

कोचीन शिपयार्ड लिमिटेड / COCHIN SHIPYARD LIMITED
कोच्ची / COCHIN - 682 015

पोत निर्माण प्रभाग / SHIP BUILDING DIVISION

आउटसोर्सिंग विभाग
OUTSOURCING DEPARTMENT



निविदा दस्तावेज़ / TENDER DOCUMENT

TENDER NO. SB-OSD/CSOV/954/2025 Dtd: 29-05-2025

**ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE
OPERATION VESSELS (CSOV) BY 151 & BY 152**



MAY - 2025

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

विषय - सूची / CONTENTS

क्र.सं. SL.No.	विवरण DESCRIPTION	संदर्भ REFERENCE
1	निविदा सूचना TENDER NOTICE	
2	जांच के नियम और शर्तें TERMS & CONDITIONS OF ENQUIRY	अनुलग्नक ANNEXURE I
3	सामान्य शर्तें GENERAL CONDITIONS	अनुलग्नक ANNEXURE II
4	कार्यों का विषय क्षेत्र/ तकनीकी विनिर्देश SCOPE OF WORKS / TECHNICAL SPECIFICATION	अनुलग्नक ANNEXURE III
5	वाणिज्यिक जांच सूची COMMERCIAL CHECK LIST	अनुलग्नक ANNEXURE IV
6	मूल्य बोली प्रारूप PRICE BID FORMAT	अनुलग्नक ANNEXURE V
7	अखंडता समझौता INTEGRITY PACT	अनुलग्नक ANNEXURE VI
8	बयान DECLARATION	अनुलग्नक ANNEXURE VII
9	अनुपालन के लिए मैट्रिक्स COMPLIANCE MATRIX	अनुबंध APPENDIX A
10	वित्तीय क्षमता के लिए प्रारूप FORMAT FOR FINANCIAL CAPABILITY	अनुबंध APPENDIX B
11	किए गए UNDERTAKEN	अनुबंध APPENDIX C
12	सीएसएल द्वारा जारी की जाने वाली ड्रॉइंग्स की सूची LIST OF DRAWINGS TO BE ISSUED BY CSL	अनुबंध APPENDIX D
13	प्रदर्शन मूल्यांकन प्रपत्र PERFORMANCE EVALUATION FORM	अनुबंध APPENDIX E
14	मास्टर निर्माण अनुसूची MASTER CONSTRUCTION SCHEDULE	अनुबंध APPENDIX F

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

15	एकल रेखा आरेख SINGLE LINE DIAGRAM	अनुबंध APPENDIX G
16	सीएसएल विद्युत आउटफिटिंग मानक CSL ELECTRICAL OUTFITTING STANDARDS	अनुबंध APPENDIX H
17	एमसीटी इंस्टालेशन चेकलिस्ट MCT INSTALLATION CHECKLIST	अनुबंध APPENDIX I
18	ईएमसी प्रबंधन नियंत्रण दस्तावेज़ EMC MANAGEMENT CONTROL DOCUMENT	अनुबंध APPENDIX J

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

निविदा सूचना / TENDER NOTICE
कोचीन शिपयार्ड लिमिटेड / COCHIN SHIPYARD LIMITED

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

SB-OSD/CSOV/954/2025

29th May - 2025

निविदा सूचना / TENDER NOTICE

संक्षिप्त विवरण / BRIEF DETAILS:

निविदा जांच संख्या और तारीख Tender enquiry No. and date	SB-OSD/CSOV/954/2025 Dtd 29-05-2025
कार्य का नाम Name of work	ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)
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)	20 th June – 2025 at 15.00 Hrs IST
पूर्व बोली बैठक की तारीख Date of Pre bid meeting	05 th June – 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	20 th June – 2025 at 15.30 Hrs IST
संपर्क व्यक्ति Contact Person	<u>For Commercial queries:</u> Mr. Adarsh S, AM (Outsourcing), Mob No: 87146 30926. <u>For Technical queries:</u> Mr. Cristin Rajan, M (EOF), Mob. No: 81389 17189.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 **05.06.2025** 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 **04.06.2025** तक सकारात्मक रूप से सूचित और अग्रेषित करना चाहिए।

The pre-bid meeting will be held on **05.06.2025** 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 **04.06.2025** positively.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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/CSOV/954/2025”** 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/CSOV/954/2025”** to:

- (i) ashtal.antony@cochinshipyard.in
(ii) adarsh.s@cochinshipyard.in
(iii) sboc.tender@cochinshipyard.in

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

प्रतिलिपि / Copy to:

(ii) rajeevkumar.s@cochinshipyard.in

(iii) madhu.pk@cochinshipyard.in

7. बोलियां दिनांक 20 जून – 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 20th June - 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. 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.

11. 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.

12. 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

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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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

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

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

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

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

13. 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.

14. 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.

15. 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.

16. 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

17. 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**

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

ANNEXURE I

जांच की नियम और शर्तें / TERMS & CONDITIONS OF ENQUIRY

ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

1. कार्य का विवरण / DESCRIPTION OF WORK

- 1.1. This tender enquiry pertains to the awarding of contract for – **ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV) BY.151 & BY.152** 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 includes complete cabling onboard vessels, dressing of cables and MCT packing of entire ships (BY 151 & BY 152) up to the entire satisfaction of CSL, Owner, and Class Surveyors; with the available infrastructure facilities and Equipments / materials / consumables provided by Cochin Shipyard Ltd (CSL) 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 **M (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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

2.2. TECHNICAL EXPERIENCE

Technical pre-qualification requirement is given below:

2.2.1. Technical requirement for cabling

- a) The sub-contractor should have prior cable laying experience in ships, minimum 130km against a single work order. The firm has to submit the documents which validates the above mentioned experience requirement. Contractor 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 have experience in the packing of MCT in ships. The firm has to submit the documents which validates the above mentioned experience requirement.
- c) The Sub-Contractor must deploy a minimum of 100 workmen to ensure completion of cable laying within six months as per the project schedule. An undertaking confirming both the manpower commitment and readiness to meet the timeline must be submitted.
- d) Separate supervisors for cable laying of power cables, control and monitoring cables and Navigation and Communication systems to be provided by the contractor. Document supporting the experience of the supervisors is to be provided.

2.3.2. 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.

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

2.3.4. 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. 74 Lakh** during the last three years ending on 31st March 2024.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 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 AWARING CONTRACT

- 4.1. Total vessels under this contract is 02 No.s CSOV vessels (BY.151 & BY.152).
- 4.2. Contract will be concluded with the Bidder qualifying to techno-commercial conditions and emerging as L1 bidder

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 4.3. CSL reserves right to reduce/ increase the percentage work or cancel partially or fully based on the performance firm at site.
- 4.4. 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 within 6 Months from the date of working area readiness from CSL.
- 5.2. **Tentative Start Date**
BY 151 – August 2025
BY 152 – January 2026
- 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 is 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV) 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 5 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 15% of total work order value after completing 25% of work.

Stage -2: Next 25% of total work order value, after completing 50% of work.

Stage -3: Next 25% of total work order value, after completing 75% of work.

Stage -4: Next 15% of total work order value, after completing 90% of work.

Stage -5: Payment of 20% of total work order value, after completing 100% of work.

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>

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

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

12.4. 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

- 12.5. 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.
- 12.6. The invoice can be tracked using the generated Invoice Tracking Number till the payment.
- 12.7. Statutory levies such as I.T, Contribution towards PF, ESI etc., shall be deducted from the bill as applicable.
- 12.8. 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.	10319954321 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:

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.
- 20.2. If any dispute, disagreement or question arising out of or relating to or in consequence of the contract, or to its fulfillment, or the validity of enforcement thereof, cannot be settled mutually or the settlement of which is not herein Specifically provided for, then the dispute shall within thirty days from the date either party informs the other in writing that such disputes, disagreement exists, be referred to arbitration. The arbitrators shall be appointed and the arbitration proceedings shall be conducted in accordance with and subject to the Arbitration and Conciliation Act, 1996 (No. 26 of 1996) as amended from 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 conveyed 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 / For Deputy General Manager
आउटसोर्सिंग विभाग / Outsourcing Department**

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

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 WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

1. INTRODUCTION

Cochin Shipyard Ltd (Yard) is constructing 02 numbers of Commissioning Service Operation Vessels (CSOV) with yard numbers BY151 & BY152 for commissioning / servicing of Wind Farms owned by Windfinity Maritime Co. Ltd.(BY 151) and Windlight Maritime Co. Ltd. (BY152), designed by Kongsberg (UT-Design type, UT 5519 HL). The vessel will be a methanol based dual fuel electric hybrid vessel having dynamic positioning capabilities using 5 various types of thrusters. Yard intends to outsource the Electrical Outfit Works of CSOV Vessels, as detailed below, to competent subcontractors which includes complete cabling onboard vessels, dressing of cables and MCT packing of entire ships (BY.151 & BY.152) up to the complete satisfaction of CSL, Owner, and Class Surveyors as per relevant clause of Technical Specification.

2. VESSEL PARTICULARS

Length Overall (Excl. Boat Landing)	Approx. 92.10 M
Length Overall (Incl. Boat Landing):	Approx. 93.40 M
Length Between Perpendiculars (P.P.):	83.10 M
Breadth Moulded (MLD):	19.60 M
Breadth Over Bridge Wings:	22.40 M
Depth to Freeboard Deck (from Baseline):	7.50 M
Design Draught:	5.00 M
Maximum Draught:	Approx. 5.50 M

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

3. CLASSIFICATION

Type of vessel: COMMISSIONING SERVICE OPERATION VESSEL (CSOV)

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

Main class: 1A

Ship type: COMMISSIONING SERVICE OPERATION VESSELS

Additional class notations: BIS BWM (T) Clean COAT-PSPC (B) Container DBC DG (B, P) E0 Grab (2-20t) ICE (1B) Recyclable Strengthened (IB) TMON.

