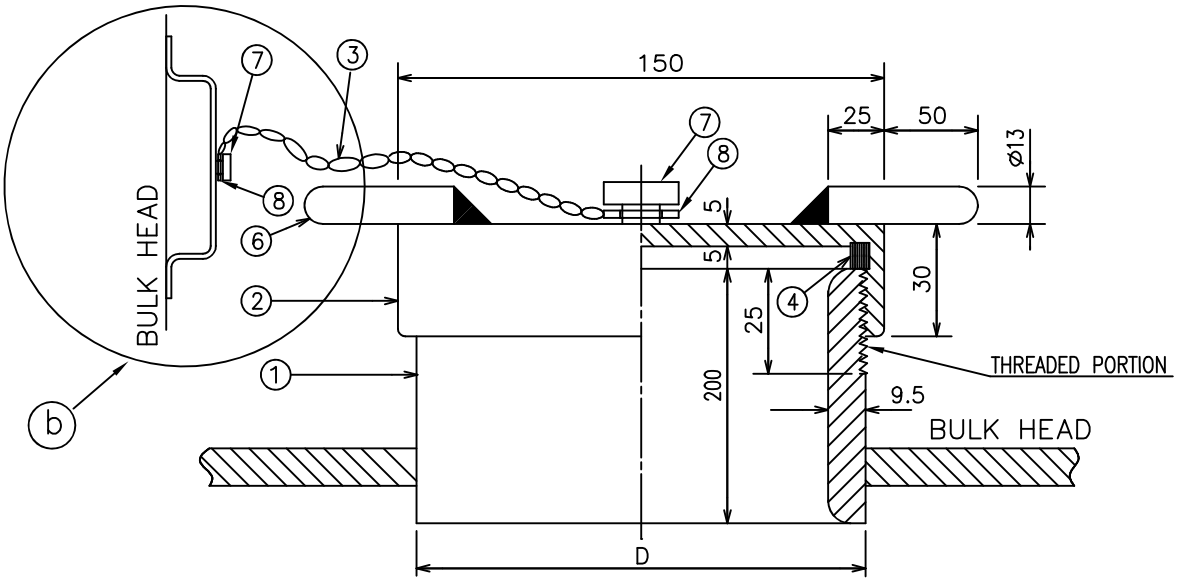
MARINE WATERTIGHT CABLE GLANDS BULKHEAD / DECK MOUNTED TYPE

YARD NO:SH 038-039

DRG NO: 038-K5700200 A

	CABLE PENETRATION	YARD NO:SH 038-039	36 / 83
	SHORE CONNECTION PIECE-PGS-125A (SCREW TYPE)	DRG NO: 038-K5700200 A	

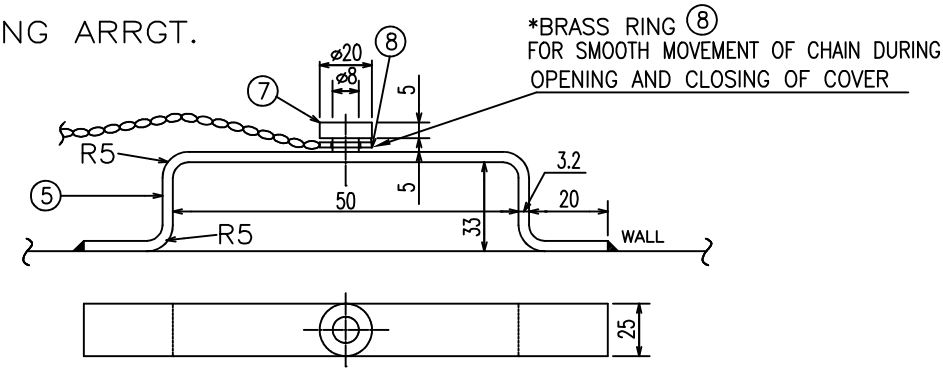
1. FOR LAYING SHORE CONNECTION CABLE



D – DEPENDS ON THE SHORE CONN. CABLE OUTER DIA.

DETAIL (b)

CHAIN HOLDING ARRGT.



*DIMENSION SHOWN IS FOR SHORE CONNECTION PIECE WITH 125NB PIPE

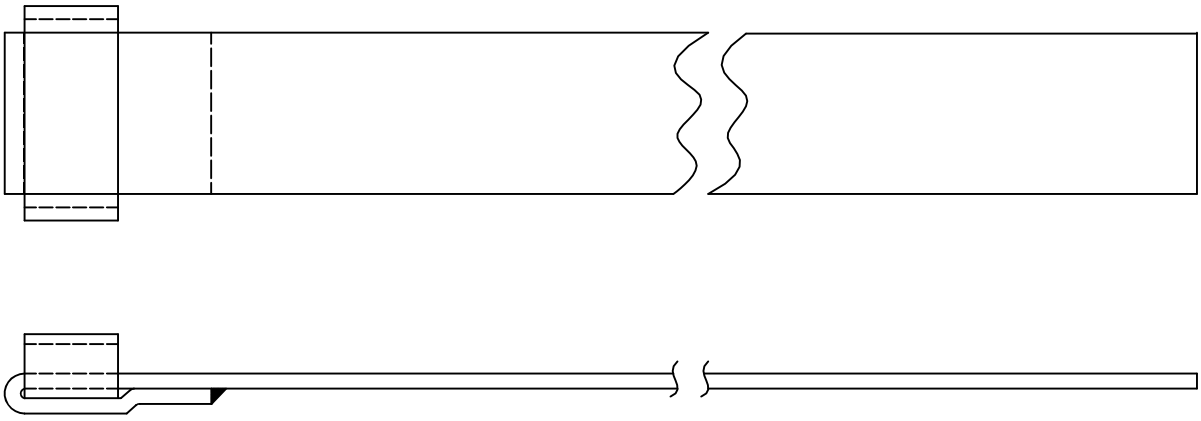
NO	NAME	MATERIAL	REMARK
1	BODY	125NB	SCH.80 ERW ELECTRO GALV.
2	COVER	BRASS	5MM THK
3	CHAIN	BRASS	400 MM (ø1.6)
4	PACKING	RUBBER	
5	CHAIN FASTNER	MS SHEET	25 X 3.2T F.B (ELECTRO GALV.)
6	HANDLE	BRASS	ø13 ROUND BAR
7	CHAIN FIXER	BRASS	
8	BRASS RING	BRASS	INSIDE DIA. 15MM, THK 2MM

NOTES:–

1) SHORE CONNECTION PIECE SHALL BE DESIGNATED BY THE NAME PGS-XXXA (XXX DENOTED PIPE N.B)

2) PIPE EDGES TO BE SMOOTHEN AFTER FABRICATION FOR AVOIDING DAMAGE TO CABLES.

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	37/83
	ELECTRIC CABLE BAND WITH BUCKLE (316 STAINLESS STEEL)	DRG NO: 038-K5700200 A	

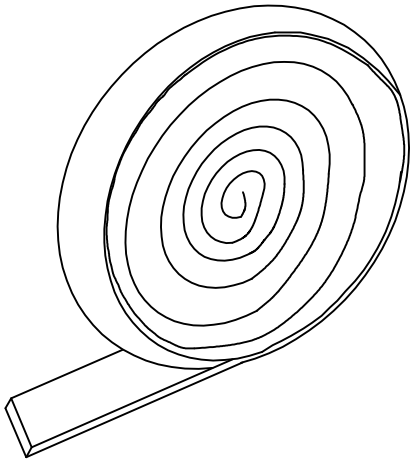


NOTE

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

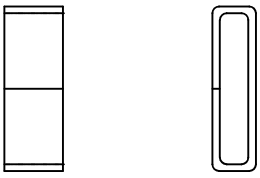
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	38/83
	ELECTRIC CABLE STRAP FOR BANDING & BAND BUCKLE	DRG NO: 038-K5700200 A	

CABLE STRAP

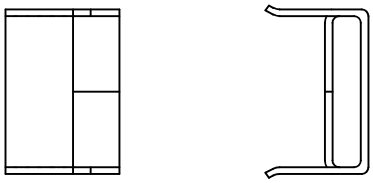


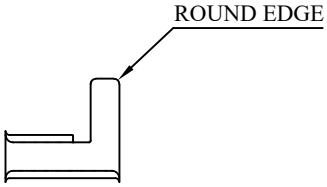
BAND BUCKLE

TYPE1



TYPE2



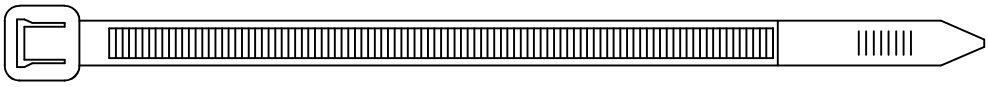


NOTE

1. MATERIAL : STAINLESS STEEL
2. DIMENSIONS OF CABLE STRAP AND BAND BUCKLE ACCORDING TO THE MAKER DETAILS.
3. BAND BUCKLES SHALL BE SELECTED IN ACCORDANCE WITH GROUPING SIZE OF CABLES AND KIND OF CABLE BAND.

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	39/83
	CABLE TIES	DRG NO: 038-K5700200 A	

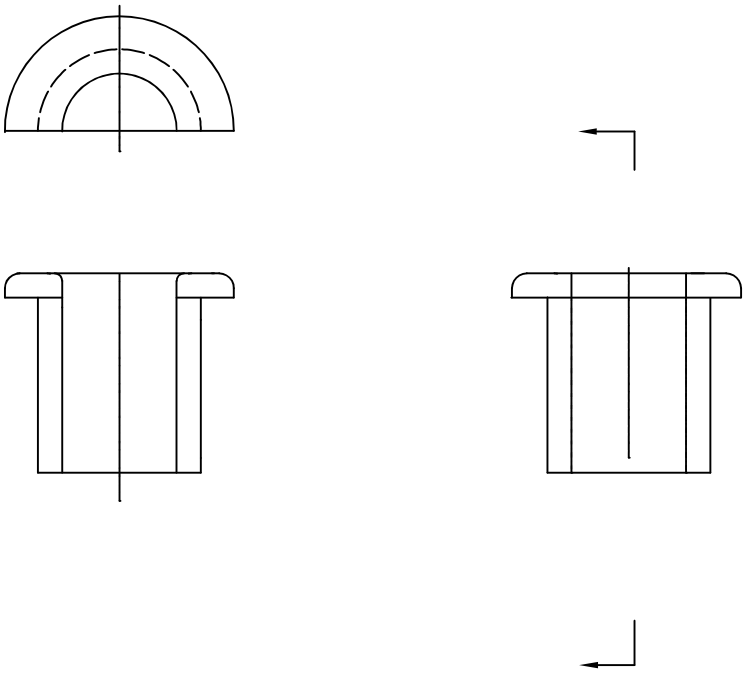
LOCKING CABLE TIE



NOTE

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

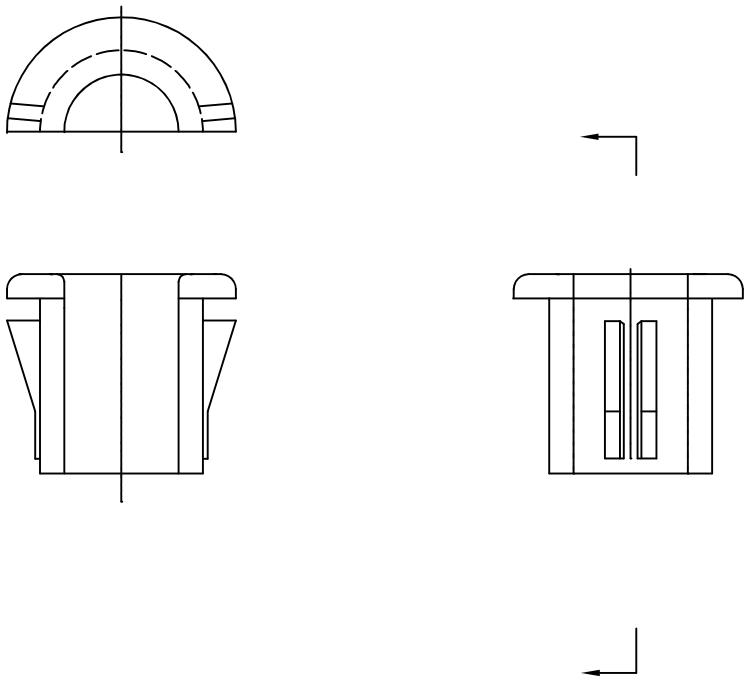
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	40/83
	VINYL BUSHING	DRG NO: 038-K5700200 A	



NOTE

1. MATERIAL : VINYL
2. LENGTH & WIDTH : SHALL BE DECIDED BY THE CABLE SIZE
3. USED FOR CABLE HAVE TO PASS THROUGH NON-WATERTIGHT BULKHEAD AND HOLE DRILLED IN SHEETS OF STRUCTURAL STEEL

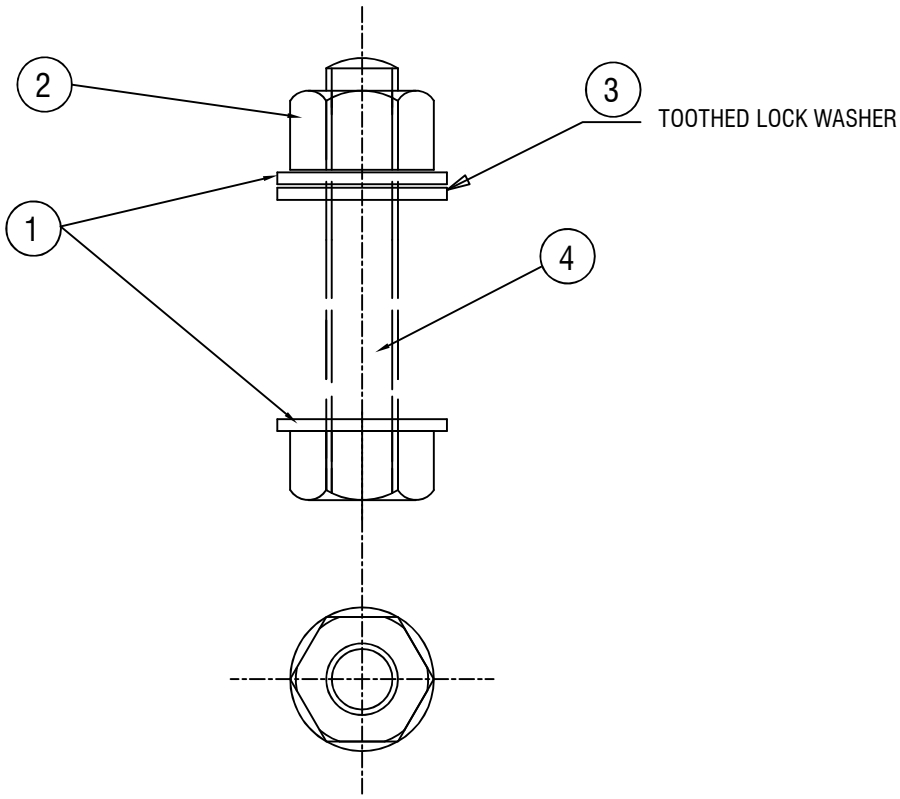
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	41/83
	VINYL BUSHING(SPRING TYPE)	DRG NO: 038-K5700200 A	



NOTE

1. MATERIAL : VINYL
2. LENGTH & WIDTH : SHALL BE DECIDED BY THE CABLE SIZE
3. USED FOR CABLE HAVE TO PASS THROUGH NON-WATERTIGHT BULKHEAD AND HOLE DRILLED IN SHEETS OF STRUCTURAL STEEL

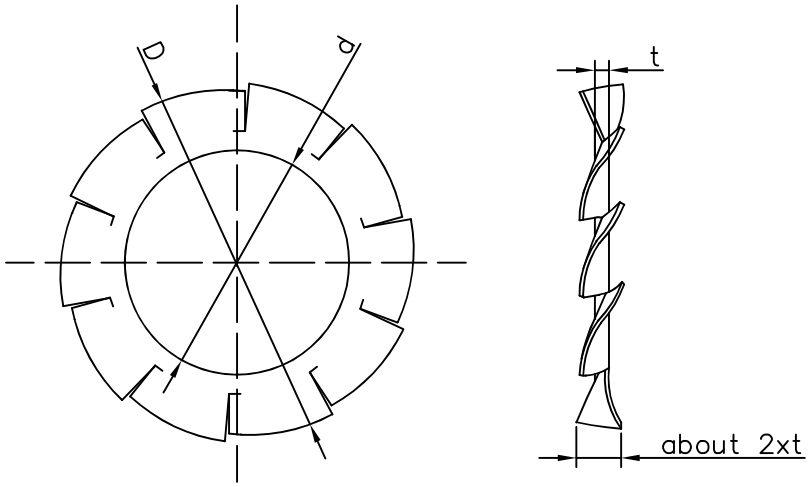
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	42/83
	EARTH BOLT	DRG NO: 038-K5700200 A	



EARTHBOLT(1NO. SS316L HEX.BOLT&NUT+2NOS. SS316L PLATEWAHSER ISO7089+1NO. SPRINGSTEEL EXT. TOOTHLOCKWASHER

SYMBOL	NAME	QTY	MATERIAL	REMARKS
1	PLATE WASHER	2	Stainless Steel	
2	NUT	1	Stainless Steel	
3	TOOTHED LOCK WASHER	1	Spring Steel	
4	BOLT	1	Stainless Steel	

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	43/83
	TOOTHED LOCK WASHER FOR EARTHING	DRG NO: 038-K5700200 A	

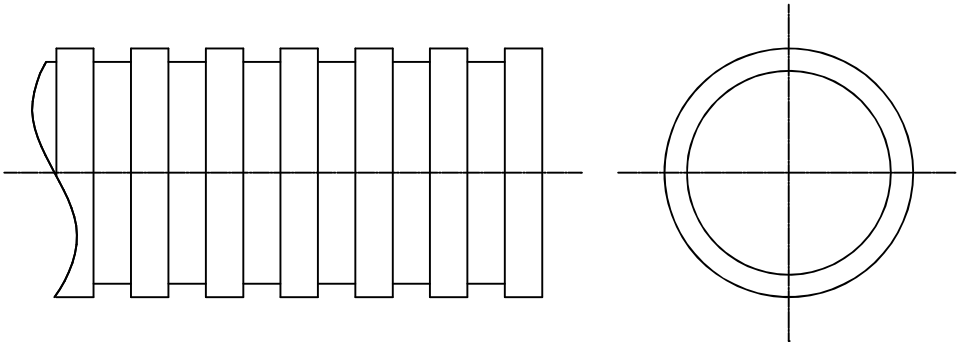


MATERIAL: SPRING STEEL

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

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	44/83
	FLEXIBLE CABLE CONDUIT	DRG NO: 038-K5700200 A	

HALOGEN FREE, FLAME RETARDANT, TEMPERATURE RESISTANT.(−40'C ~ +100'C)

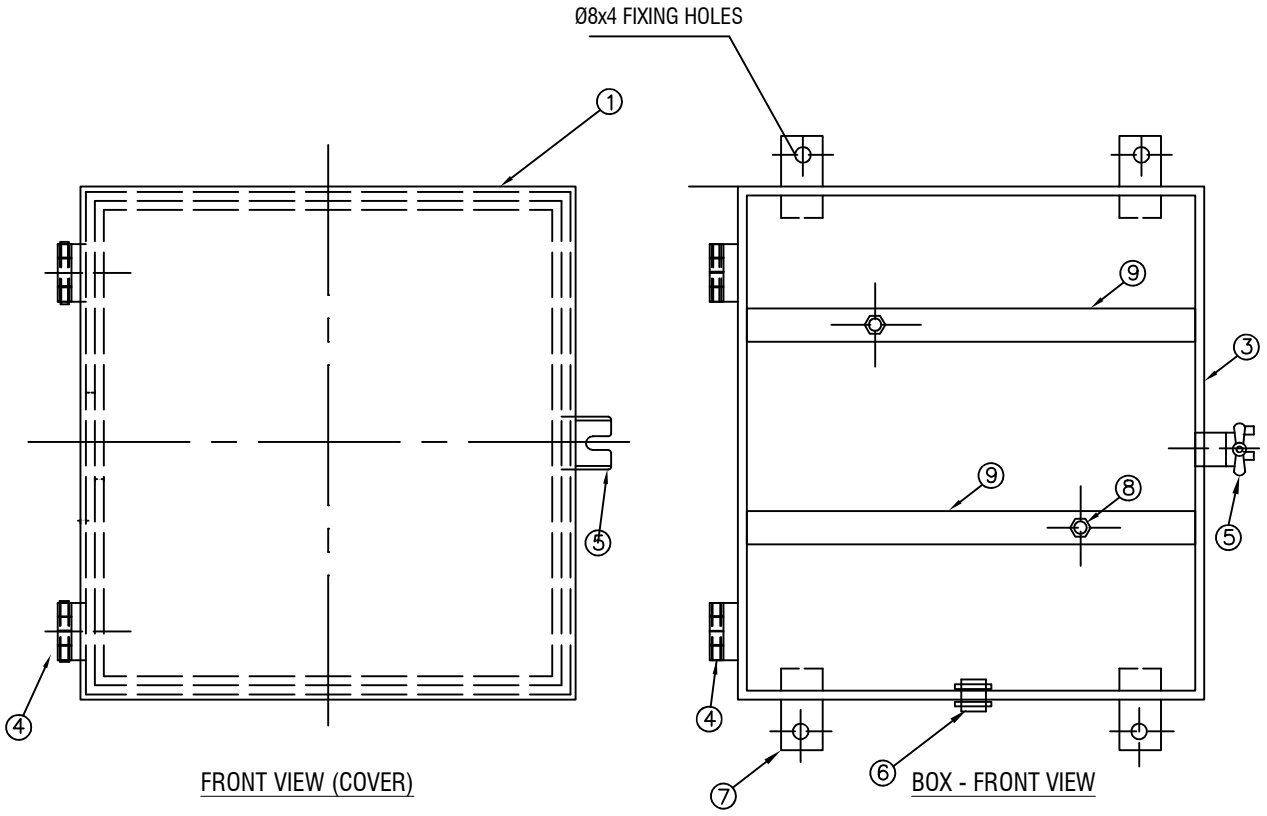


SYMBOL	DIMENSION		LENGTH/UNIT (M)	REMARK
	AØ	BØ		
FCC -12	9.5	13.0	50	
16	11.5	16.0	50	
20	14.6	20.0	50	
25	18.8	25.0	50	
32	25.0	32.0	25	
40	31.2	40.0	25	
50	39.6	50.0	25	
63	52.6	63.0	25	

NOTE

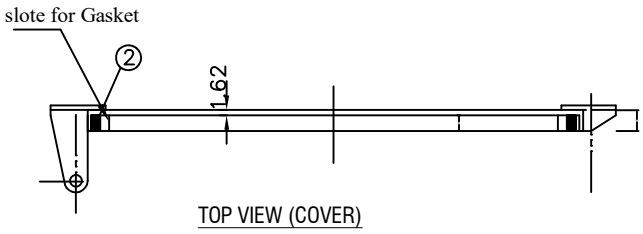
1. MATERIAL : PVC
2. HALOGEN FREE, FLAME RETARDANT, TEMPERATURE RESISTANT.(-40'C ~ +100'C)
3. COLOUR : BLACK or GREY
4. USED FOR THE SITUATION WHERE THERE IS AN EXCEPTIONAL RISK OF MECHANICAL DAMAGE ON CABLES. EX. IN HOLDS, STORAGE , CARGO SPACE ETC.

	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	45/83
	PROTECTION BOX (W/T) TYPICAL ARRANGEMENT	DRG NO: 038-K5700200 A	

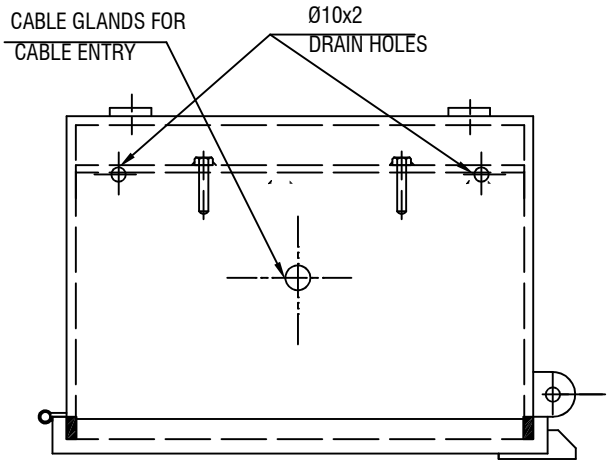


FRONT VIEW (COVER)

BOX - FRONT VIEW



TOP VIEW (COVER)



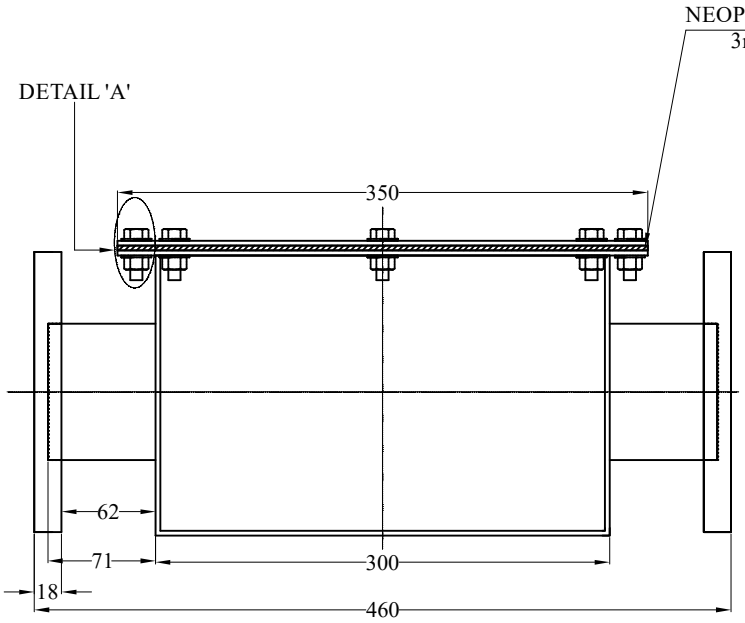
BOX & COVER TOP VIEW

NO.	ITEM	MATERIAL	QTY/ BOX	REMARKS
①	COVER	SUS 316	1	1.62THK/ 16 SWG
②	GASKET	NEOPRENE	1	15x5
③	BODY/ BOX	SUS 316	1	1.62THK/ 16 SWG
④	HINGE	SUS 316	2	3Thk
⑤	BUCKLE	BRASS	1	
⑥	CABE GLANDS	BRASS	1	
⑦	FIXING LEG	SUS 316	4	
⑧	BOLT With NUT and WASHER	SUS 316	2	
⑨	FIXING PLATE			

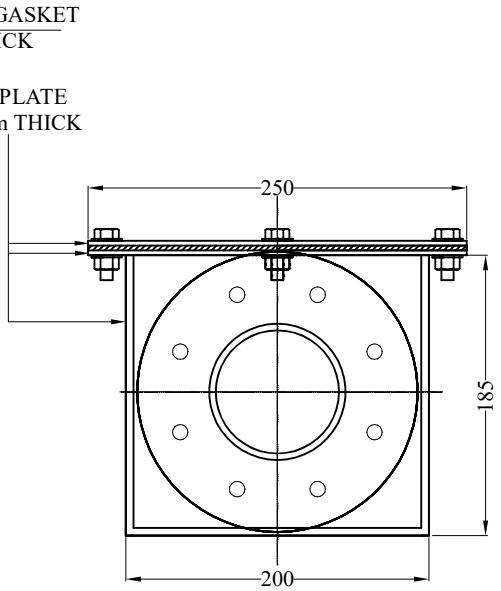
SUS: JAPANESE INDUSTRIAL STANDARD (JIS) STAINLESS STEEL

APPLICATION: SWITCHES/SOCKETS AND PUSH BUTTONS INSTALLED IN WEATHER EXPOSED AREA.

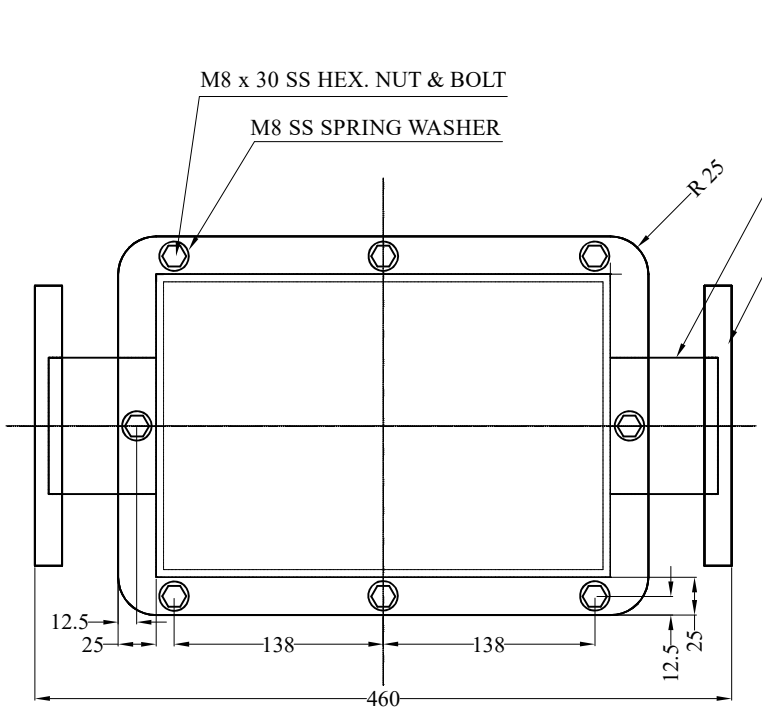
	CABLE INSTALLATION MATERIALS	YARD NO:SH 038-039	46/83
	CABLE/DRAW BOX	DRG NO: 038-K5700200 A	



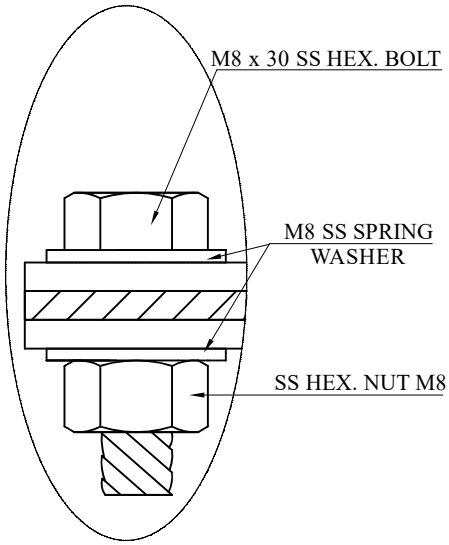
ELEVATION



SIDE VIEW



PLAN



DETAIL 'A'

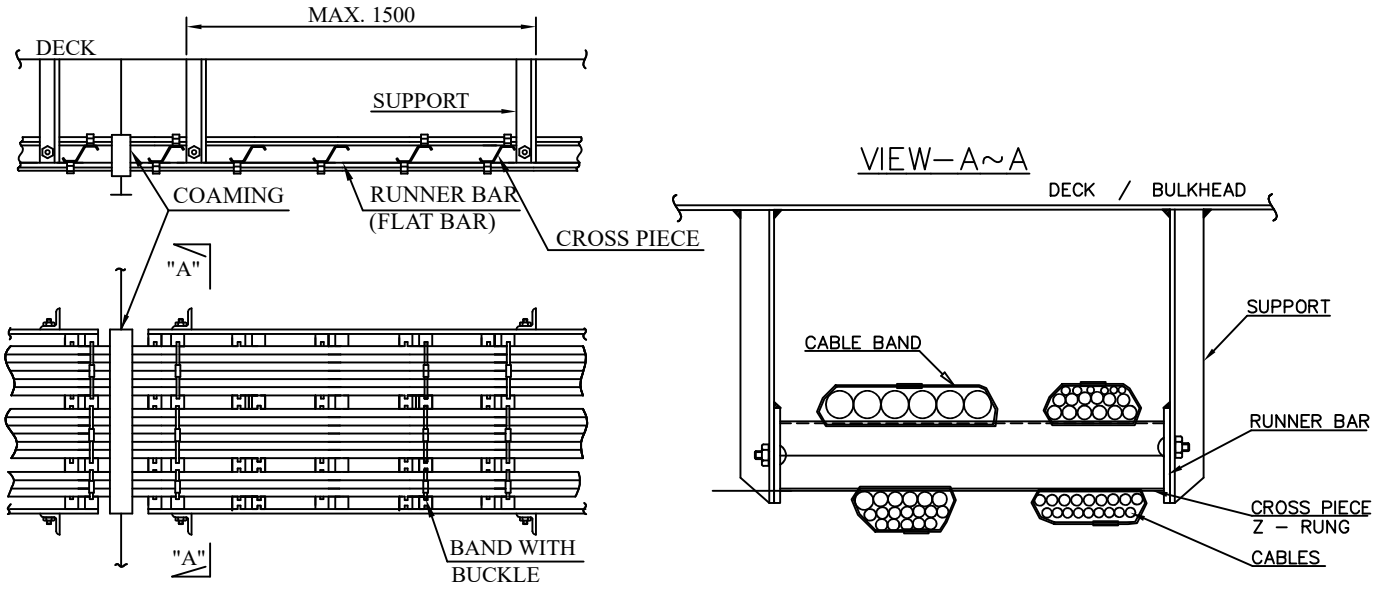
NOTE

1) ALL DIMENSIONS ARE IN MM
2) THE CABLE BOX SHALL BE DESIGNATED AS EXP/CB-01,EXP/CB-02 ETC.
3) THE PIPE AND PLATE EDGES SHALL BE SMOOTHENED AFTER FABRICATION TO AVOID DAMAGES TO CABLES.
4) PIPE AND BOX SIZE MAY VARY ACCORDING TO THE ACTUAL REQUIREMENT.
5) THE CABLE BOX IS PAINTED AFTER FABRICATION BASED ON AREA OF INSTALLATION.

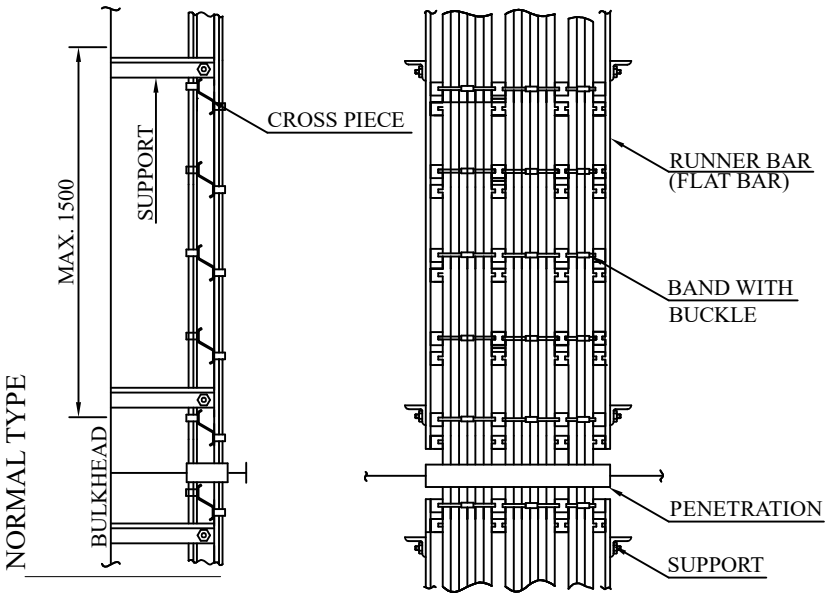
	INSTALLATION OF CABLE WAY	YARD NO:SH 038-039	47/83
	HORIZONTAL CABLE RACK Z TYPE	DRG NO: 038-K5700200 A	

TYPICAL ARRANGEMENT

NORMAL TYPE

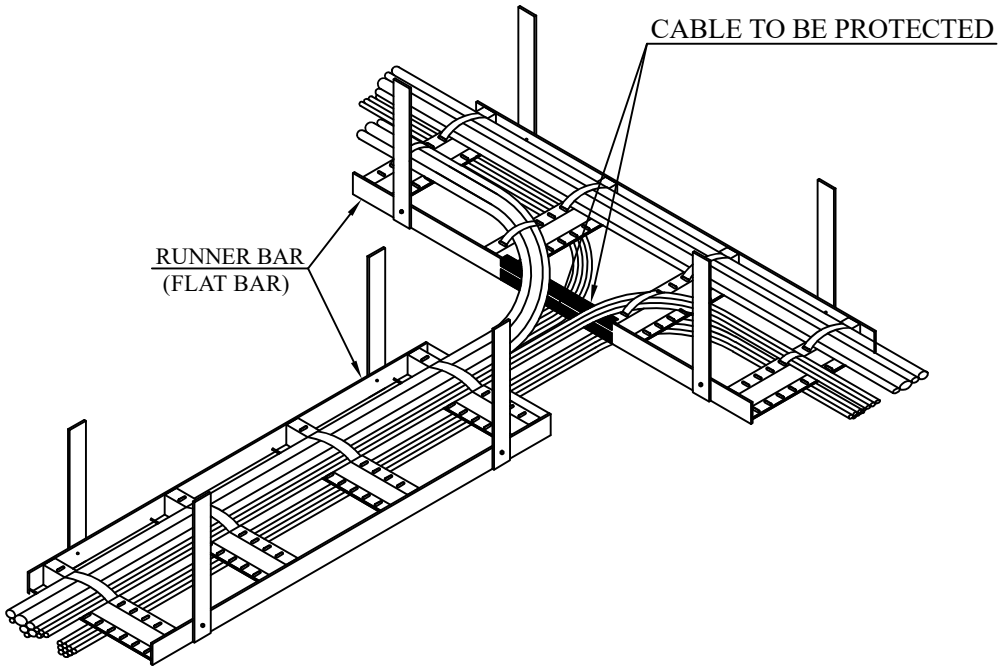


VERTICAL TYPE CABLE RACK Z TYPE



	INSTALLATION OF CABLE WAY	YARD NO:SH 038-039	48/83
	TURNING METHOD OF MAIN CABLE WAY (TYPICAL)	DRG NO: 038-K5700200 A	

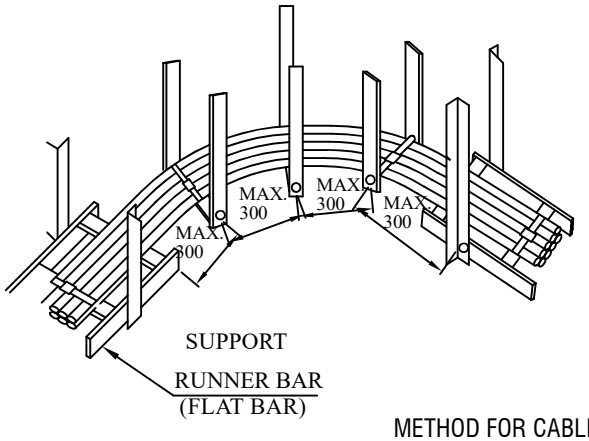
TURNING METHOD OF MAIN CABLE WAY



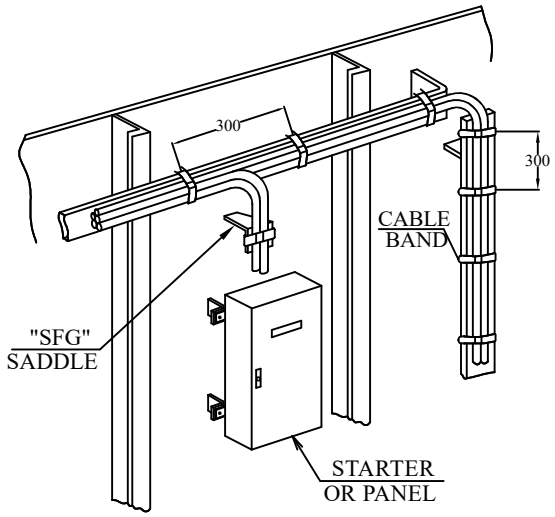
WHERE CABLE WAY CURVED

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

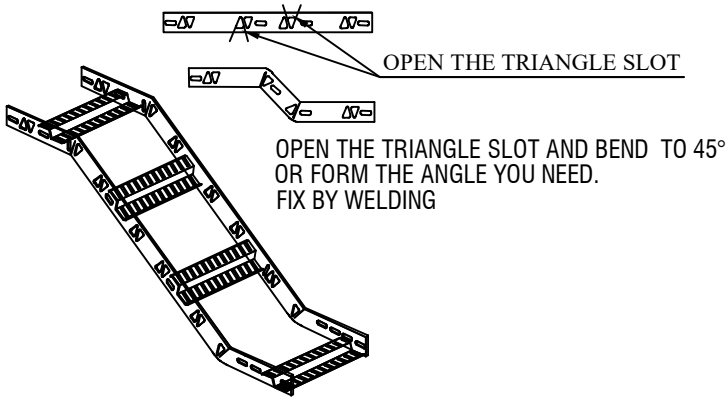
BENDING RADIUS OF HANGER ROUTE TO BE AS PER CABLE MAKERS DETAILS.



CURVED & BRANCH CABLE WAY

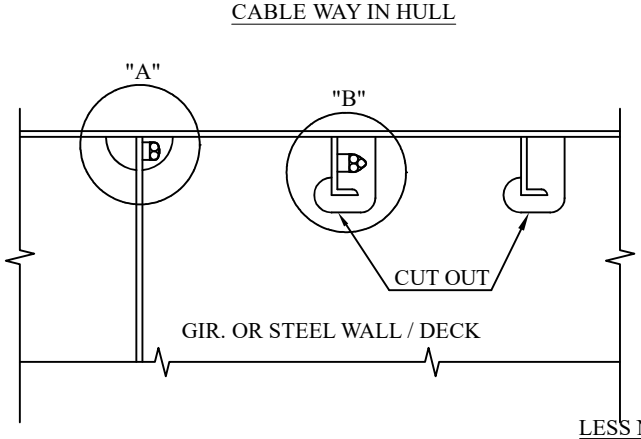


METHOD FOR CABLE WAY BENDING ~45°

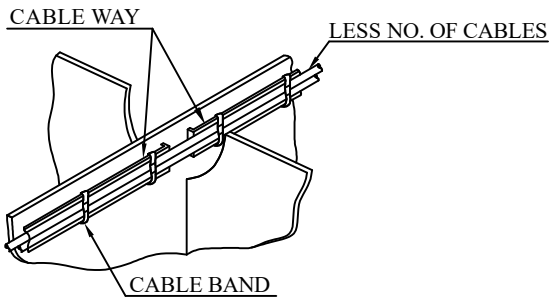


	INSTALLATION OF CABLE WAY	YARD NO:SH 038-039	49 / 83
	CABLE WAY IN HULL CUTOUTS AND NEAR HOT PIPES	DRG NO: 038-K5700200 A	

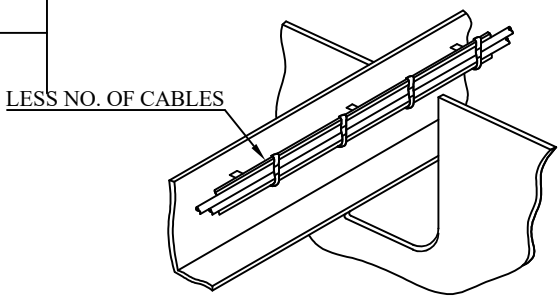
IN CUT OUT



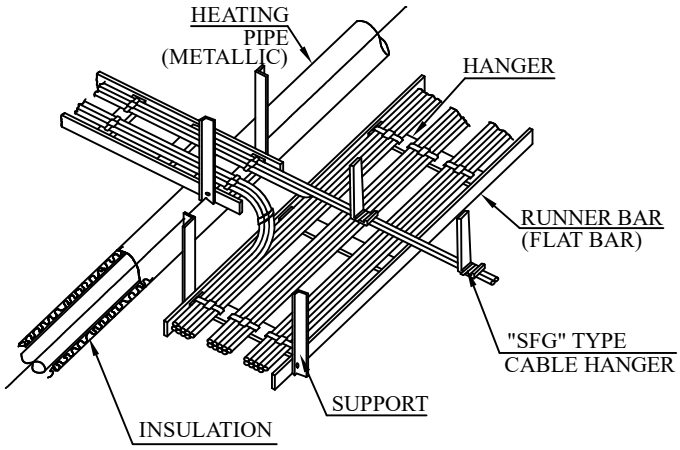
DETAIL "A"



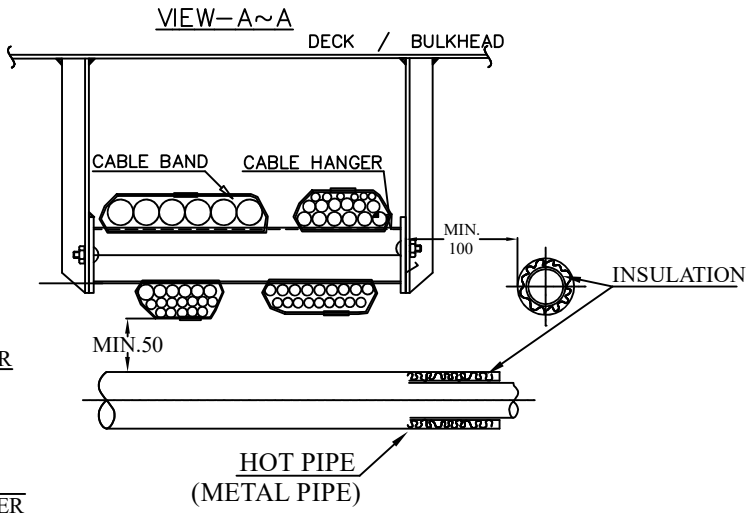
DETAIL "B"



DISTANCE FROM HOT PIPE



VIEW–A~A



NOTE

1. IN CASE THAT CABLES RUN ACROSS THE HEATING, STEAM & EXH. GAS METALLIC 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 CABLE WAY	YARD NO:SH 038-039	50/83
	SEPARATION OF CABLES IN A RACK	DRG NO: 038-K5700200 A	

SEPARATION OF CABLE

CABLES SHALL BE INSTALLED WITH IDEA OF CABLE SEPARATION TO AVOID MAGNETIC INTERFERENCE INDUCED FROM POWER CIRCUIT. ACCORDING TO THIS CONCEPT, ALL CABLES SHALL BE GROUPED INTO FOLLOWING CATEGORIES AND INSTALLED WITH SEPARATED EACH OTHER EXCEPT THAT CATEGORY (A) AND (B) SHALL BE BUNCHED TOGETHER.