4. SCOPE OF WORK

The work shall be carried out based on the contract specification, general arrangement drawing, CSL mentioned standards and Design drawings. The scope of contractor involves cabling and packing of MCTs (whole vessel BY.151 and BY.152) up to the entire satisfaction of CSL / Owner / Class surveyor, and up to the delivery of the vessel, which includes the following;

- a) Complete cabling onboard vessel which also includes CAT 7/ CAN BUS/ FIBRE OPTIC/ MODBUS/ COAXIAL/ PROFIBUS cables and any special cables as per CSL & marine standards.
- b) Temporary cable ties required for the dressing of cables are in the scope of subcontractor.
- c) Cabling includes under water transducer cables, antenna communication cables, maker cables and various inbuilt sensor cables. (Installation of underwater sensors and antennas are not under sub-contractor scope).
- d) The subcontractor shall be solely responsible for the packing of MCTs (Multi-Cable Transits) for the entire vessel, which shall be carried out strictly in accordance with the OEM instructions. The associated survey shall be conducted in compliance with the applicable Class requirements. Any defects identified in the packing of MCTs during the construction phase shall be rectified by the subcontractor at no additional cost. The subcontractor is required to ensure strict adherence to the relevant packing guidelines and shall complete and submit the MCT Installation Checklist in the format provided in Annex G. Packing of MCTs related to individual equipment shall remain under the scope of the yard.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- e) Dressing of cables (both temporary and permanent).
- f) Any minor modification (Hot works) required in the cable way during cable laying.
- g) Providing sufficient protection of the laid cables as per Yard direction (Material for protection is under scope of CSL).
- h) The minimum internal bending radius for power and control cables shall be in accordance with the manufacturer's recommendations
- i) Survey presentation to Yard I&QC, Owners and Class authorities as per yard practices which coming under the above scope of work. Rectification of defects as per the comments from Yard I&QC, Owners & Class authorities.
- j) All tools and tackles including cable drum stand and cable tying machines, MCT packing tools required for the work are under the scope of the sub-contractor.
- k) Minor staging up to 3m height shall be erected by the contractor for the work using
- l) CSL material without any separate payment. Any requirement over and above this shall be arranged by CSL separately.
- m) The Megger reading/insulation value of the cables shall be measured and recorded both before cable cutting and after installation onboard the vessel. These records shall be properly maintained and submitted to the QC department.
- n) The cable pulling through the 3D Gangway Tower system is in the scope of the yard. All the cables from the Gangway Instrument Room or Switch Board Room should be pulled till the Gangway Tower cable entry point by the sub-contractor and the balance cable is to be rolled and kept safely near the Gangway Tower cable entry. The end of the cable must be properly protected to prevent any water entry.
- o) Total estimated length of the cables per vessel is approximately 3,30,000 meters. Required cables will be supplied by the Yard. Since ship's cable scheduling works in progress, the length of cables indicated is approximate only.

5. NOTES

- a) Electrical equipment & systems includes all the Power, Lighting, Control & Monitoring, Signals, Communication (Internal, external, GMDSS), Fire detection alarm, General alarm, Navigation systems (includes bottom equipments) etc. as mentioned in the wiring diagrams.
- b) Minor re-works on the installation has to be expected in considering the outfitting of items, and the changes has to be carried out as per the drawings issued by design department time to time.
- c) Minor rectification / modification works have to be undertaken by the contractor as part of the job, at no extra cost. However, major rectification / modification works shall be treated as an additional work, and payment shall be released based on actual manhour expenditure / pro-rata basis as certified by the executing officer. Major & minor work shall be decided on a case-by-case basis and the same shall be intimated to the subcontractor before commencement of the work.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- d) Also, a conciliatory approach shall be taken towards all the working agencies on the vessel in a team spirit to achieve the project success in time.
- e) In the event that the sub-contractor is unable to fulfill the stipulated manpower levels as outlined in clause 2.2 C Annexure – I, the yard retains the prerogative to allocate the necessary manpower so as to meet the project targets. The contractor shall bear the responsibility for the expenses associated therewith, and said amount shall be debited during the stage payments.

6. OTHER RESPONSIBILITIES OF THE OUTSOURCED FIRM

- 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, equipment's, tools with valid certification, welding sets etc. necessary for the work will be the responsibility of the firm, and should be carried out as per CSL standards.
- e) Yard has the right to change the schedules of the project to the interests of the company and the firm should be capable of adjusting the resources according to the instructions from the Yard contact person.
- f) Detailed working schedule (Weekly/monthly) etc. to be prepared and submitted to yard personnel. However, a detailed overall schedule, in a reasonable manner should be submitted prior to commencement of work.
- g) Localized lighting, DBs etc. for the smooth work to be arranged by the firm. Required general lights/DBs etc. shall be arranged by Yard based on availability.
- h) Mobilizing own equipment's, necessary working tools and tackles, safety and protective gear for their personnel inside the yard for carrying out the work as per Safety/Statutory rules/Yard rules of working people under the firm is the responsibility of the firm.
- i) Firm shall be responsible for safety and welfare of all its employees employed for construction, and shall be responsible for payment of all salaries to their employees and other statutory dues and for all provisions of statues governing them.
- j) Once the item/material is issued to the contractor, proper accounting of the items consumed shall be maintained, till the delivery of vessel.
- k) The contractor, on receipt of any material, is requested to immediately verify the quality and quantity of the material with respect to the requirement and inform the executing officer any shortage/discrepancy noted/anticipated well in advance so that CSL can take corrective action in time.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

7. SCOPE OF YARD

- a) The design & supply of materials for Cable Laying for the mentioned scope of work except the materials required for Cable ID tags used inside vessel. SS Metal Embossing tags used for tagging cables in the weather decks will be supplied by CSL.
- 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 3 m height
- i) Necessary items like fire cloth, polythene/silpaulin sheets, Bubble sheets etc. required for protection of equipments.
- j) Installation of cable ways & equipment seats, installation of equipments, cable termination and commissioning of equipments/systems.
- k) Laying of cable through the 3D Gangway Tower System is in the scope of the yard, however the cable laying till the Gangway Tower cable entry point will be under subcontractor scope.

8. 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, contractors and other agencies working in the vessel 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- 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 every day 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.

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.

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

- 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/CSOV/954/2025 Dtd: 29-05-2025

Firm Name:

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

SL No.	Tender Enquiry Requirements	Confirmation from bidder (<u>strike off</u> <u>whichever is not</u> <u>applicable</u>)	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	

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 31 st 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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

ANNEXURE-V

मूल्य बोली प्रारूप / PRICE BID FORMAT

TENDER NO. SB-OSD/CSOV/954/2025 Dtd: 29-05-2025

ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

SL.No	Type of cable (Outer diameter in mm)	Total Qty in meters Per Vessel (A)	Rate per unit meters in INR (B)	Total amount (C) = (A)*(B) in INR
1	Up to 15mm	278310		
2	15 mm and up to 25 mm	31039		
3	25 mm and up to 35 mm	2322		
4	35 mm and up to 45 mm	17718		
5	45 mm and above	611		
6	SUB TOTAL AMOUNT FOR ONE VESSEL (SUM OF SL No. 1 to SL No. 5)			
7	GST% HSN CODE.....			
8	TOTAL AMOUNT FOR ONE VESSEL (SUM OF SL No. 6 + SL No. 7)			
9	GRAND TOTAL AMOUNT FOR TWO VESSEL (2 * SL No. 8)			

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

Grand Total amount (in words)

Rupees.....
.....
.....

NOTE:

- A. L1 will be determined based on Sub total amount **SL. No. (6)** 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. 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.
- E. 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:

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

(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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

- (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 may 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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 their decision in the matter.

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

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 aton

For & on behalf of PRINCIPAL
Cochin Shipyard Limited
(Office Seal)

For & on behalf of BIDDER
(Office Seal)

Witness

1.....

2.....

Witness

1.....

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.

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

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 /debaring/ tender holiday from doing business issued by Govt. of India / State govt. / Public Sector Undertakings etc.

Yours faithfully,

(Signature & Seal of Authorised Signatory)

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

APPENDIX- A

COMPLIANCE MATRIX

<u>Clause No.</u>	<u>Compliance/ Deviation</u>

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.

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

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 Firm) 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

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

APPENDIX - C

UNDERTAKING

I, Shriin 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/CSOV/954/2025 Dtd: 19.02.2025.

Signature of Contractor/authorized signatory of firm or agency:

Name of contractor:

Designation of authorized signatory of firm/agency:

Address:

Contact No:

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)

APPENDIX - D

LIST OF DRAWINGS TO BE ISSUED BY CSL AT THE TIME OF WORK EXECUTION

SL. No	Drawing to be issued	Remarks
1	Fitting arrangement of electrical equipment seat and cable way	
2	MLF – Cable	
3	Electric cable schedule	
4	Wiring diagram	
5	Electrical Outfit Practice and Standards	

TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)
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 (<i>sum of points in each grade</i>)	20					
Grand total of grade points awarded (Max 100)						

Points to be considered during evaluation

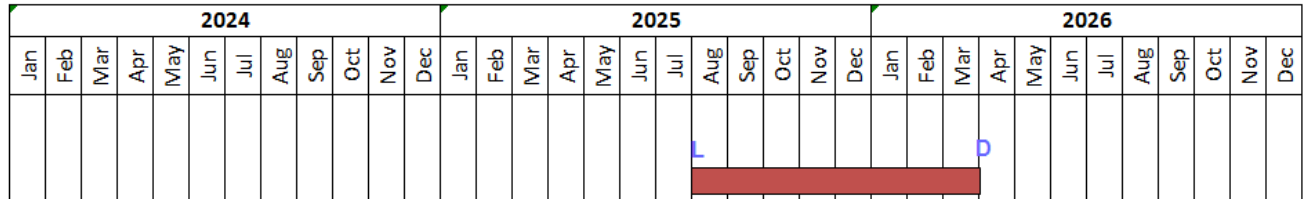
Timely Completion as per Project schedule	Completion of work within stipulated time, including class surveys & till submission of proper quotation. (No Reworks/Survey failures)
Work Planning & Co-ordination	Planning of (material, labour & machinery) for smooth execution of work, coordination with multiple 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.