(A) FOR POWER CIRCUITS.

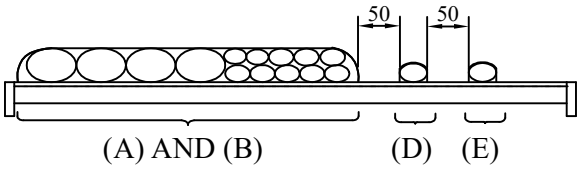
(B) FOR LIGHTING AND OTHER SIMILAR CIRCUITS .

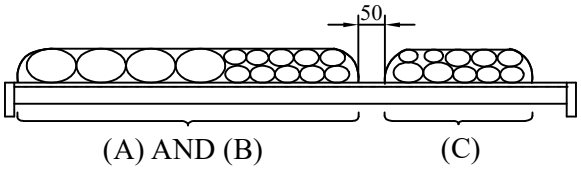
(C) INSTRUMENTATION AND SIGNAL CIRCUITS.

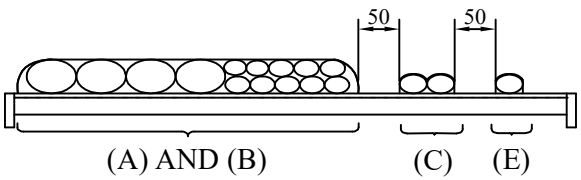
(D) FOR ECHO SOUNDER , ANTENNA CIRCUITS.

(E) FOR INTRINSICALLY SAFE CIRCUITS.

TYPICAL EXAMPLE OF BUNCHING CONDITION.

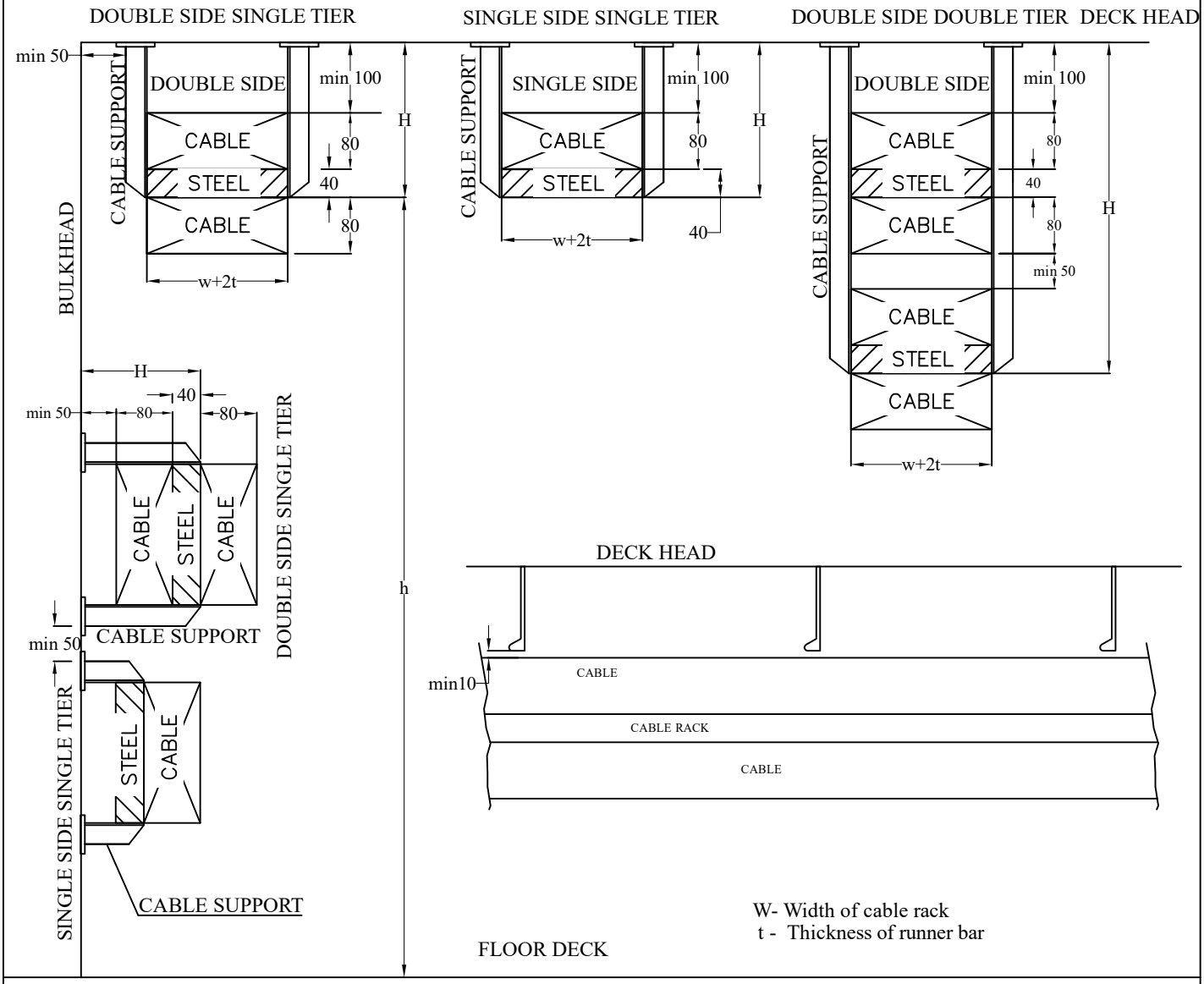






NOTE: D AND E CABLES ARE TO BE SEPARATED FROM OTHER CABLES BY MINIMUM 50 MM

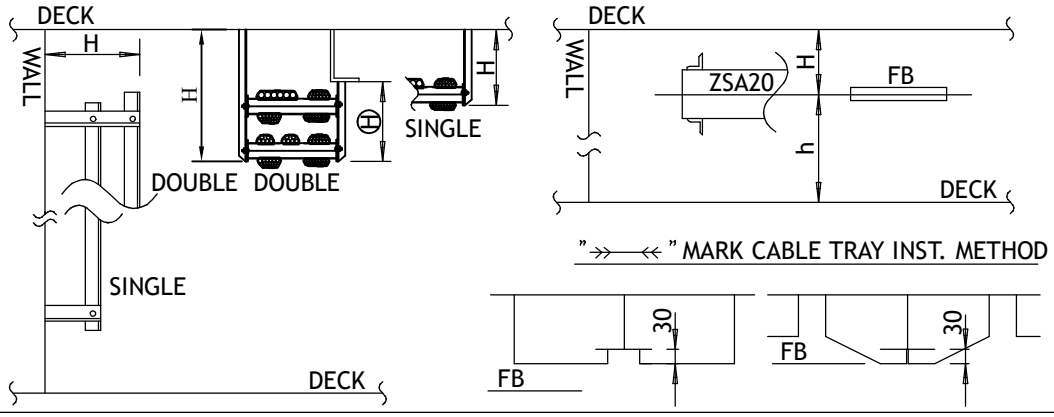
	INSTALLATION OF CABLEWAY	**YARD NO:SH 038-039** 51/83
	INSTALLATION METHOD OF CABLE WAY	**DRG NO: 038-K5700200 A**



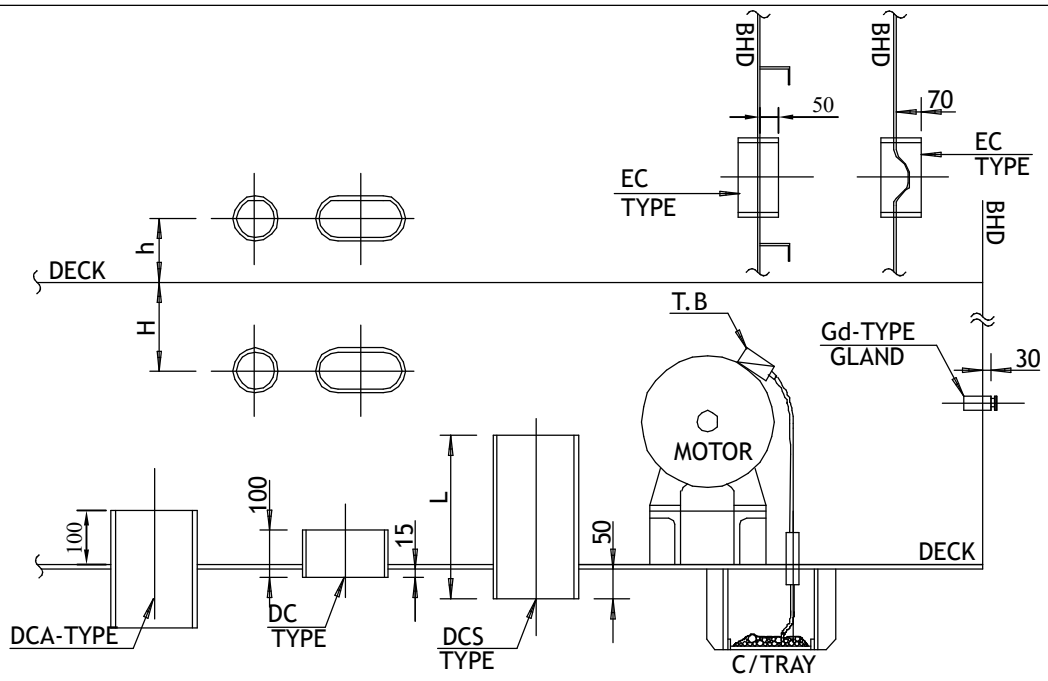
	INSTALLATION OF CABLEWAY	YARD NO:SH 038-039	52 / 83
	STANDARD HEIGHTS	DRG NO: 038-K5700200 A	

STANDARD HEIGHTS

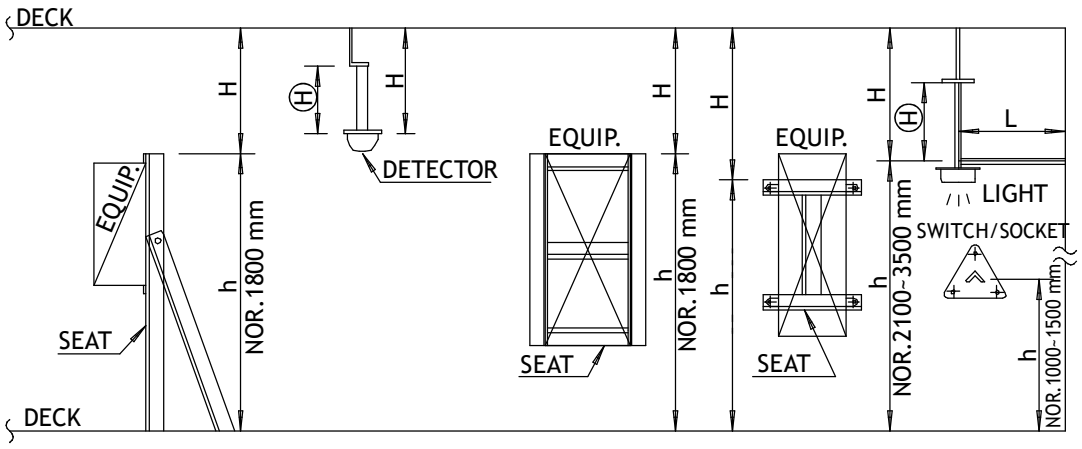
CABLE HANGER



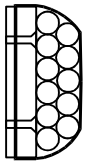
COAMING & GLAND



EQUIPMENT SEAT

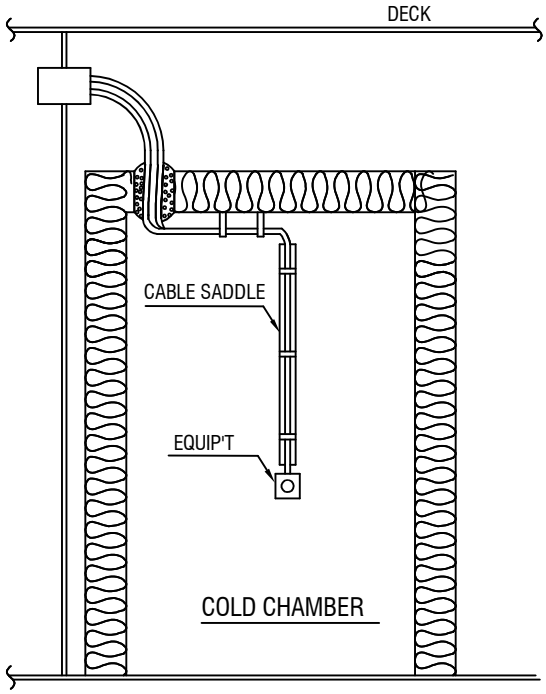


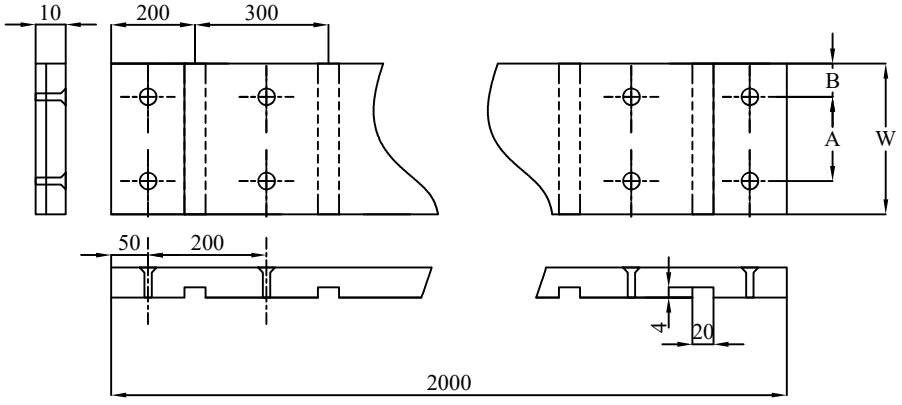
	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	YARD NO:SH 038-039	53 83
	CABLE WAY- NYLON TYPE	DRG NO: 038-K5700200 A	



ELE.CABLE

BINDING TAPE & BUCKLE

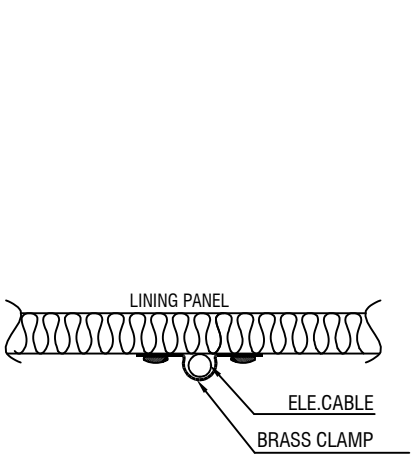


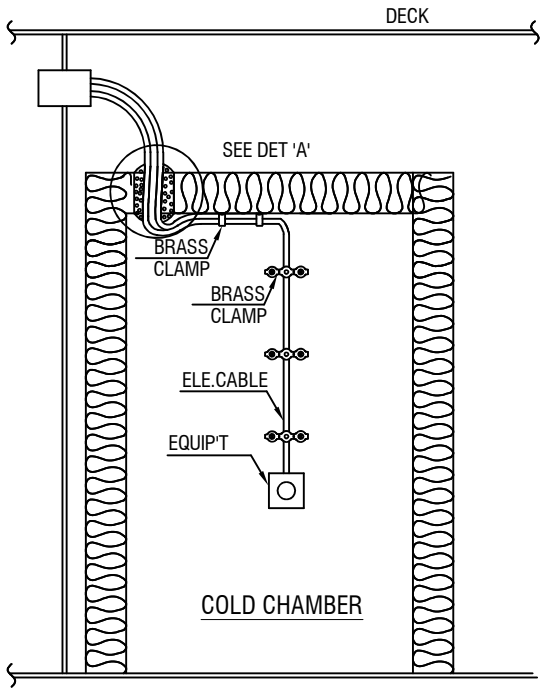


MATERIAL:NYLONE(COLOUR:WHITE)

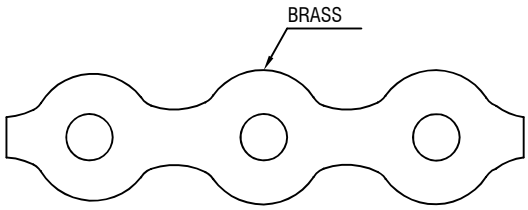
ITEM NO	W	A	B
PC-1	30	16	7
PC-2	50	30	10

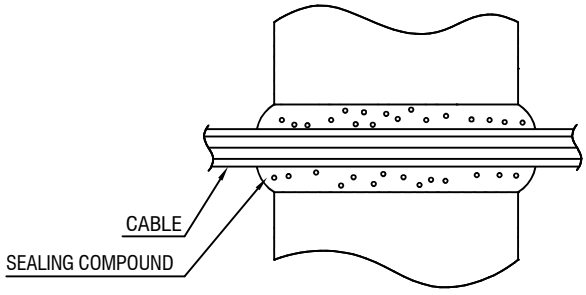
	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	**YARD NO:SH 038-039**	**54 / 83**
	CABLE WAY- BRASS CLAMP TYPE	**DRG NO: 038-K5700200 A**	





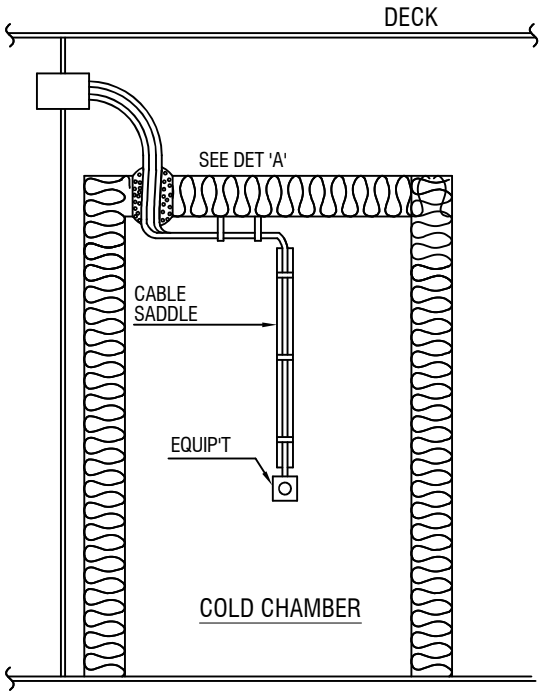
1. BRASS CLAMP



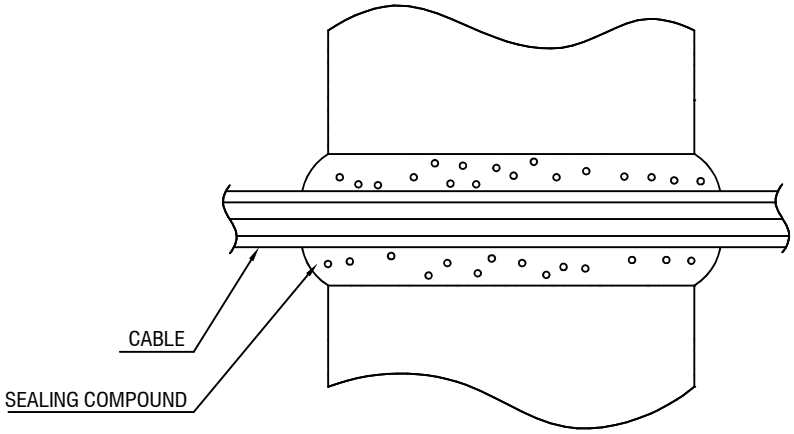


DETAIL 'A'
INSTALLATION METHOD

	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	**YARD NO:SH 038-039**	**55 / 83**
	INSULATION PENETRATION	**DRG NO: 038-K5700200 A**	



INSTALLATION METHOD

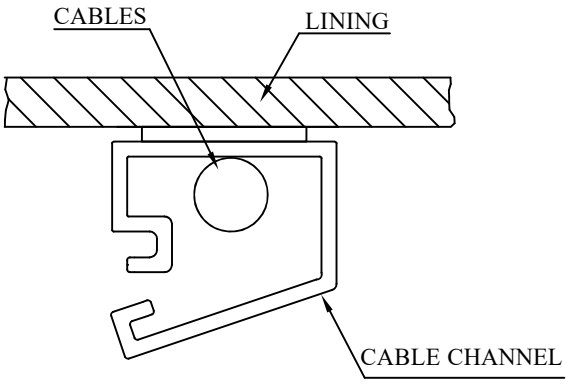


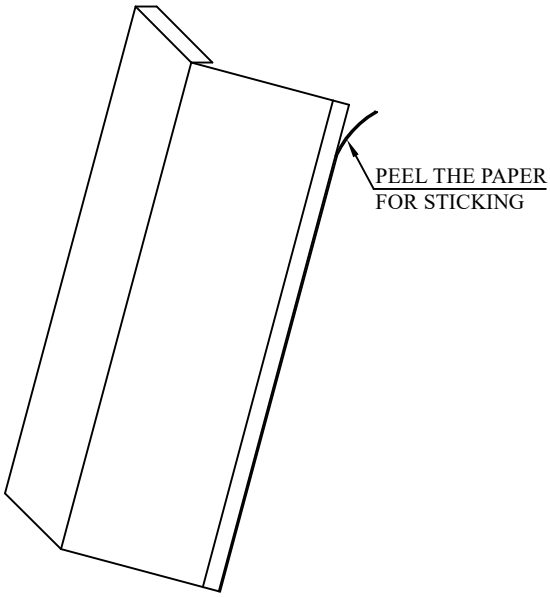
DETAIL 'A'

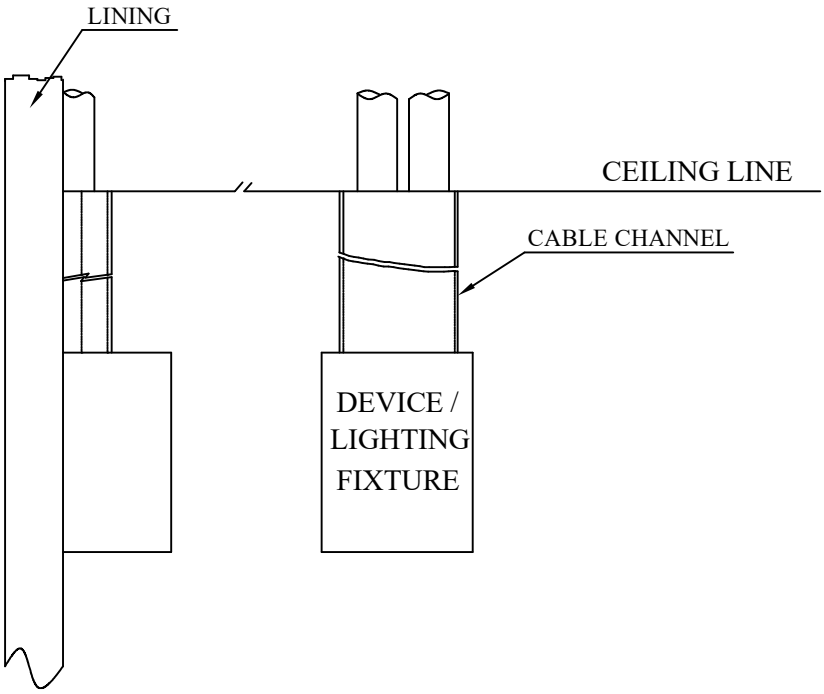
	INSTALLATION OF CABLE	YARD NO:SH 038-039	56/83
	CABLE CHANNEL	DRG NO: 038-K5700200 A	

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.





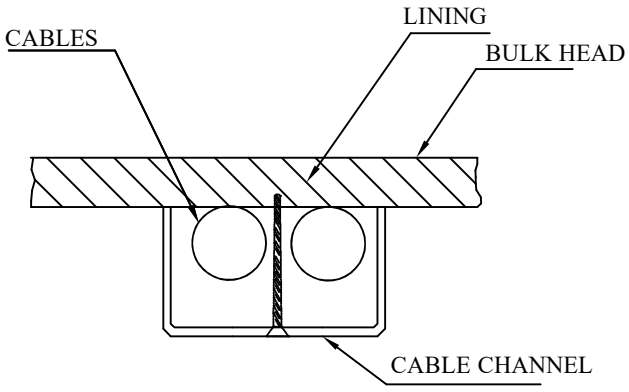


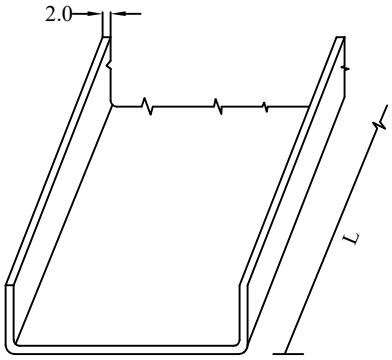
CHANNELS SHOULD BE FREE FROM SCRATCHES
IMPRESSIONS ETC TO BE SUPPLIED IN FINE FINISH.

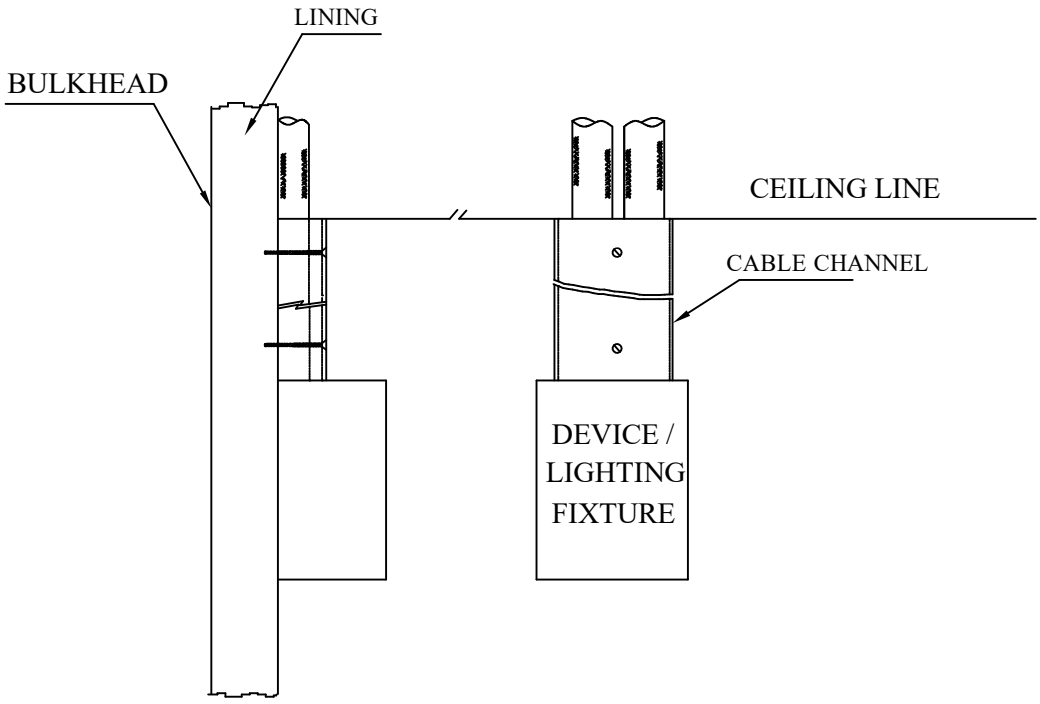
	INSTALLATION OF CABLE	YARD NO:SH 038-039	57 / 83
	CABLE CHANNEL	DRG NO: 038-K5700200 A	

CABLE CHANNEL (SCREWING TYPE)

Another type of cable channel is Anodised aluminium cable channel screwing type.



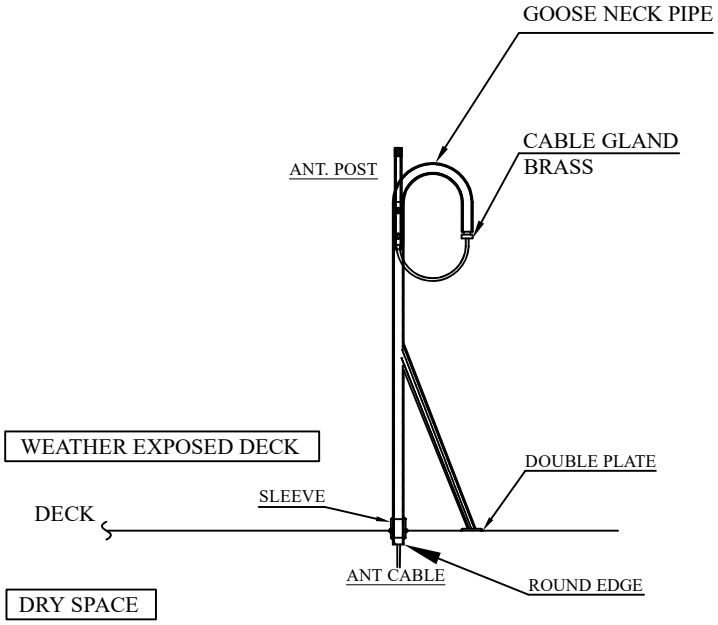


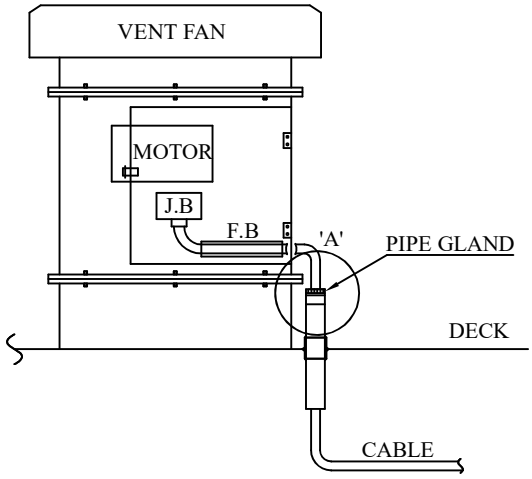


CHANNELS SHOULD BE FREE FROM SCRATCHES
IMPRESSIONS ETC TO BE SUPPLIED IN FINE FINISH.

	INSTALLATION OF CABLE	YARD NO:SH 038-039	58/83
	BRANCHED CABLE- WEATHER EXPOSED AREA	DRG NO: 038-K5700200 A	

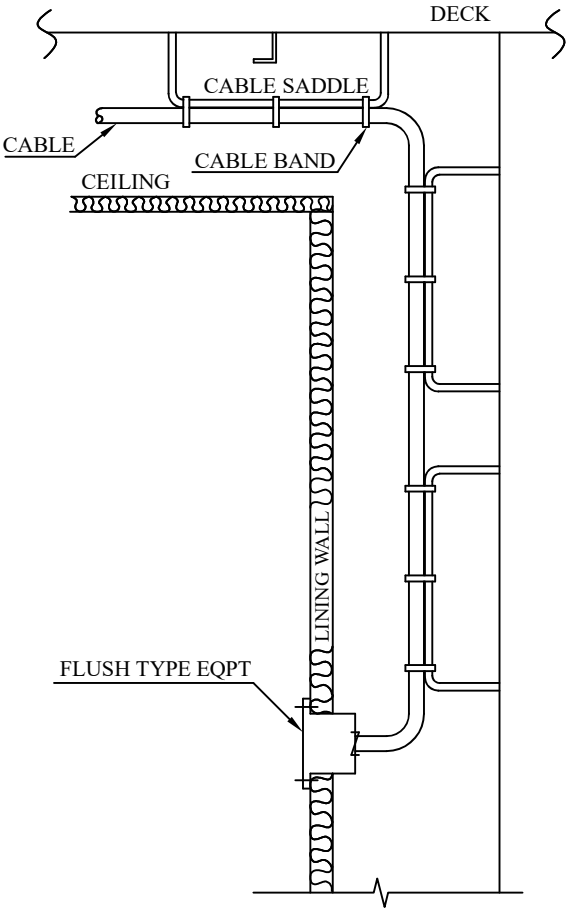
2. ANTENNA CABLE AT WEATHER EXPOSED AREA



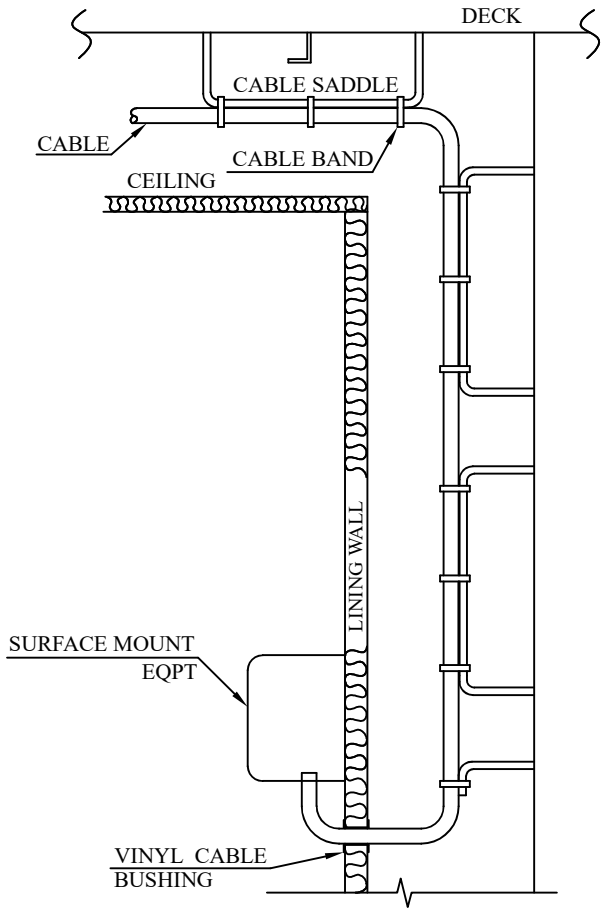


	INSTALLATION OF CABLE	YARD NO:SH 038-039	59 / 83
	BRANCHED CABLE - ACCOM. SPACE	DRG NO: 038-K5700200 A	

1. BRANCH CABLE WAY BETWEEN STEEL BULKHEAD AND LINING WALL



FLUSH TYPE EQUIP



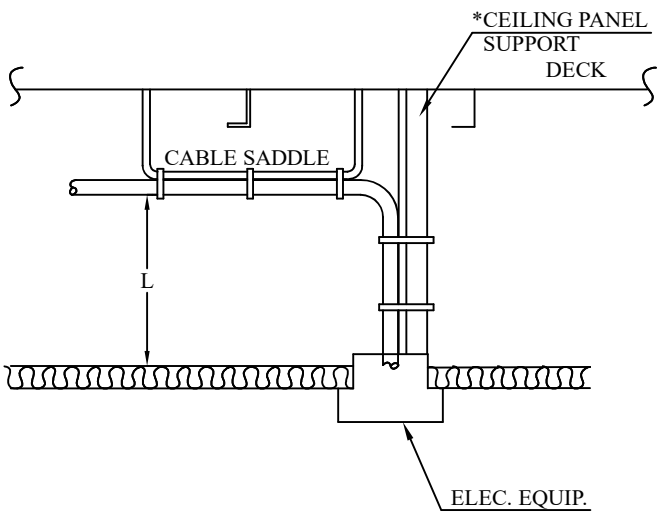
SURFACE TYPE

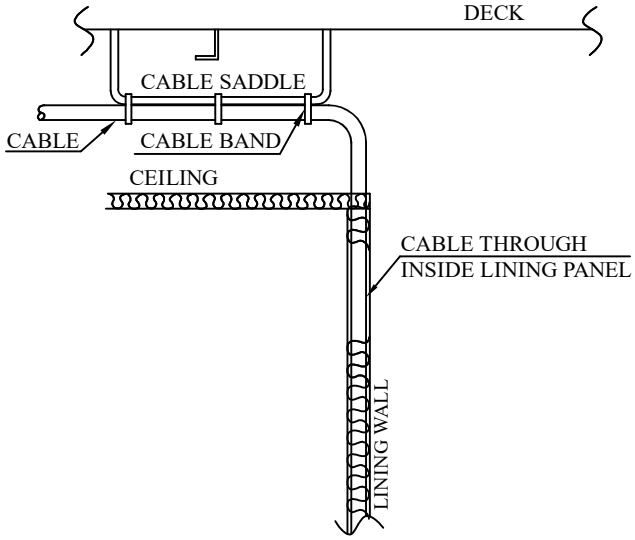
NOTE

IN THE ABOVE CASE CABLE MAY ALSO TAKEN THROUGH INSIDE LINING PANEL. SEE TYPICAL FIG. 1

2. BRANCH CABLE WAY IN CEILING

FIG.1





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

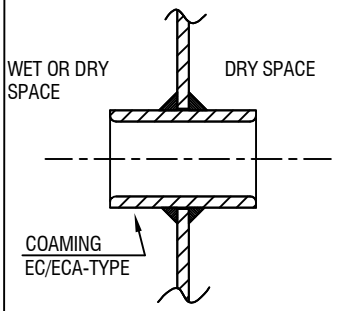
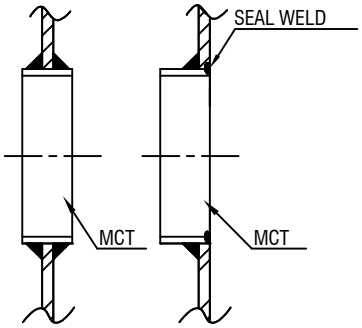
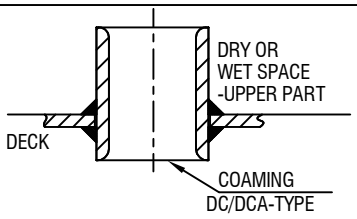
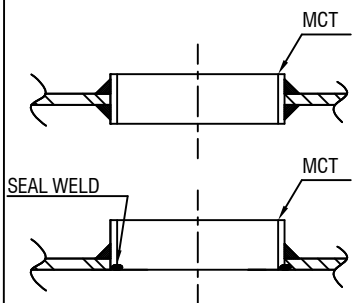
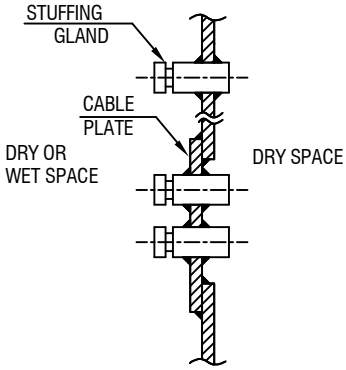
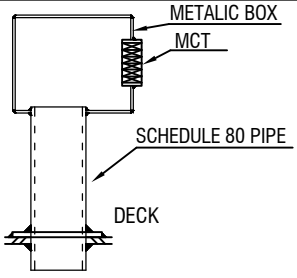
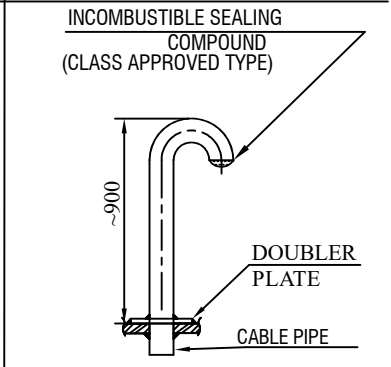
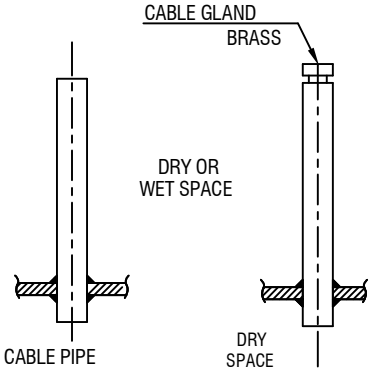
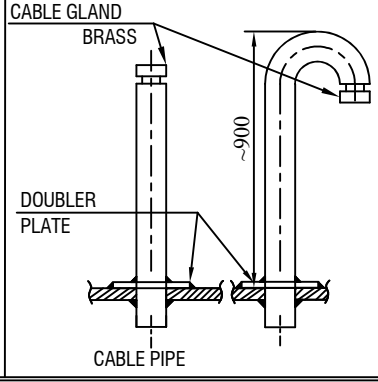
INSTALLATION PRACTICE ON PENETRATIONS

YARD NO:SH 038-039 | 60/83

INSTALLATION METHOD OF CABLE COAMING

DRG NO: 038-K5700200 A

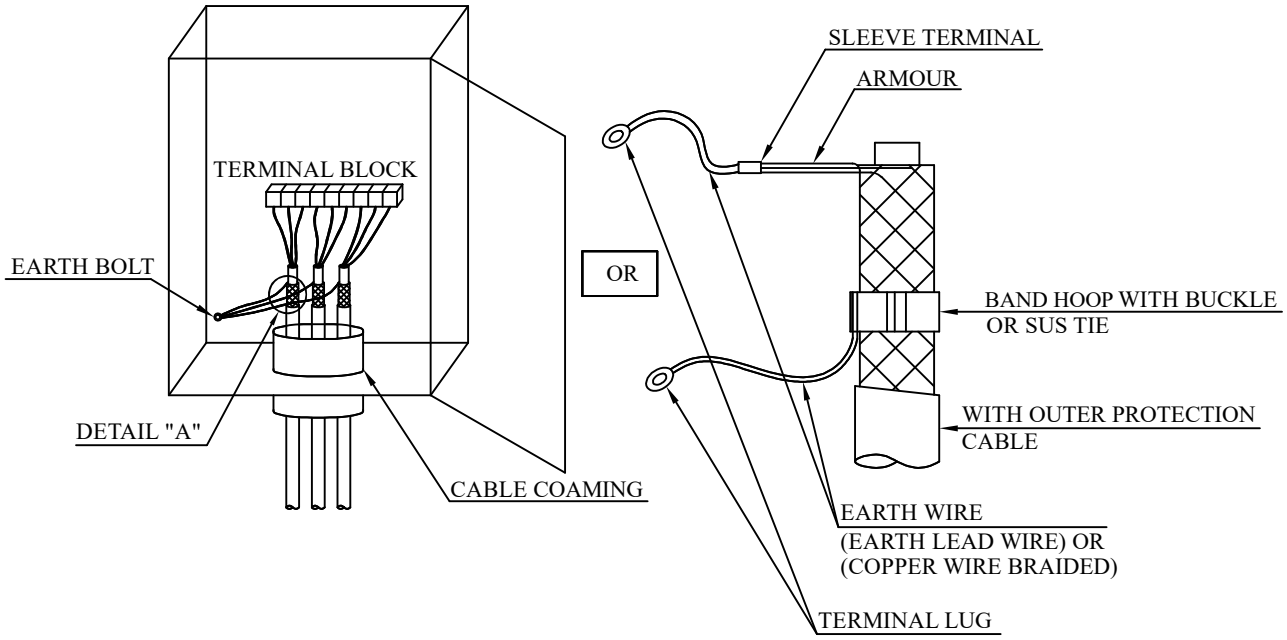
ALL FILLET WELDING (SIDE OF WELD = MINIMUM 4.0mm)