**TENDER ENQUIRY NOTICE – ELECTRICAL OUTFIT WORKS – ELECTRICAL CABLE
LAYING WORKS IN COMMISSIONING SERVICE OPERATION VESSELS (CSOV)**

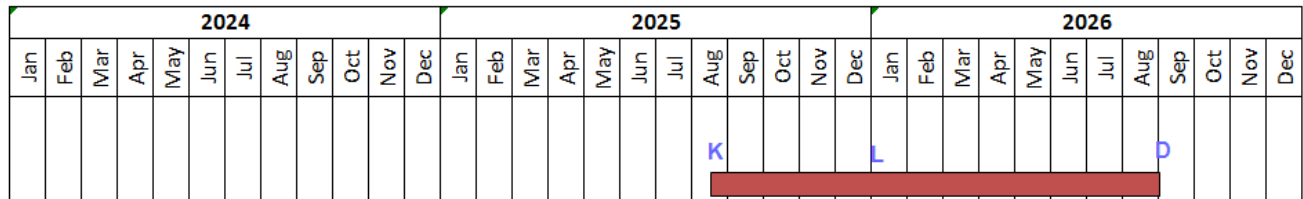
Signature (CSL Officer in-Charge)	
Name & Design	

COCHIN SHIPYARD LTD

Master Construction Schedule



MASTER CONSTRUCTION SCHEDULE - BY-152 - CSOV



- C CONTRACT SIGNING
- F FABRICATION START
- K KEEL LAY
- L LAUNCHING
- D DELIVERY

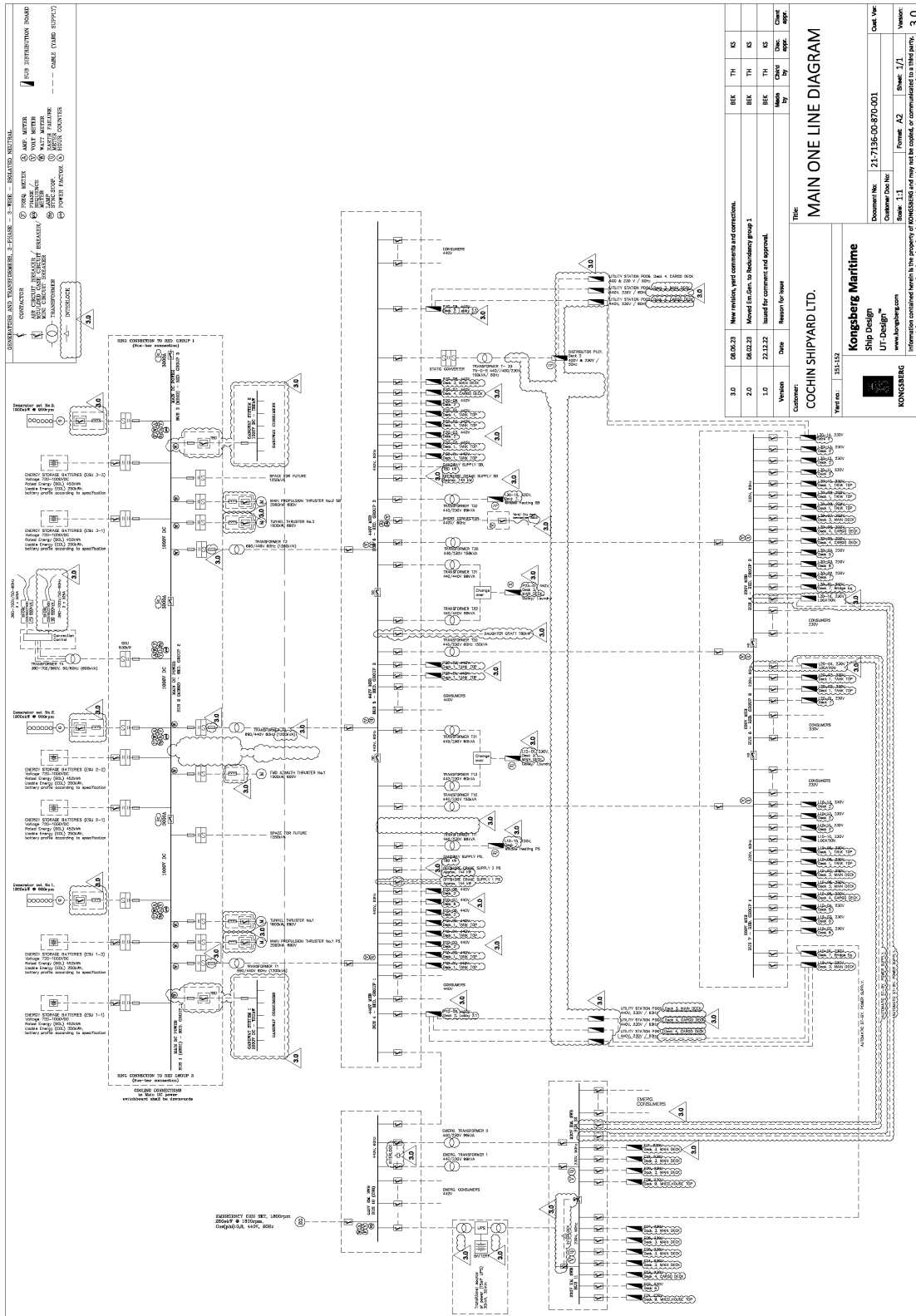
[illegible]



COCHIN SHIPYARD LTD

List of Drawings Issued By CSL

Sl. No.	Drawing to be issued	Remarks
1	Fitting arrangement of electrical equipment seat and cable way	
2	Material List of Fittings – Equipments	
3	Electric cable schedule	
4	Wiring diagram	





COCHIN SHIPYARD LTD



COCHIN SHIPYARD LTD

CSL Electrical Outfitting Standards

ELECTRICAL OUTFIT DESIGN

01
T3

CAUTION

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.

TOTAL 74 PAGES
INCLUDING COVER.
A4- 74 SH



COCHIN SHIPYARD LIMITED

A GOVERNMENT OF INDIA ENTERPRISE

P.O. Box 1653, COCHIN-682015, INDIA

VESSEL NAME	---
CSL YARD No	BY 151-152
PROJECT	---
CLASS	DNV
OWNER - BY151	WINDFINITY MARITIME CO. LTD
OWNER - BY152	WINDLIGHT MARITIME CO. LTD
APPROVED	Bilju
REVIEWED	Midhun
CHECKED	Sanjith
PREPARED	Elias
DATE:	11.09.2023


WIND FARM SERVICE VESSEL

ELECTRICAL OUTFITTING PRACTICE AND STANDARDS

SCALE: NTS

DRG No: 151-K5700200

REV : A

	INDEX		PART NO: 03.00	03 73
			DRG NO: 151-K5700200	


PART	DESCRIPTION		PAGE NO
01	COVER PAGE		01
02	PLAN HISTORY		02
03	INDEX		03-05
04	INDICATION METHOD FOR CABLE WAY		06
05	CABLE WAY INSTALLATION MATERIALS		
	GALVANISED		
	05.01	CROSS PIECE (Z TYPE)	07
	05.02	RUNNER BAR (FLAT BAR)	08
	05.03	CABLE RACK (TYPICAL)	09
	05.04	Z TYPE CABLE HANGER SINGLE TIER	10
	05.05	Z TYPE CABLE HANGER DOUBLE TIER	11
	05.06	Z TYPE CABLE RACK SINGLE TIER	12
	05.07	Z TYPE CABLE RACK DOUBLE TIER	13
	05.08	CABLE RACK BEND TYPE	14
	05.09	CABLE SADDLE - "FB" TYPE	15
	05.10	CABLE SADDLE - "SFG" TYPE	16
	05.11	FITTING MATERIAL	17
06	CABLE PENETRATION		
	06.01	CABLE COAMING	18
	06.02	MARINE WATERTIGHT CABLE GLANDS BULKHEAD / DECK MOUNTED TYPE	19
	06.03	TYPICAL SHORE CONNECTION PIECE-PGS-125A (SCREW TYPE)	20
07	CABLE INSTALLATION MATERIALS		
	07.01	ELECTRIC CABLE BAND WITH BUCKLE	21
	07.02	ELECTRIC CABLE STRAP FOR BANDING & BAND BUCKLE	22
	07.03	CABLE TIES	23
	07.04	INTENTIONALLY LEFT BLANK	24
	07.05	INTENTIONALLY LEFT BLANK	25
	07.06	TOOTHED LOCK WASHER FOR EARTHING	26

	INDEX		PART NO: 03.00	04
			DRG NO: 151-K5700200	73

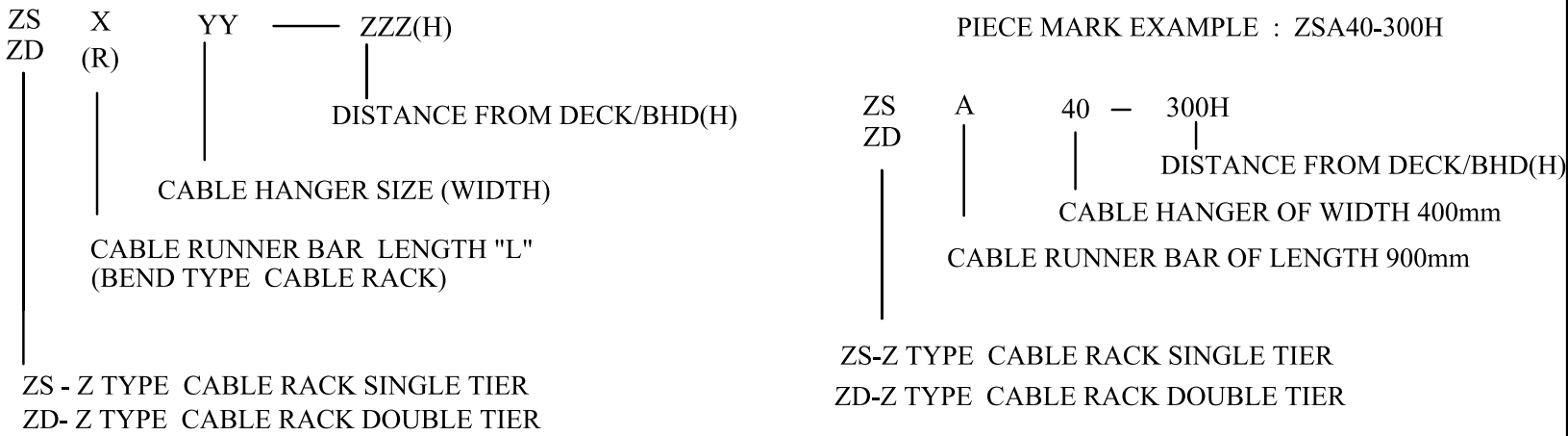
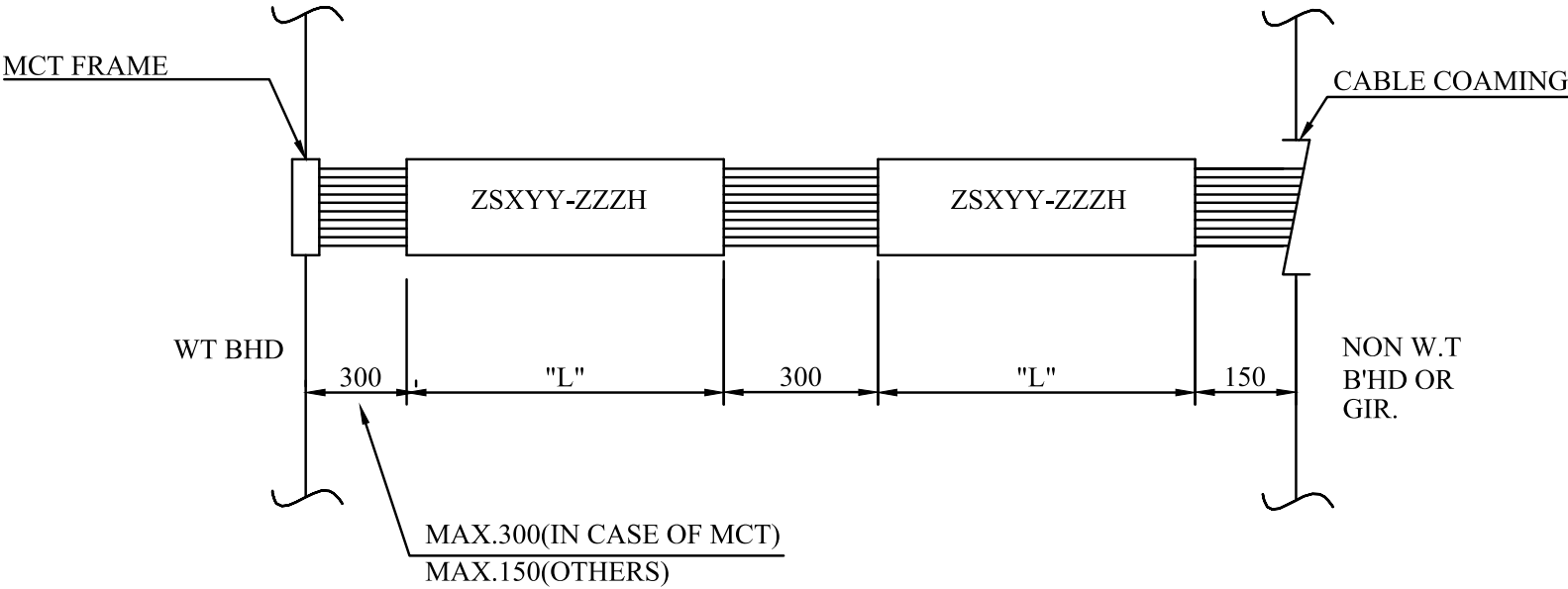
PART	DESCRIPTION		PAGE NO
08	GENERAL REFERENCE		
	08.01	INSTALLATION OF CABLES	27-29
	08.02	TYPICAL ARR'T OF ELECTRICAL APPARATUS IN ACCOMMODATION	30
	08.02A	INSTALLATION OF ELECTRICAL APPARATUS	30A
	08.03	INSTALLATION PRACTICE ON EARTHING	31
	08.04	TYPICAL LAYOUT-TYPE "A"	32
	08.05	TYPICAL LAYOUT-TYPE "B"	33
	08.06	TYPICAL LAYOUT-TYPE "C"	34
	08.07	TYPICAL LAYOUT-TYPE "D"	35
	08.08	TYPICAL LAYOUT-TYPE "E"	36
	08.09	APPARATUS IN ACCOM. PASSAGE-TYPICAL LAYOUT	37
	08.10	TYPICAL LAYOUT ENGINE ROOM	38
	08.11	CABLE PENETRATION	39-40
	08.12	MCT FRAME	41-43
	08.13	CABLE PENETRATION TO WEATHER EXPOSED AREA	44
	08.14	CABLE COAMING WITH MCT	45
	08.15	WELDING METHOD	46
	08.16	PAD DETAILS	47
09	INSTALLATION OF CABLE WAY		
	09.01	HORIZONTAL & VERTICAL CABLE RACK Z TYPE	48
	09.02	TURNING METHOD OF MAIN CABLE WAY (TYPICAL)	49
	09.03	CABLE WAY IN HULL CUTOUTS AND NEAR HOT PIPES	50
	09.04	INSTALLATION METHOD OF CABLE WAY	51
	09.05	STANDARD HEIGHTS	52
10	INSTALLATION OF CABLE WAY REF.CHAMBER		
	10.01	CABLE WAY- NYLON TYPE	53
	10.02	INSULATION PENETRATION	54

	INDEX	PART NO: 03.00	05
		DRG NO: 151-K5700200	73

PART		DESCRIPTION	PAGE NO
11		INSTALLATION OF CABLES	
	11.01	CABLE CHANNEL	55
	11.02	BRANCHED CABLE- WEATHER EXPOSED AREA	56
	11.03	BRANCHED CABLE - ACCOM. SPACE	57
12		INSTALLATION PRACTICE ON PENETRATIONS	
	12.01	INSTALLATION METHOD OF CABLE COAMING	58
13		INSTALLATION PRACTICE ON EARTHING	
	13.01	GENERAL DESCRIPTION	59-66
	13.02	GROUNDING OF CABLE SHIELD AT CABINET ENTRY	67
	13.03	GROUNDING THE S/FTP CABLE SCREEN	68
	13.04	NON-EMC ENTRY OF SIGNAL, BUS AND POWER CABLE	69
	13.05	EMC ENTRY OF SIGNAL, BUS AND POWER CABLE	70
	13.06	EMC MODULE	71
14		INSTALLATION METHOD FOR LIGHTING FIXTURE	
	14.01	DECK MOUNTING TYPE	72
	14.02	WALL MOUNTING TYPE	73

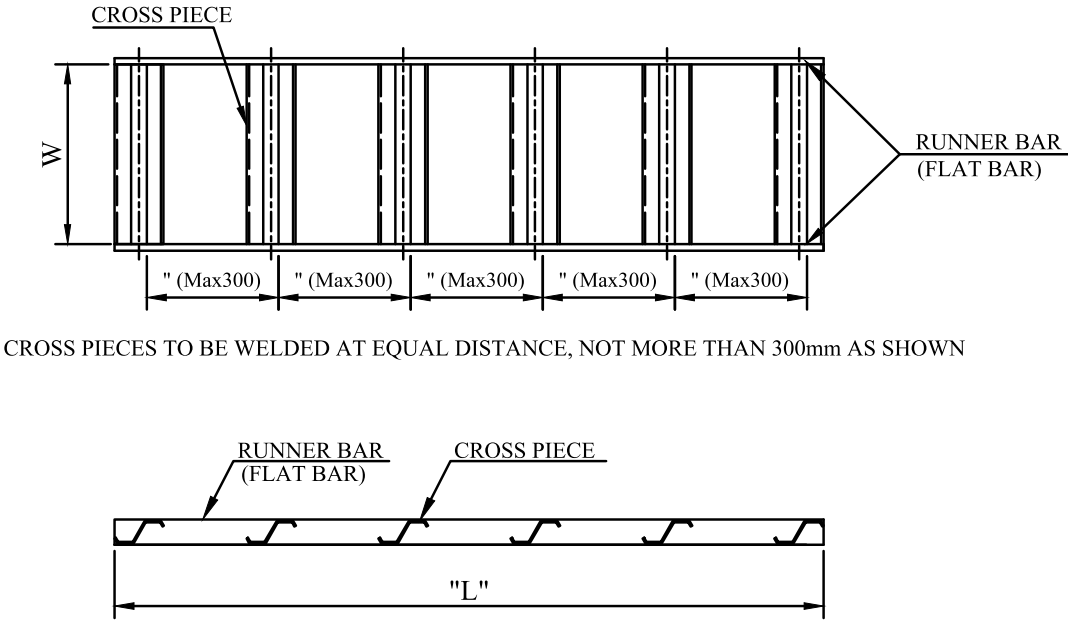
	INDICATION METHOD FOR CABLE WAY	PART NO: 04.00	06
	CABLE WAY INDICATION METHOD	DRG NO: 151-K5700200	73