TYPE	BOTH SIDES				TYPE	BOTH SIDES	
	FIG			AREA		FIG	AREA
GIRDER/ BEAM BHD	 * FILLING WITH INCOMBUSTIBLE SEALING COMPOUND (CLASS APPROVED TYPE)	EC-TYPE		ACC. E/R NWT BHD	GIRDER/ BEAM BHD		ACC. E/R WT BHDS WEATHER EXPOSED AREA (A60) CLASS DIVISION
		* ECA-TYPE		ACC. E/R WT BHD WEATHER EXPOSED AREA (A60) CLASS DIVISION			
DECK	 * FILLING WITH INCOMBUSTIBLE SEALING COMPOUND (CLASS APPROVED TYPE)	DC-TYPE		ACC. E/R NWT DECKS	DECK		E/R WT DECKS WEATHER EXPOSED AREA (A60) CLASS DIVISION
		* DCA-TYPE		ACC. E/R WT DECKS WEATHER EXPOSED AREA (A60) CLASS DIVISION			
DECK BULKHEAD GIRDER/ BEAM				ACC. E/R (A,B) CLASS DIVISION WEATHER EXPOSED AREA WT BHDS / DECKS (A60) CLASS DIVISION	DECK		WEATHER EXPOSED AREA & AREA WHERE CABLE ARE TAKEN THROUGH PIPE
					DECK (CABLE PIPE) (MORE THAN ONE CABLE)	 SIZE OF THE PIPE ACCORDING TO NUMBER OF CABLES.	
DECK (CABLE PIPE)				ACC. E/R (A,B) CLASS DIVISION	DECK (CABLE PIPE)		WEATHER EXPOSED AREA

	INSTALLATION PRACTICE ON EARTHING	YARD NO:SH 038-039	61/83
	GENERAL DESCRIPTION	DRG NO: 038-K5700200 A	

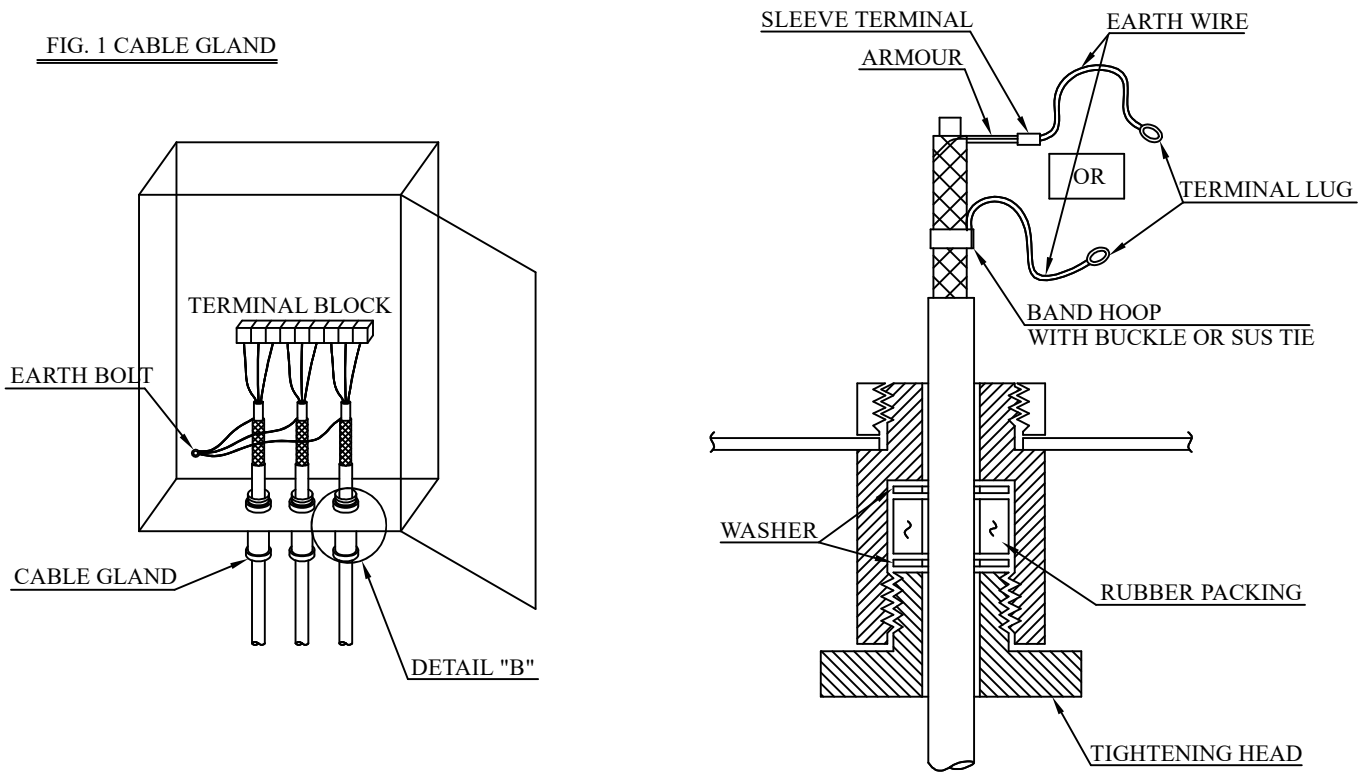
1) EARTHING METHOD OF CABLE COAMING SIDE

FIG. 1 CABLE COAMING
(WITH OUTER PROTECTION CABLE)



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

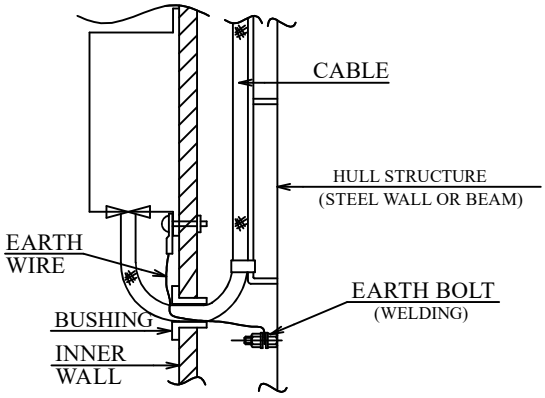
FIG. 1 CABLE GLAND



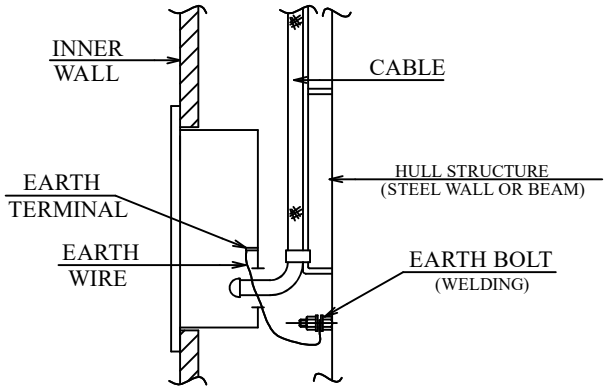
3) EARTHING METHOD OF EQUIPMENT INSTALLED ON PANELLING.

EARTHED BY SEPARATE EARTH CONDUCTOR IN CABLE OR FOLLOWING METHOD.

EARTHING METHOD OF
SURFACE TYPE EQUIPMENT

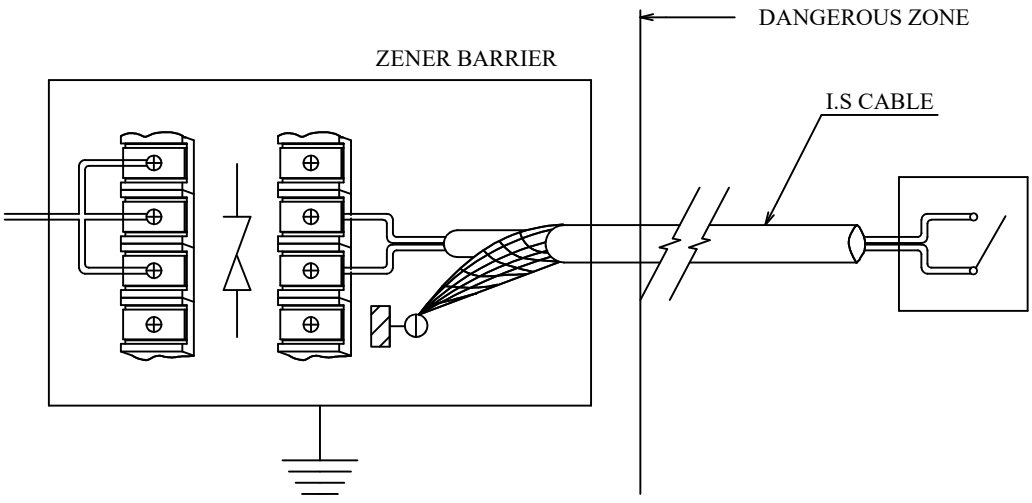


EARTHING METHOD OF
FLUSH TYPE EQUIPMENT



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.

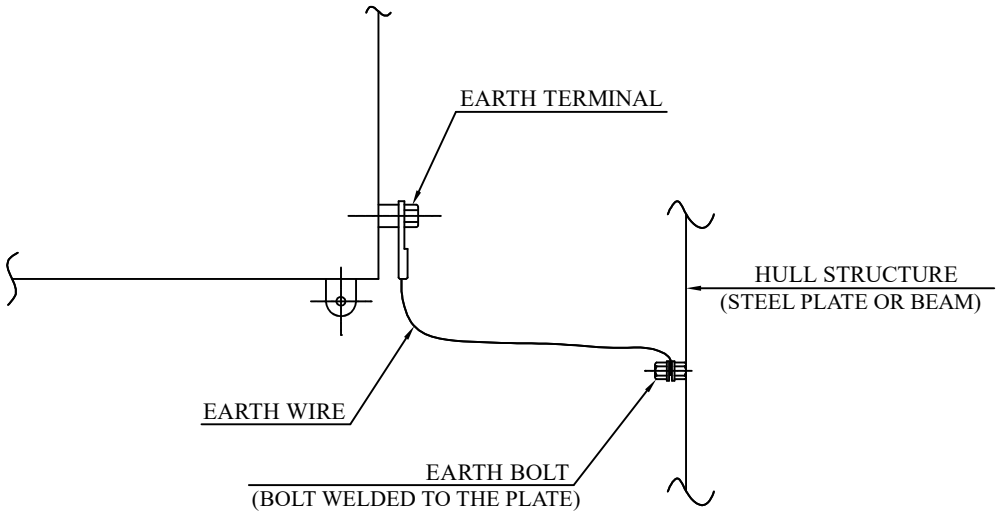
iii) WHERE AN EARTH TERMINAL IS PROVIDED ON THE EQUIPMENT, EARTH PIECE SHOULD BE FITTED CLOSE TO ON EARTH TERMINAL.

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 $16mm^2$



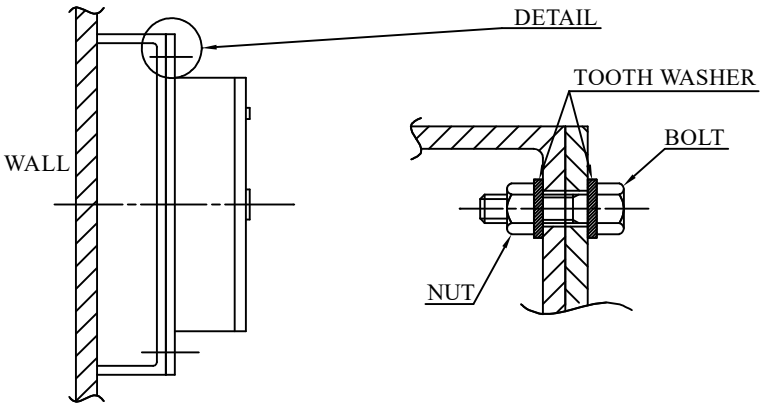
NOTE ; EARTH BOLT FOR EARTH WIRE MAY BE FITTED ON THE STEEL SEAT OF EQUIPMENT, CABLE TRAY OR HULL STRUCTURE.

	INSTALLATION PRACTICE ON EARTHING	YARD NO:SH 038-039	64/83
	GENERAL DESCRIPTION	DRG NO: 038-K5700200 A	

6) METALLIC CONTACT METHOD.

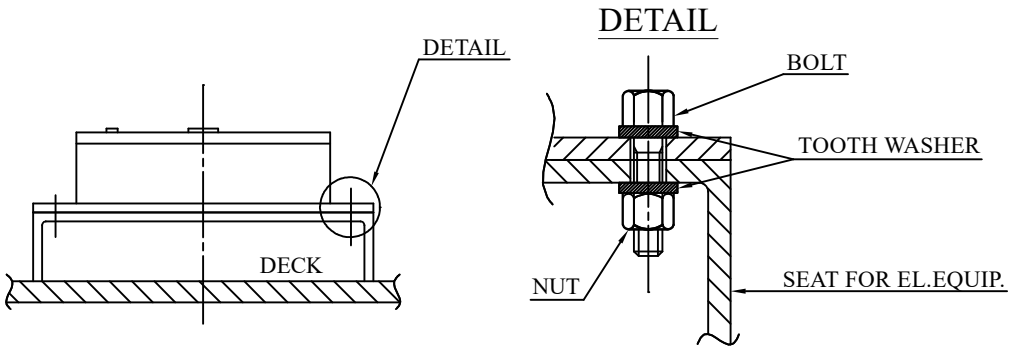
i) METHOD THAT METAL FRAMES OR ENCLOSURES OF ELECTRICAL EQUIPMENT ARE IN METALLIC CONTACT WITH VESSEL'S STRUCTURE.

ii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL WALL.



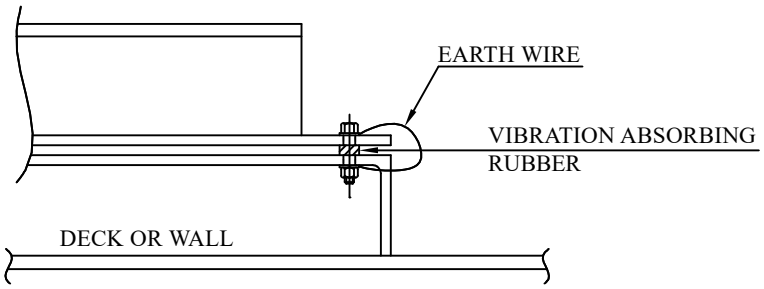
NOTE ; 1 POINT SHALL BE EARTHED.

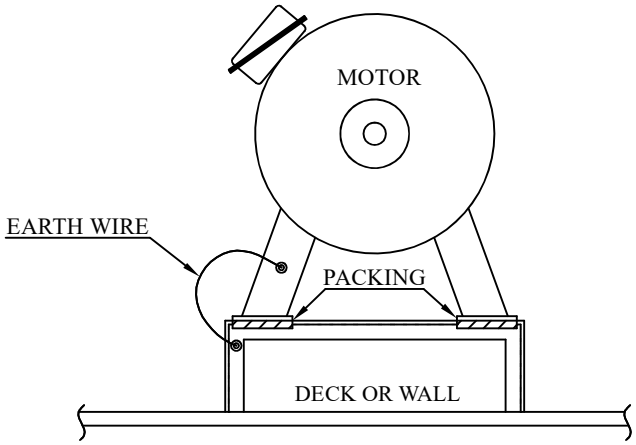
iii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL DECK.



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

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



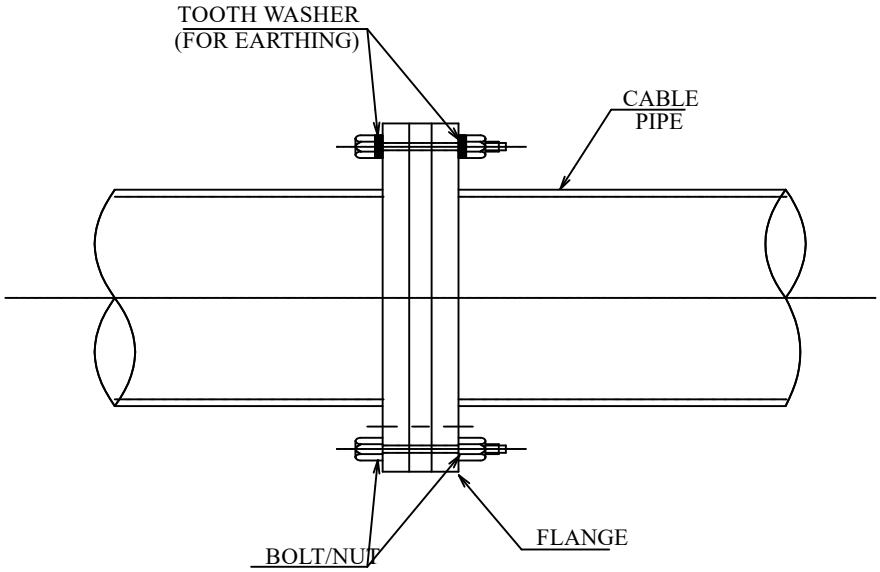


	INSTALLATION PRACTICE ON EARTHING	YARD NO:SH 038-039	66 / 83
	GENERAL DESCRIPTION	DRG NO: 038-K5700200 A	

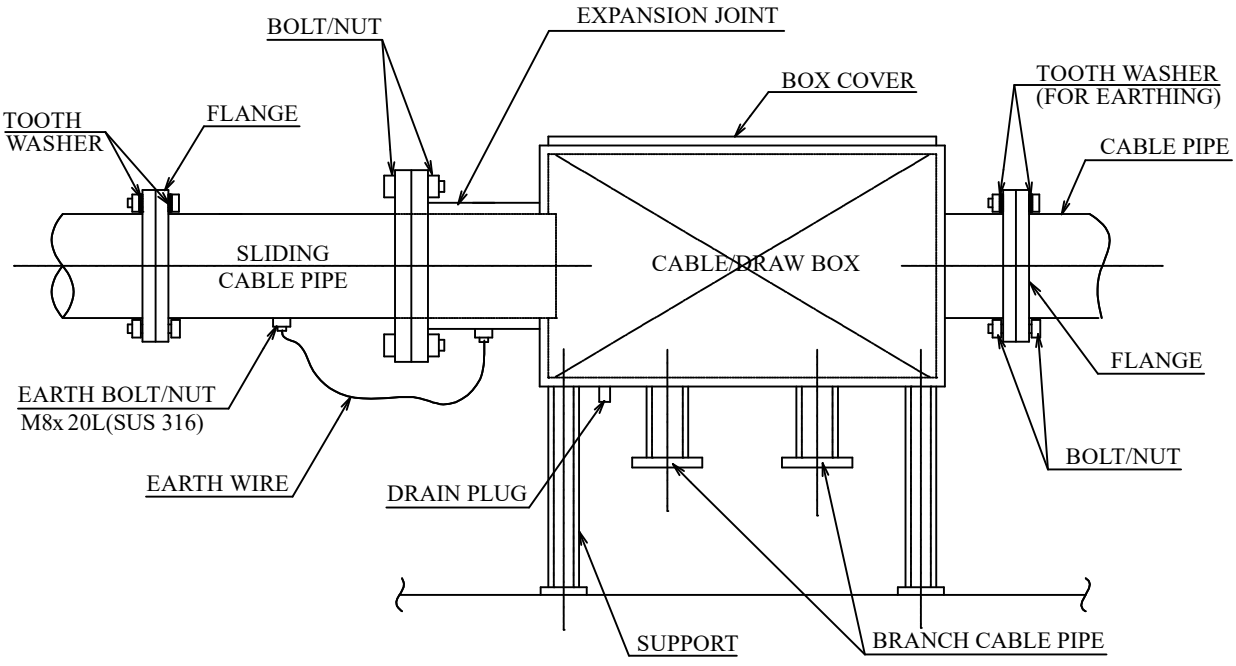
7) EARTHING METHOD OF ELECTRIC CABLE PIPES AND DUCT

ALL ELECTRIC CABLE PIPES AND DUCTS ARE TO BE EARTHED BY TOOTHED LOCK WASHER WITH WHOLE LENGTH

i) FLANGE JOINT PART



ii) EXPANSION JOINT ON CABLE BOX



	INSTALLATION METHOD FOR LIGHTING FIXTURE	YARD NO:SH 038-039	67/83
	DECK MOUNTING TYPE	DRG NO: 038-K5700200 A	

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

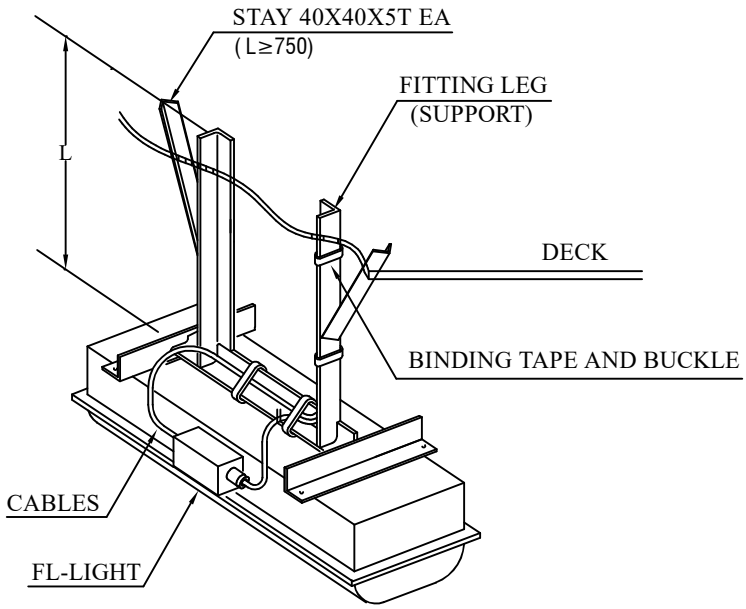
1000 > L 40x40x5t EA

APPLICATION OF STAY

- L≤ 750: NO STAY
- L>750:40X40X5T EA

DECK MOUNTING

L : LIGHTING SUPPORT LENGTH



NOTE: FLUORESCENT LIGHT FITTING BELOW MAIN DECK TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENSION.

	INSTALLATION METHOD FOR LIGHTING FIXTURE	YARD NO:SH 038-039	68/83
	WALL MOUNTING TYPE	DRG NO: 038-K5700200 A	

WALL MOUNTING

APPLICATION

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

APPLICATION OF FITTING LEG

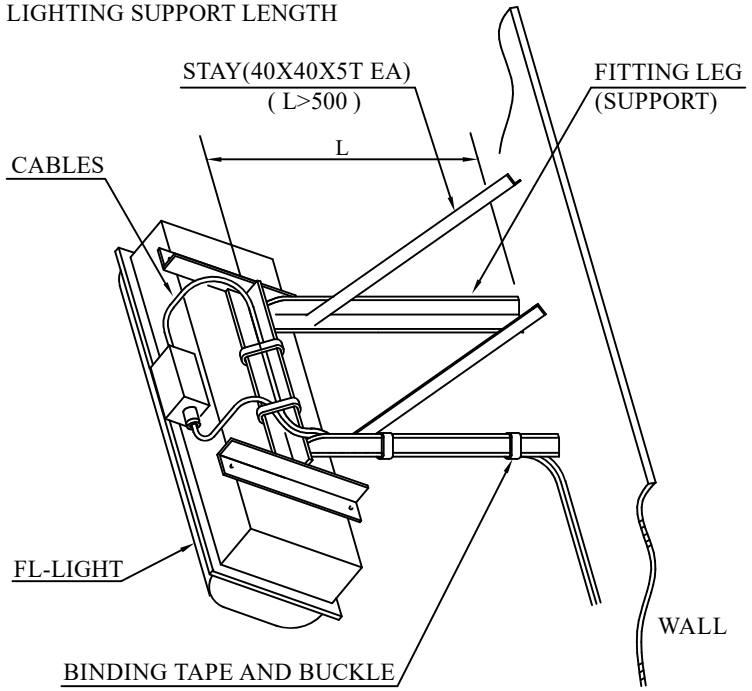
40x40x5t EA

APPLICATION OF STAY

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

WALL MOUNTING

L : LIGHTING SUPPORT LENGTH



NOTE: FLUORESCENT LIGHT FITTING BELOW MAIN DECK TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENSION.

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 doing the cable installations:-

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

- Cables exposed to risk of mechanical damage to be protected by providing the cable runs with covers of plates, profiles or grids or by carrying the cables in pipes.

- 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.

-Low voltage power cables shall not be bunched together , or run through the same pipes with high voltage cables.

-High voltage cables are not to be installed on the same cable tray as cables operating at nominal system voltage of 1 kV and less.

-In battery compartments the cable shall have a protective covering resistant to the vapours developed by the electrolyte and the bulkhead penetration shall be gas tight.

- Cables for essential/emergency power for lighting, internal communication or signals shall be routed clear of galley, laundry, machinery spaces of category A and other area of high risk fire. Unless they serving the space to the extent possible.

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

- Avoid sharp edges on clips, saddles bands and supports to prevent cable damages.

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

- All the cables must be provided with corresponding cable tags and core identifications.

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/Flatbars 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 material Clips/bands.The metal should be of Stainless steel. Inside panel boards flame retardant 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.

	GENERAL REFERENCE	YARD NO:SH 038-039	71/83
	INSTALLATION OF CABLES	DRG NO: 038-K5700200 A	

- INSTRUCTION FOR FIXING CABLES

1. Cables on cable racks in Machinery/Accommodation/Exposed area
   on top of horizontal cable trays = Metallic cable tie 900mm gap
   on bottom of horizontal cable trays = Metallic cable tie 300mm gap
   on vertical cable trays = Metallic cable tie 300mm gap

2. Cables on flat bar in Machinery/Accommodation area =
   Metallic cable tie 300mm gap.

3. Cables Inside electrical cabinets such as DBs, S/Bs Panels etc =
   Nylon cable ties flame retardant , (Black colour).

4. For temporary tying = Nylon cable ties flame retardant (White colour)

- CABLE BUNDLES:

Power cable of maximum 6 cables or signal cables of maximum 15 cables shall be bunched together by one tie.

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	YARD NO:SH 038-039	72/83
	TYPICAL ARR'T OF ELECTRICAL APPARATUS IN ACCOMMODATION	DRG NO: 038-K5700200 A	

- 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.

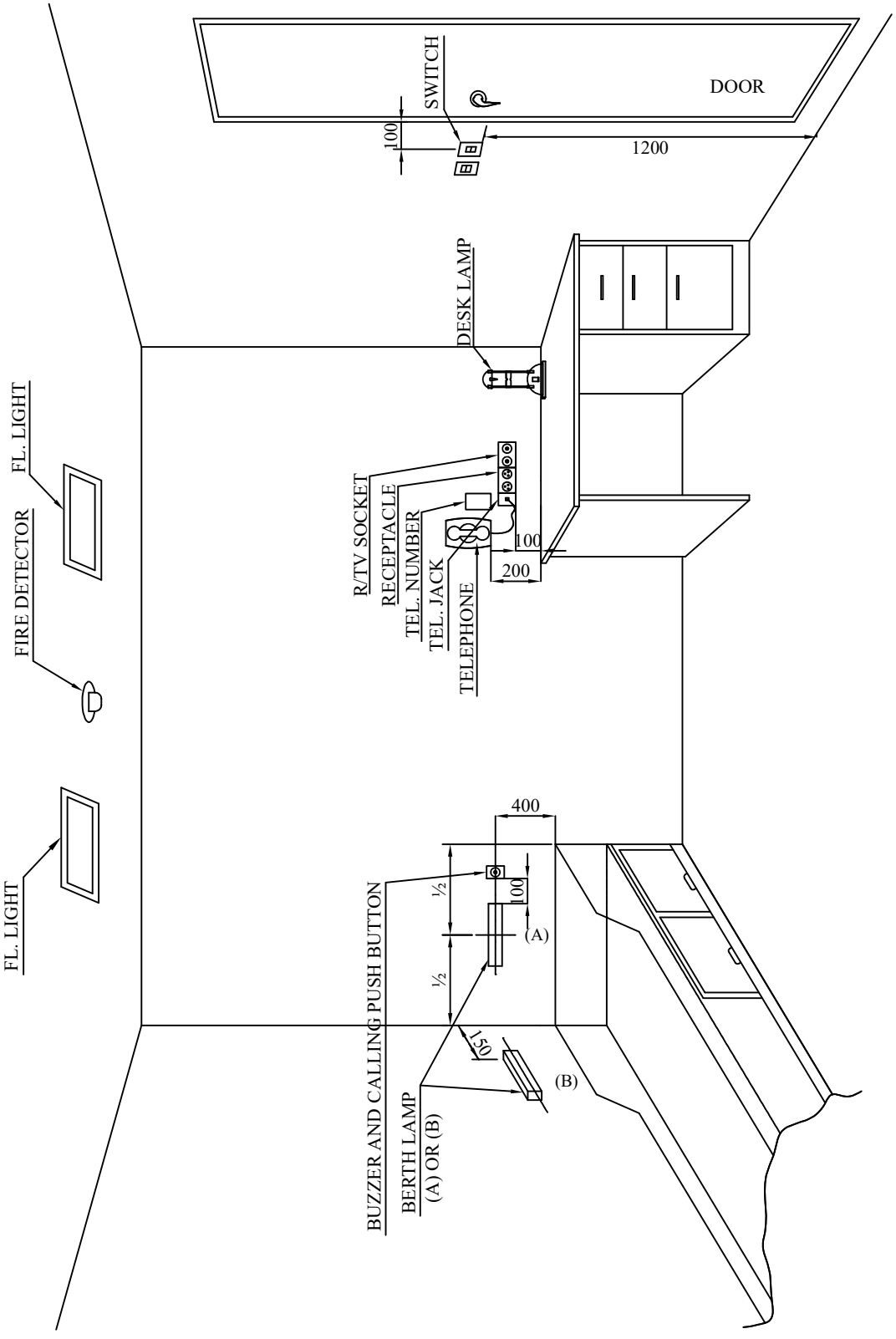
- BUZZER AND CALLING PUSH BUTTON :

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

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

	GENERAL REFERENCE	YARD NO:SH 038-039	73/83
	TYPICAL LAYOUT-TYPE "A"	DRG NO: 038-K5700200 A	

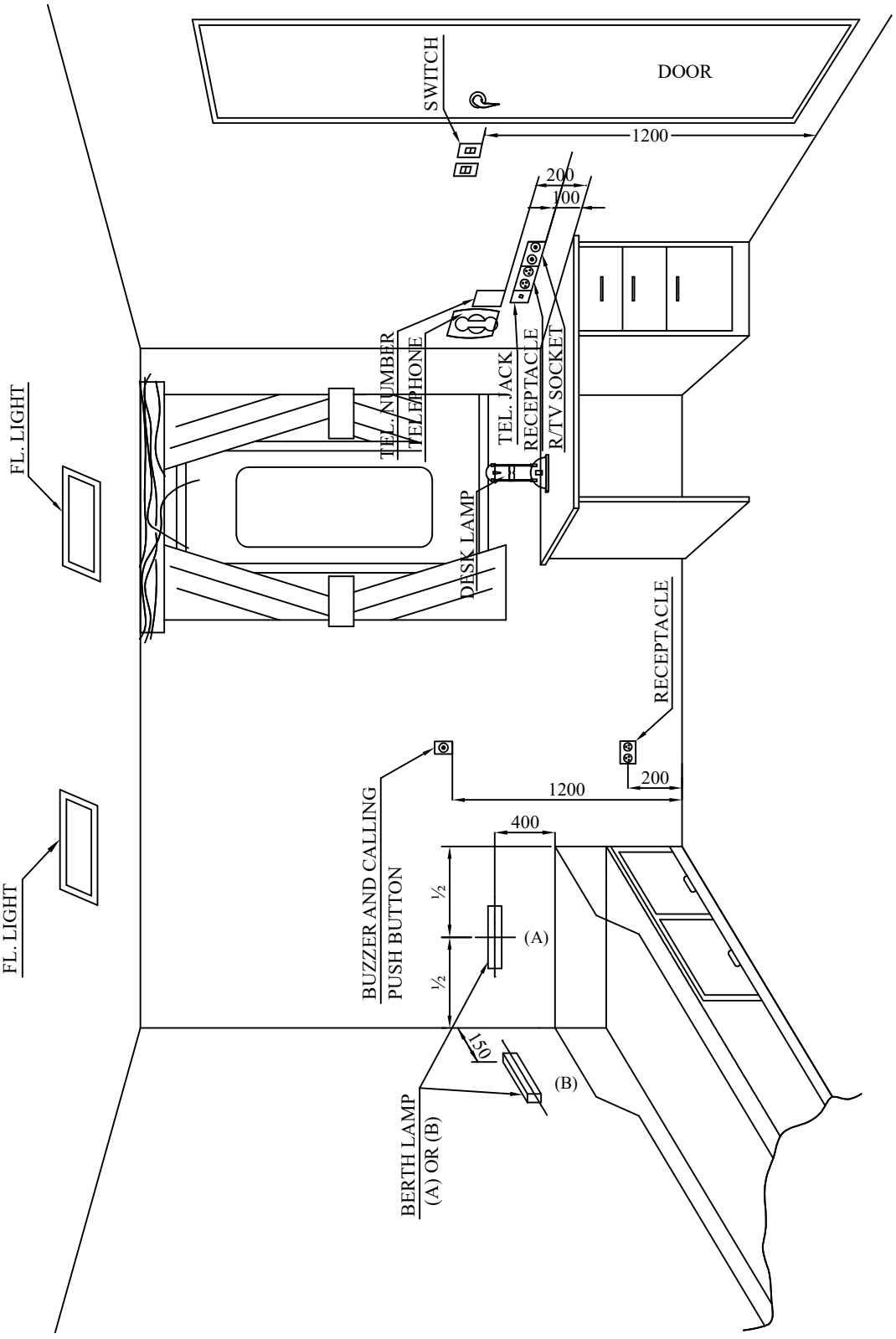
(CABIN)



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

	GENERAL REFERENCE	YARD NO:SH 038-039	74 / 83
	TYPICAL LAYOUT-TYPE "B"	DRG NO: 038-K5700200 A	

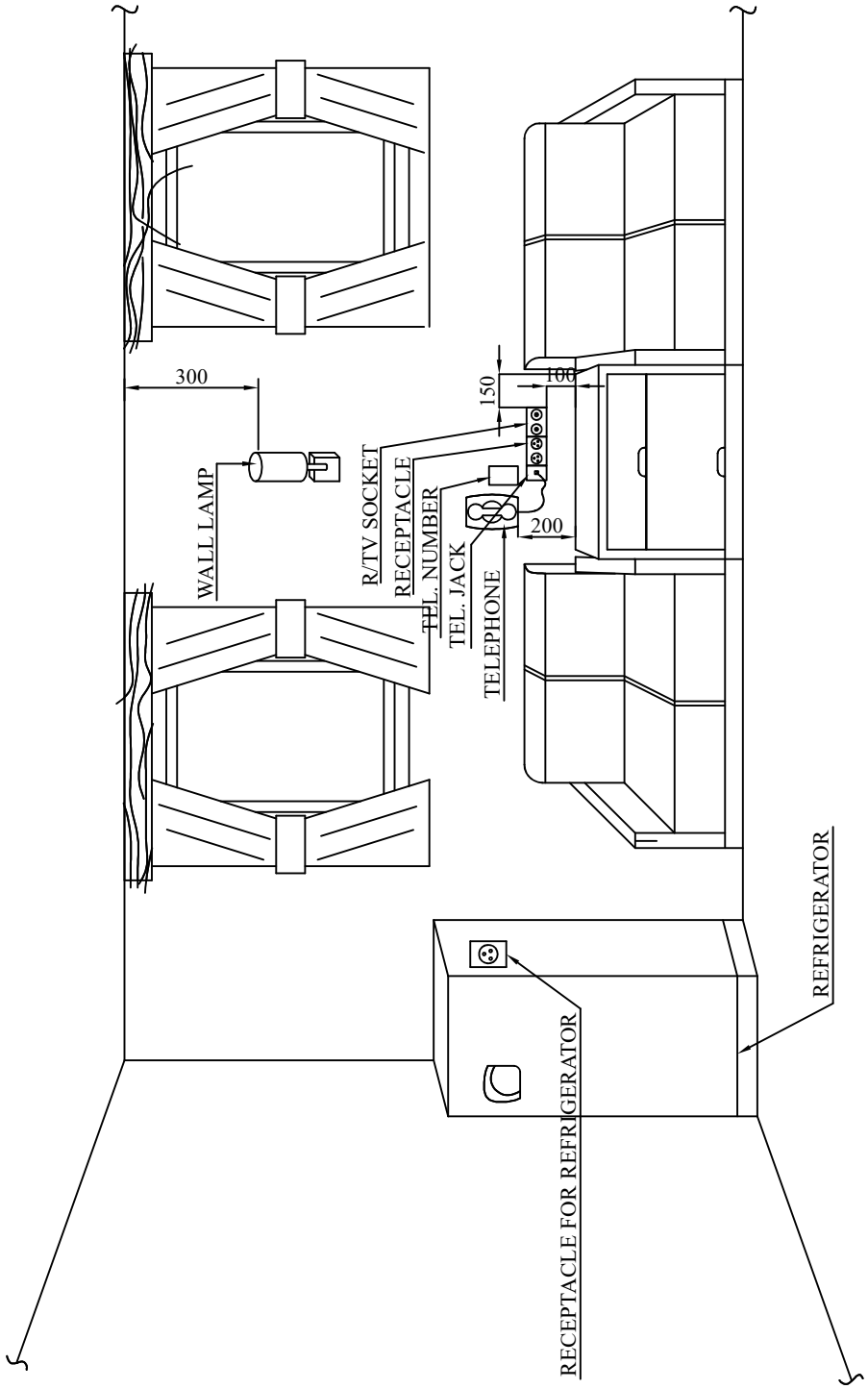
(CABIN)



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

	GENERAL REFERENCE	YARD NO:SH 038-039	75 / 83
	TYPICAL LAYOUT-TYPE "C"	DRG NO: 038-K5700200 A	

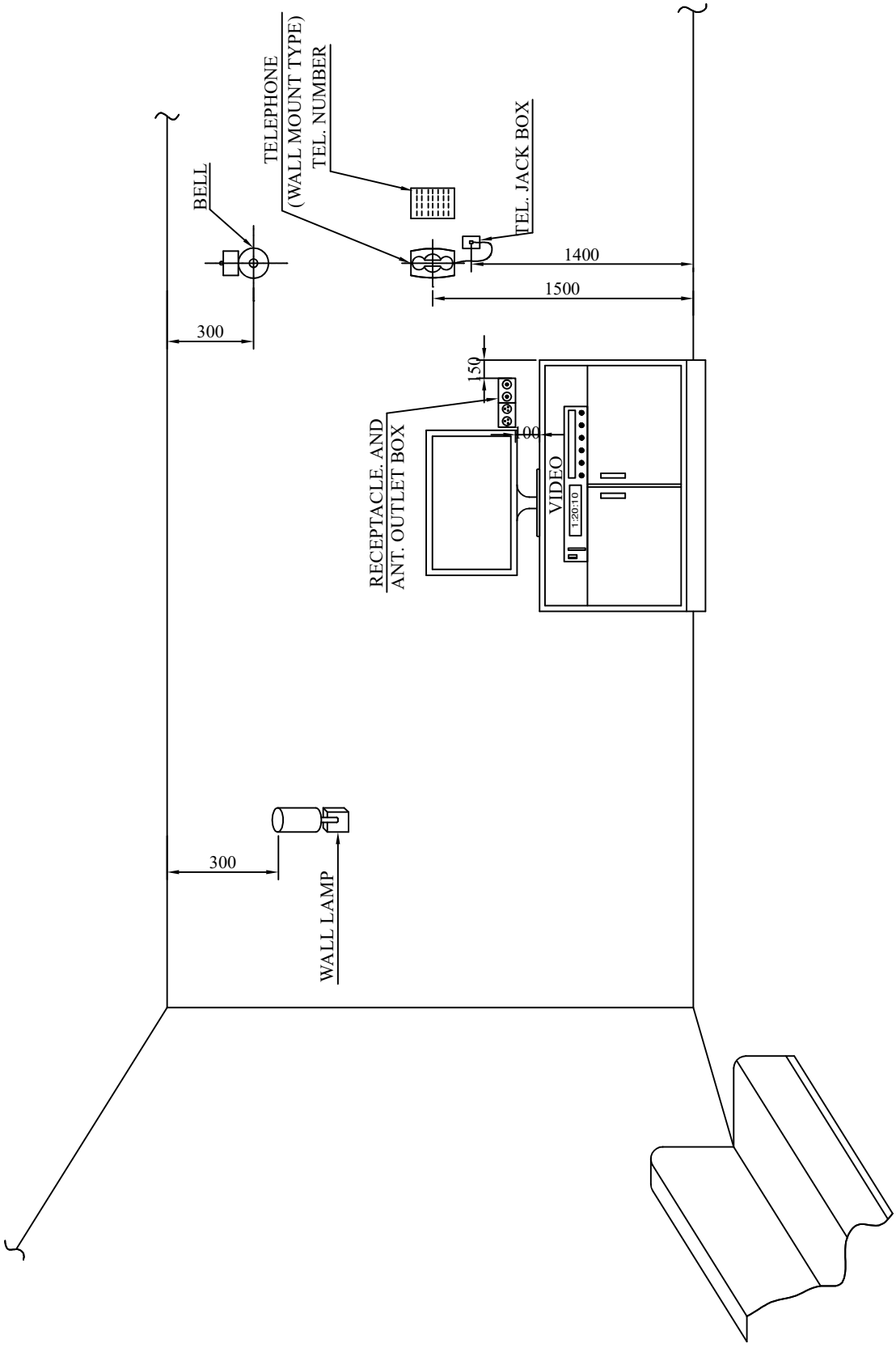
(MESS & DAY ROOM)



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

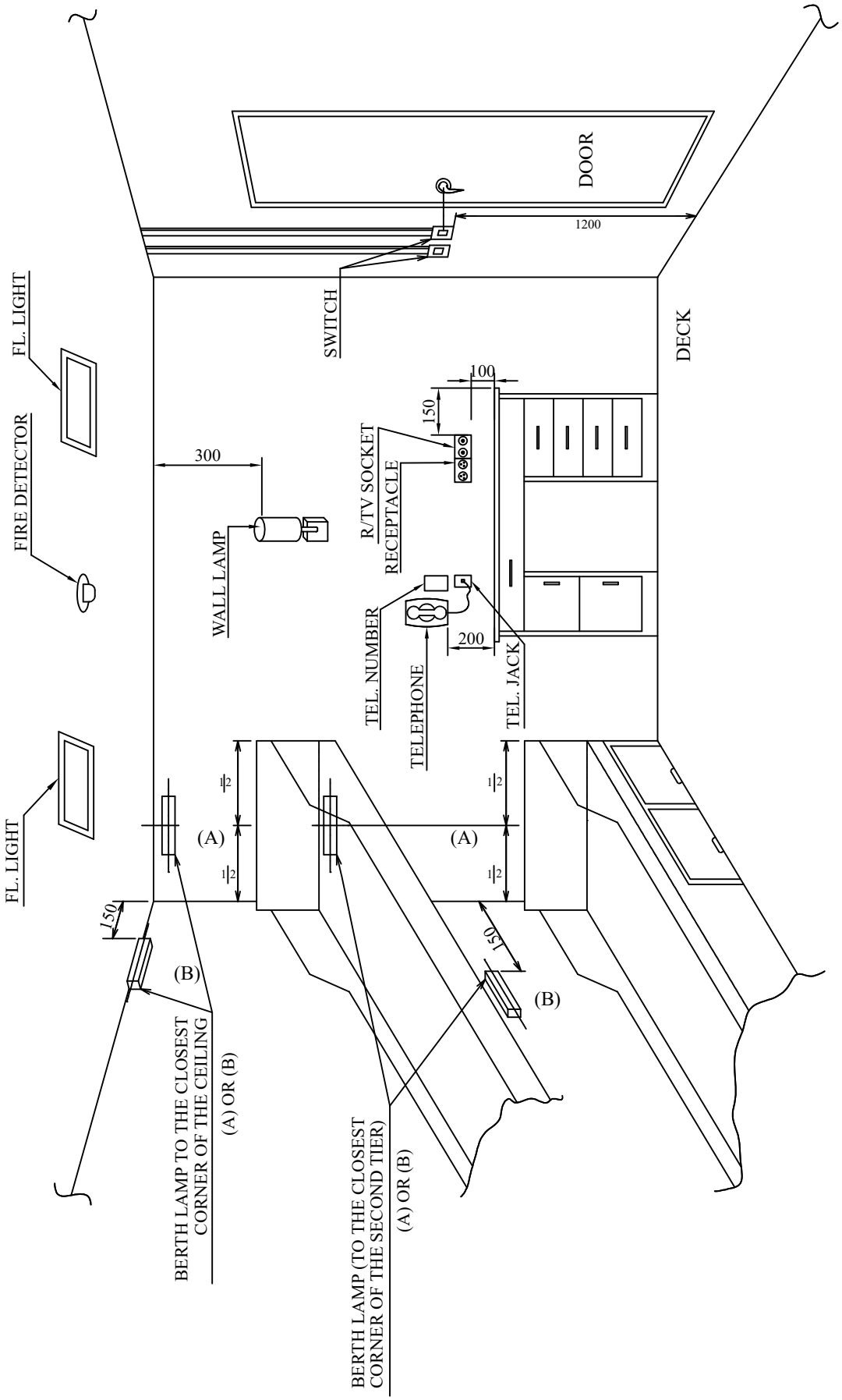
	GENERAL REFERENCE	YARD NO:SH 038-039	76/83
	TYPICAL LAYOUT-TYPE "D"	DRG NO: 038-K5700200 A	

(MESS & DAY ROOM)



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

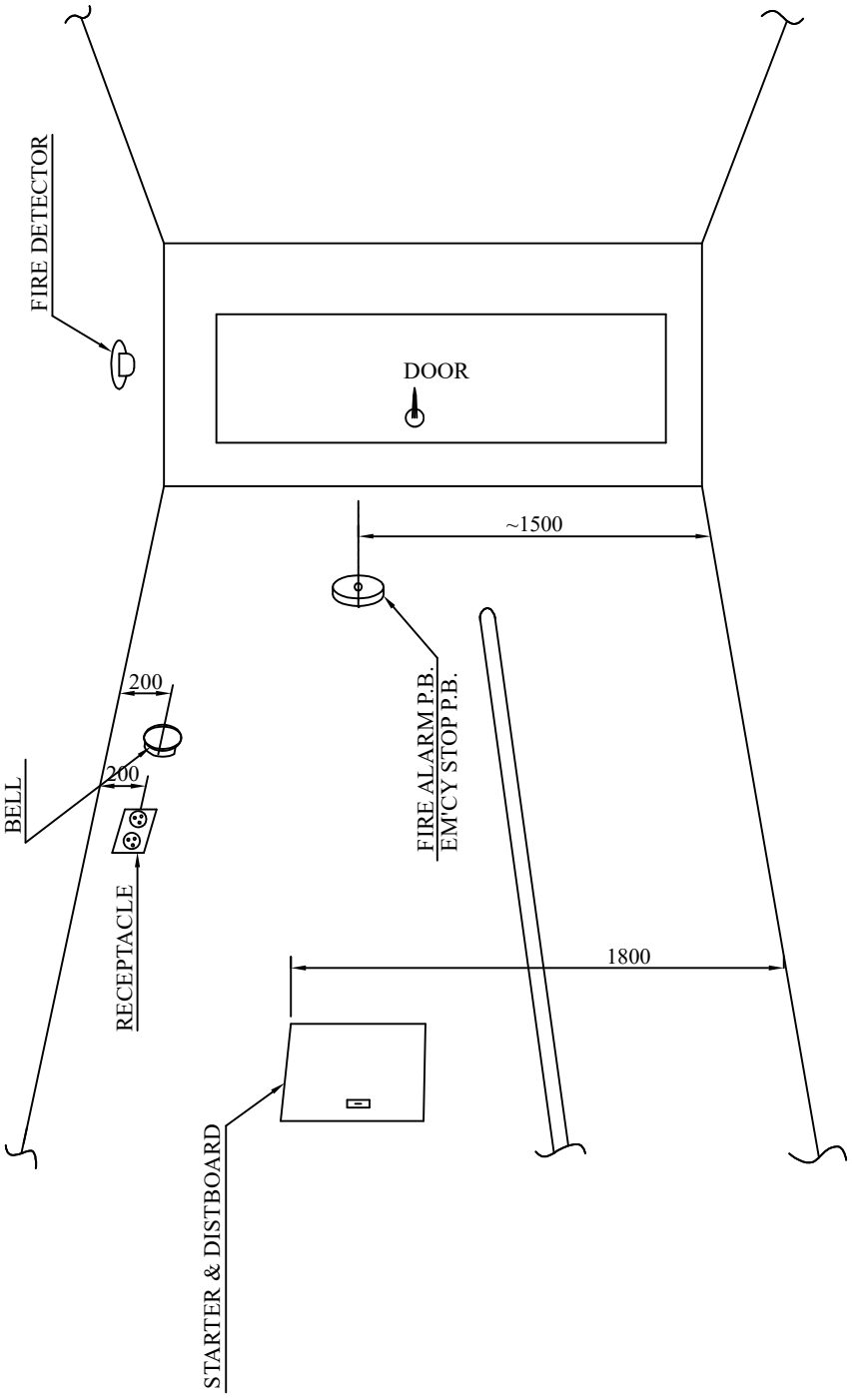
	GENERAL REFERENCE	YARD NO:SH 038-039	77 / 83
	TYPICAL LAYOUT-TYPE "E"	DRG NO: 038-K5700200 A	



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

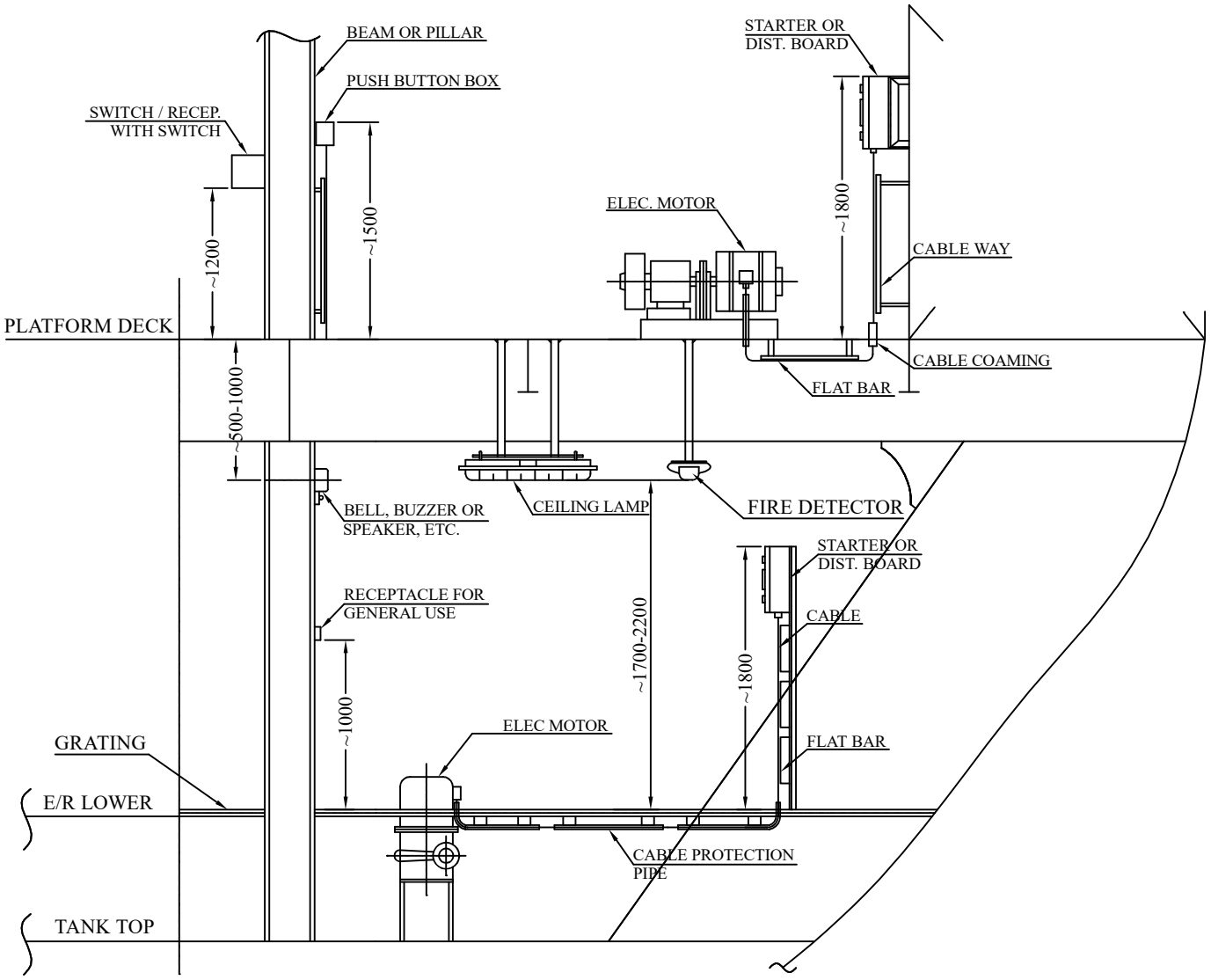
NOTE:- THESE ARE GENERAL/TYPICAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS OF BUILDING SPECIFICATION AND BEST SUITING LOCATION ONBOARD.

	GENERAL REFERENCE	YARD NO:SH 038-039	78/83
	APPARATUS IN ACCOM. PASSAGE-TYPICAL LAYOUT	DRG NO: 038-K5700200 A	



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

	GENERAL REFERENCE	YARD NO:SH 038-039	79 / 83
	TYPICAL LAYOUT ENGINE ROOM	DRG NO: 038-K5700200 A	



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 OF BUILDING SPECIFICATION AND BEST SUITING LOCATION ONBOARD.

	GENERAL REFERENCE	YARD NO:SH 038-039	80/83
	CABLE PENETRATION	DRG NO: 038-K5700200 A	

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.

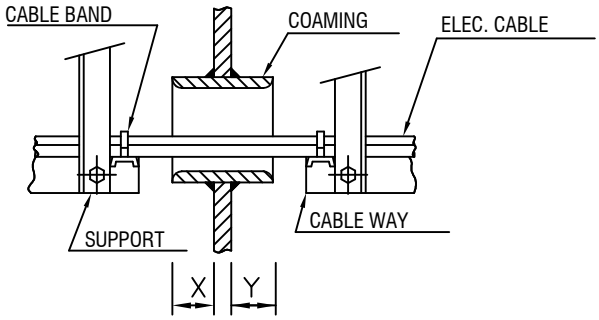
2. WHERE CABLES PASS THROUGH WATER TIGHT, FIRE PROOF AND GAS TIGHT BULKHEADS OR DECKS, PROPER PENETRATION METHOD TO BE APPLIED NOT TO AFFECT THE INTEGRITY OF SUCH BULKHEADS OR DECK. .

FOLLOWING FIGURES INDICATE TYPICAL METHOD OF CABLE PENETRATION RESPECTIVELY.

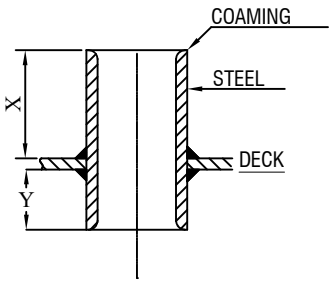
1) FOR NON-WATERTIGHT PENETRATION.

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-EC TYPE



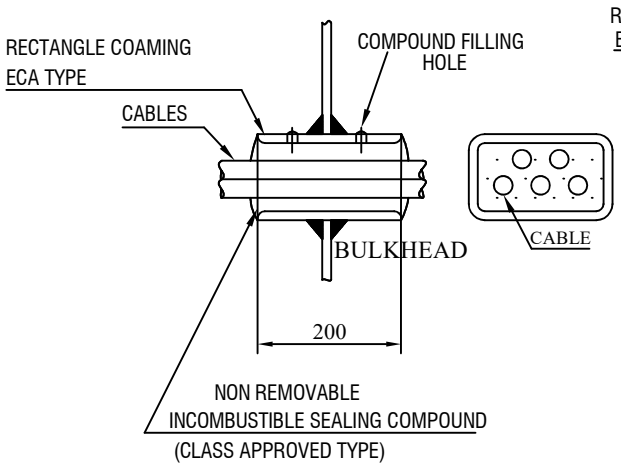
B) DECK PENETRATION - DC TYPE

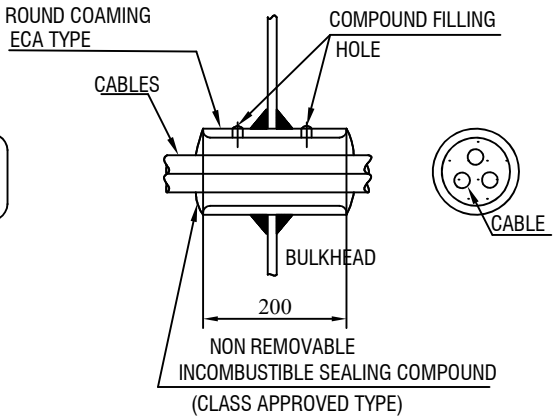


2) WATER/GAS TIGHT PENETRATION

(a).CONVENTIONAL CABLE COAMING ON BULKHEAD WITH WATER/GAS TIGHT SEALING COMPOUND

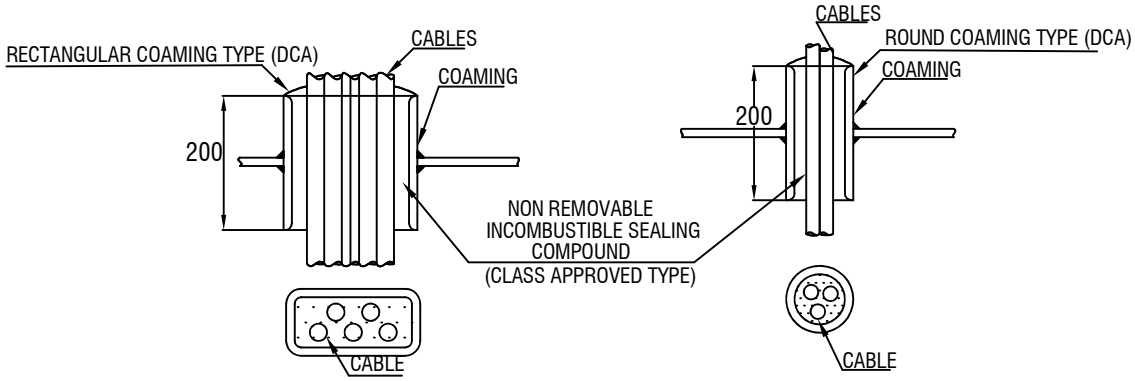
BULKHEAD PENETRATION - ECA TYPE



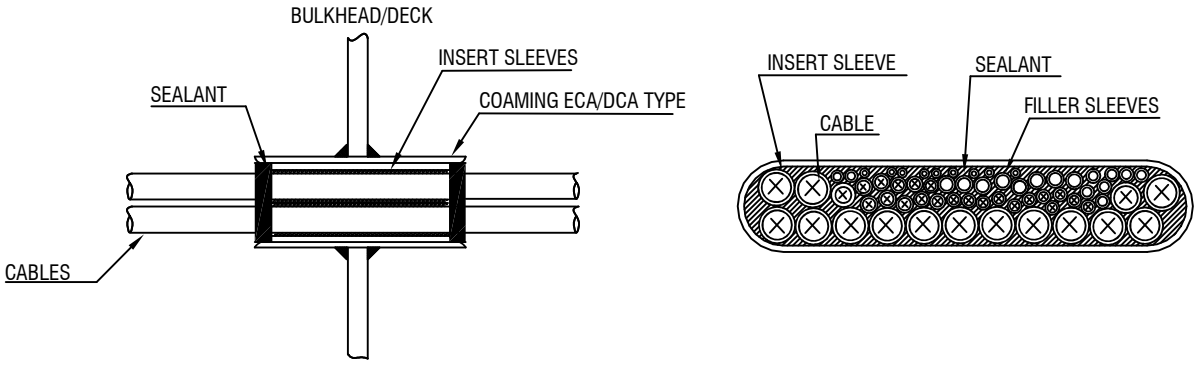


	GENERAL REFERENCE	YARD NO:SH 038-039	81/83
	CABLE PENETRATION	DRG NO: 038-K5700200 A	

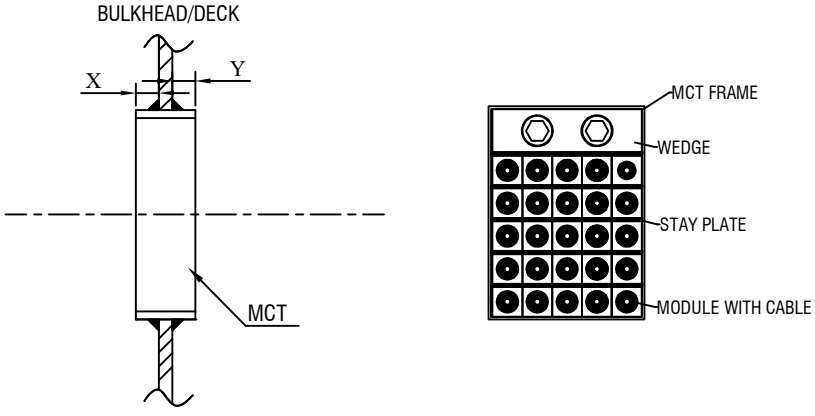
DECK PENETRATION - DCA TYPE



(b) CONVENTIONAL COAMING REMOVABLE SEALING SYSTEM



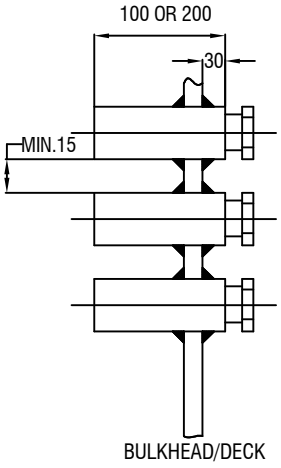
(c) MULTI CABLE TRANSIT (MCT)



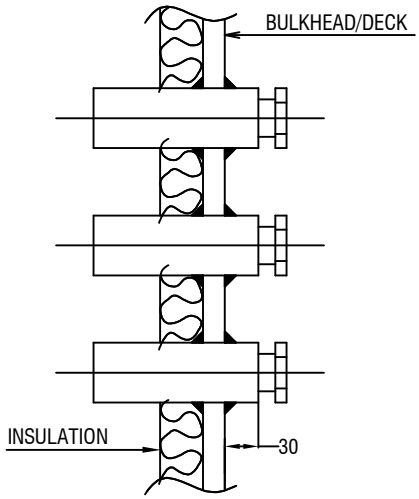
	GENERAL REFERENCE	YARD NO:SH 038-039	82/83
	CABLE PENETRATION	DRG NO: 038-K5700200 A	

(d) PIPE GLANDS

IN CASE OF FITTING
OF STUFFING GLAND.

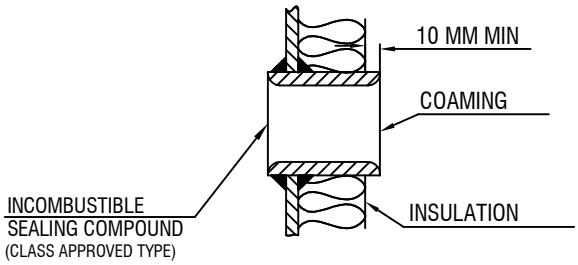


IN CASE OF THE HEAT RESISTING
TO BE FITTED AS BELLOW.

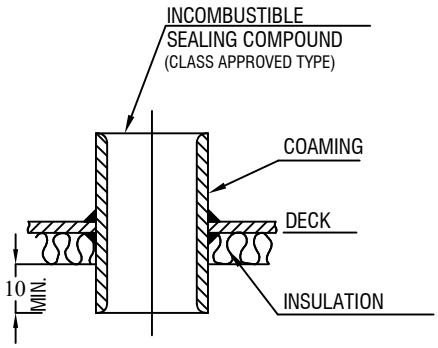


3) IN CASE OF INSULATION / FLOATING FLOOR

BULKHEAD PENETRATION



DECK PENETRATION

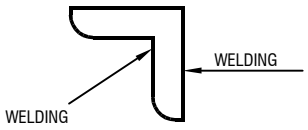
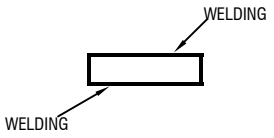
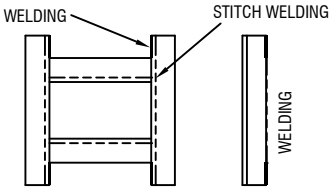
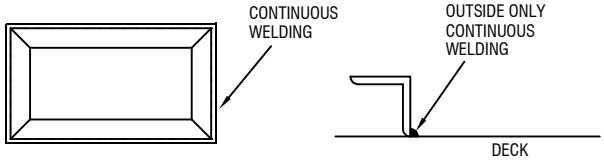
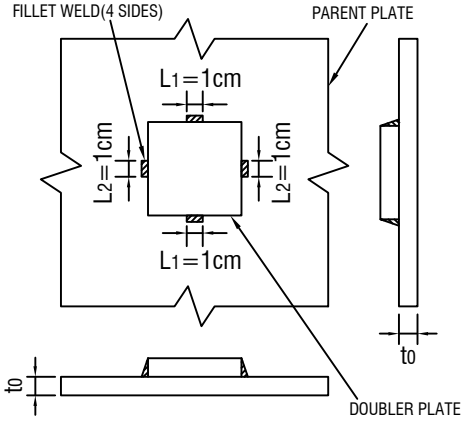


-COAMING TO BE FITTED TO PUT OUT ABOUT
10MM (MIN.)FROM THE HEAT RESISTING SURFACE.

	GENERAL REFERENCE	YARD NO:SH 038-039	83 / 83
	WELDING METHOD	DRG NO: 038-K5700200 A	

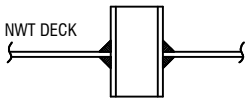
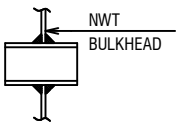
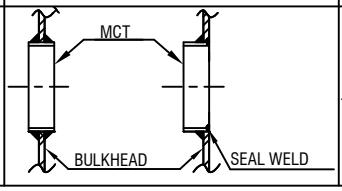
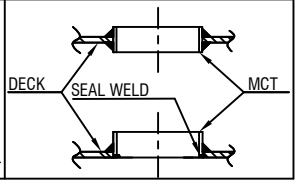
1. THE SUPPORT FOR ELECTRIC EQUIPMENT SUCH AS CABLE HANGER,
ELECTRIC LIGHTING, STARTER, PANEL TO BE WELDED AS FOLLOWS.

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
DOUBLER PLATE FOR OUTFITTING ITEMS ON BULKHEAD			THICKNESS OF DOUBLER PLATE AND PARENT PLATE MUST BE EQUAL(**to**) THE NUMBER AND LENGTH(**L**) OF WELDS ARE TO BE INCREASED DEPENDING UPON THE SIZE AND WEIGHT OF THE OUTFITTING ITEMS TO BE SUPPORTED 1 CM ON 4 SIDES OF THE DOUBLER PLATE CAN CARRY A MAXIMUM LOAD OF FOR STEEL 1340 KG	DRY SPACE (E/R, ACC, S/G, B/T,S/T ETC.-)

2) WEATHER&WET SPACE : BOTH SIDE FULL WELDING.
(INCLUDING E/R LOWER ETC)

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	INTERNAL BHD	INTERNAL DECK
COAMING & COLLAR				

APPENDIX - I

MLF.NO: T5ZXXXES00

TOTAL 26 PAGES INCLUDING COVER :
A4- 24 SHEETS,A2- 02 SHEET
ANNEXURE 1 (7 PAGES) & ANNEXURE 2 (14 PAGES)

COCHIN SHIPYARD LTD

A GOVERNMENT OF INDIA ENTERPRISE
COCHIN-682015 , INDIA.

CSLYARD NO : SHIP 038~039		
CLASS : DNV		
OWNER : NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS		
TEAM	VEDAM	CSL
APPROVED	BISWAJIT	SREERESH R S 3/12/24
REVIEWED	——	SUMESH RAJAN LISHA
CHECKED	GULSHAN	GIRISH V S
PREPARED	ANCHITHA	

SAMSKIP SEA SHUTTLE CONTAINER CARRIER

Fitting Arrangement of Electrical equipment and Cable Way for Underwater Electrical items, cable route.

DATE :	03.12.2024	SCALE: NTS	DRG NO:038-S5ZES0001	REV : 0

ISSUED TO																		
DEPT.																		
No.																		

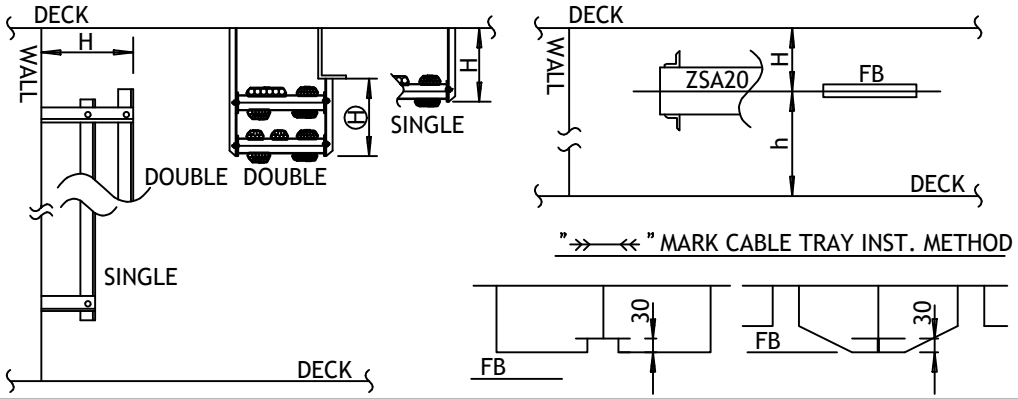
	PLAN HISTORY	YARD.NO:SH 038-039 02/26
		DRG NO : 038-S5ZES0001 R0

DATE	REV	DESCRIPTION	VEDAM				CSL			
			DWN. BY	CHKD. BY	RVD. BY	APP. BY	DWN. BY	CHKD. BY	RVD. BY	APP. BY
03.12.2024	0	FIRST ISSUE	ATA	GN	—	BJT		GVS	SR/ LS	SRS

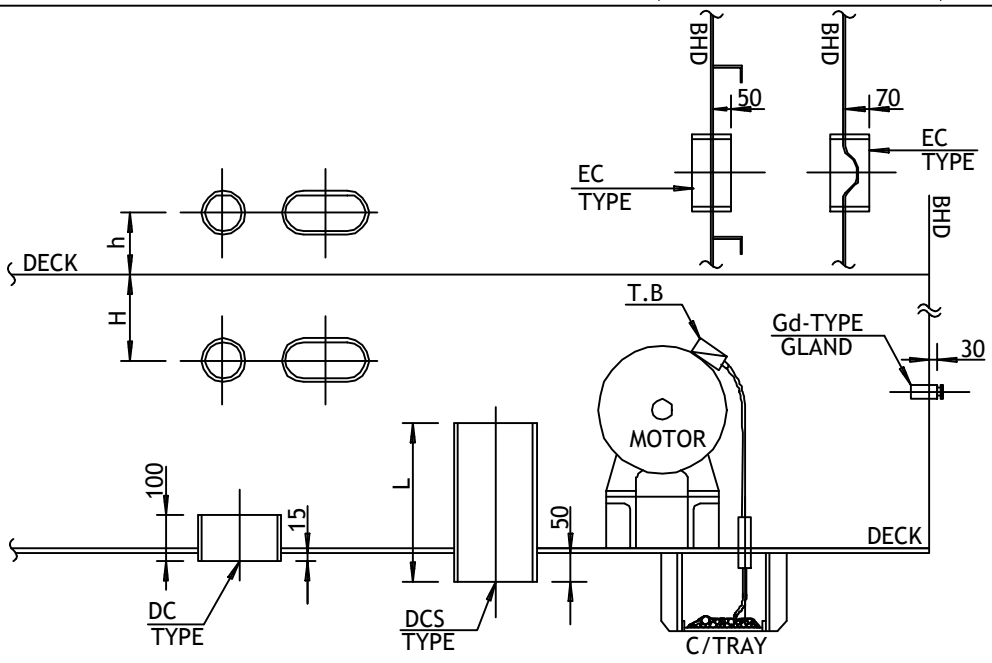
	INSTALLATION OF CABLEWAY	YARD.NO:SH 038-039	03 / 26
	STANDARD HEIGHTS	DRG NO : 038-S5ZES0001 R0	

STANDARD HEIGHTS

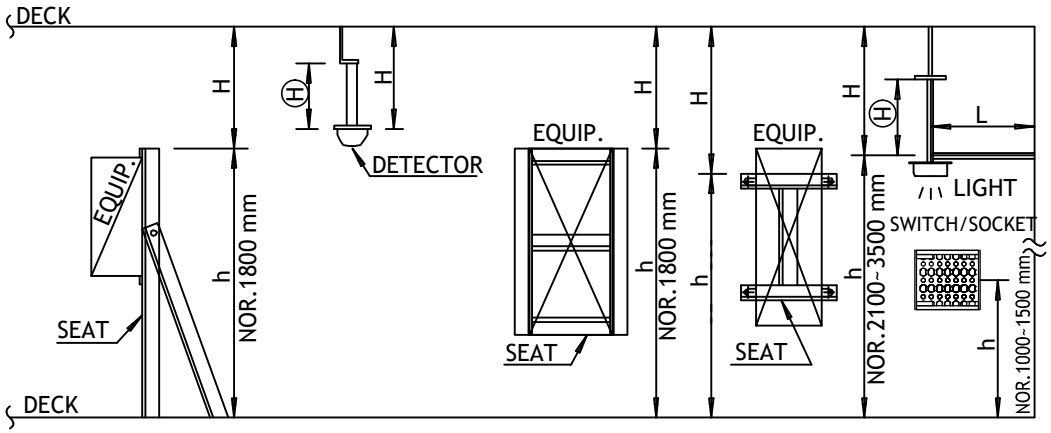
CABLE HANGER

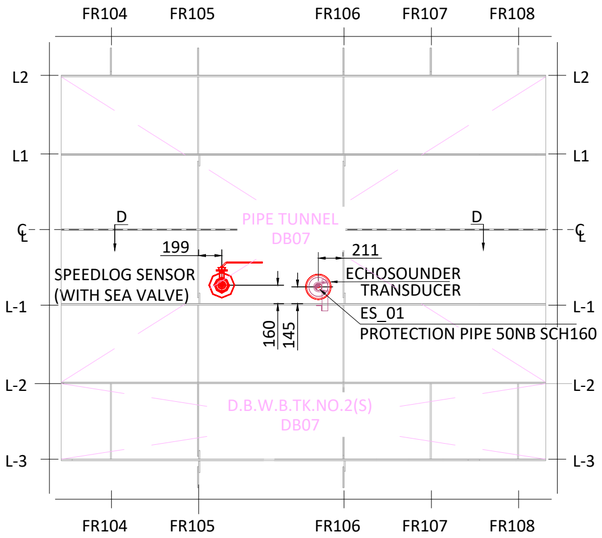


COAMING & GLAND

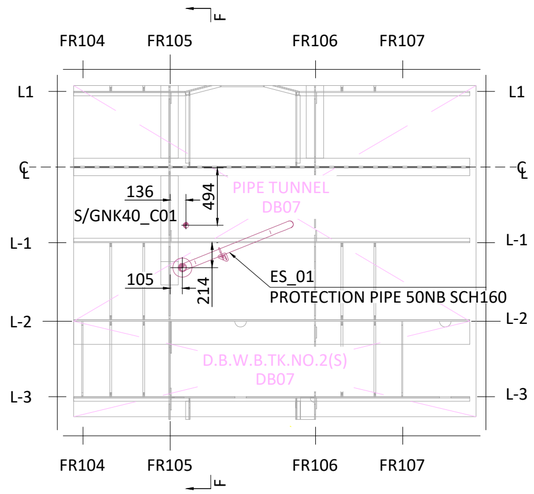


SEAT



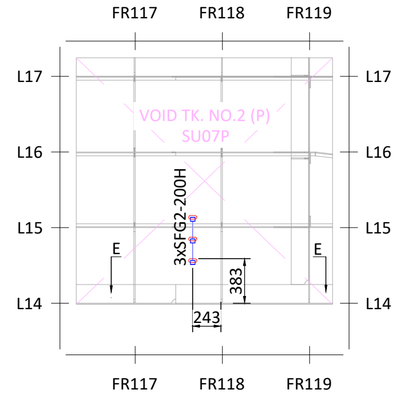


PLAN VIEW BELOW TANKTOP (AT 900 ABL)

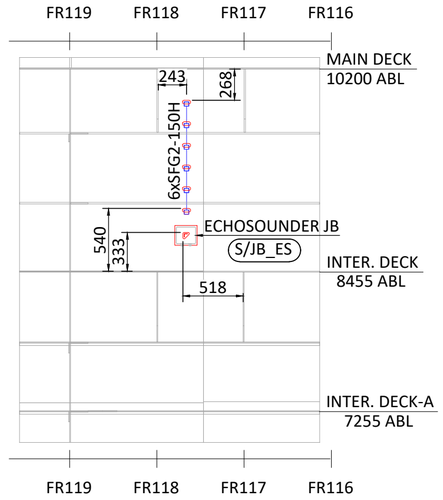


PLAN VIEW BELOW TANKTOP (AT 1400 ABL)

(PIPE TUNNEL DECKHEAD)

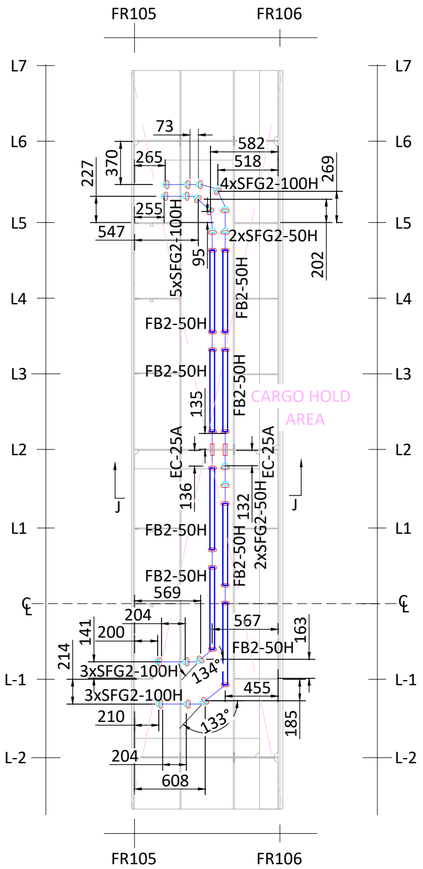


PLAN VIEW BELOW MAIN DECK (10200 ABL)

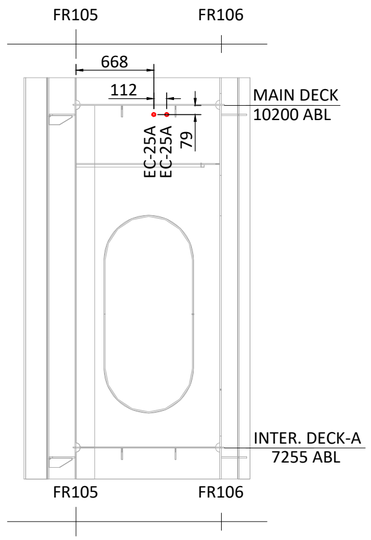


SECTION E-E

(VIEW LOOKING STBD - BULKHEAD AT LONG. L14)

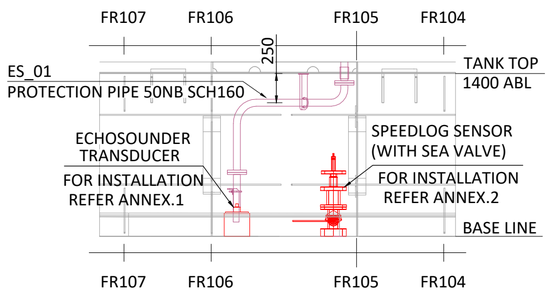


PLAN VIEW BELOW MAIN DECK (10200 ABL)



SECTION J-J

(VIEW LOOKING PORT @ L2)



SECTION D-D

(VIEW LOOKING STBD BULKHEAD-BETWEEN L0 TO L-2)

GENERAL NOTE:

1. ALL DIMENSIONS ARE IN MM
2. INSTALLATION OF ELECTRICAL EQUIPMENTS AND CABLEWAYS SHALL BE IN ACCORDANCE WITH ELECTRICAL OUTFITTING STANDARD & PRACTICE
3. CABLEWAY SUPPORTS WHICH IS COMING UNDER FRAMES OR GIRDERS MAY BE SUITABLY TRIMMED AT SITE TO ACHIEVE THE REQUIRED HEIGHT.
4. CABLEWAY SUPPORTS OBSTRUCTING PIPES/DUCTS/STIFFNERS/GIRDERS, IF ANY TO BE ADJUSTED AT SITE.
5. THE DIMENSIONS FOR EQUIPMENT FITTING SEATS ARE MARKED TO THE PAD EDGE.
6. NON STANDARD HEIGHTS FOR CABLE SADDLES SHALL BE ACHIEVED BY SUITABLY TRIMMING THE IMMEDIATE HIGHER SIZE.
7. CABLE HANGERS & SADDLES WITHOUT ORDINATES (DIMENSIONS), TO BE FITTED AS PER STANDARDS
8. * MARKED ITEMS TO BE SUITABLY ADJUSTED BY YARD TO SUIT SITE CONDITIONS.
9. (**) & (***) MARKED ITEMS SHOULD BE FOLLOWED AS PER TYPICAL DETAIL UNLESS OTHERWISE MENTIONED IN SEPARATE VIEW.
10. PIPE'S ARE SHOWN ONLY FOR REFERENCE. REFER CORRESPONDING MACHINERY PIPE FITTING ARRANGEMENT FOR FITTING PIPES & SUPPORTS.
11. ALL DIMENSIONS INDICATED ARE EXCLUDING THICKNESS OF FRAME/LONGES,STIFFNERS.

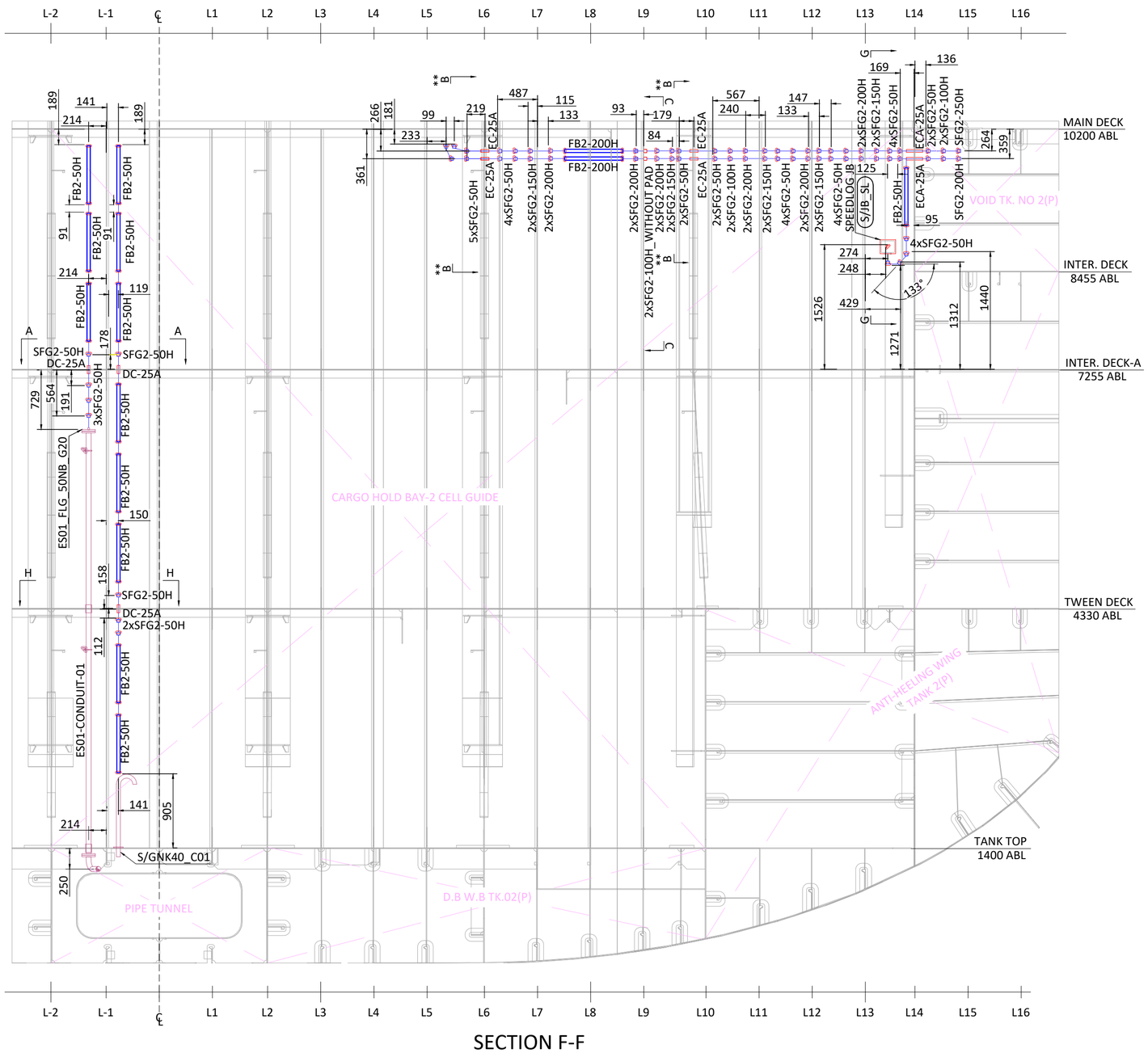
INDICATION METHOD FOR EQUIPMENT & FITTING SEAT

XXXXXXXXXX
S/XXXXXXXX

XXXXXXXXXX : INDICATES EQUIPMENT NAME
S/XXXXXXXX : INDICATES FITTING SEAT PIECEMERK

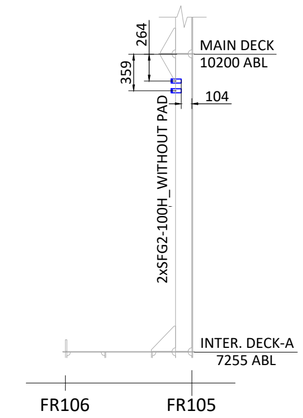
COCHIN SHIPYARD LIMITD P.O. Bag - 1653, COCHIN - 682 015 CSL YARD No. : SHIP-038-039			SAMSKIP SEA SHUTTLE CONTAINER CARRIER
OWNER	NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS		SCALE : NTS
TEAM	VEDAM	CSL	
APPROVED	BISWAJIT	SREERESH RS	FORMAT : A2
REVIEWED	——	SUMESH RAJAN LISHA	TITLE : Fitting Arrangement of Electrical equipment and Cable Way for Underwater Electrical items, cable route
CHECKED	GULSHAN	GIRISH V S	
DRAWN	ANCHITHA		

DWG. NO. 038-S5ZES0001



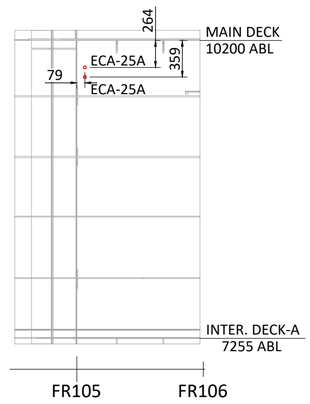
SECTION F-F

(VIEW LOOKING AFT AT BULKHEAD - FR.105)



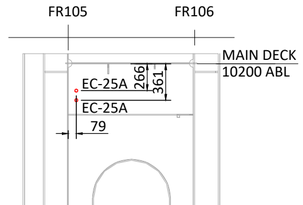
SECTION C-C

VIEW LOOKING STBD AT L9



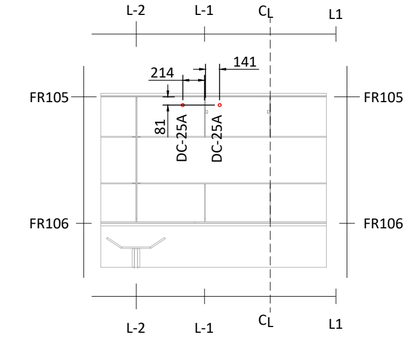
SECTION G-G

VIEW LOOKING PORT - BHD L14



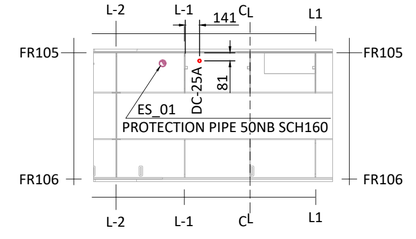
SECTION B-B

(TYPICAL)
(**)



SECTION A-A

(PLAN VIEW @ INTER. DECK-A 7255 ABOVE BASELINE)



SECTION H-H

(PLAN VIEW @ TWEEN DECK 4330 ABOVE BASELINE)

COCHIN SHIPYARD LIMITD P.O. Bag - 1653, COCHIN - 682 015 CSL YARD No. : SHIP-038-039			SAMSKIP SEA SHUTTLE CONTAINER CARRIER
OWNER	NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS		SCALE : NTS
TEAM	VEDAM	CSL	
APPROVED	BISWAJIT	SREERESH RS	FORMAT : A2
REVIEWED	——	SUMESH RAJAN LISHA	TITLE : Fitting Arrangement of Electrical equipment and Cable Way for Underwater Electrical items, cable route
CHECKED	GULSHAN	GIRISH V S	
DRAWN	ANCHITHA		
This drawing or document is the property of Cochin Shipyard Ltd. and must not be partially or wholly copied and used for any other purposes without prior written permission.			DWG. NO. 038-S5ZES0001
			PAGE:5 OF 26 | REV: 0

1. General information

The SKIPPER ETNST Standard Tank is used for installation of:
1. Echo Sounder transducer type (50 and 200 kHz).