TYPE 1 - STEEL IS 1079 + ZINC HOT DIP GALVANISED CABLE WAY

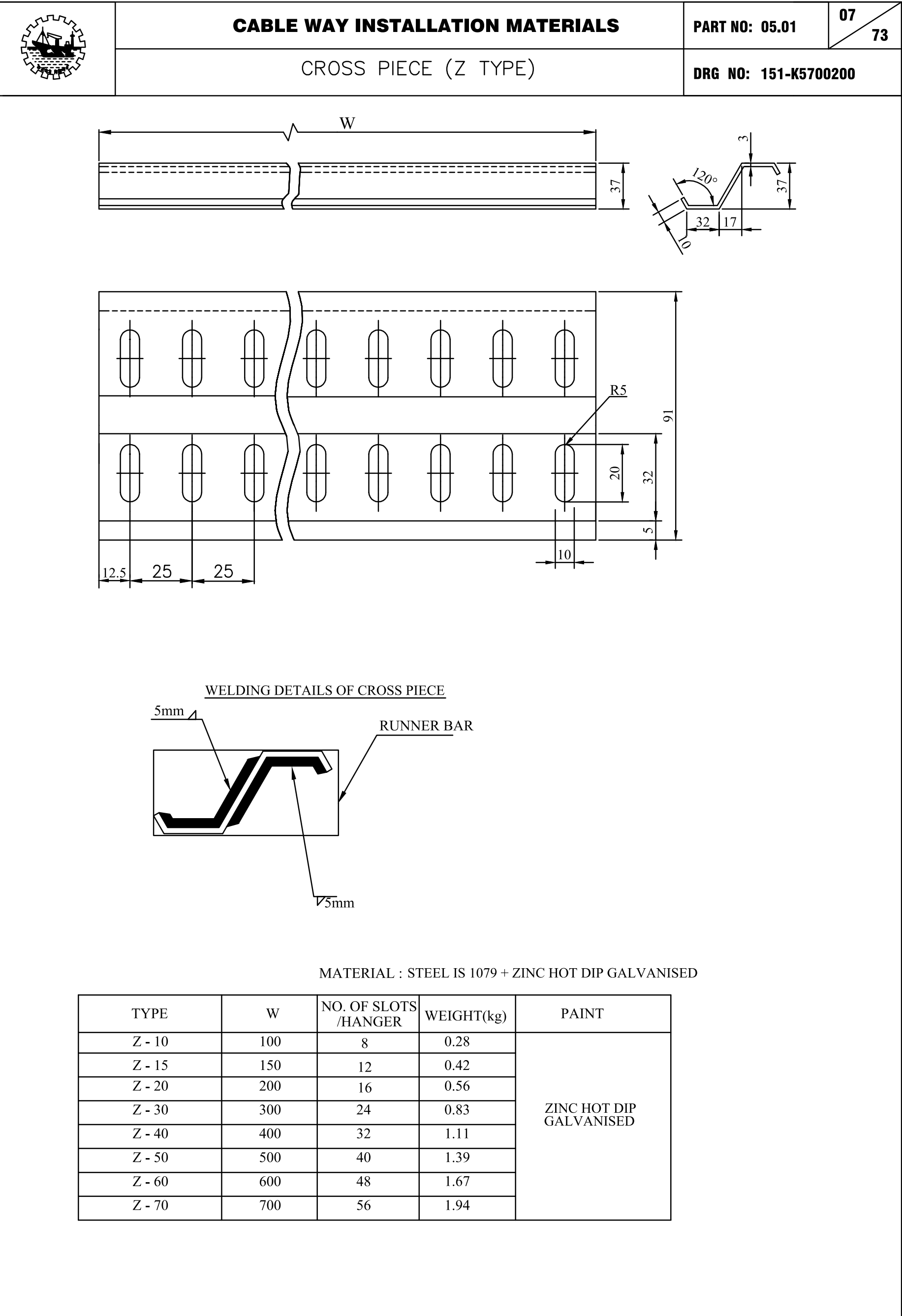


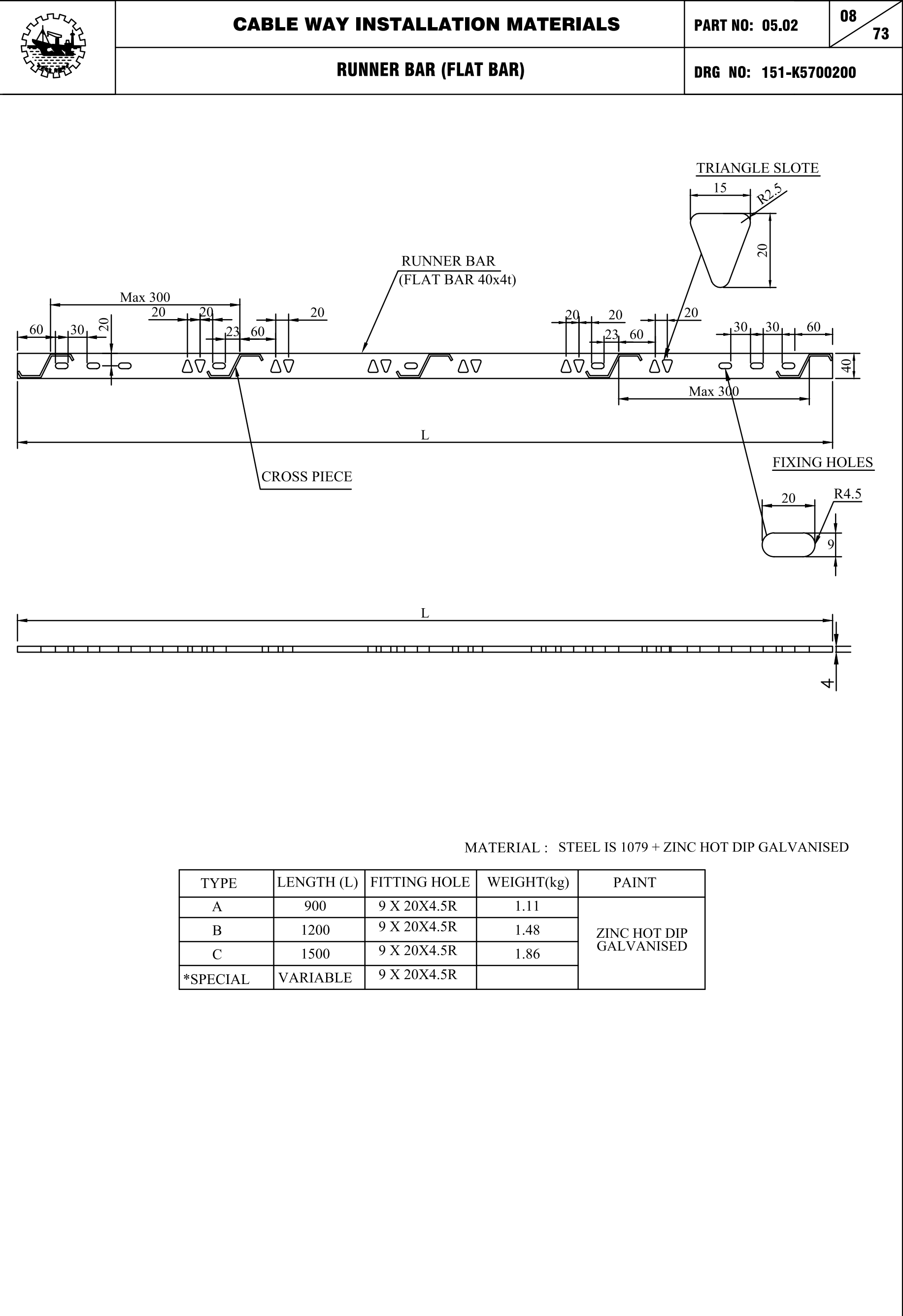
"L" STANDARD OF CABLE RACK LENGTH

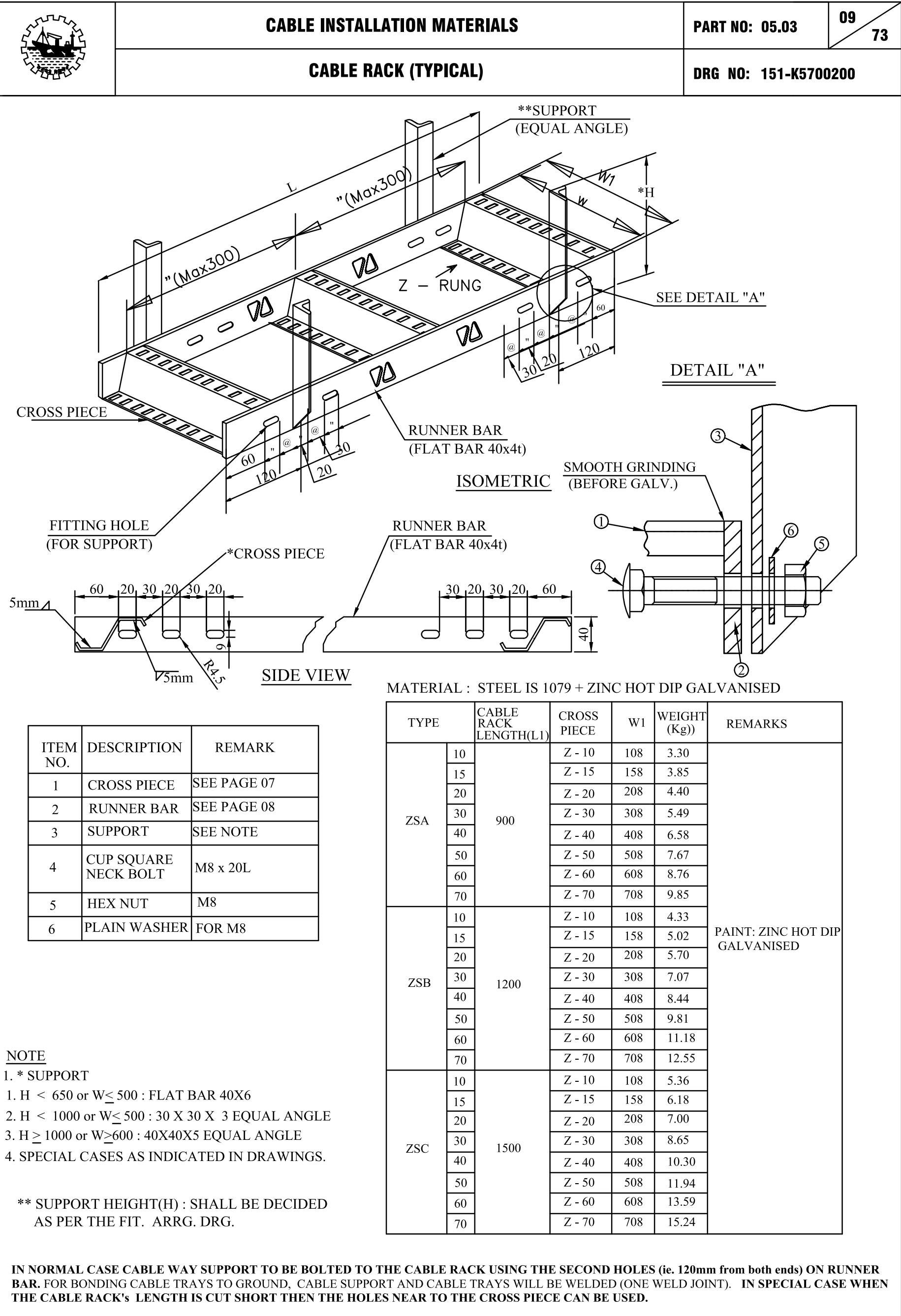
SYMBOL	A	B	C	S
LENGTH (L)	900	1200	1500	*SPECIAL