Caution!
Be aware that the sensor/transducer contains high precision parts and therefore proper handling when mounting is essential for the final result.

When handling the Tank, all lifting devices must be attached on the outside of the Tank. It is very important to not insert any chains, wire, rope or any other device into the Tank chamber. This to avoid damaging and any kind of pollution of the Tank

The SKIPPER ETNST Standard Tank is delivered final assembled. The parts necessary for the transducer mounting will be found packed with the transducer. First of all, it must be decided where the Tank should be installed. Normally, this will be in the fore part of the ship, in the centerline, or as close to the centerline as possible. Optimal system operation is achieved by fitting the transducer as deep as possible on the hull.

- The active surface of the transducer must be installed with front face a maximum of +/-7 degree to the ships horizontal plane. (Echo Sounder).

Do not mount transducers close to the bow thruster propeller outlets, or aft of other hull installations (outlets, vents or other protruding details) who may create aeration or turbulence.

It is necessary to select a part of the hull that is submerged and free from turbulence and aeration under all load and speed conditions, and to avoid positions where air is trapped in heavy weather.

If a flat, horizontal section is not available for transducer fitting, the shipyard must construct a suitable bed. Welding seams in this area should be smoothed and rounded off, in order not to create turbulence or aeration at speed.

Protect the active element of the transducer during transport and installation, and
do not paint the surface.

Important

"Sensors for Speed Log and Echo Sounder are delivered with a fixed cable. Needed attention must be taken to allow easy replacement/pulling of new cable during maintenance".

SKIPPER Electronics AS will recommend installation positions if GA-drawings (General arrangements), lines drawings and frame drawings are made available for study.

Condition.
The welding to hull structures and structural support of the items may be subject to separate approval by classification societies for each installation on board a ship.

- Standard welding practice, methods and procedures should be observed, but may vary. (See welding notes).

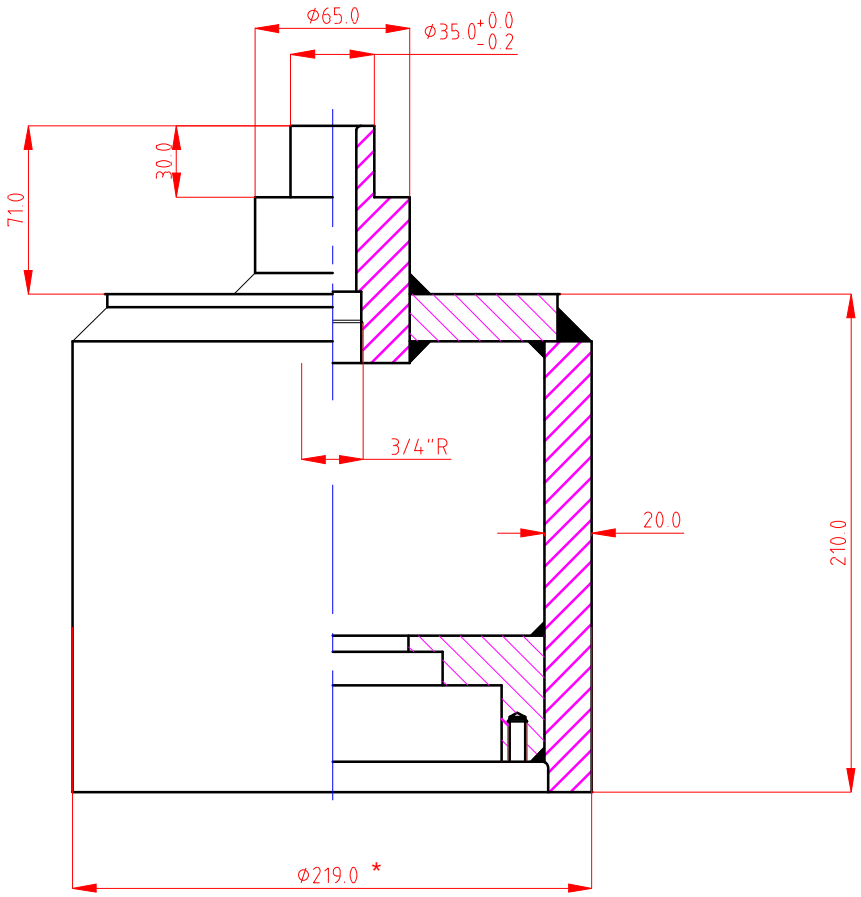
WELDING NOTES!

All bottom parts and flanges for welding are precisely machined parts. During welding of these parts to the ship's hull plates, careful attention must be paid to avoid construction strain on the bottom parts and flanges.

- **Let parts cool down during welding.**
- **Over heating may change fit and form and result in non-conformity with intended sensor/ transducer.**
- **Welding to thick hull steel plates will exert high stress on bottom parts and flanges.**
- **Especially care must be taken during welding of stainless steel flanges.**
- **Work must be performed by a qualified and certified welder.**

2. Transducer Tank ETNST

RevNo	Revision note	Date	Signature	Checked



× Note due to surface machining, the diameter may vary between 217 and 219,1

Part.no: ETNST.

Material: ST.52.3N
Surface Treatment: Flugger 1240 Industriprimer. Colour: Red
Gen. tolerance: ±0.2

Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
Designed by AM		Checked by VF	Approved by - date VF-2005/01/25	File name	Date 2010.02.12	Scale
Skipper Electronics AS			Transducer Tank			
			TB-2002-Rev-00-Customer only		Edition 100215	Sheet 1/1

3. Installation and Welding Guidance for Transducer Tank

RevNo	Revision note	Date	Signature	Checked

Max 1° for Speed Logs
Max 7° for Echo Sounders

Flush

Flush

Protruding
Utstikkende

Max 20°

30 cm

30 cm

Ahead

Build a streamlined blester around the tank

50 kHz 200 kHz

Material Tickness Top and Sides: 20mm
Materialtykkelse topp og sider: 20mm

40°

45°

40°

5

10

30°

10

30°

Shell: 20 - 30mm
Hud: 20 - 30mm

Shell: Thicker than 30mm
Hud: Tykkere enn 30mm

Flush

Weld the Tank according to procedure as shown.
Use low-Hydrogen electrodes, e.g OK 4800. In order to avoid contraction strain, hammer each Welding seam before applying. next. Allow the Tank to cool down during welding.
DO NOT HAMMER THE LAST WELDING SEAM!
Grind flush all Weldings within 5M in front of, and 3M to the side of the Transducer. Finally, paint the Transducer Tank inside and outside with a non-corrocive coating.

Sveis tanken i henhold til viste prosedyre. Bruk lavhydrogen elektroder, f.eks. OK 4800.
For å unngå krympespenninger mest mulig, hamres hver sveisestreng før neste legges, og tanken holdes så kald som mulig under sveising.
SISTE SVEISESTRENG MÅ IKKE HAMRES!
Planslip alle sveisesømmer innenfor et areal av 5M i front og 3M til hver side for svingeren. Til slutt males svingertanken utvendig og innvendig med korrosjonshindrende maling.

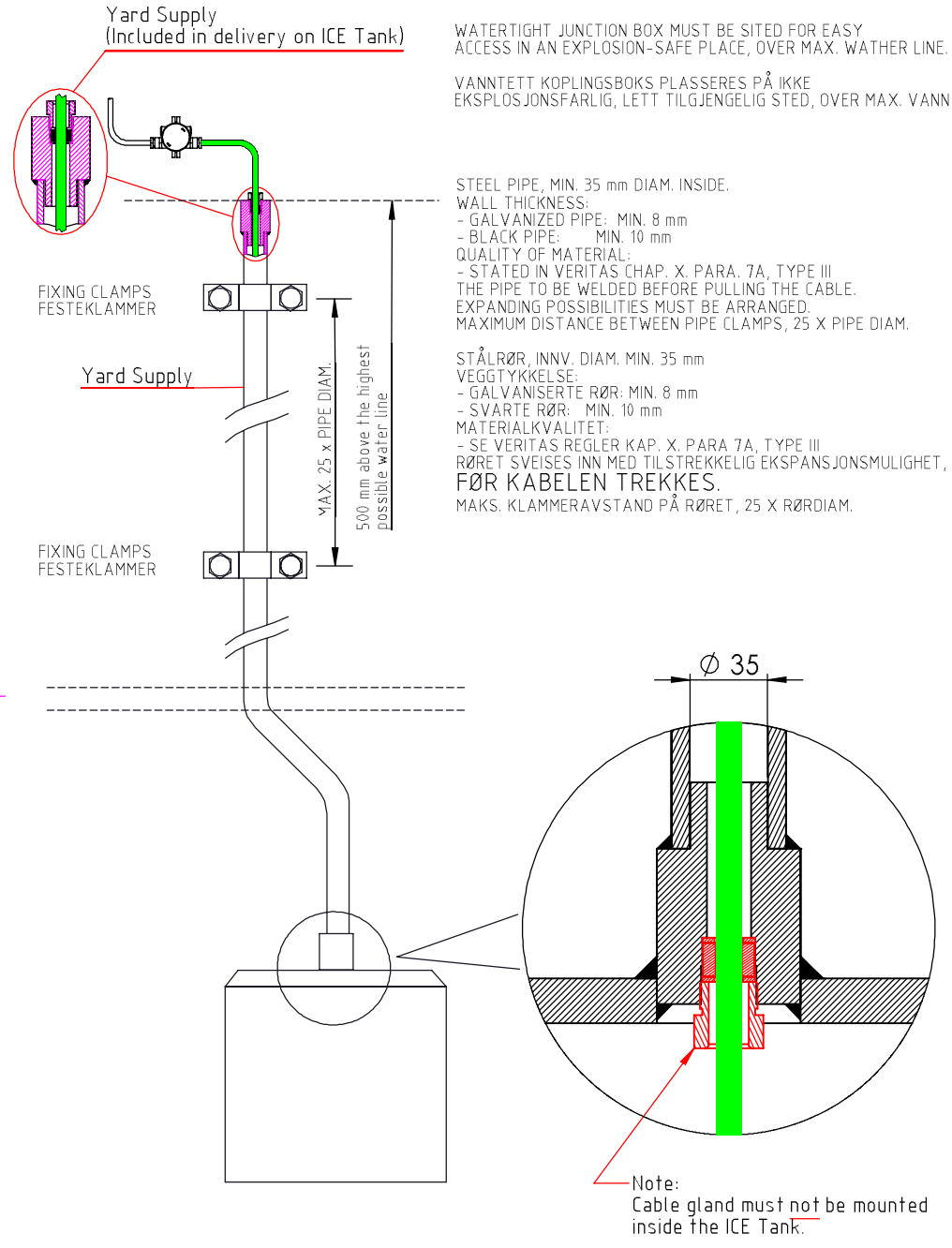
1 4 5 6 8 7 3 2

Welding sequence
Sveise rekkefølge

Itemref	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference
Designed by A.Matre		Checked by	Approved by - date	File name	Date 2007.10..16	Scale
SKIPPER Electronics AS			Installation and welding guidance for Tranducer Tank		
			TB-3001-Rev-03	Edition 12.05.24	Sheet 1/1

4. Cable Pipe for Transducer Tank

RevNo	Revision note	Date	Signature	Checked



WATERTIGHT JUNCTION BOX MUST BE SITED FOR EASY ACCESS IN AN EXPLOSION-SAFE PLACE, OVER MAX. WATHER LINE.

VANNTETT KOPLINGSBOKS PLASSERES PÅ IKKE EKSPLOSJONSFARLIG, LETT TILGJENGELIG STED, OVER MAX. VANNLINJE.

STEEL PIPE, MIN. 35 mm DIAM. INSIDE.
WALL THICKNESS:
- GALVANIZED PIPE: MIN. 8 mm
- BLACK PIPE: MIN. 10 mm
QUALITY OF MATERIAL:
- STATED IN VERITAS CHAP. X. PARA. 7A, TYPE III
THE PIPE TO BE WELDED BEFORE PULLING THE CABLE.
EXPANDING POSSIBILITIES MUST BE ARRANGED.
MAXIMUM DISTANCE BETWEEN PIPE CLAMPS, 25 X PIPE DIAM.

STÅLRØR, INNV. DIAM. MIN. 35 mm
VEGGTYKKELSE:
- GALVANISERTE RØR: MIN. 8 mm
- SVARTE RØR: MIN. 10 mm
MATERIALKVALITET:
- SE VERITAS REGLER KAP. X. PARA 7A, TYPE III
RØRET SVEISES INN MED TILSTREKKELIG EKSPANSJONSMULIGHET, FØR KABELEN TREKKES.
MAKS. KLAMMERAVSTAND PÅ RØRET, 25 X RØRDIAM.

Designed by	Date	Scale	Checked by	Approved by - date
AM	2007.12.18		VF	

Skipper Electronics AS

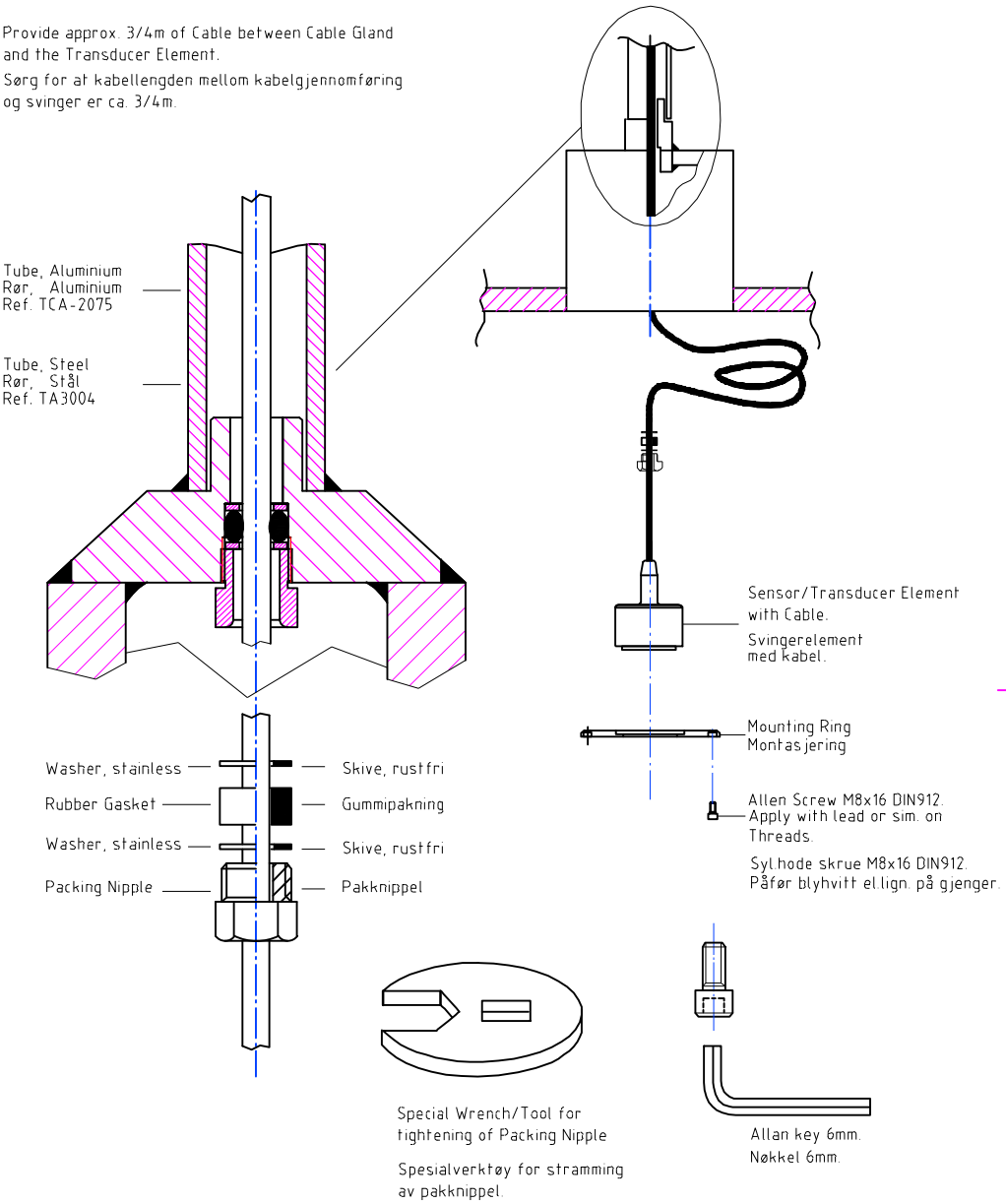
Cable pipe for Transd.Tank Steel

TA-3004	Revision 01	Edition date 2013.05.07	Sheet 1/1

5. Mounting of Transducer

RevNo	Revision note	Date	Signature	Checked

Provide approx. 3/4m of Cable between Cable Gland and the Transducer Element.
Sørg for at kabellengden mellom kabelgjennomføring og svinger er ca. 3/4m.

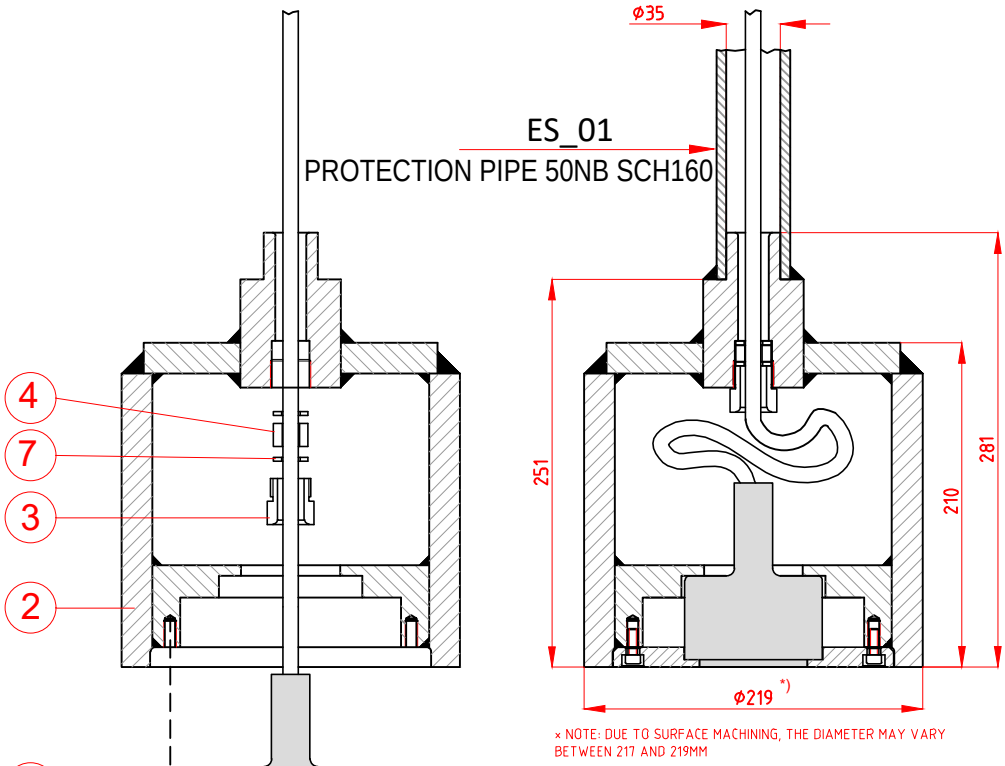


Itemref	Quantity	Title/Name, designation, material, dimension etc		Article No./Reference	
Designed by AM		Checked by VF	Approved by – date	File name	Date 2007.12.18	Scale
Skipper Electronics AS			Mounting of Transducer		
			TB-3003-Rev-01	Edition	Sheet 1/1

	(ANNEX. 1)	YARD.NO:SH 038-039	12 / 26
	ECHOSOUNDER INSTALLATION DETAILS (07/07)	DRG NO : 038-S5ZES0001 R0	

EchoSounder Transducer Tank 50kHz

RevNo	Revision note	Date	Signature	Checked



ITEM	QTY.	DESCRIPTION	DWG.NO/MATERIAL
8	6	Screw M8 x 16 DIN 912	St.steel A4
7	2	Washer M12 DIN 125	St.steel A4
5	1	Ring 50 kHz	TC-2010-Rev-00
4	1	Gasket	SB-6029-Rev-00
3	1	PG-Nipple	TC-2013-Rev-00
2	1	Transducer Tank ETNST	TB-2002-Rev-01
1	1	Sensor 50 kHz	

Itemref	Quantity	Title/Name, designation, material, dimension etc	Article No./Reference

Designed by	Checked by	Approved by - date	File name	Date	Scale
AM	VF			2005/05/02	

Skipper Electronics AS	Transducer Tank 50kHz			
	TB-0050	Revision 00	Draw. Edition 100215	Sheet 01

SKIPPER SB (Single Bottom) Sea Valve 100 mm

1. Installation

The SKIPPER SB Sea Valve 100 mm is used for installation of:SKIPPER speed log sensors and Echo sounder transducers fitted with adaptor for XB-100-XX .

Caution!
Be aware that the Sea Valve contains high precision parts and therefore proper handling when mounting is essential for the final result.

When handling the Sea Valve, all lifting devices must be attached on the outside of the valve. It is very important to not insert any chains, wire, rope or any other device into the valve chamber. This to avoid damaging and any kind of pollution of the Sea Valve.

Caution must be taken when mounting seavalves that all parts are aligned correctly, and that the inside is clean. DO NOT use liguid sealants, and DO NOT paint the inside of a valve.

The SKIPPER SB Sea Valve 100 mm is delivered partly assembled for transport. The parts necessary for final assembly will be found packed in a box delivered with the Sea Valve. First of all, it must be decided where the Sea Valve should be installed. Normally, this will be in the fore part of the ship, in the centerline, or as close to the centerline as possible. Optimal system operation is achieved by fitting the transducer/ sensor as deep as possible on the hull.

- The active surface of the sensor must be installed with front face a maximum of +/-1 degree to the ships horizontal plane. (Speed Logs).
- The active surface of the transducer must be installed with front face a maximum of +/-7 degree to the ships horizontal plane. (Echo Sounder).

Do not mount transducers close to the bow thruster propeller outlets, or aft of other hull installations (outlets, vents or other protruding details) who may create aeration or turbulence.

It is necessary to select a part of the hull that is submerged and free from turbulence and aeration under all load and speed conditions, and to avoid positions where air is trapped in heavy weather.

If a flat, horizontal section is not available for transducer fitting, the shipyard must construct a suitable bed. Welding seams in this area should be smoothed and rounded off, in order not to create turbulence or aeration at speed.

Protect the active element of the transducer/sensors during transport and installation, and
do not paint the surface.

The Sea Valve should be placed in a service accessible place, large enough for installation and disassembly of the sensor unit. See drawing: “Space considerations”.

Important

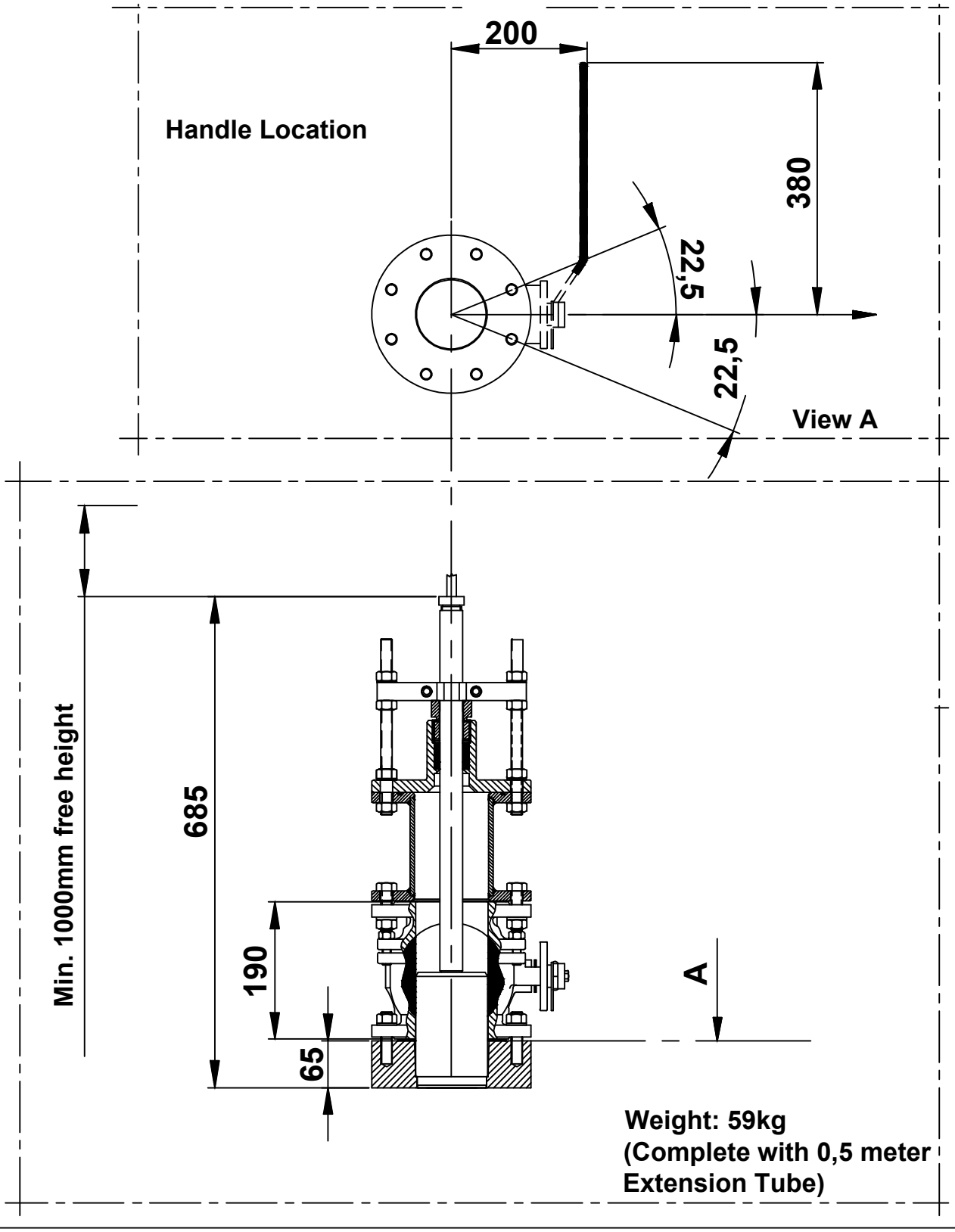
"Sensors for Speed Log and Echo Sounder are delivered with a fixed cable. Attention must be taken to allow easy replacement/pulling of new cable during maintenance".

SKIPPER Electronics AS will recommend installation positions if GA-drawings (General arrangements), lines drawings and frame drawings are made available for study.

Condition.
The welding to hull structures and structural support of the items may be subject to separate approval by classification societies for each installation on board a ship.

Note: All "Item (X)" references on the following pages, can be found on drawing 100 mm Single Bottom Ball Valve.

	(ANNEX. 2)	YARD.NO:SH 038-039	15 / 26
	SPEED LOG SENSOR INSTALLATION DETAILS (03/14)	DRG NO: 038-S5ZES0001 R0	



3. Welding the bottom flange

- When the position has been decided, a 220 mm hole is cut in the hull.
- The bottom flange, Item (1), is welded into the hull. Standard welding practice, methods and procedures should be observed, but may vary. (See welding notes).

Attention:

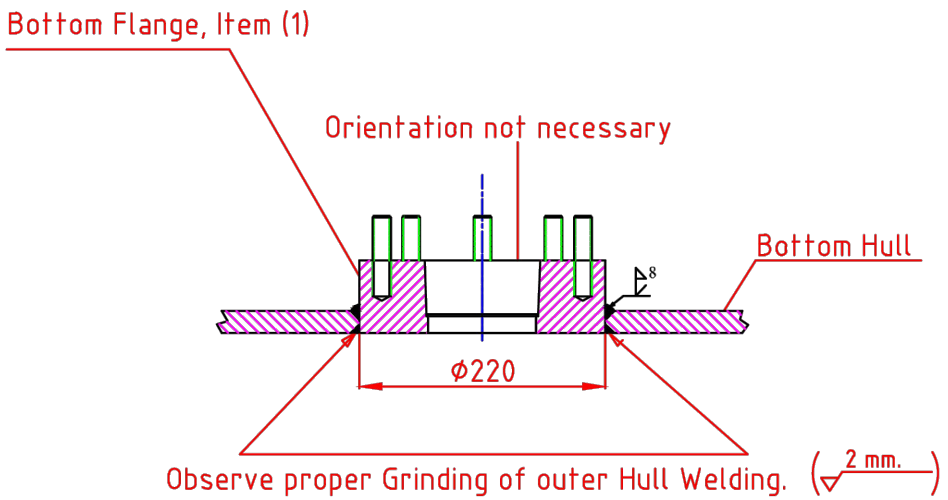
The bottom flange is a part of the Sea Valve that is machined with high accuracy and it should be protected after mounting to avoid damage to the bottom flange surfaces. This to avoid leakage. If the valve is pre-mounted, be sure to protect the valve from being polluted by welding debris.

WELDING NOTES!

All bottom parts and flanges for welding are precisely machined parts. During welding of these parts to the ship's hull plates, careful attention must be paid to avoid construction strain on the bottom parts and flanges.

- **Let parts cool down during welding.**
- **Over heating may change fit and form and result in non-conformity with intended sensor/ transducer.**
- **Welding to thick hull steel plates will exert high stress on bottom parts and flanges.**
- **Especially care must be taken during welding of stainless steel flanges.**
- **Work must be performed by a qualified and certified welder.**

Welding the bottom flange in ship's hull.



4. Sea Valve Assembly (Orientation not necessary).

Step 1

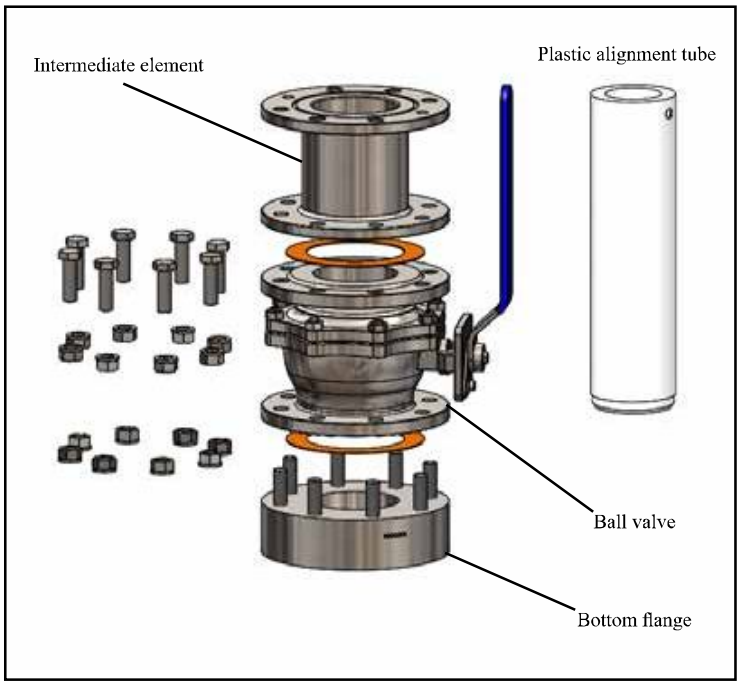
- Place 1.5 mm gasket, on top of Bottom Flange.
- Then place the Ball Valve element on top of the Bottom Flange. The 16 mm nuts and washers should be mounted, **not** tightened.
- Place a 1.5 mm gasket on top of the Ball Valve element.
- Mount the intermediate element on top of the Ball Valve element. The track for o-ring to be upwards.
- All 8 nuts and washers should be mounted, **not** tightened.

Step 2

- Place the plastic alignment tube, all the way, into the sea valve.
- Tighten 8 nuts ball valve to bottom flange.
- Tighten 8 nuts Intermediate element to ball valve.
- Remove the plastic alignment tool.

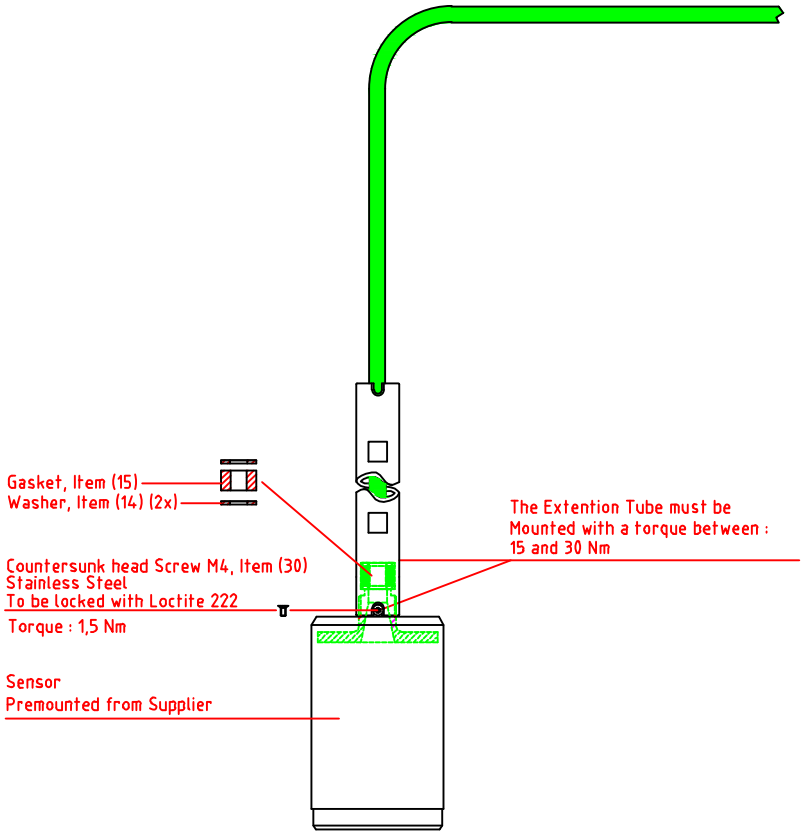
Caution must be taken when mounting seavalves that all parts are aligned correctly, and that the inside is clean. DO NOT use liguid sealants, and DO NOT paint the inside of a valve.

Step 1

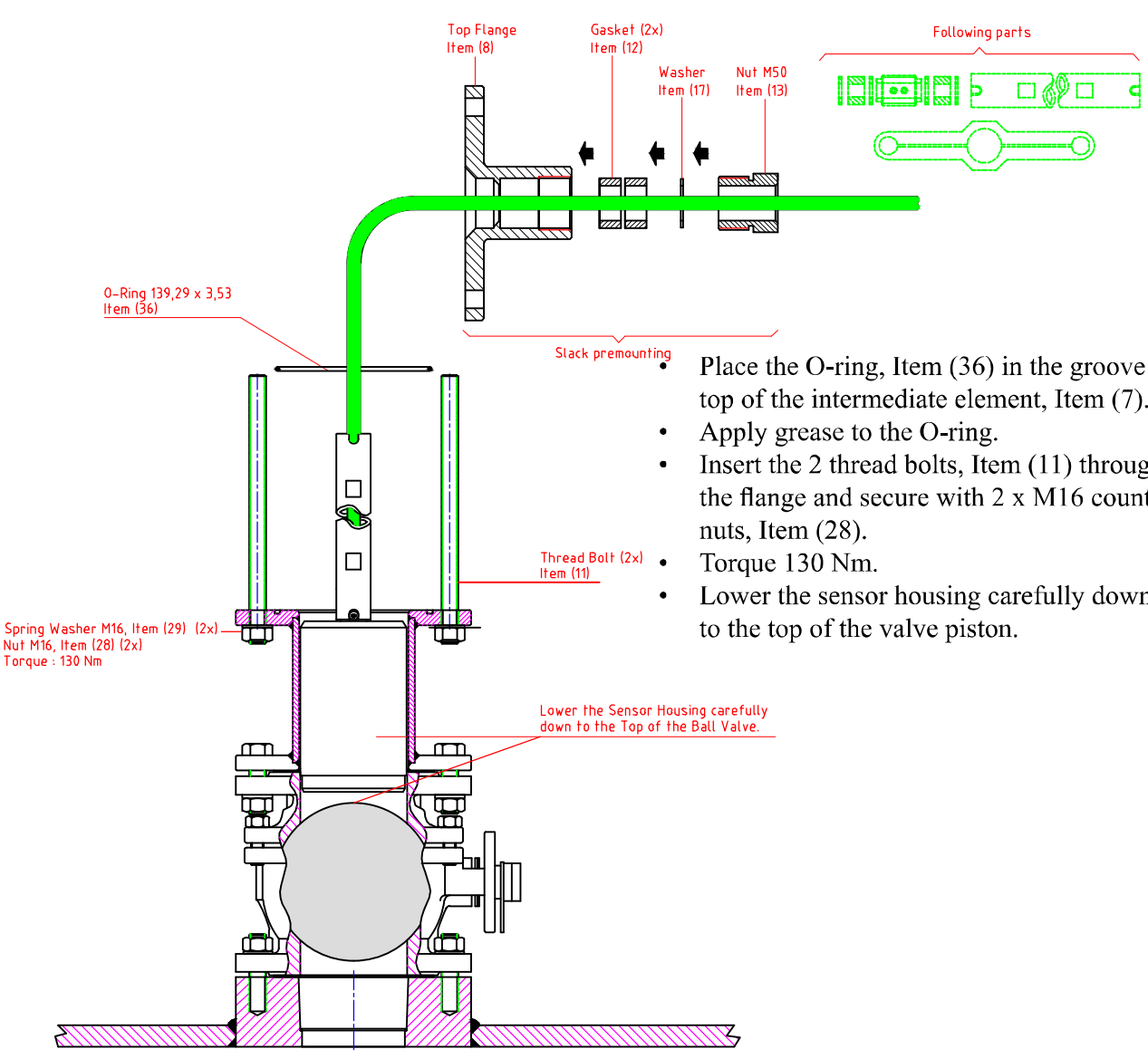


Step 2

5. Assembling of Extension Tube and Sensor



6. Sensor installation



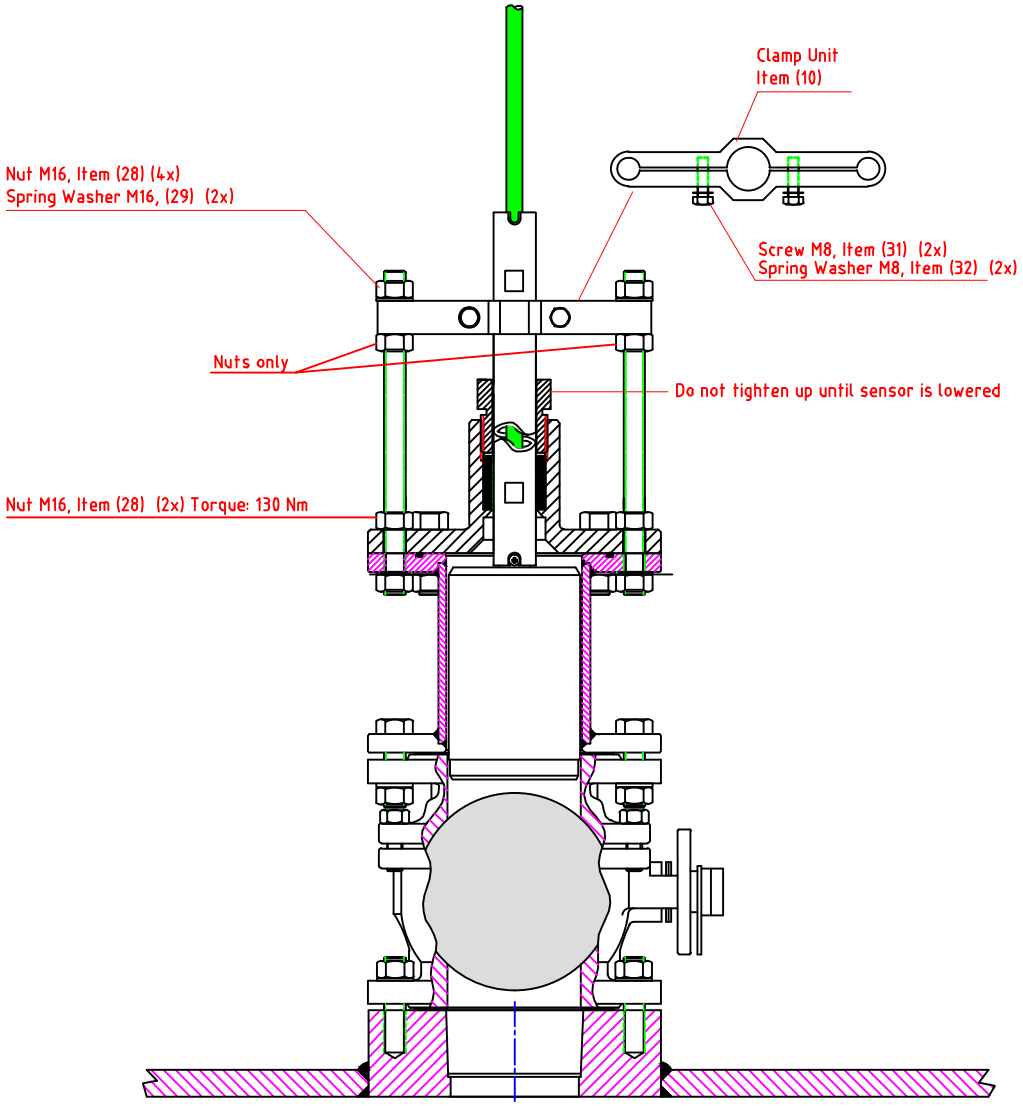
- Place the O-ring, Item (36) in the groove on top of the intermediate element, Item (7).
- Apply grease to the O-ring.
- Insert the 2 thread bolts, Item (11) through the flange and secure with 2 x M16 counter nuts, Item (28).
- Torque 130 Nm.
- Lower the sensor housing carefully down to the top of the valve piston.

7. Clamp Unit mounting

Mount Top Flange, Item (8). Secure with 8 washers, Item (29) and nuts, Item (28). Torque: 130 Nm.

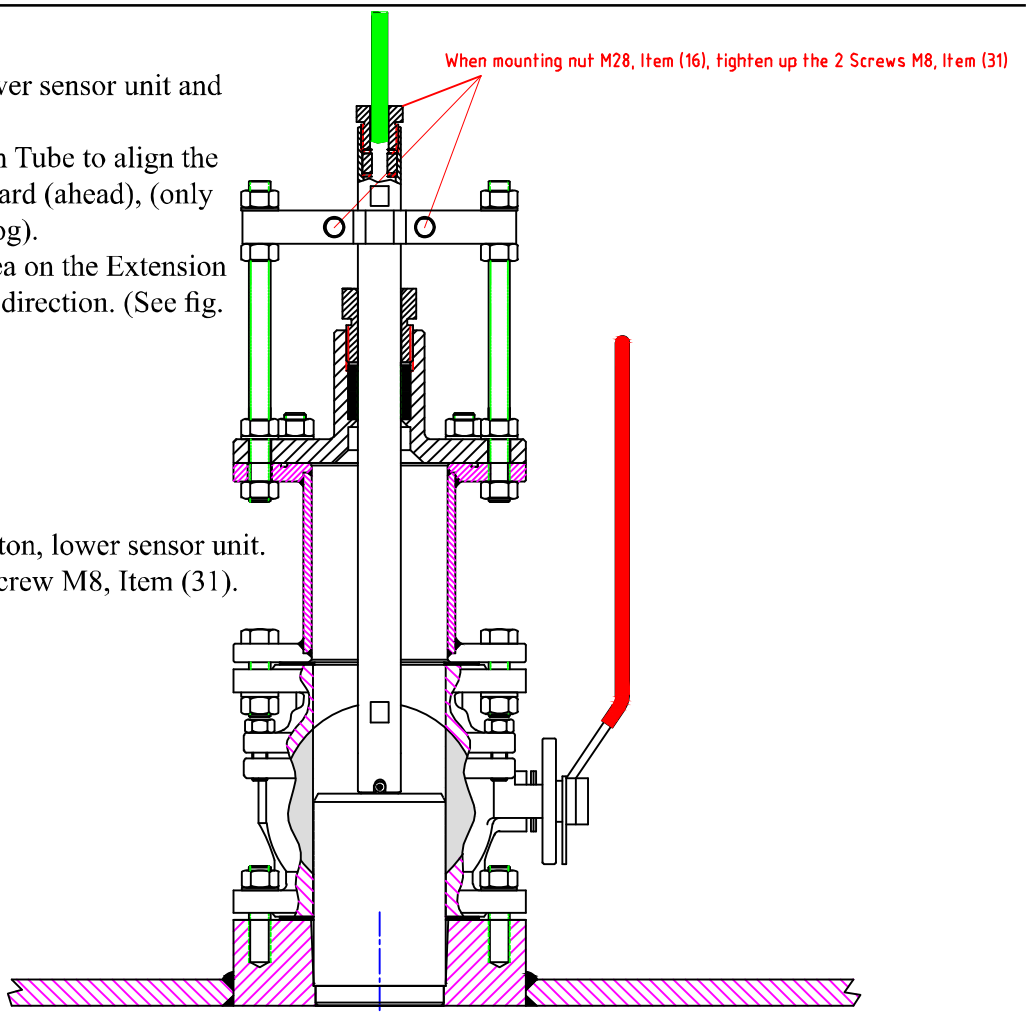
Mount in following order:

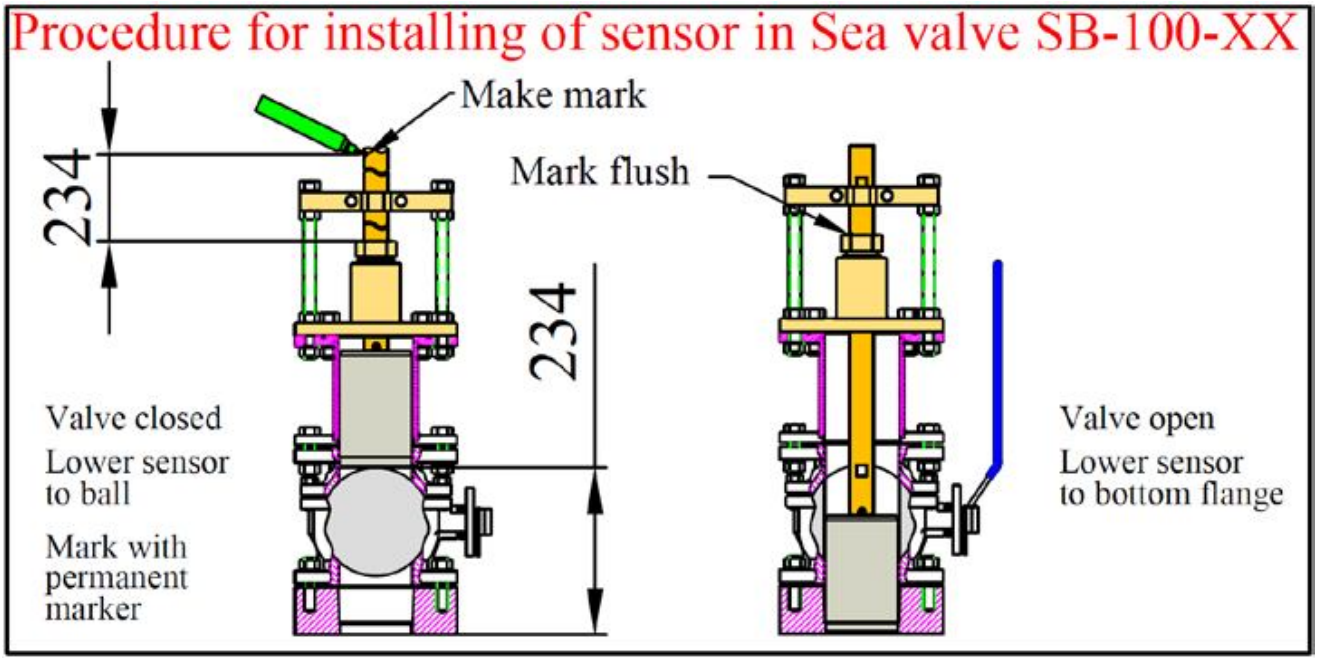
- 2 x gasket, Item (12).
- Washer, Item (17).
- Nut M50, Item (13).
- 2 x M16 nuts, Item (28).
- Clamp Unit, Item (10).
- 2 x M16 nuts, Item (28) with spring washer, Item (29).



- Open Sea Valve, lower sensor unit and Extension Tube.
- Rotate the Extension Tube to align the sensor to point forward (ahead), (only needed for Speed Log).
- Use the flattened area on the Extension Tube to find correct direction. (See fig. 8 Final Assembly.

- Open Ball Valve piston, lower sensor unit.
- Tighten up the 2 x screw M8, Item (31).

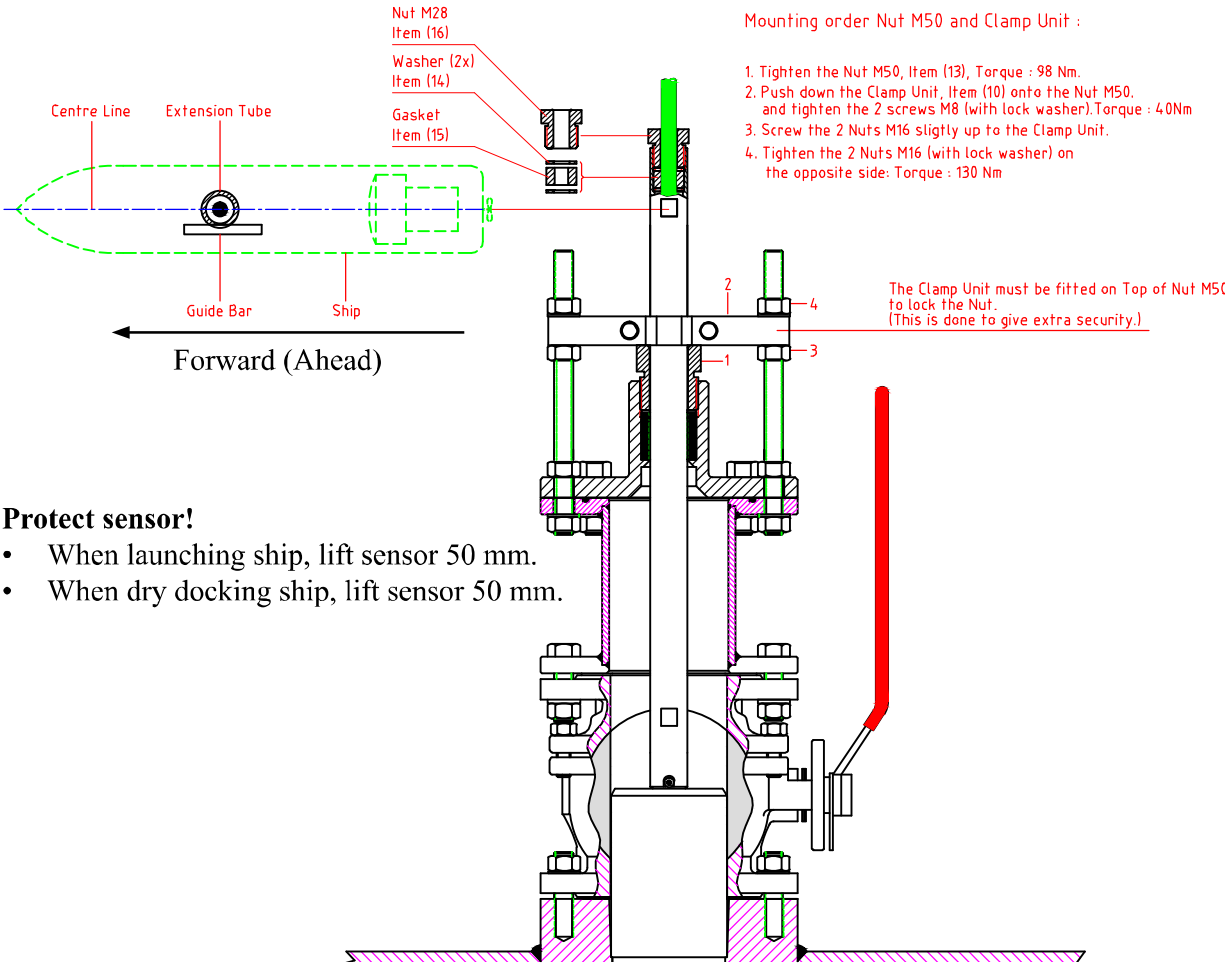




8. Final assembly

After the ship is afloat, it is necessary to let the air out of the Sea Valve:

- Loosen the nut M50, let the air out and tighten nut again.



Protect sensor!

- When launching ship, lift sensor 50 mm.
- When dry docking ship, lift sensor 50 mm.

Check that the transducer sensor housing, when fully inserted, is flush with the lower surface of the bottom flange.

PLACEMENT OF THE SENSOR IN SEA VALVE

The sensor DL2 is installed into sea valve 100mm for single bottom SB-100-SB or double bottom DB-100-SB.
Please see sea valve manual for installation procedure.

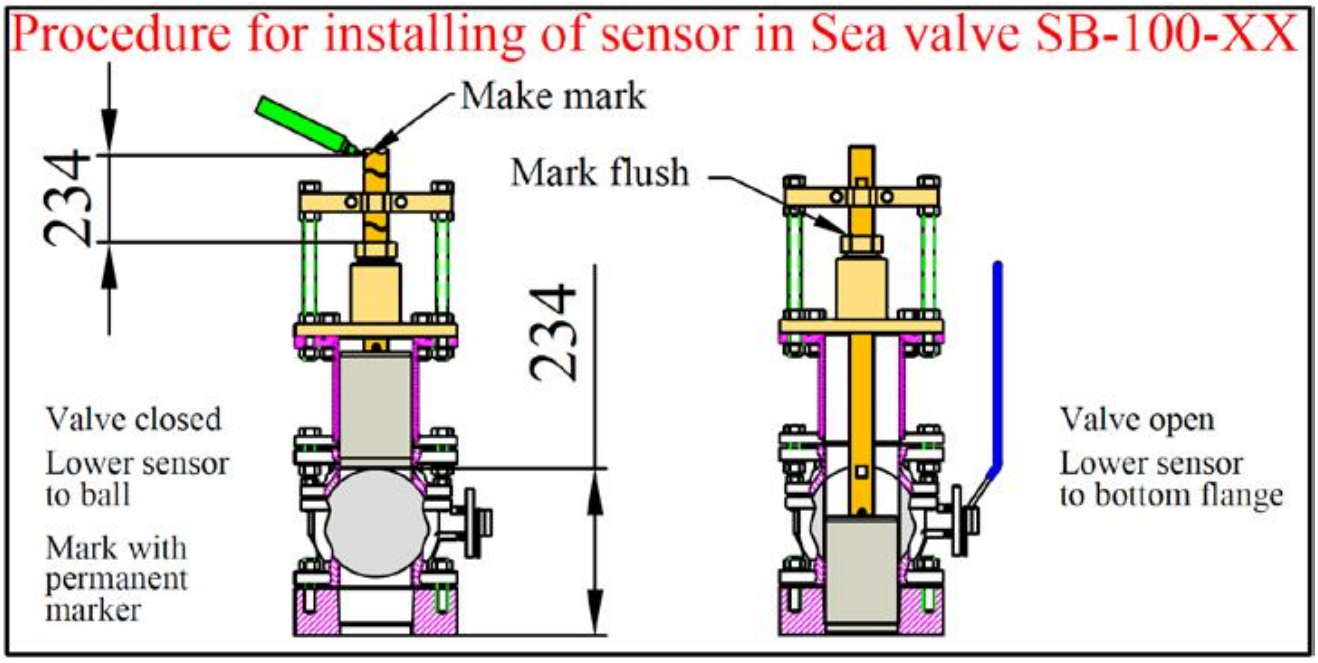
Manuals available as downloads from www.skipper.no

The sensor includes 40m moulded in cable. The cable is 11 mm in outer diameter with a bending radius of 56 mm. The cable can be cut or extended if required

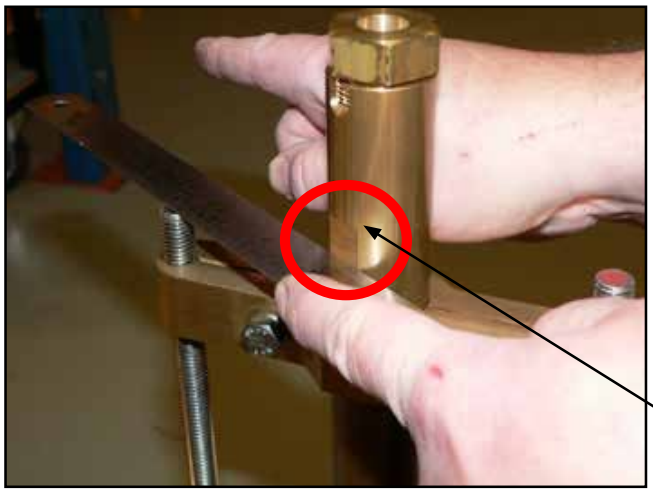
NOTE
During physical installation of sensor into sea valve please make special care of the following points:

- Sensor to be lowered completly into bottom flange making sensor head flush with outer hull.
- Sensor forward direction to be aligned +/-10deg. (Fine adjust by software in calibration page)
- Clamping unit nuts and nut M50 to be tighten to secure sensor position.

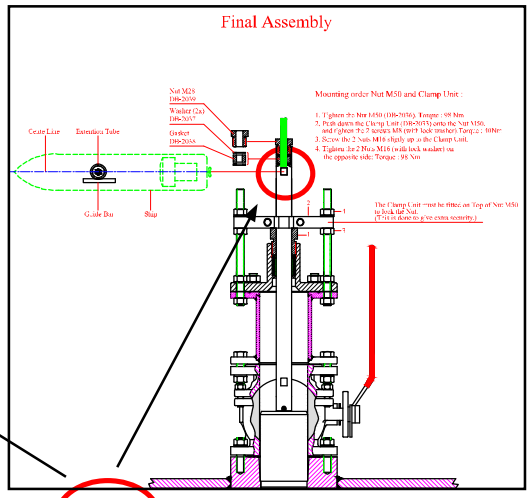
Sensor lowered flush with outer hull.
Pictures showing lowering procedure in sea valve SB-100-SB.



Sensor forward direction.
It is important to align sensor forward direction.
Pictures showing forward direction alignment in sea valve SB-100-SB.

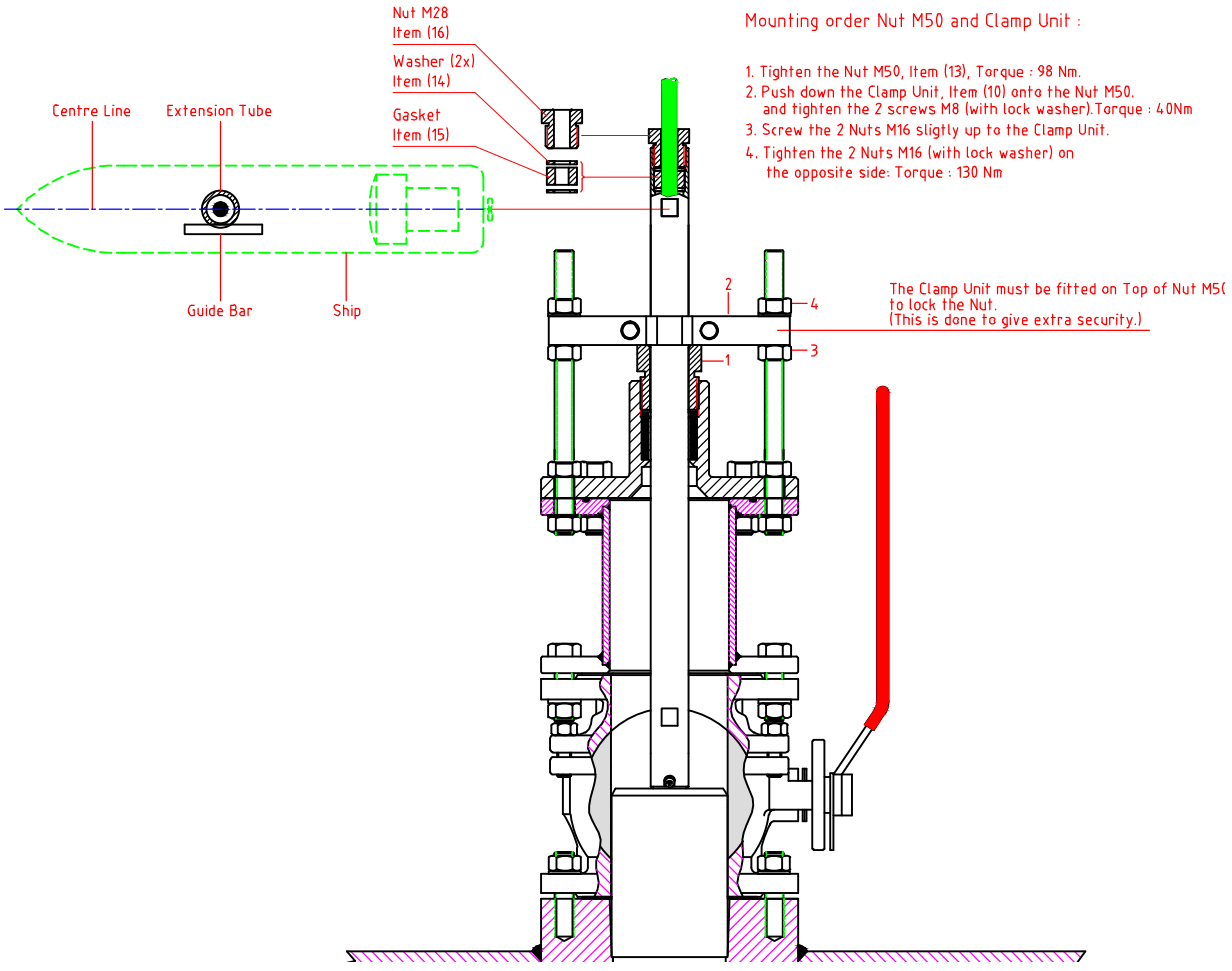


A flat object points fore/aft.

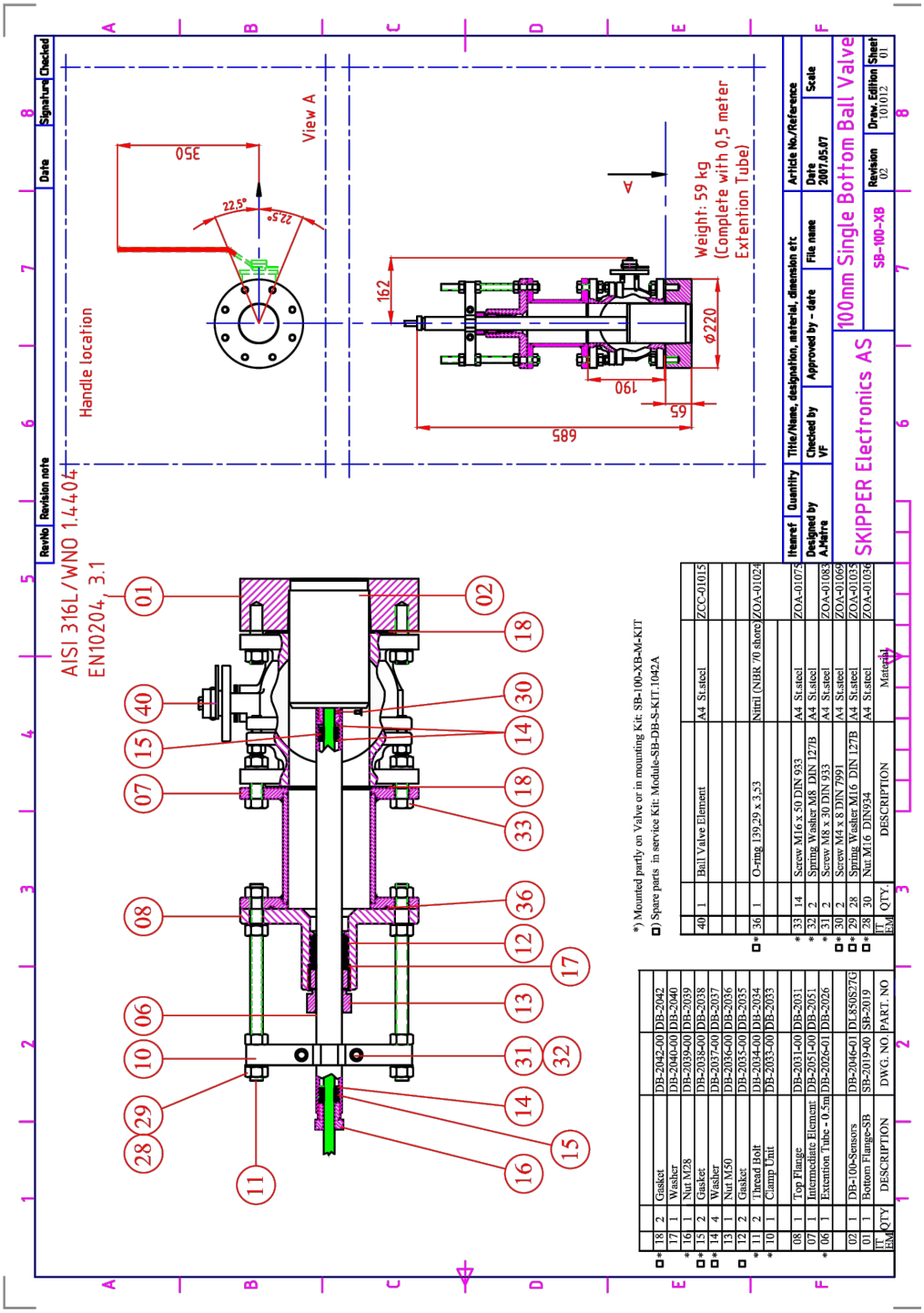


The flat side should be on the port side.

Secure sensor by tightening clamping unit and nut M50



12. 100 mm Single Bottom Ball Valve



APPPENDIX - J

MLF.NO: T5ZICPA100 R0

TOTAL 06 PAGES INCLUDING COVER :
A4- 03 SHEETS,A3- 01 SHEET, A1- 02 SHEETS
+ ANNEXURE I & II (16 PAGES)

COCHIN SHIPYARD LTD

A GOVERNMENT OF INDIA ENTERPRISE
COCHIN-682015 , INDIA.

CSLYARD NO : SHIP 038~039		
CLASS : DNV		
OWNER : NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS		
TEAM	VEDAM	CSL
APPROVED	BISWAJIT	SREERESH RS
REVIEWED	——	SUMESH RAJAN LISHA
CHECKED	GULSHAN	SUBIN.P
PREPARED	ANCHITHA	

SAMSKIP SEA SHUTTLE CONTAINER CARRIER

Fitting Arrangement of Electrical equipment and Cable Way for ICCP fitment and pipe/cable route

DATE :	19.11.2024	SCALE: NTS	DRG NO:038-S5ZICP001	REV : 0

ISSUED TO	DEPT.																	
	No.																	

	PLAN HISTORY	YARD.NO:SH 038-39	02 / 06
		038-S5ZICP001 R0	

DATE	REV	DESCRIPTION	VEDAM				CSL			
			DWN. BY	CHKD. BY	RVD. BY	APP. BY	DWN. BY	CHKD. BY	RVD. BY	APP. BY
19.11.2024	0	FIRST ISSUE	ATA	GN	—	BJT		SP	SR/ LS	SRS

GENERAL NOTE:

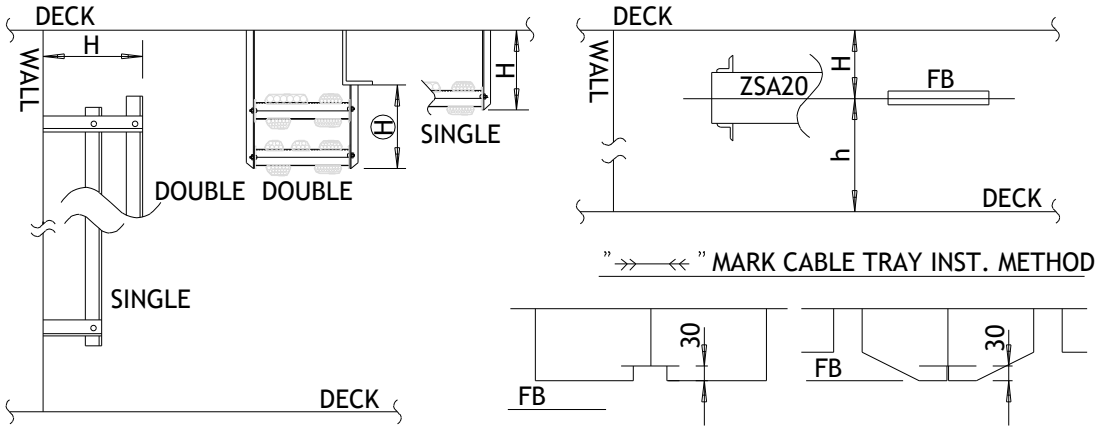
1. ALL DIMENSIONS ARE IN MM
2. INSTALLATION OF ELECTRICAL EQUIPMENTS AND CABLEWAYS SHALL BE IN ACCORDANCE WITH ELECTRICAL OUTFITTING STANDARD & PRACTICE
3. CABLEWAY SUPPORTS WHICH IS COMING UNDER FRAMES OR GIRDERS MAY BE SUITABLY TRIMMED AT SITE TO ACHIEVE THE REQUIRED HEIGHT.
4. CABLEWAY SUPPORTS OBSTRUCTING PIPES/DUCTS/STIFFNERS/GIRDERS, IF ANY TO BE ADJUSTED AT SITE.
5. THE DIMENSIONS FOR EQUIPMENT FITTING SEATS ARE MARKED TO THE PAD EDGE.
6. NON STANDARD HEIGHTS FOR CABLE SADDLES SHALL BE ACHIEVED BY SUITABLY TRIMMING THE IMMEDIATE HIGHER SIZE.
7. CABLE HANGERS & SADDLES WITHOUT ORDINATES (DIMENSIONS), TO BE FITTED AS PER STANDARDS
8. * MARKED ITEMS TO BE SUITABLY ADJUSTED BY YARD TO SUIT SITE CONDITIONS.
9. (**) , (***), (****), (*****), (******) & (*******)MARKED ITEMS SHOULD BE FOLLOWED AS PER TYP DETAIL UNLESS OTHERWISE MENTIONED IN SEPARATE VIEW.
10. PIPING SHOWN IN THIS DRAWING IS ONLY SCHEMATIC DETAILS OF THE SAME WILL BE SHOWN IN THE PIPIE PIECE/FITTING DRAWING OF HULL OUTFIT DESIGN SECTION

10. FOR MOUNTING DETAILS REFER ANNEXURE : I (PAGE 1-9) FOR ANODE AND ANNEXURE : II (PAGE 1-7) FOR REFERENCE ELECTRODE.

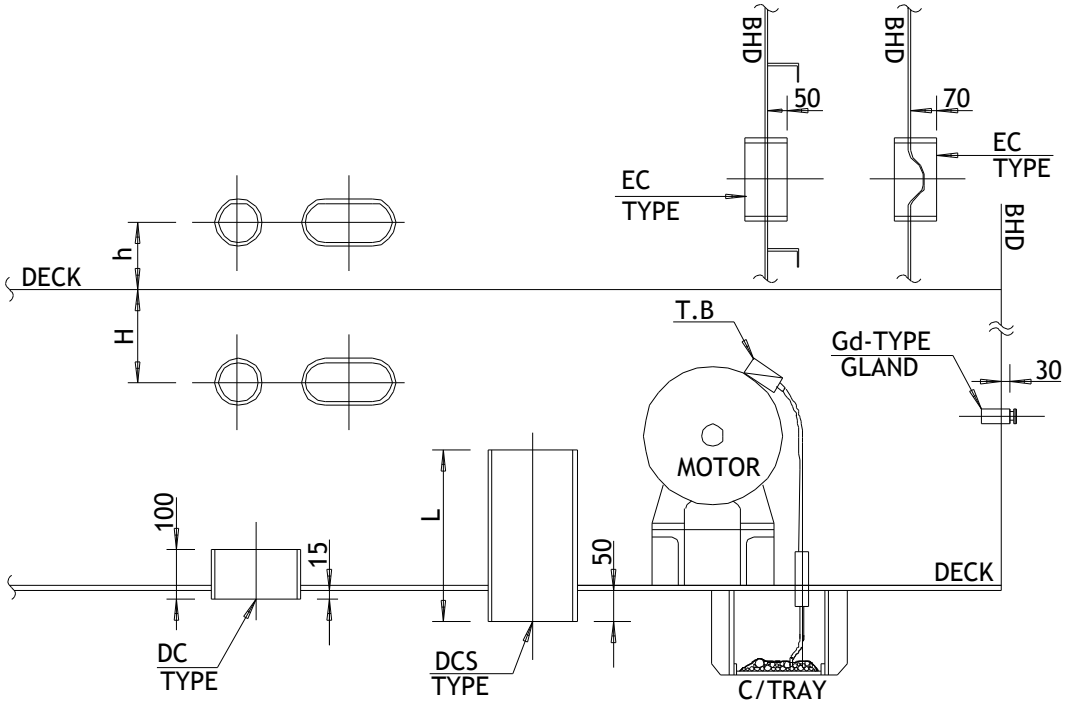
	INSTALLATION OF CABLEWAY	YARD NO:SH 038-039	03 / 06
	STANDARD HEIGHTS		038-S5ZICP001 R0

STANDARD HEIGHTS

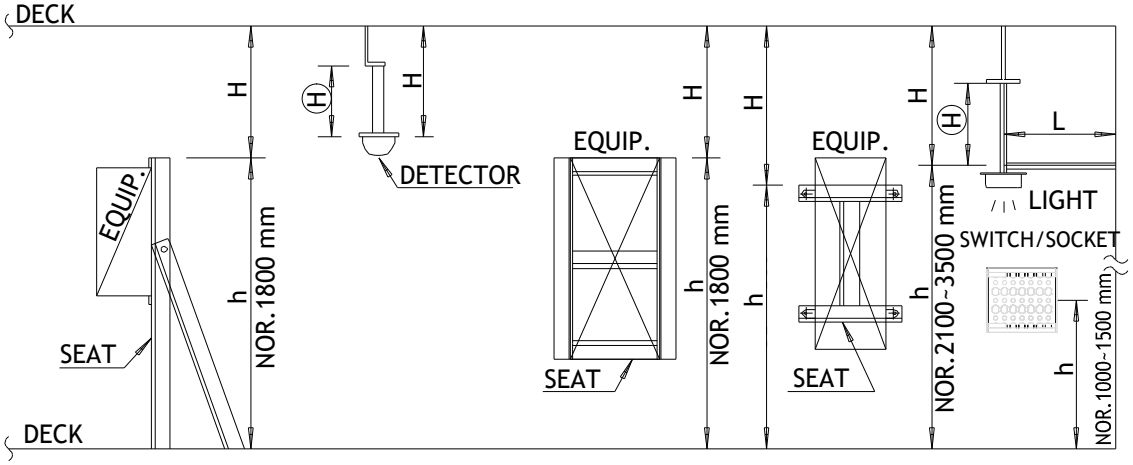
CABLE HANGER

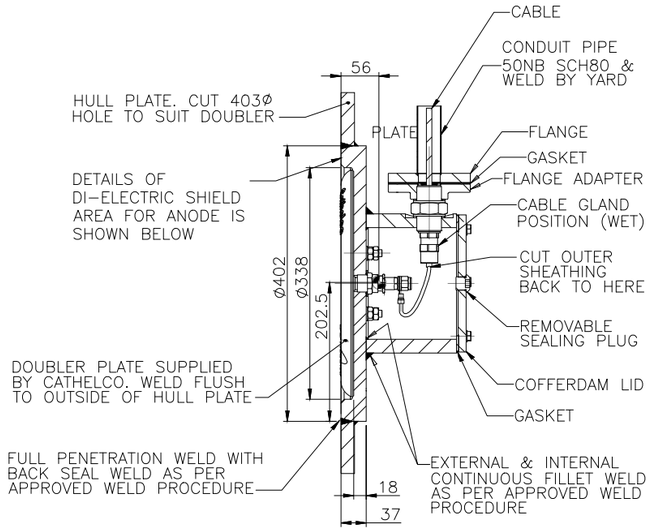


COAMING & GLAND



SEAT

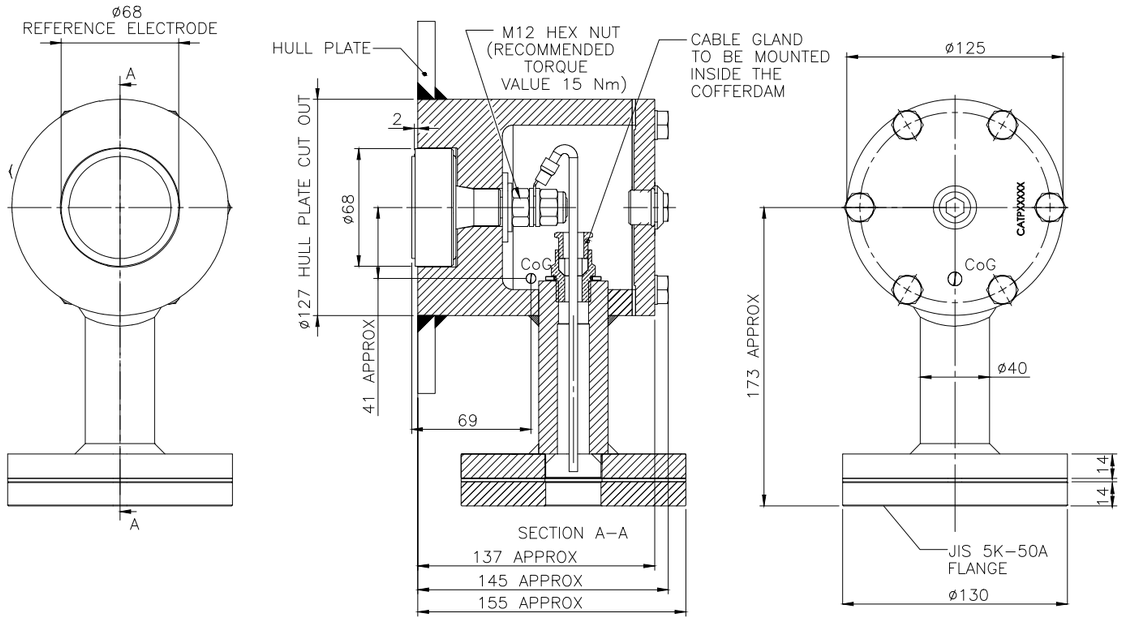




SECTION THROUGH ANODE & COFFERDAM

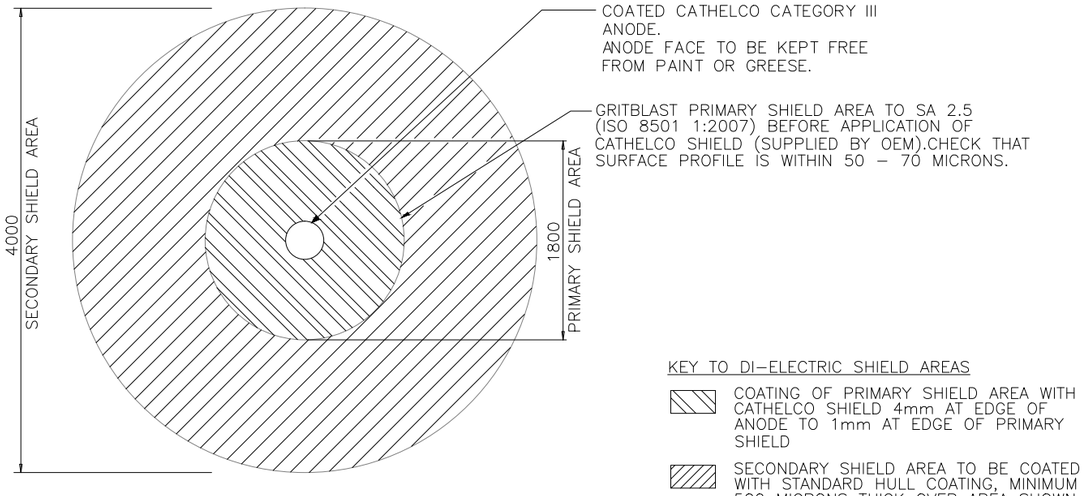
DETAILS OF ANODE MOUNTED IN TO FLANGED COFFERDAM

(SCALE–NTS)



DETAILS OF REFERENCE ELECTRODE MOUNTED IN TO FLANGED COFFERDAM

(SCALE–NTS)



DETAILS OF DI-ELECTRIC SHIELD AREA FOR ANODE

(SCALE–NTS)

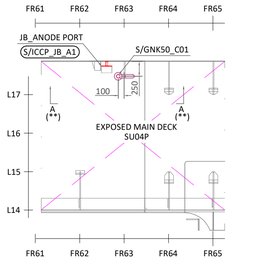
0	18.11.24	FIRST ISSUE	SUBIN.P	LISHA	SUMESH RAJAN	SREERESH RS
REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:

COCHIN SHIPYARD LIMITD
P.O. Bag - 1653, COCHIN - 682 015
CSL YARD No. : SHIP-038-039

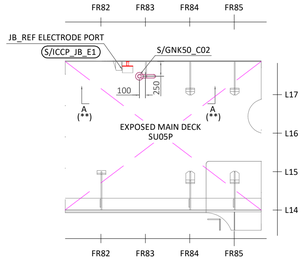
SAMSKIP SEA SHUTTLE CONTAINER CARRIER

TEAM	VEDAM	CSL	SCALE :	TITLE :
OWNER		NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS	NTS	Fitting Arrangement of Electrical equipment and Cable Way for ICCP fitment and pipe/cable route
APPROVED	BISWAJIT	SREERESH RS	FORMAT :	
REVIEWED	——	SUMESH RAJAN LISHA	NTS	
CHECKED	GULSHAN	SUBIN.P		
DRAWN	ANCHITHA			

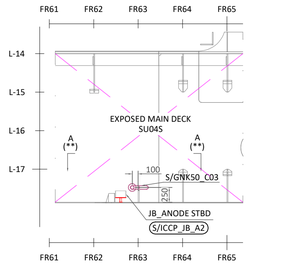
DWG. NO. 038-S5ZICP001



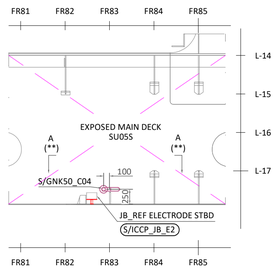
PLAN VIEW ABOVE MAIN DECK (AT 10200 ABL)
(PORT SIDE)



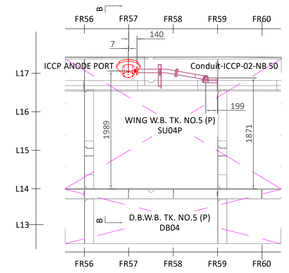
PLAN VIEW ABOVE MAIN DECK (AT 10200 ABL)
(PORT SIDE)



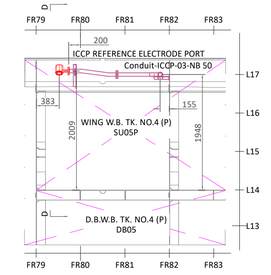
PLAN VIEW ABOVE MAIN DECK (AT 10200 ABL)
(STBD SIDE)



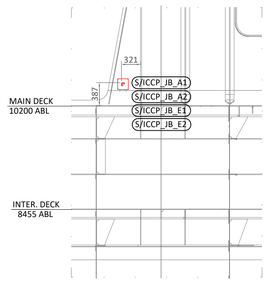
PLAN VIEW ABOVE MAIN DECK (AT 10200 ABL)
(STBD SIDE)



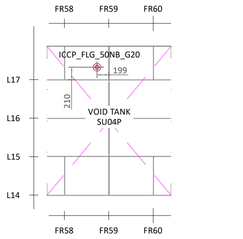
PLAN VIEW BELOW TWEEN DECK (AT 3500 ABL)
(PORT SIDE)



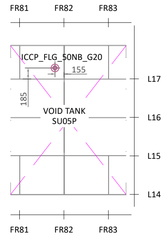
PLAN VIEW BELOW TWEEN DECK (AT 3500 ABL)
(PORT SIDE)



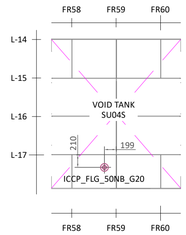
SECTION A-A
(TYPICAL)
(**)



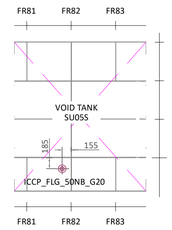
PLAN VIEW INTERMEDIATE DECK (AT 8455 ABL)
(PORT SIDE)



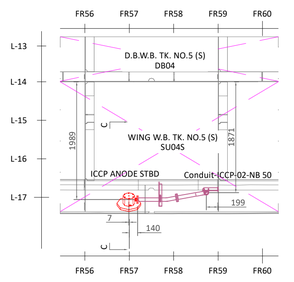
PLAN VIEW INTERMEDIATE DECK (AT 8455 ABL)
(PORT SIDE)



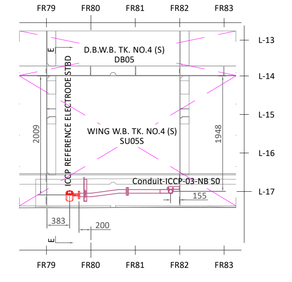
PLAN VIEW INTERMEDIATE DECK (AT 8455 ABL)
(STBD SIDE)