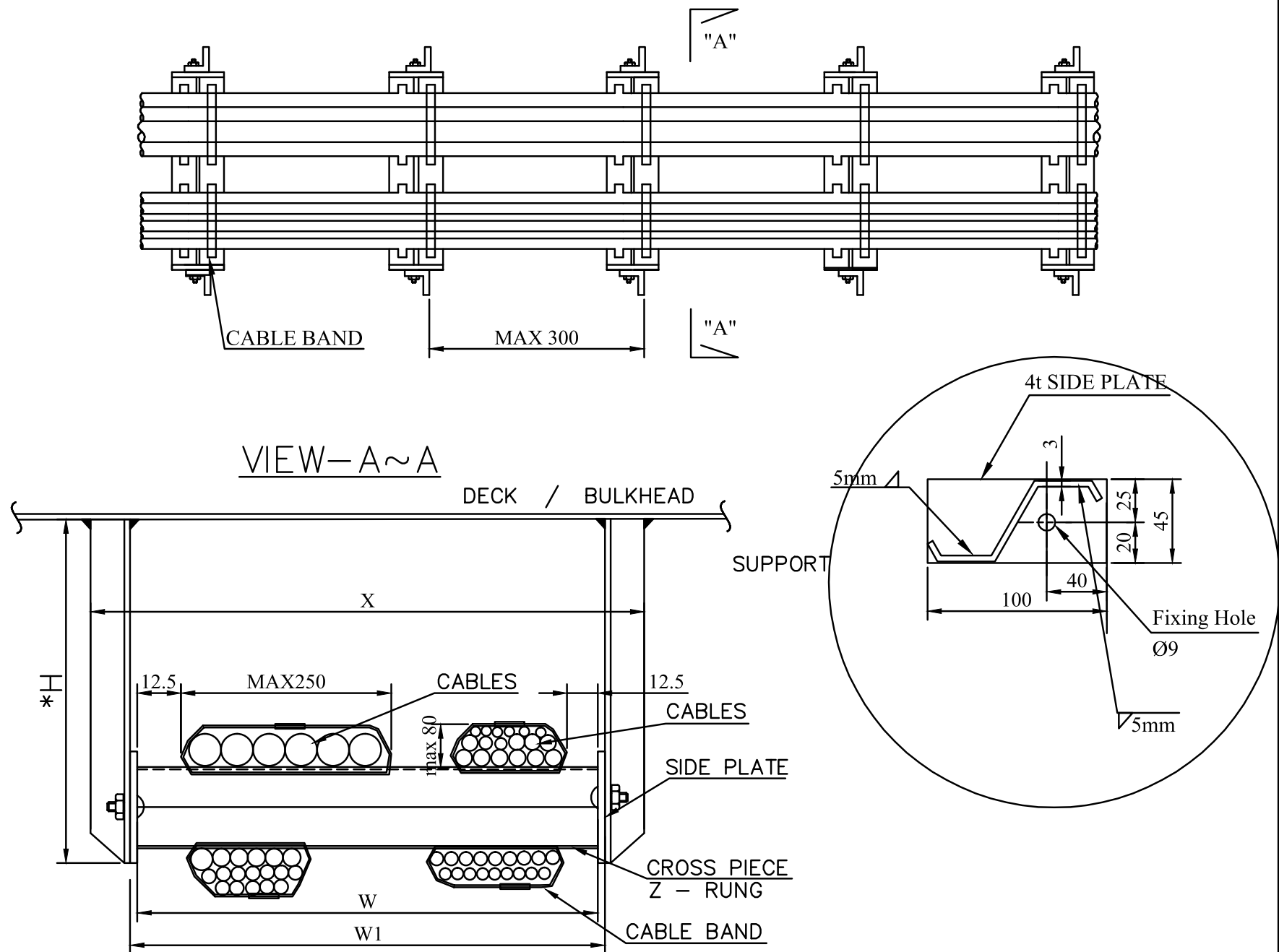
*SPECIAL TYPE CABLERACK CAN BE CUSTOMISED FROM "A,B,C" TYPE CABLE RACK FOR CABLE WAYS OF NON STANDARD LENGTH.







	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.04	10
	Z TYPE CABLE HANGER SINGLE TIER	DRG NO: 151-K5700200	73



MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

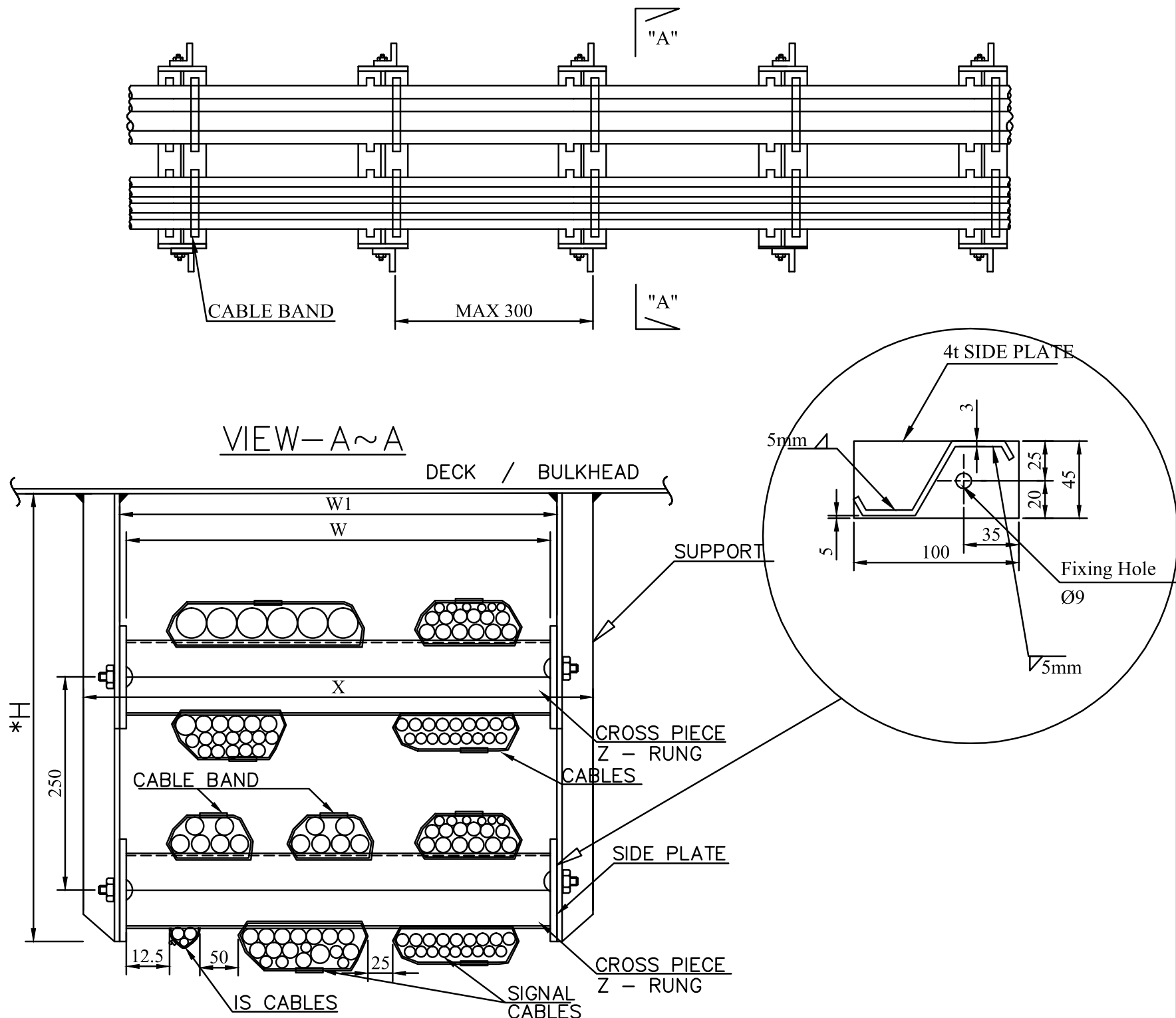
TYPE	CROSS PIECE	W	W1	X**		WEIGHT(kg)
				1	2	
SZS10	Z - 10	100	108	168	188	0.54
SZS15	Z - 15	150	158	218	238	0.67
SZS20	Z - 20	200	208	268	288	0.80
SZS30	Z - 30	300	308	368	388	1.06
SZS40	Z - 40	400	408	468	488	1.32
SZS50	Z - 50	500	508	568	588	1.58
SZS60	Z - 60	600	608	668	688	1.83
SZS70	Z - 70	700	708	768	788	2.09

NOTE

1. * SUPPORT
1. H < 650 or W ≤ 500 : FLAT BAR 40X6
 2. H < 1000 or W ≤ 500 : 30 X 30 X 3 EQUAL ANGLE
 3. H ≥ 1000 or W ≥ 600 : 40X40X5 EQUAL ANGLE
 4. SPECIAL CASES AS INDICATED IN DRAWINGS.