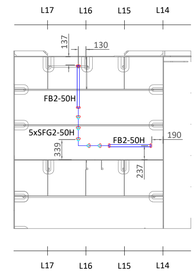
PLAN VIEW INTERMEDIATE DECK (AT 8455 ABL)
(STBD SIDE)



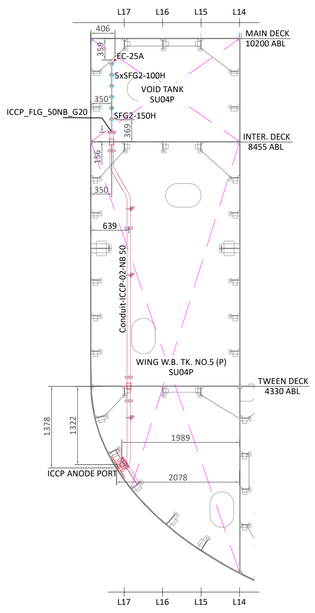
PLAN VIEW BELOW TWEEN DECK (AT 3500 ABL)
(STBD SIDE)



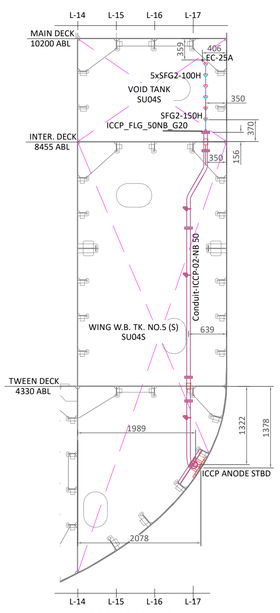
PLAN VIEW BELOW TWEEN DECK (AT 3500 ABL)
(STBD SIDE)



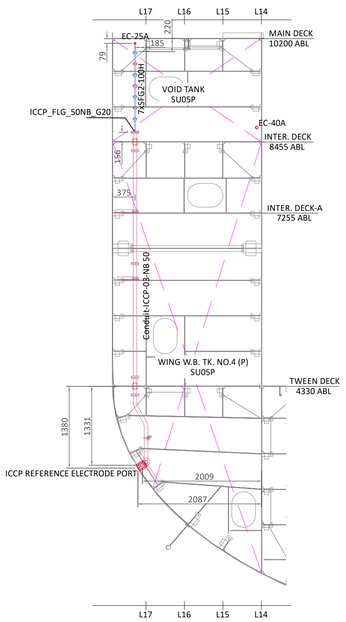
SECTION K-K
(VIEW LOOKING FWD AT FR84+350)



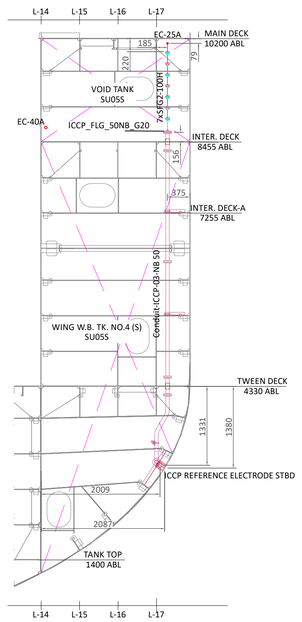
SECTION B-B
(VIEW LOOKING FWD AT FR56+350)
(PORT)



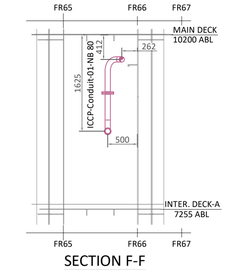
SECTION C-C
(VIEW LOOKING FWD AT FR56+350)
(STBD)



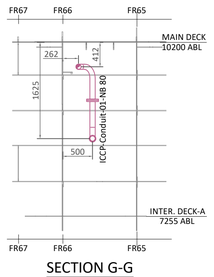
SECTION D-D
(VIEW LOOKING FWD AT FR78+100)



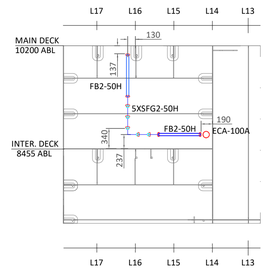
SECTION E-E
(VIEW LOOKING FWD AT FR78+100)



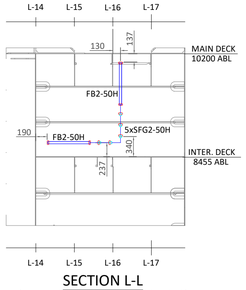
SECTION F-F
(VIEW LOOKING PORT AT LONG. L14)



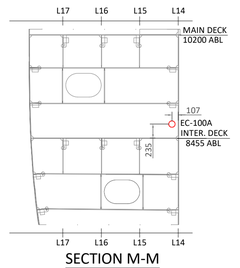
SECTION G-G
(VIEW LOOKING STBD AT LONG. L-14)



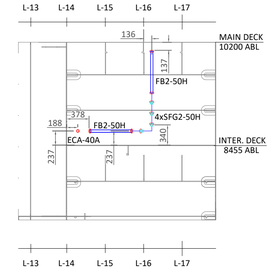
SECTION H-H
(VIEW LOOKING FWD AT FR64+350)



SECTION L-L
(VIEW LOOKING FWD AT FR84+350)



SECTION M-M
(TYPICAL)
(***)



SECTION J-J
(VIEW LOOKING FWD AT FR64+350)

0	18.11.24	FIRST ISSUE	SUBIN.P	LISHA	SUMESH RAJAN	SREERESH RS
REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:

COCHIN SHIPYARD LIMITD
P.O. Bag - 1653, COCHIN - 682 015
CSL YARD No. : SHIP-038-039

SAMSKIP SEA SHUTTLE CONTAINER CARRIER

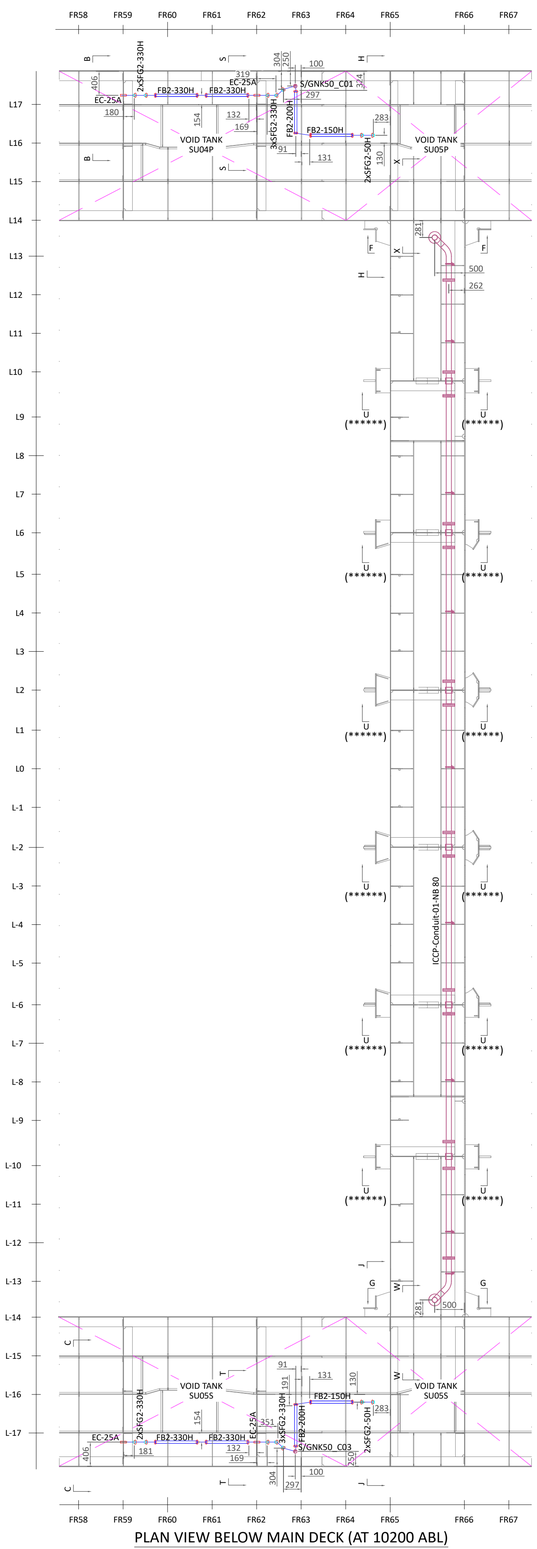
TEAM	VEDAM	CSL
OWNER		NAV SHUTTLE 1 AS NAV SHUTTLE 2 AS
APPROVED	BISWAJIT	SREERESH RS
REVIEWED	——	SUMESH RAJAN LISHA
CHECKED	GULSHAN	SUBIN.P
DRAWN	ANCHITHA	

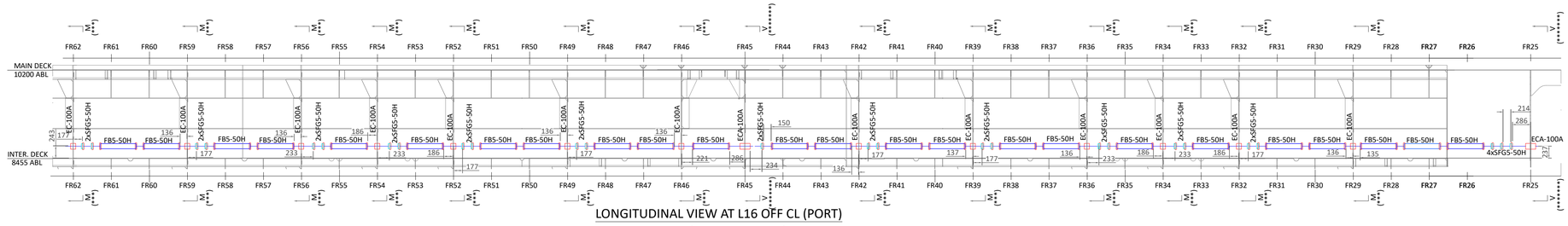
SCALE : NTS
FORMAT : NTS

TITLE :
Fitting Arrangement of Electrical equipment and Cable Way for ICCP fitment and pipe/cable route

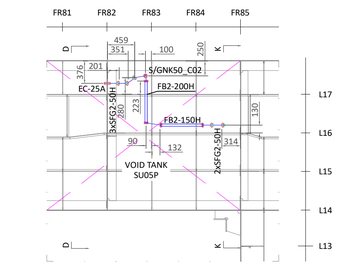
DWG. NO. 038-S5ZICP001

PAGE:5 OF 6 | REV: 0

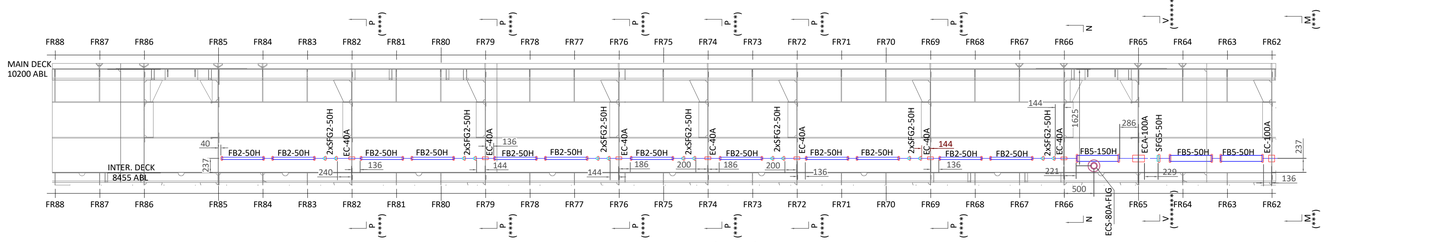




LONGITUDINAL VIEW AT L16 OFF CL (PORT)
(LOOKING STBD.)
(FROM FR.25 TO FR.62)

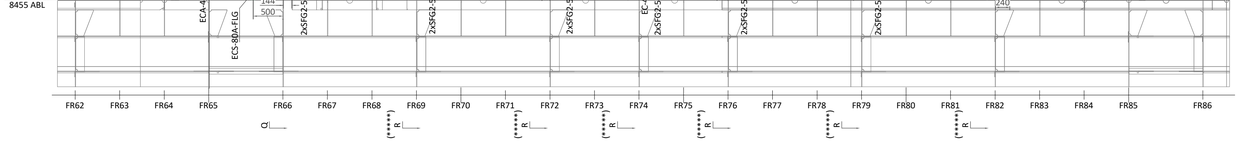


PLAN VIEW BELOW MAIN DECK (AT 10200 ABL)
(PORT SIDE)

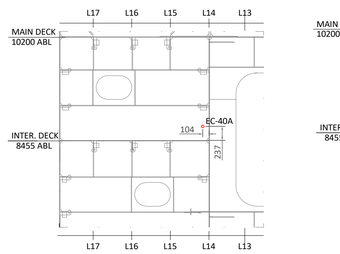


LONGITUDINAL VIEW AT L16 OFF CL (PORT)
(LOOKING STBD.)
(FROM FR.62 TO FR.85)

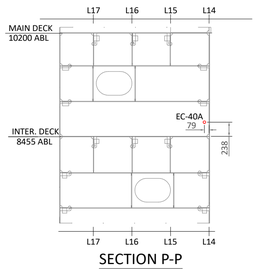
PLAN VIEW BELOW MAIN DECK (AT 10200 ABL)
(STBD SIDE)



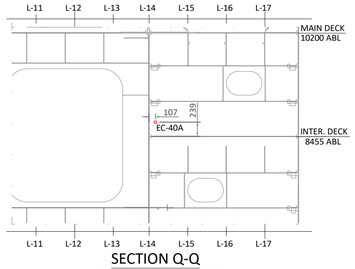
LONGITUDINAL VIEW AT L-16 OFF CL (STBD.)
(LOOKING PORT)



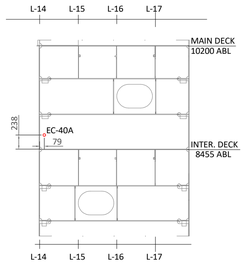
SECTION N-N
(VIEW LOOKING FWD AT FR66



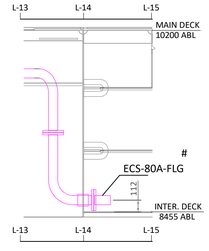
SECTION P-P
(TYPICAL)
(****)



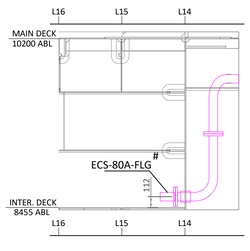
SECTION Q-Q
(VIEW LOOKING FWD AT FR66)



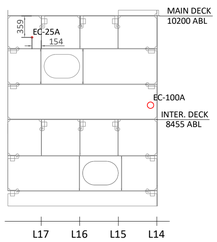
SECTION R-R
(TYPICAL)
(*****)



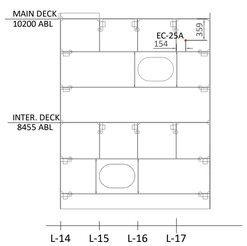
SECTION W-W
(VIEW LOOKING FWD AT FR65



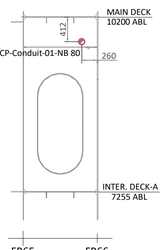
SECTION X-X
(VIEW LOOKING FWD AT FR65



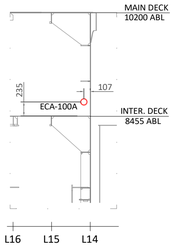
SECTION S-S
(VIEW LOOKING FWD AT FR.62)
(PORT)



SECTION T-T
(VIEW LOOKING FWD AT FR.62)
(STBD)



SECTION U-U
(TYPICAL)
(******)



SECTION V-V
TYPICAL
(*******)

"#' WHILE FILLING THE SEALING COMPOUND INSIDE THE SPECIAL COAMING, DISTANCE BETWEEN THE FLANGES SHALL BE KEPT AS MINIMUM AS POSSIBLE

0	18.11.24	FIRST ISSUE	SUBIN.P	LISHA	SUMESH RAJAN	SREERESH RS
REV.	DATE	TEXT	Prepared by:	Checked by:	Reviewed by:	Approved by:

COCHIN SHIPYARD LIMITED
P.O. Bag - 1653, COCHIN - 682 015
CSL YARD No. : SHIP-038-039

SAMSKIP SEA SHUTTLE CONTAINER CARRIER

TEAM	VEDAM	CSL	NAV.SHUTTLE 1 AS / NAV.SHUTTLE 2 AS
OWNER			
APPROVED	BISWAJIT	SREERESH RS	
REVIEWED	——	SUMESH RAJAN / LISHA	
CHECKED	GULSHAN	SUBIN.P	
DRAWN	ANCHITHA		

SCALE : NTS
FORMAT : NTS

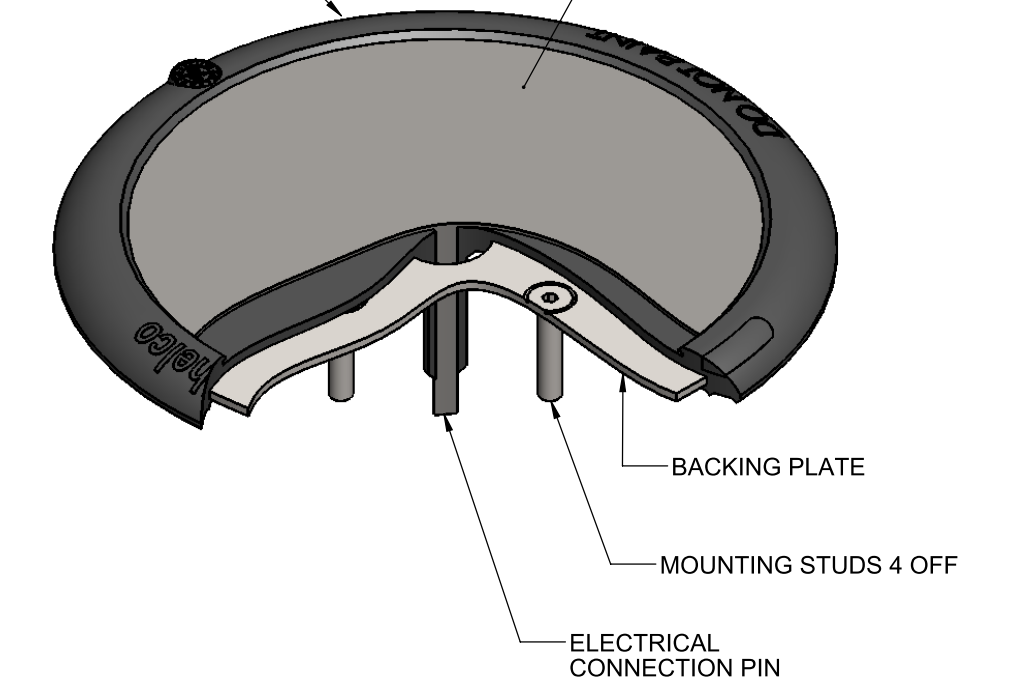
TITLE :
Fitting Arrangement of Electrical equipment and Cable Way for ICCP fitment and pipe/cable route

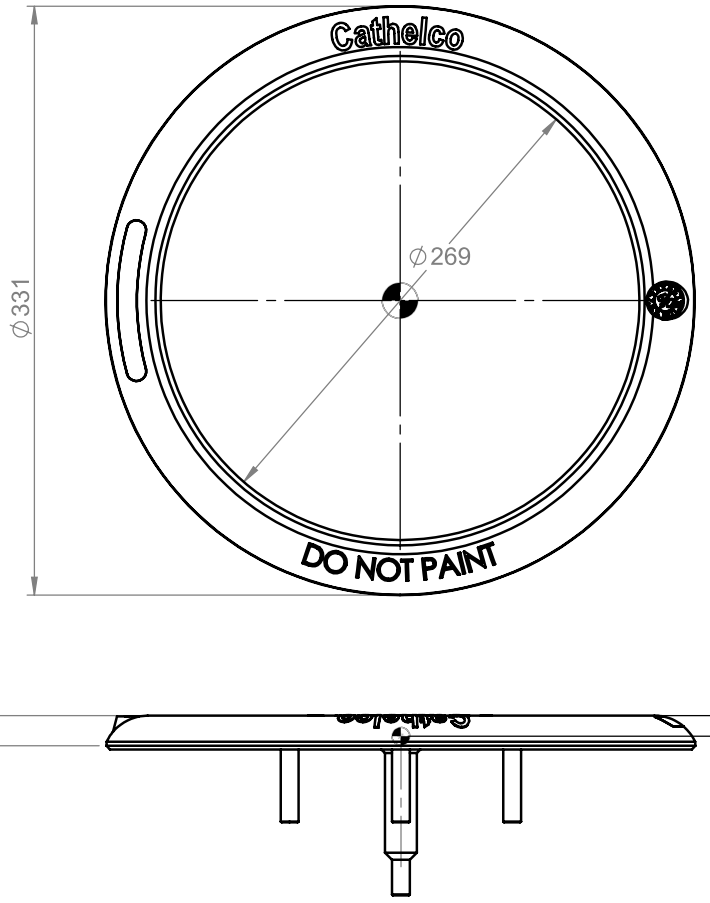
DWG. NO.
038-S5ZICP001

PAGE:6 OF 6 REV: 0

ANNEXURE-I

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	ADD NOTE & REVISE DRAWINGS	04.11.11	W.T
2	CG MARK ADDED	17/10/2012	D.C





NOTE : THIS ANODE IS DIVER CHANGEABLE

WEIGHT: 3.69 kg ±5%

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:
ANGULAR DIM'S ± .50°
0 DECIMAL PLACE ± .50
1 DECIMAL PLACE ± .10

CONTACT DETAILS:
TEL: +44 (0) 1246 457900 FAX: +44 (0) 1246 457901
EMAIL: technical@cathelco.com WEB: www.cathelco.com

THIRD ANGLE PERSPECTIVE

INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRIANGULAR BALLOONS.

SCALE:	1:3	DO NOT SCALE.	
SHEET SIZE: A4		SHEET: 1 OF 1	
DRN BY:	S.C	DATE: 20.06.2011	
APP' BY:	S.E	DATE: 20.06.2011	
DRG TYPE:	MANUAL		
CA NUMBER:	N/A		
3D PART FILE:	N/A		
PART NO:	N/A		

Cathelco

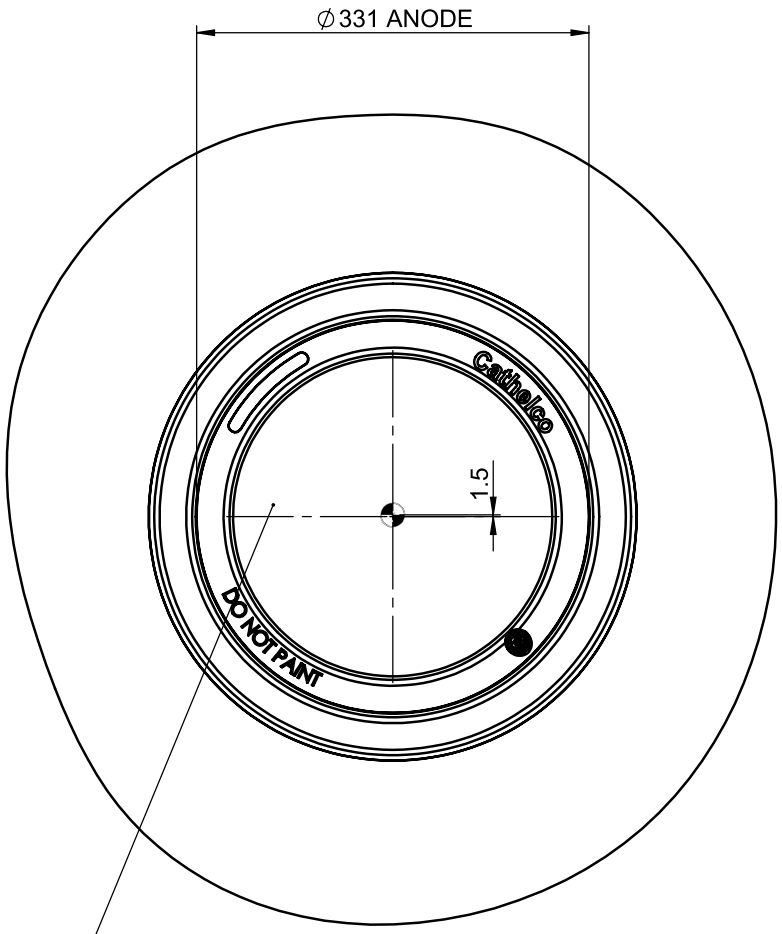
TITLE:

C-MAX 50-100 AMP
DISC ANODE

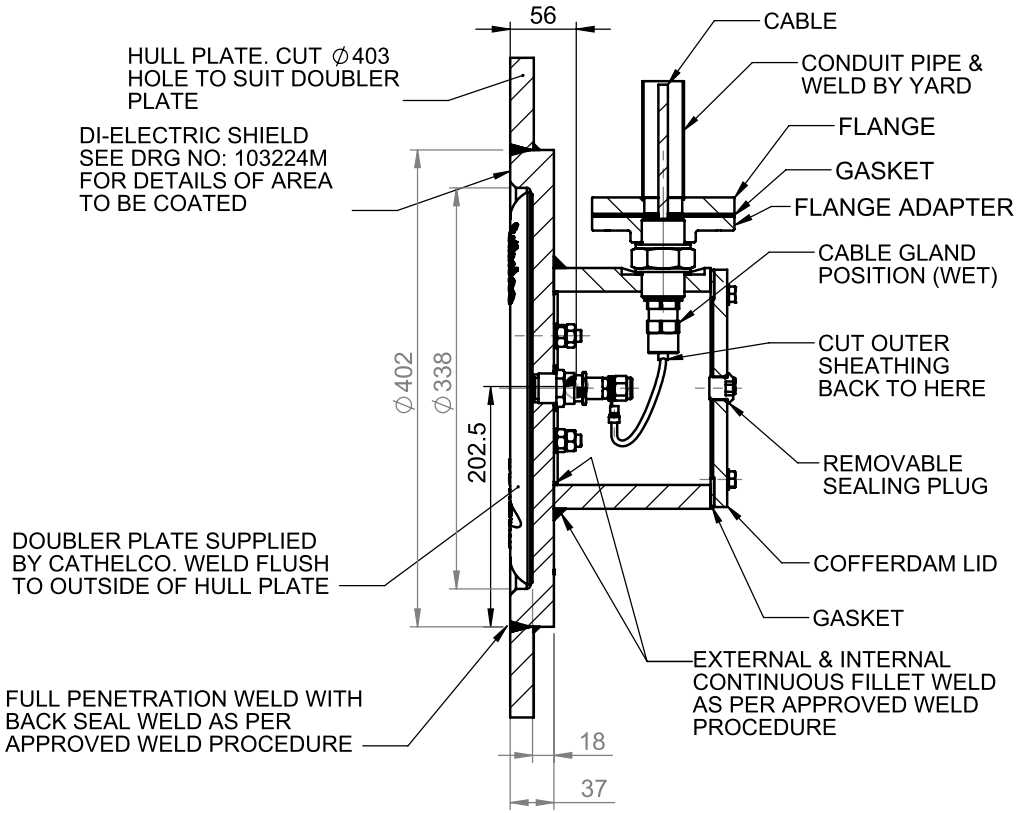
DRG NO: 100718M REV: 2

02/09

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED



COATED CATHELCO CATEGORY III OR CATEGORY V. RECESSED DISC ANODE. KEEP SURFACE CLEAN AT ALL TIMES



SECTION THROUGH ANODE & COFFERDAM

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:
ANGULAR DIM'S ± .50°
0 DECIMAL PLACE ± .50
1 DECIMAL PLACE ± .10

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EMAIL: technical@cathelco.com WEB: www.cathelco.com

THIRD ANGLE PERSPECTIVE

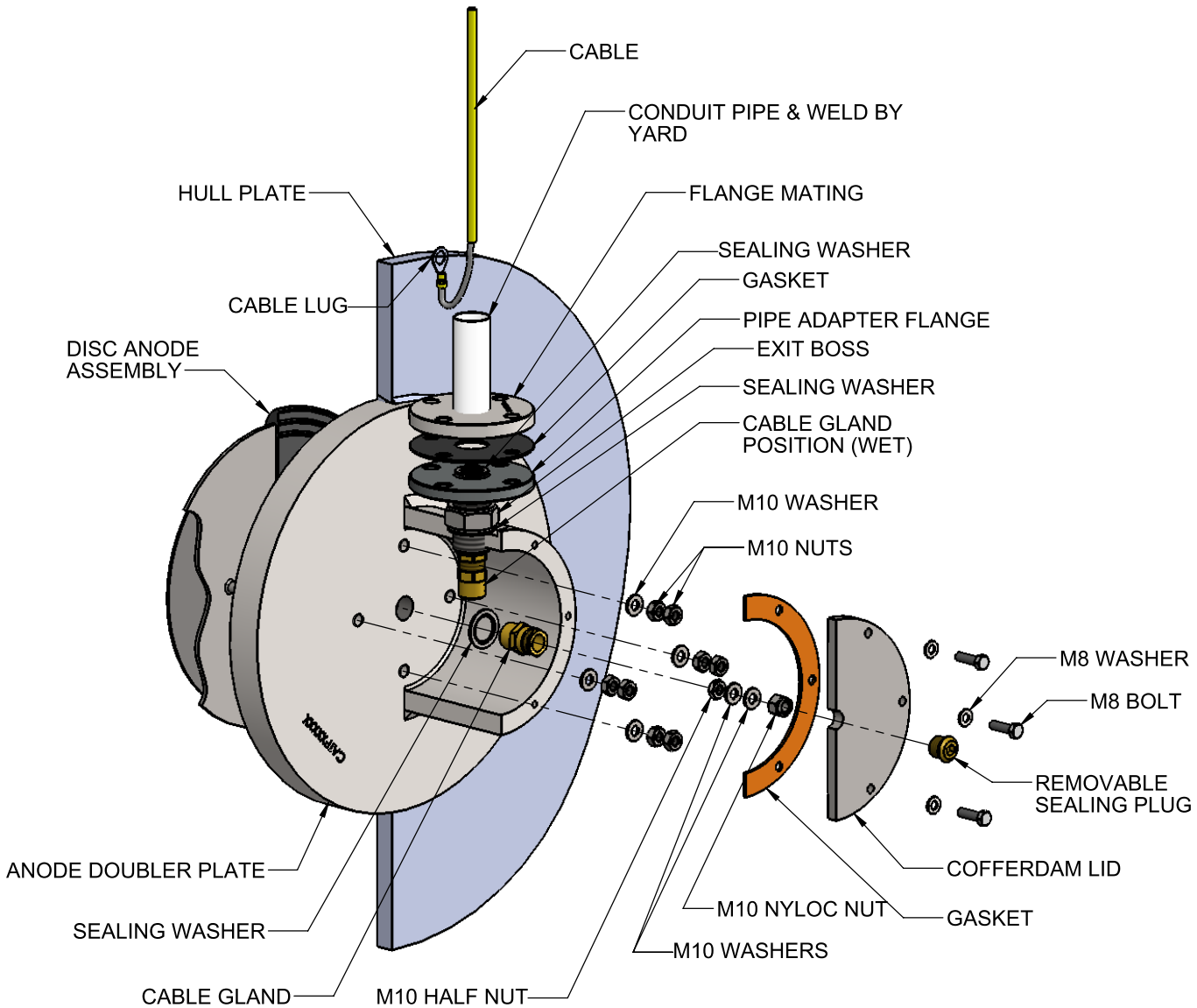
INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRIANGULAR BALLOONS.

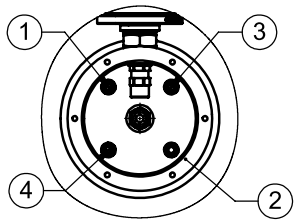
SCALE:	1:6	DO NOT SCALE.	
SHEET SIZE: A4		SHEET: 1 OF 2	
DRN BY:	NJ	DATE: 03.04.2013	
APP' BY:	CH	DATE: 03.04.2013	
DRG TYPE:	MANUAL		
CA NUMBER:	N/A		
3D PART FILE:	N/A		
PART NO:	N/A		

Cathelco

TITLE:
INSTALLATION OF FLANGED C-MAX 50 - 100 AMP DISC ANODE

DRG NO: 105290M REV: 0

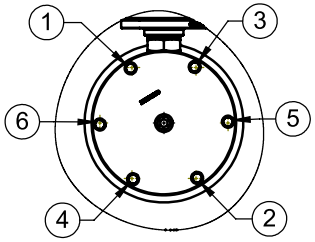




CROSS PATTERN TIGHTENING SEQUENCE

HAND TIGHTEN ALL NUTS EVENLY
ROUND 1 - TIGHTEN IN SEQUENCE ABOVE TO 15 N/M
ROUND 2 - TIGHTEN IN SEQUENCE ABOVE TO 30 N/M
ROUND 3 - TIGHTEN IN SEQUENCE ABOVE TO 50 N/M

TIGHTENING PROCEDURE FOR DISC ANODE



CROSS PATTERN TIGHTENING SEQUENCE

HAND TIGHTEN ALL BOLTS EVENLY
ROUND 1 - TIGHTEN IN SEQUENCE ABOVE TO 7 N/M
ROUND 2 - TIGHTEN IN SEQUENCE ABOVE TO 13 N/M
ROUND 3 - TIGHTEN IN SEQUENCE ABOVE TO 26 N/M

TIGHTENING PROCEDURE FOR COFFERDAM LID

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:
ANGULAR DIM'S ± .50°
0 DECIMAL PLACE ± .50
1 DECIMAL PLACE ± .10

CONTACT DETAILS:
TEL: +44 (0) 1246 457900 FAX: +44 (0) 1246 457901
EMAIL: technical@cathelco.com WEB: www.cathelco.com

THIRD ANGLE PERSPECTIVE

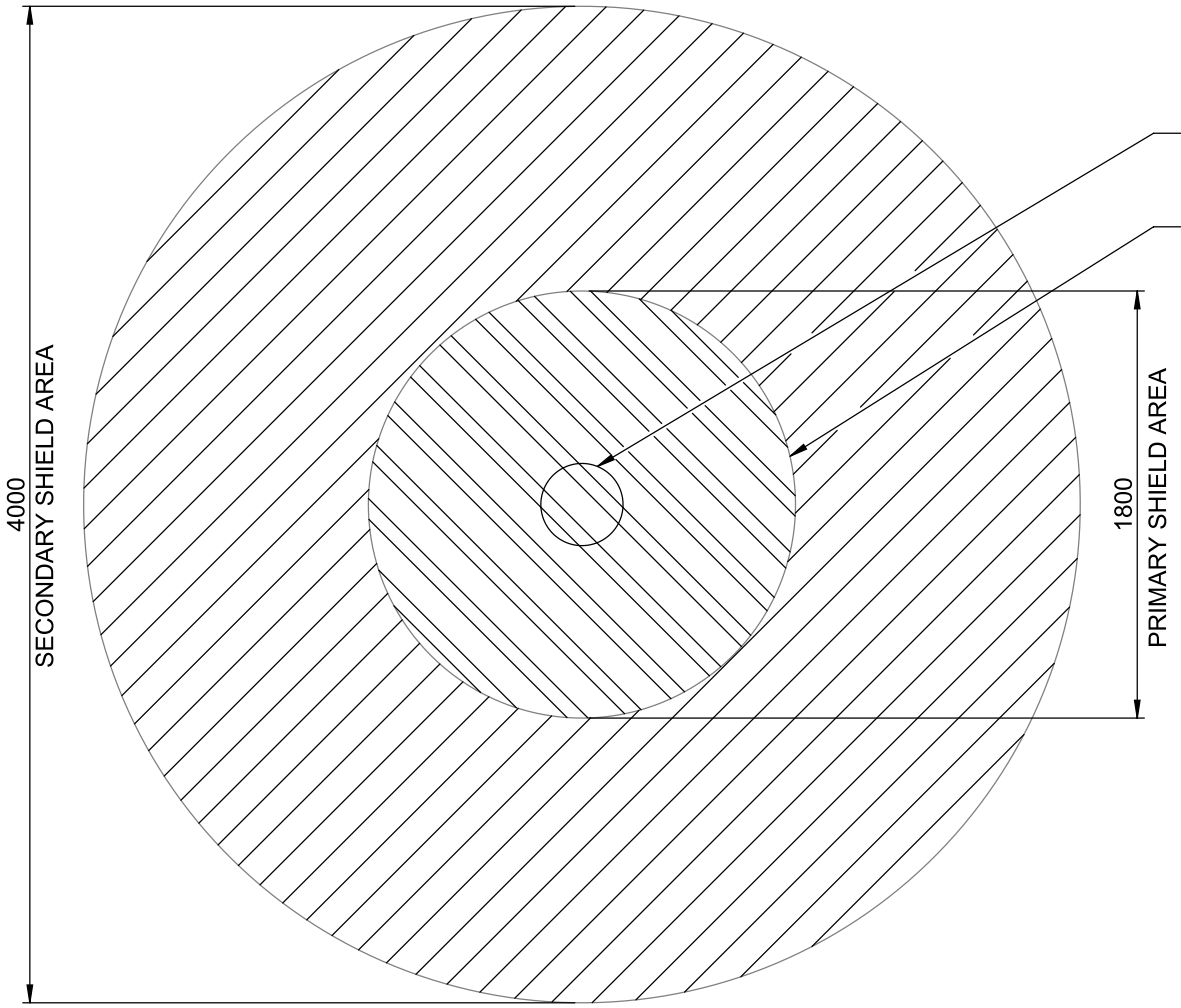
INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRIANGULAR BALLOONS.

SCALE:	1:6	DO NOT SCALE.	
SHEET SIZE: A4		SHEET: 2 OF 2	
DRN BY:	NJ	DATE: 03.04.2013	
APP' BY:	CH	DATE: 03.04.2013	
DRG TYPE:	MANUAL		
CA NUMBER:	N/A		
3D PART FILE:	N/A		
PART NO:	N/A		

Cathelco

TITLE:
INSTALLATION OF FLANGED C-MAX 50 - 100 AMP DISC ANODE

DRG NO: 105290M REV: 0



C-MAX DISC ANODE

GRITBLAST PRIMARY SHIELD AREA TO SA 2.5 (ISO 8501 1:2007) BEFORE APPLICATION OF DI-ELECTRIC SHIELD. CHECK THAT SURFACE PROFILE IS WITHIN 50 - 70 MICRONS.

COATING TABLE	
PRODUCT	APPLICATION
MARATHON IQ	2 x 500 MICRONS
JOTAMASTIC 87 ALUMINIUM	2 x 450 MICRONS
JOTAMASTIC 87 WG.	2 x 450 MICRONS
CATHELCO SHIELD	4mm AT EDGE OF ANODE TO 1mm AT EDGE OF PRIMARY SHIELD
HEMPADUR MULTI-STRENGTH 35560	2 x 500 MICRONS

KEY TO DI-ELECTRIC SHIELD AREAS

COATING OF PRIMARY SHIELD AREA TO FOLLOW ONE OF THE OPTIONS IN THE COATING TABLE ABOVE

SECONDARY SHIELD AREA TO BE COATED WITH STANDARD HULL COATING, MINIMUM 500 MICRONS THICK OVER AREA SHOWN. COATING MATERIAL TO BE SUPPLIED BY SHIPYARD

CONTACT DETAILS:
TEL: +44 (0) 1246 457900
FAX: +44 (0) 1246 457901
EMAIL: technical@cathelco.com
WEB: www.cathelco.com

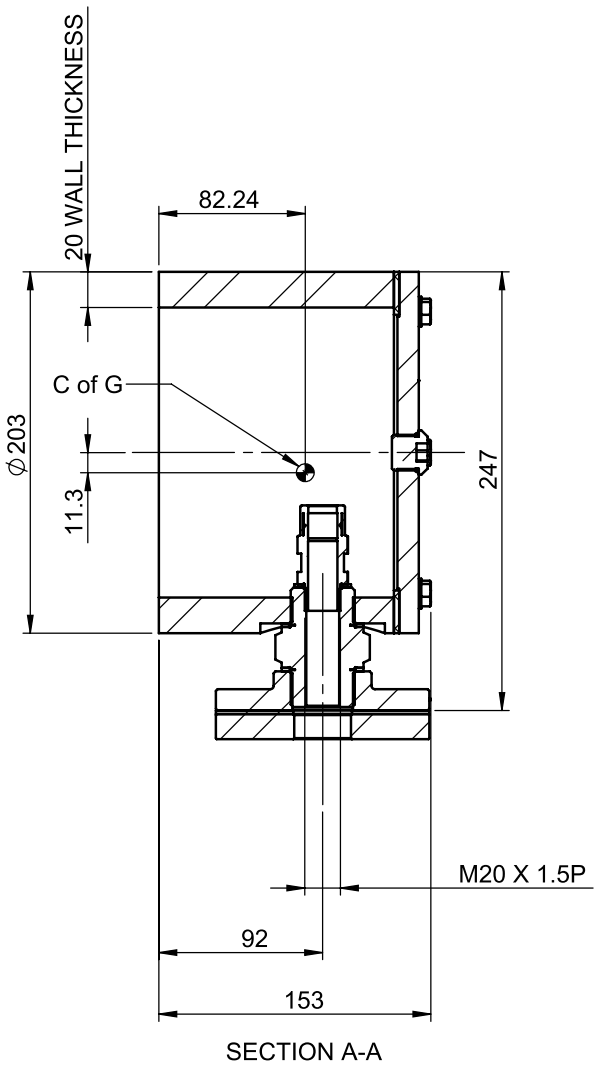
Cathelco

SHEET SIZE: A4	SHEET: 1 OF 1
DRN BY: S.C	DATE: 24.06.2011
CKD BY: -	DATE: -
APP' BY: S.E	DATE: 24.06.2011
DRG TYPE: MANUAL	

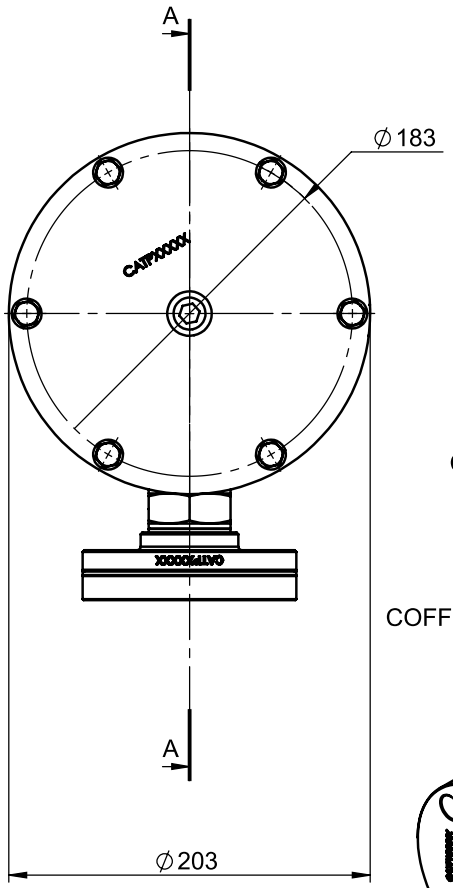
TITLE:
DI-ELECTRIC SHIELD AREA FOR C-MAX DISC ANODES

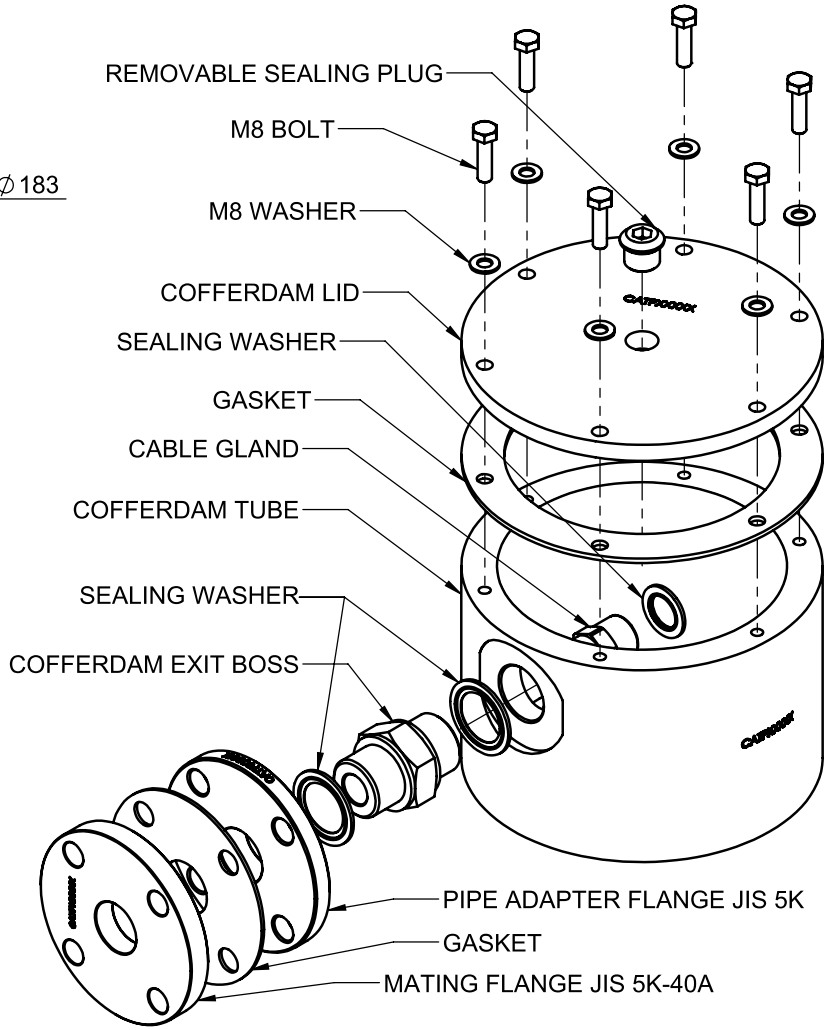
DRG NO: 103224M REV: 07

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	CHANGE CABLE GLAND AND WASHER POSITION, ADD FINISH, CHANGE C of G POSITION, UPDATE DRAWING	30.11.11	W.T
2	ITEMS ADDED & CABLE GLAND POSITION CHANGED	09.05.2013	N.J



SECTION A-A





WEIGHT : 17.4 KG ± 5%

FINISH : COFFERDAM SUPPLIED WITH A COAT OF WELDABLE PRIMER BY CATHELCO. AFTER INSTALLATION , COFFERDAM CAN BE PAINTED AS PER CLIENTS REQUIREMENTS.