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

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.05	11
	Z TYPE CABLE HANGER DOUBLE TIER	DRG NO: 151-K5700200	73



MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE	CROSS PIECE	W	W1	X**	
				1	2
SZD10	Z - 10	100	108	168	188
SZD15	Z - 15	150	158	218	238
SZD20	Z - 20	200	208	268	288
SZD30	Z - 30	300	308	368	388
SZD40	Z - 40	400	408	468	488
SZD50	Z - 50	500	508	568	588
SZD60	Z - 60	600	608	668	688

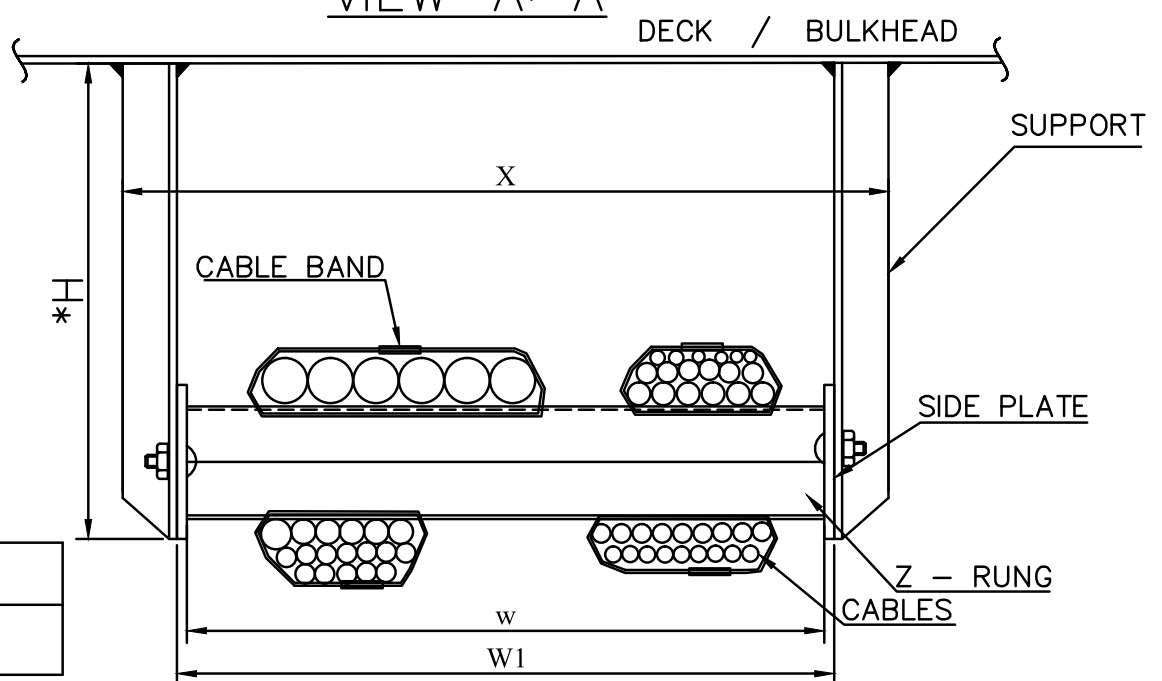
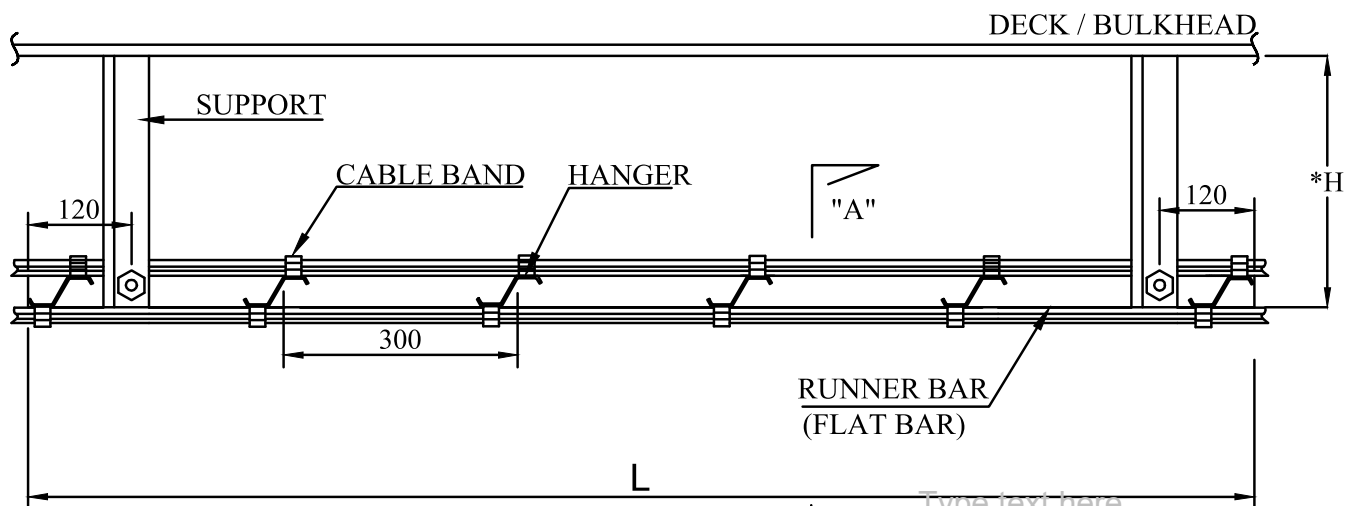
NOTE

1. * SUPPORT
1. $H < 650$ or $W \leq 500$: FLAT BAR 40X6
 2. $H < 1000$ or $W \leq 500$: 30 X 30 X 3 EQUAL ANGLE
 3. $H \geq 1000$ or $W \geq 600$: 40X40X5 EQUAL ANGLE
 4. SPECIAL CASES AS INDICATED IN DRAWINGS.

- ** CASE
1. IF ANGLE IS OF 30x30x3
 2. IF ANGLE IS OF 40x40x5

CABLES SHOWN ARE INDICATIVE ONLY.

	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.06	12 73
	Z TYPE CABLE RACK SINGLE TIER	DRG NO: 151-K5700200	



STANDARD OF CABLE RACK LENGTH

SYMBOL	A	B	C
LENGTH (L)	900	1200	1500

MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

TYPE	CROSS PIECE	RUNNER BAR			W	W1	X**	
		SIDE PLATE	FITTING HOLE	BOLT			1	2
ZSA/B/C - 10	Z - 10	40 X 4 F.B.	9 X 20X4.5R	M8 X 20 L	100	108	168	188
ZSA/B/C - 15	Z - 15	"	"	"	150	158	218	238
ZSA/B/C - 20	Z - 20	"	"	"	200	208	268	288
ZSA/B/C - 30	Z - 30	"	"	"	300	308	368	388
ZSA/B/C - 40	Z - 40	"	"	"	400	408	468	488
ZSA/B/C - 50	Z - 50	"	"	"	500	508	568	588
ZSA/B/C - 60	Z - 60	"	"	"	600	608	668	688

NOTE

1. * SUPPORT

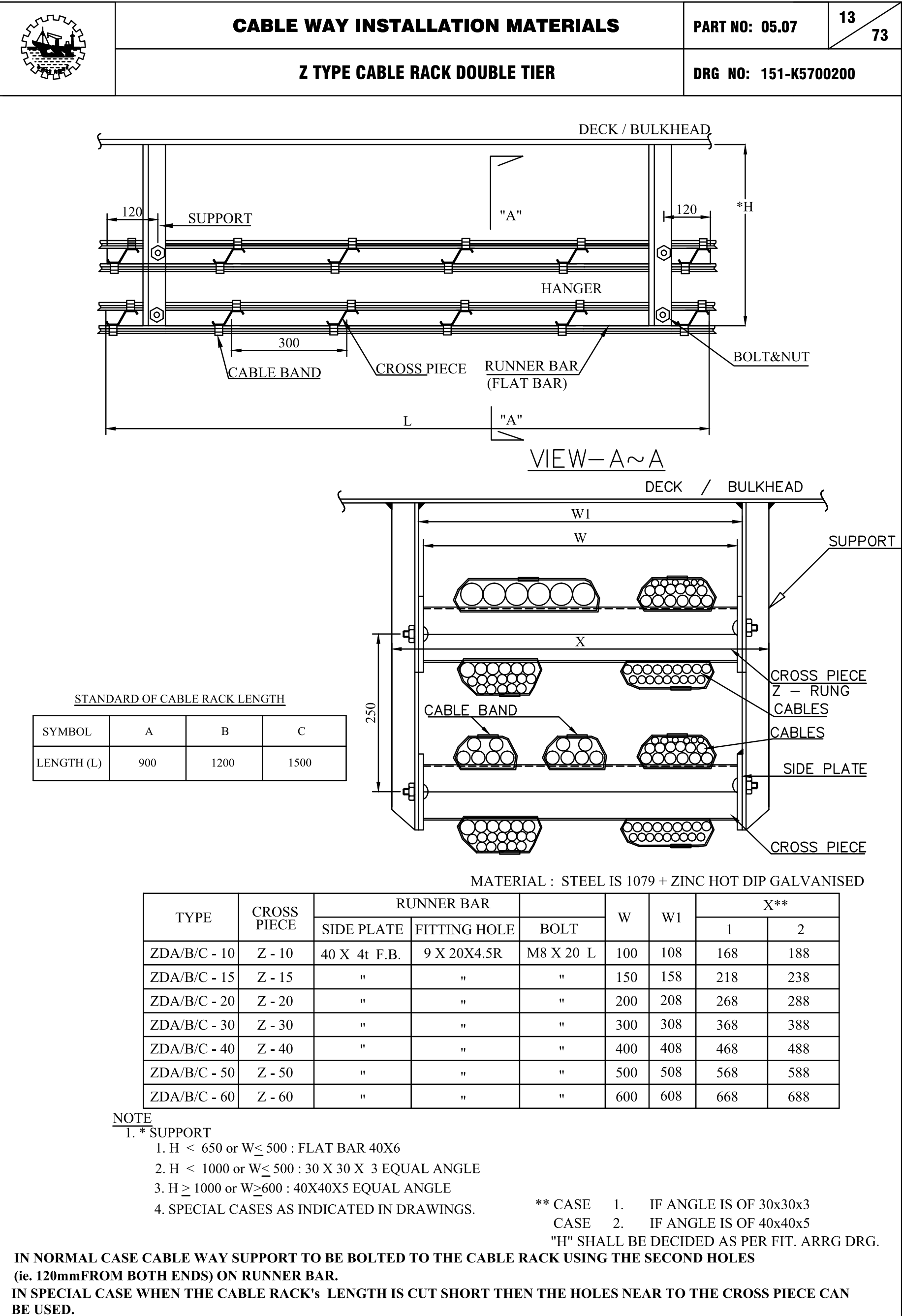
1. $H < 650$ or $W \leq 500$: FLAT BAR 40X6
2. $H < 1000$ or $W \leq 500$: 30 X 30 X 3 EQUAL ANGLE
3. $H \geq 1000$ or $W \geq 600$: 40X40X5 EQUAL ANGLE
4. SPECIAL CASES AS INDICATED IN DRAWINGS.