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:
ANGULAR DIM'S ± .50°
0 DECIMAL PLACE ± .50
1 DECIMAL PLACE ± .10

CONTACT DETAILS:
TEL: +44 (0) 1246 457900 FAX: +44 (0) 1246 457901
EMAIL: technical@cathelco.com WEB: www.cathelco.com

THIRD ANGLE PERSPECTIVE

INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRIANGULAR BALLOONS.

SCALE:	N.T.S.	DO NOT SCALE.	
SHEET SIZE: A4		SHEET: 1 OF 1	
DRN BY:	W.T	DATE: 15.11.2011	
APP' BY:	S.C	DATE: 15.11.2011	
DRG TYPE:	MANUAL		
CA NUMBER:			
3D PART FILE:	PPD100764		
PART NO:	PPD100729		

Cathelco

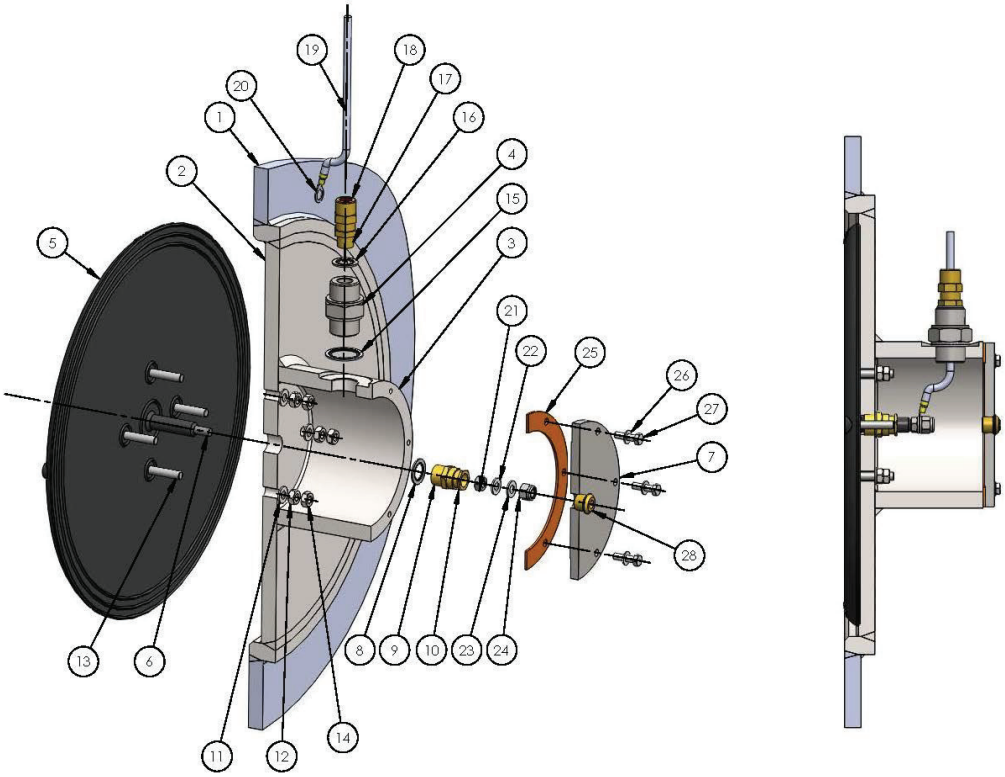
TITLE:
C-MAX ANODE COFFERDAM 20mm FL STD BOSS

DRG NO: 100764M REV: 2

3.2 Diver Change 50-100A C-Max Disc Anode

Description

Drawing No 100717M shows an exploded view of the complete assembly and hull mounting details. The equipment consists of an anode, anode doubler plate cofferdam and a di-electric shield.
The anode consists of a titanium disc (coated with Cathelco category CCIII or CCV) moulded in a rubber holder with integrated packing rings and four bolts to fasten the unit flush to the hull. A water tight cofferdam is welded to the anode doubler plate.



Note: Numbers to be cross-referenced with text below.

Installation

3.2.0 Cut a 403mm opening in the hull plate (1) in accordance with drawing 100717M to permit the doubler plate (2). Prepare the hole for welding by bevelling the inside edge of the hole.

3.2.1 Position the doubler plate (2) as per drawing 100717M and secure into place using a full penetration weld with back seal weld as per approved weld procedure.

3.2.2 Clean off any weld splatter on the back of the doubler plate (2) to ensure that the cofferdam (3) will locate flat to the doubler plate (2) at the inboard side.

3.2.3 Locate the cofferdam (3) centrally on to the doubler plate (2) and position it such that the cable entry pipe (4) is orientated to suit the installation. Secure in place using a external and internal continuous fillet weld as per approved weld procedure.

3.2.4 Externally in way of the area to be covered by the anode (5) clean off any weld spatter from the surface, and grind flat all welds.

3.2.5 Before proceeding further, ensure that ALL other welding work, either inboard or outboard has been completed for the entire area to be covered by the di-electric shield. Any welding carried out after application of the di-electric shield will damage the shield material even if the welding is not associated with the cathodic protection system.

3.2.6 The dimensions of the di-electric shield are shown on drawing 103224M

3.2.7 Inspect the area to be covered and grind off all weld spatter and surplus weld material to a smooth profile.

3.2.8 Remove all oil and grease from the areas using clean, dry, oil free rags soaked in a hydrocarbon solvent such as Xylol, Toluene or white spirit, do not use petrol or paraffin. Change the rags frequently to avoid merely spreading contamination.

3.2.9 Plug the hull penetration and gritblast the primary shield area to SA 2.5 (ISO 8501 1:2007). Check that the surface profile is within 50-70 microns.

3.2.10 Remove residual dust with a clean dry brush.

3.2.11 Form the di-electric shield by painting the Di-electric supplied as per drawing 103224M within 4 hours of blasting and before the formation of any visible rust bloom. If the Di-electric cannot be painted within 4 hours of blasting then an epoxy primer must be applied before the Di-electric.The Di-electric can be paint applied or airless sprayed. Primary shield to be applied as per drawing 103224M. Secondary shield area to be coated with standard hull coating minimum of 500 microns. If the paint film is too thin, roughening of the surface by blasting to Grade Coarse G is needed. Allow sufficient drying time before applying the second coat. Safety data sheets can be supplied upon request.

3.2.12 Fit the anode (5) into position through the doubler plate (2) taking care not to damage the electrical connection pin (6).

3.2.13 Inside the vessel, remove the cofferdam lid (7) from the cofferdam (3) and check the pin (6) for damage

3.2.14 Fit the dowty washer (8) and gland (9) (10) to the base of the doubler plate (2) recess and fully tighten the gland body (9)

3.2.15 Fit one washer (11) and one nut (12) to each anode stud (13) and hand tighten.

3.2.16 Starting at the #1 bolt, use cross-pattern tightening sequence in drawing 100717M to tighten the nuts. Each sequence constitutes a 'Round'. Use 3 rounds to fully tighten to the required torque of 50 N-m (36.9lbs/ft or 5.1kg/m). .

3.2.17 Fit the second nut (14) to each stud (13) and hand tighten

3.2.18 Hold the first nut and starting at the #1 bolt, use cross-pattern tightening sequence in drawing 100717M to tighten the nuts. Each sequence constitutes a 'Round'. Use 3 rounds to fully tighten to the required torque of 50 N-m (36.9lbs/ft or 5.1kg/m).

3.2.19 Fully tighten the anode cable gland compression ring (10).

3.2.20 Ensure the cofferdam exit boss (4) is secure with the dowty washer (15) fitted. Fit the dowty washer (16) gland (17) (18) into position outside the cofferdam (dry compartment installation) or inside the cofferdam (wet compartment installation). Any cables which run through tanks must be housed in heavy wall conduit pipe. Tighten the main body (17) fully into position, but fully slacken the compression ring (18).

3.2.21 Thread the shipyard cable (19) through the gland (17) (18) into the cofferdam (3). Connect a correct sized crimp ring (20) onto the shipyard cable (19). Connect the shipyard cable (19) to the anode electrical connection pin (6), the connection is made by adding 1 x M10 half nut (21) and washer (22) onto the anode electrical connection pin (6). The crimp ring (20) is then placed over the anode electrical connection pin (6) and secured in place with a washer (23) and M10 nyloc nut (24). This can then be insulated by applying a piece of heat shrink. Tighten the gland compression ring (18) onto the cable (19) leaving a loop of slack cable inside the cofferdam. Connect the shipyard cable (19) into the power supply unit via a junction box if required.

3.2.22 Check the insulation of the anode connection circuit to the hull using a 500V earth insulation test meter. DO NOT MEGGER if the vessel is afloat.

Disconnect from the power supply unit before this test, or permanent damage may occur.

3.2.23 Make a final visual check of all connections and fit the cofferdam lid (7) and gasket (25) to seal the cofferdam (3). Fit the cofferdam lid (7) by fitting one M8 washer (26) over each M8 bolt (27) and tighten the 6 x M8 bolts (27) into the cofferdam body (3). Starting at the #1 bolt, use cross-pattern tightening sequence in drawing 100717M to tighten the nuts. Each sequence constitutes a 'Round'. Use 3 rounds to fully tighten to the required torque of 26 N-m (19.17lbs/ft or 2.63kg/m). Ensure the removable sealing plug (28) is fitted to the cofferdam lid (7).

3.2.24 After the anode installation work is finished, the cofferdams may be filled with an electrical insulation compound (This is to be supplied by the shipyard if required).

NOTES:

Do not paint over the anode surface.

External surface of base plate to be painted to same specification as primary shield area

Before painting over the primary shield area with hull paint an epoxy tiecoat must be applied

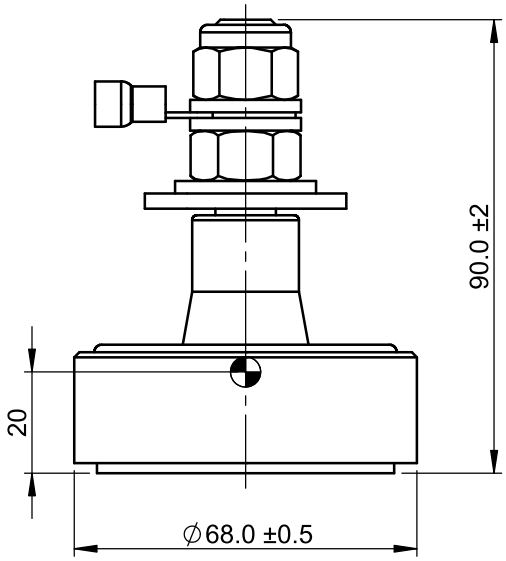
All welds used during installation should meet the yard or Classification Society rules.

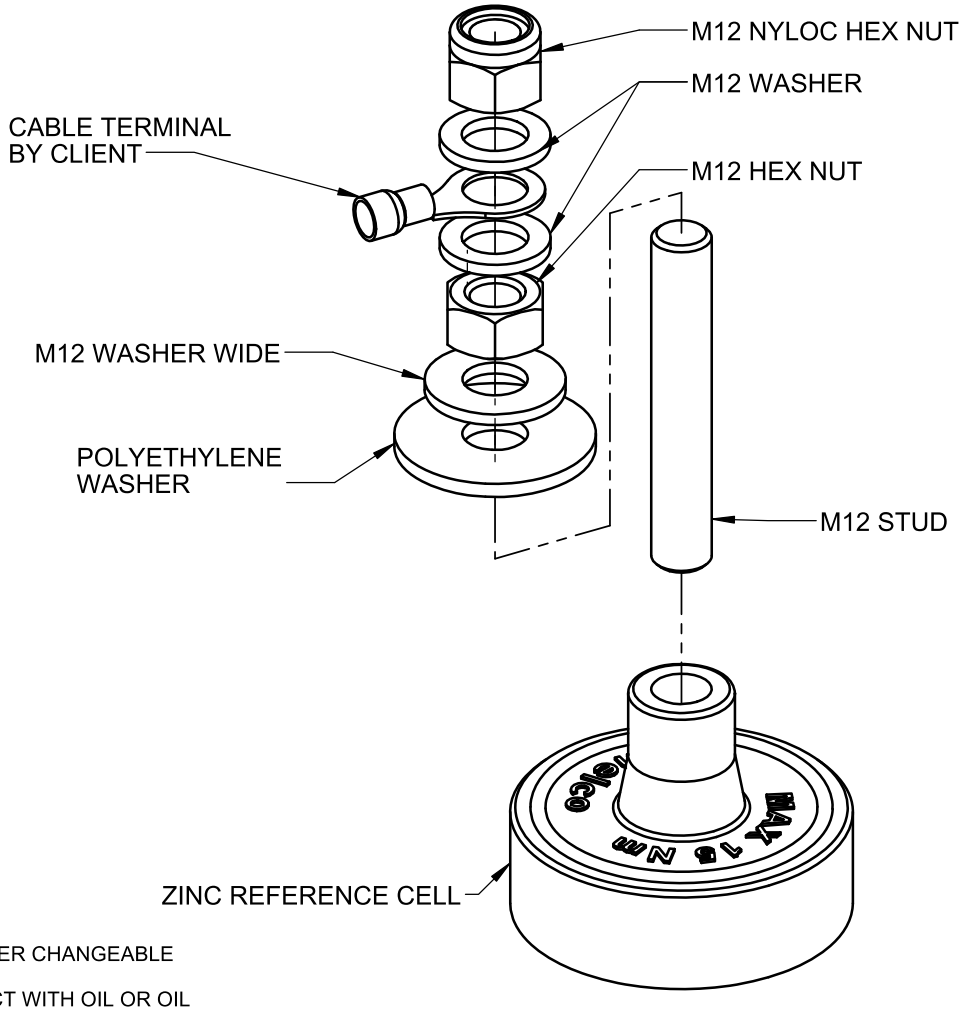
No welding on or adjacent to the cable pipes shall be performed after cable pull in.

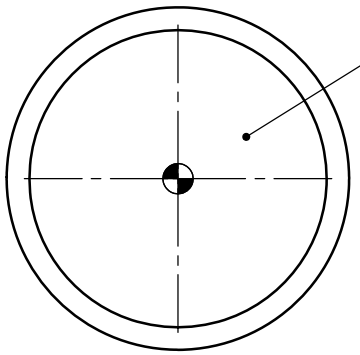
Always use a calibrated Torque wrench

Scan for installation overview, refer to manual for full details.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
6	NOTES UPDATED	12.02.14	N.B







NOTES:
THIS REFERENCE ELECTRODE IS DIVER CHANGEABLE

DURING STORAGE PREVENT CONTACT WITH OIL OR OIL BASED SUBSTANCES.

WEIGHT = 0.6 Kg APPROX

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:

ANGULAR DIM'S ± .50°

0 DECIMAL PLACE ± .50
1 DECIMAL PLACE ± .10

CONTACT DETAILS:
TEL: +44 (0) 1246 457900 FAX: +44 (0) 1246 457901
EMAIL: technical@cathelco.com WEB: www.cathelco.com

THIRID ANGLE PERSPECTIVE

INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRIANGULAR BALLOONS.

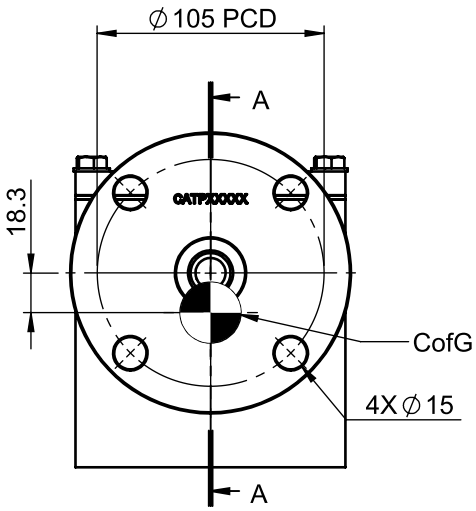
SCALE: 1:1.5	DO NOT SCALE.		
SHEET SIZE: A4	SHEET: 1 OF 1		
DRN BY: D.A	DATE: 17.10.2008		
APP' BY: C.R	DATE: 17.10.2008		
DRG TYPE: MANUAL			
CA NUMBER: N.A			
3D PART FILE: PPR100006			
PART NO: PPR100006			

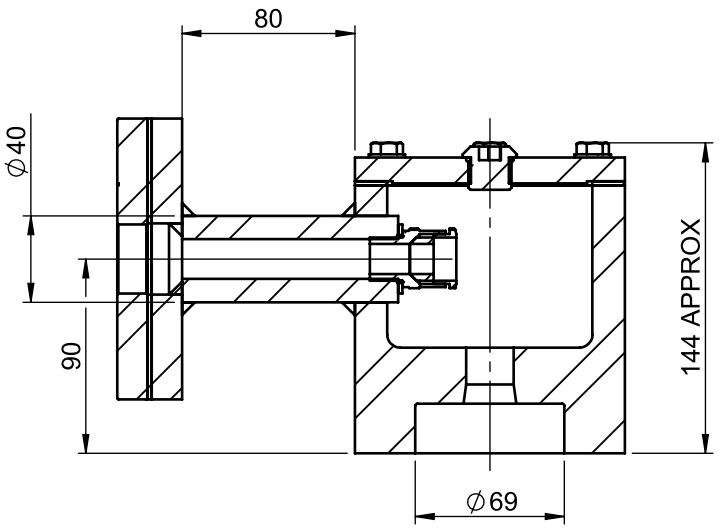
Cathelco

TITLE:
ZINC REFERENCE ELECTRODE ASSEMBLY

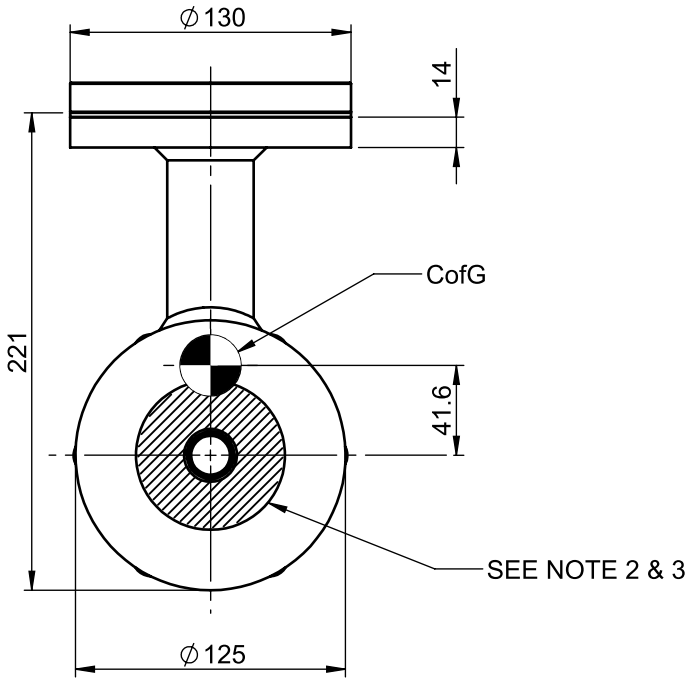
DRG NO: 100006M REV: 6

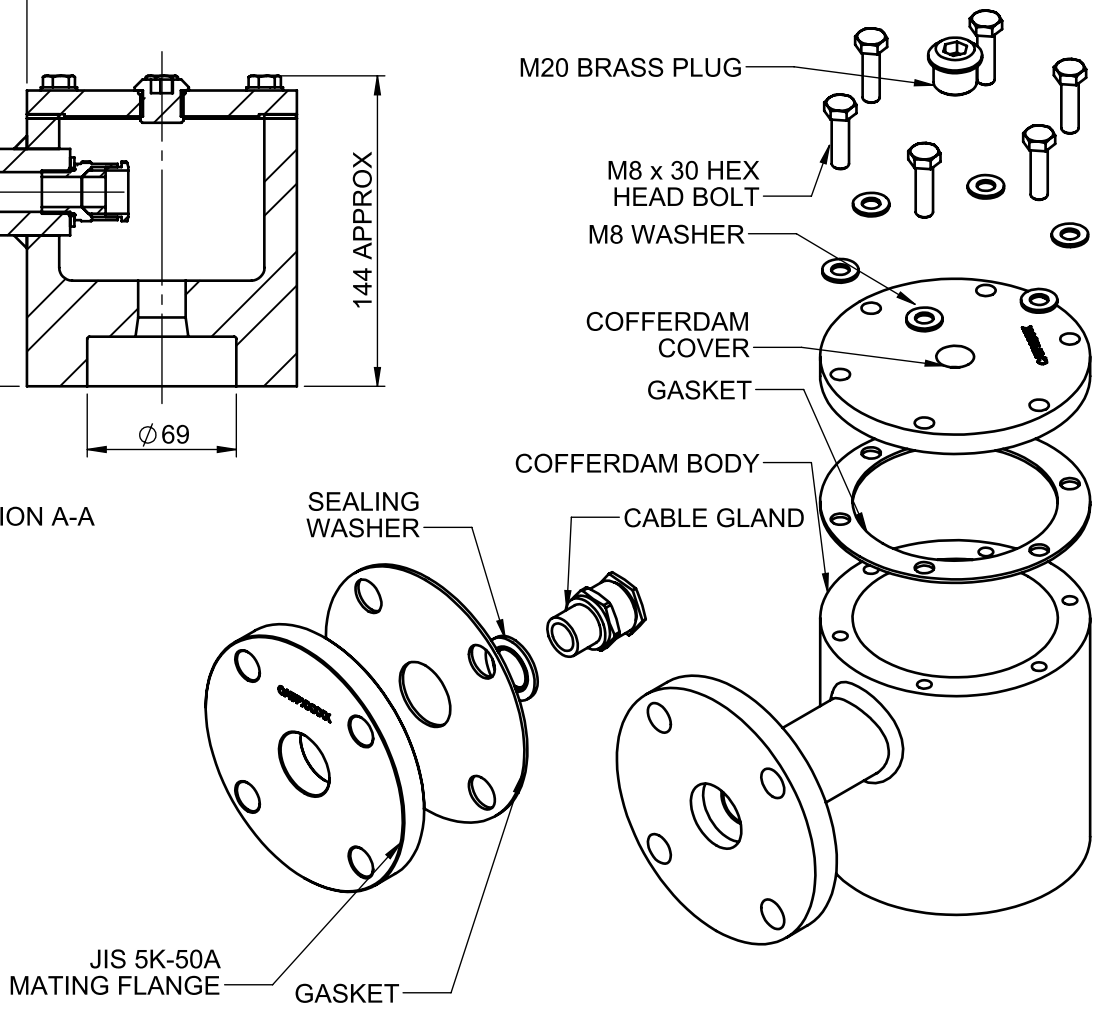
REVISIONS				
REV.	DESCRIPTION	DRN BY	APP BY	DATE
3	CORRECT TEMPLATE ADDED, MODEL CORRECTED	W.W	M.B	30.09.2014





SECTION A-A





NOTE:
1. THIS COFFERDAM IS USED FOR A REFERENCE ELECTRODE AND A 10A MINITEK ANODE
2. FOR 10A MINITEK ANODE INSTALLATION, PAINT SHADED RECESS WITH DI-ELECTRIC AS PER DRAWING 102788M.
3. FOR REFERENCE CELL INSTALLATION, DO NOT PAINT SHADED RECESS.

WEIGHT: 11.54 Kg

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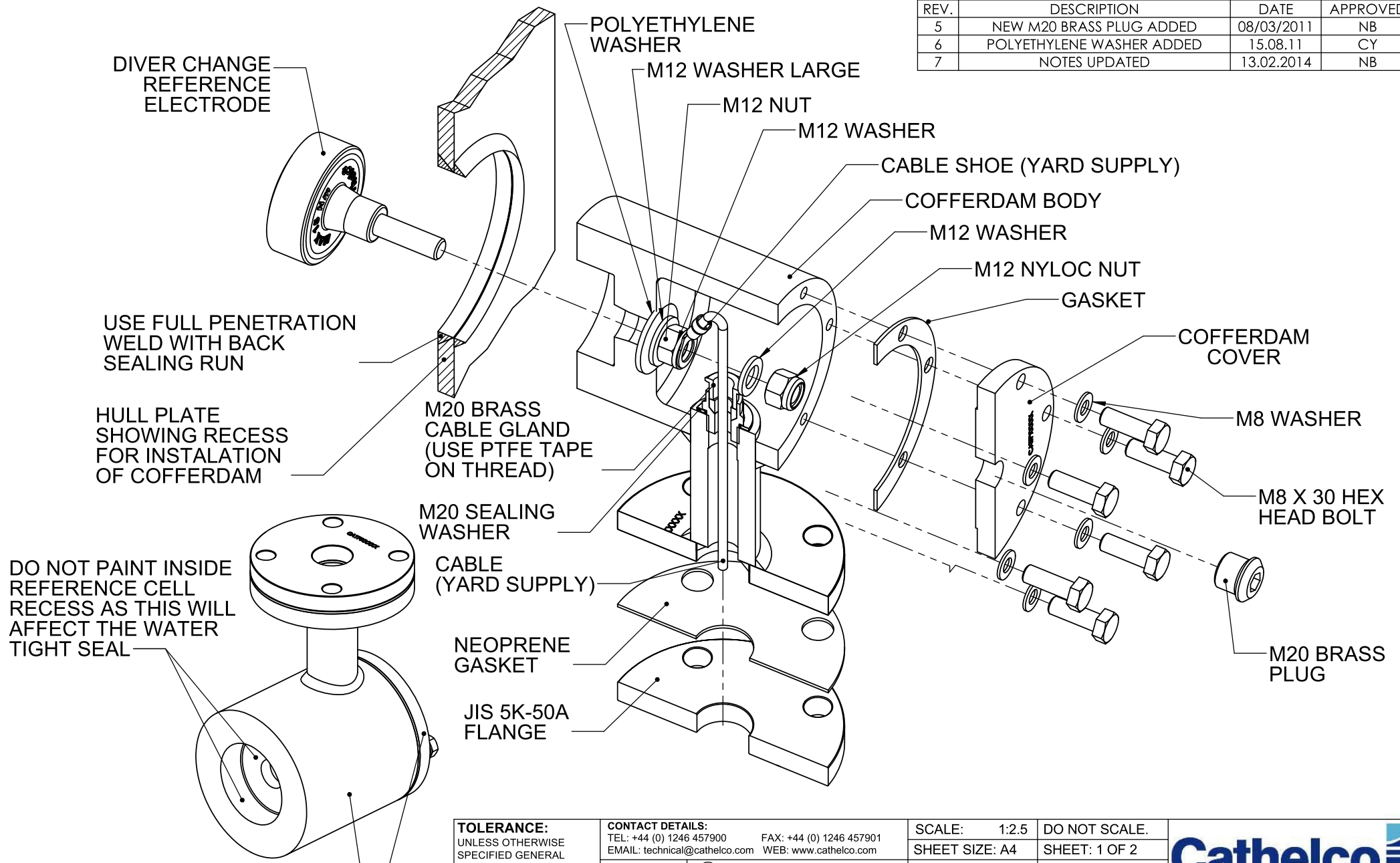
SCALE: 1:3.5	DO NOT SCALE.	TITLE: COFFERDAM REFERENCE ELECTRODE / 10A ANODE (FLANGED)	
SHEET SIZE: A4	SHEET: 1 OF 1		
DRN BY: D.A	DATE: 12.03.2009		
APP' BY: S.C	DATE: 12.03.2009		
DRG TYPE:	MANUAL	DRG NO: 100472M	REV: 3

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
5	NEW M20 BRASS PLUG ADDED	08/03/2011	NB
6	POLYETHYLENE WASHER ADDED	15.08.11	CY
7	NOTES UPDATED	13.02.2014	NB



TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:

ANGULAR DIM'S ∠ ± .50°

0 DECIMEL PLACE ± .50
1 DECIMEL PLACE ± .10

CONTACT DETAILS:
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THIRID ANGLE PERSPECTIVE

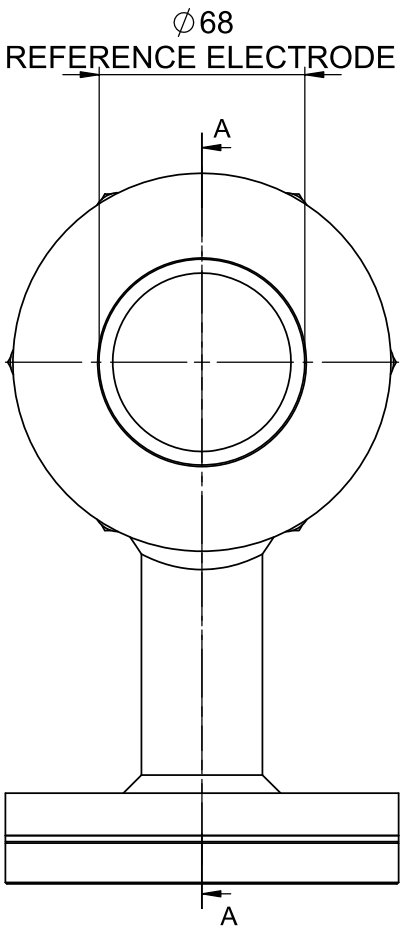
INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRANGUALR BALLOONS.

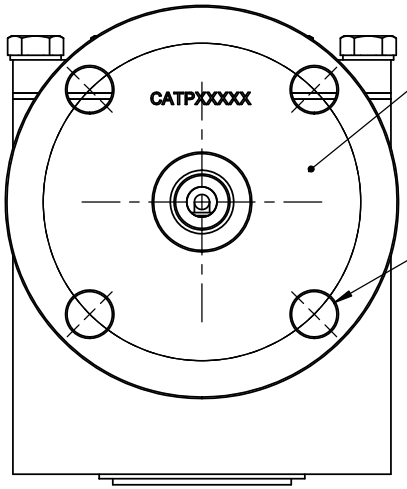
SCALE: 1:2.5	DO NOT SCALE.
SHEET SIZE: A4	SHEET: 1 OF 2
DRN BY: D.A	DATE: 12.03.2009
APP' BY: D.A	DATE: 12.03.2009
DRG TYPE: MANUAL	
CA NUMBER: N/A	
3D PART FILE: N/A	
PART NO: N/A	

Cathelco

TITLE:
EXPLODED DIAGRAM OF FLANGED REFERENCE ELECTRODE INSTALATION

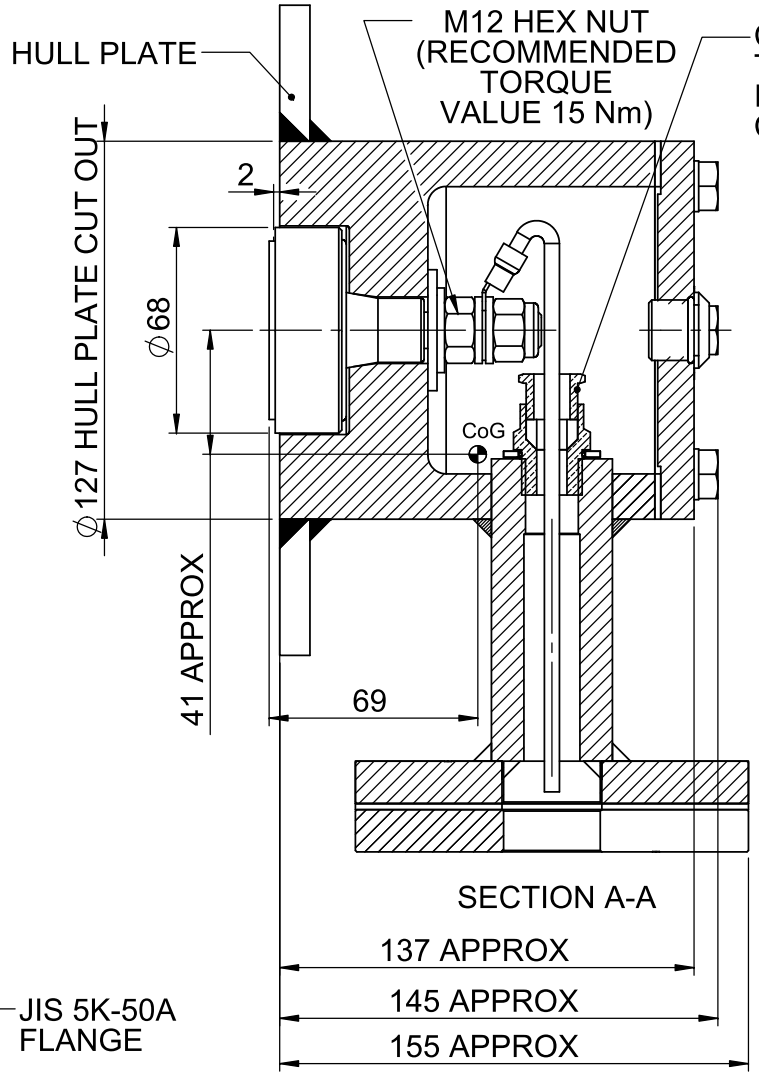
DRG NO: 100474M REV: 7

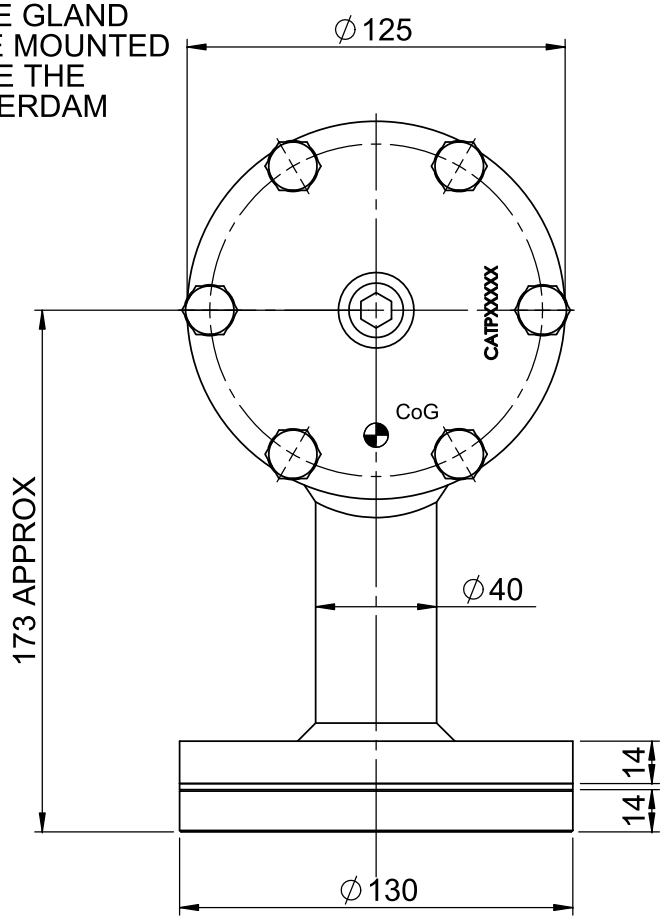




JIS 5K-50A
FLANGE

4X ∅15
105 PCD





NOTE:
1.THIS REFERENCE ELECTRODE IS DIVER CHANGEABLE
2.ALL WELDING WORK TO BE CARRIED OUT BY SHIPYARD AND TO BE TO THE REQUIREMENT OF THE CLASSIFICATION SOCIETY PRESENT

TOLERANCE:
UNLESS OTHERWISE SPECIFIED GENERAL TOLERANCES ARE:
ANGULAR DIM'S ∠ ± .50°
0 DECIMEL PLACE ± .50
1 DECIMEL PLACE ± .10

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THIRID ANGLE PERSPECTIVE

INSPECTION DIMENSIONS ARE SHOWN IN ENCLOSED OVALS.
DRAWING REVISIONS ARE SHOWN IN TRANGUALR BALLOONS.

SCALE: 1:2.5	DO NOT SCALE.
SHEET SIZE: A4	SHEET: 2 OF 2
DRN BY: D.A	DATE: 12.03.2009
APP' BY: D.A	DATE: 12.03.2009
DRG TYPE: MANUAL	
CA NUMBER: N/A	
3D PART FILE: N/A	
PART NO: PPD100025	

Cathelco

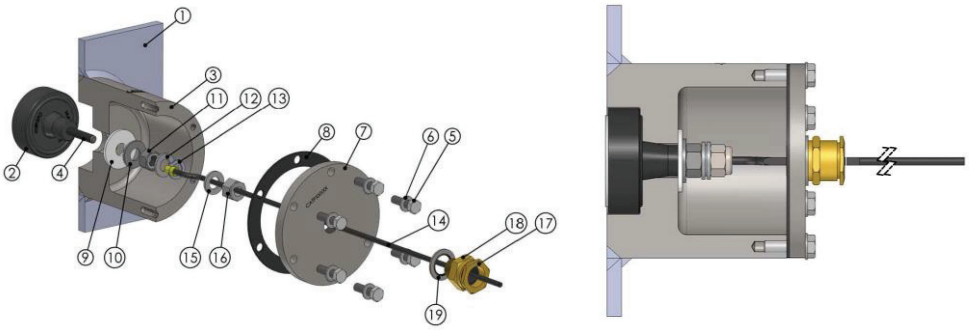
TITLE:
DETAILS OF REFERENCE ELECTRODE MOUNTED IN TO FLANGED COFFERDAM

DRG NO: 100474M REV: 7

3.4 DIVER CHANGE REFERENCE ELECTRODE

Description

Drawing No: 100006M (Zinc Reference Electrode) or Drawing No: 100019M (Silver / Silver Chloride Reference Electrode). Drawing No: 100376M shows an exploded view of the complete assembly and hull mounting details of the Reference Electrode and cofferdam. Both types of reference electrodes consist of a cylindrical plate with an integral 12 mm bolt for fastening and electric contact. The reference electrode is mounted in a rubber holder with integrated sealings for water tight fitting.



Note: Numbers to be cross-referenced with text below.

Cofferdam assembly for dry installation

Drawing no: 100025M shows an exploded view of the standard reference electrode cofferdam. Drawing no: 100376M shows an exploded view of the complete assembly and hull mounting details.

The "General Arrangement of ICCP System" drawing shows where the reference electrodes are to be situated on the hull.

3.4.01 Cut a 127mm diameter hole in the hull (1) at each reference electrode (2) location to permit the cofferdam (3) to be inserted. Prepare the hole for welding by bevelling the outside edge of the hole.

3.4.02 Remove 6 x M8 Bolts (5), M8 washers (6), cofferdam lid (7) and gasket (8) from the cofferdam body (3).

3.4.03 Position the cofferdam body (3) with the outside face flush to the outside of the hull (1) and secure into place using a full penetration weld with back seal weld as per the yards approved weld procedure. Grind the protruding weld around the cofferdam flush with the hull before painting the front face of the cofferdam with two coats of primer of the same quality as the underwater hull. Recessed surfaces are not to be painted.

3.4.04 Fit the dowty washer (19) and gland (18) (17) to the cofferdam lid (7), positioned on the outside of the cofferdam for dry compartment installation. Tighten the main body of the gland (18) fully into position, full fully slacken the compression ring on the gland (17).Please note the Reference electrode arrangement is not for wet installations.

3.4.05 Fit the Reference electrode (2) into position through the cofferdam body (3) taking care not to damage the Reference electrode stud (4).

3.4.06 Inside the vessel, check the Reference electrode stud (4) for any damage.

3.4.07 Fit the polyethylene washer (9), M12 wide washer (10) and the M12 nut (11) to the Reference electrode stud (4). Tighten up to 1.5kpm (15Nm) usng a calibrated torque wrench.

3.4.08 Thread the shipyard cable (14) through the gasket (8) and the gland (18) (17) in the cofferdam lid (7). Connect a correct sized crimp ring (13) onto the shipyard cable (14). Connect the shipyard cable (14) to the Reference electrode stud (4). The connection is made by adding M12 washer (12) and the crimp ring (13) over the Reference electrode stud (4), then secured in place with an M12 washer (15) and M12 nyloc nut (16). Tighten M12 nyloc nut (16) up to 1.5kpm (15Nm) using a calibrated torque wrench. Cable connection can then be insulated by applying heat shrink.

Cabling. Typical cable (14) size is 1 core x 4mm^2 this must be shielded. The shield must be terminated in the cabinet of the rectifier at the earthing point, see terminal drawing in the manual for full details. Under especially noisy conditions it may be favourable to earth the cables also in the cofferdam (3). An earthing connect must then be constructed in the cofferdam (3)

3.4.09 Make final visual check of all connections. Tighten compression ring on the gland (17) on to the shipyard cable (14) leaving loop of slack cable inside the cofferdam body (3)

3.4.10 Please ensure that if the vessel is going to be stood in water for a long period of time during the outfitting period, the Reference electrodes (2) are **NOT** to be connected to the panel until the ICCP system is commissioned. If the system is switched off after commissioning the Reference electrodes (2) should be disconnected and only reconnected when the system is switched on. When the system is to be left switched off for any prolonged period of time Cathelco should be contacted for further details.

3.4.11 After the electrical installation is finished the cofferdam body (3) can be filled with a non-conductive electrical isolating compound, however this is down to the yards discretion and is not essential. The compound must also be supplied by the yard.

3.4.12 Align the gasket (8) and fit the cofferdam lid (7) to seal the cofferdam body (3). Secure the cofferdam lid (7) by fitting an M8 washer (6) over each M8 bolt (5) and tighten the M8 bolts (5) into the cofferdam body (3). Starting at the #1 bolt, use a cross-pattern tightening sequence to tighten the M8 bolts (5). Each sequence constitutes a 'Round'. Use 3 'Rounds' to fully tighten to the required torque of 26Nm (19.17lbs/ft or 2.63kg/m).

Notes:

Do not paint over reference cell surface
All welds used during installation should meet the yard or classification rules
No welding on or adjacent to the cable pipes shall be performed after cable pull in
Always use a calibrated torque wrench
Silver / silver chloride reference cells to be stored at no more than 20°C and humidity of no more than 80%
Silver / silver chloride reference cells stored for more than 1 month must be immersed in sea water for 24 hours.