** CASE 1. IF ANGLE IS OF 30x30x3

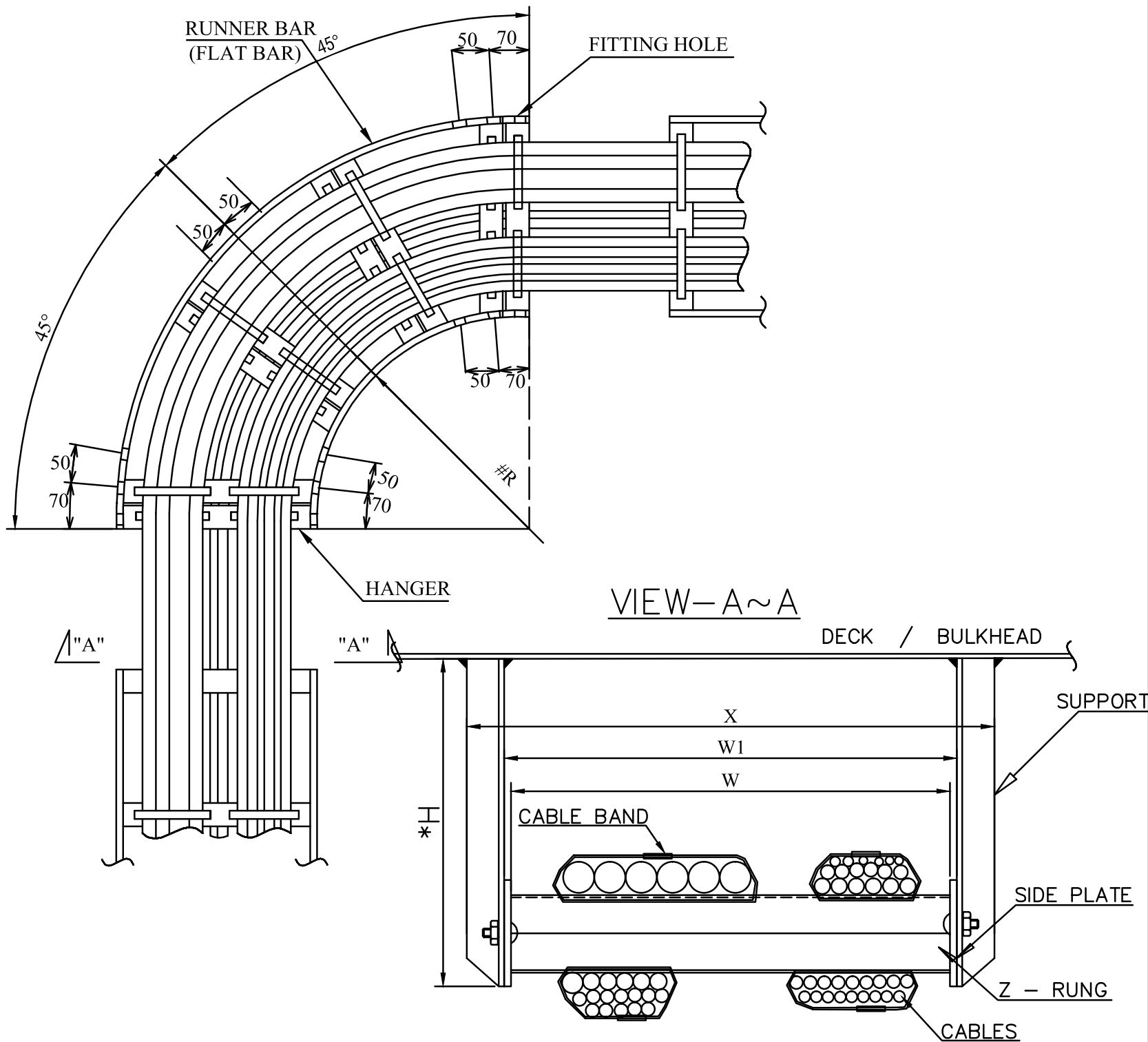
CASE 2. IF ANGLE IS OF 40x40x5

IN NORMAL CASE CABLE WAY SUPPORT TO BE BOLTED TO THE CABLE RACK USING THE SECOND HOLES (ie. 120mm FROM BOTH ENDS) ON RUNNER BAR..

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	PART NO: 05.08	14
	CABLE RACK BEND TYPE	DRG NO: 151-K5700200	73



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

W<500 R = 300, W≥500 R=400

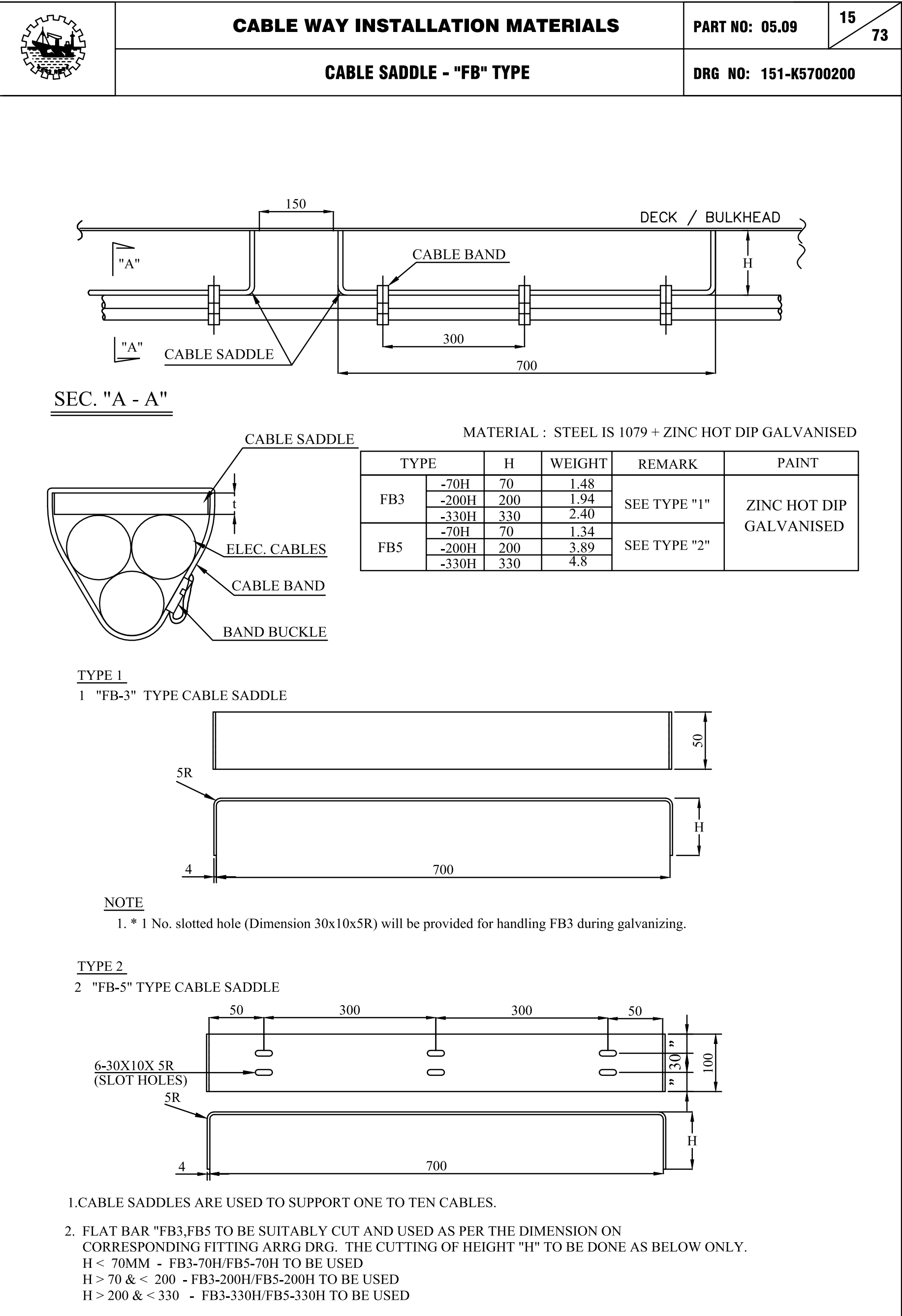
MATERIAL : STEEL IS 1079 + ZINC HOT DIP GALVANISED

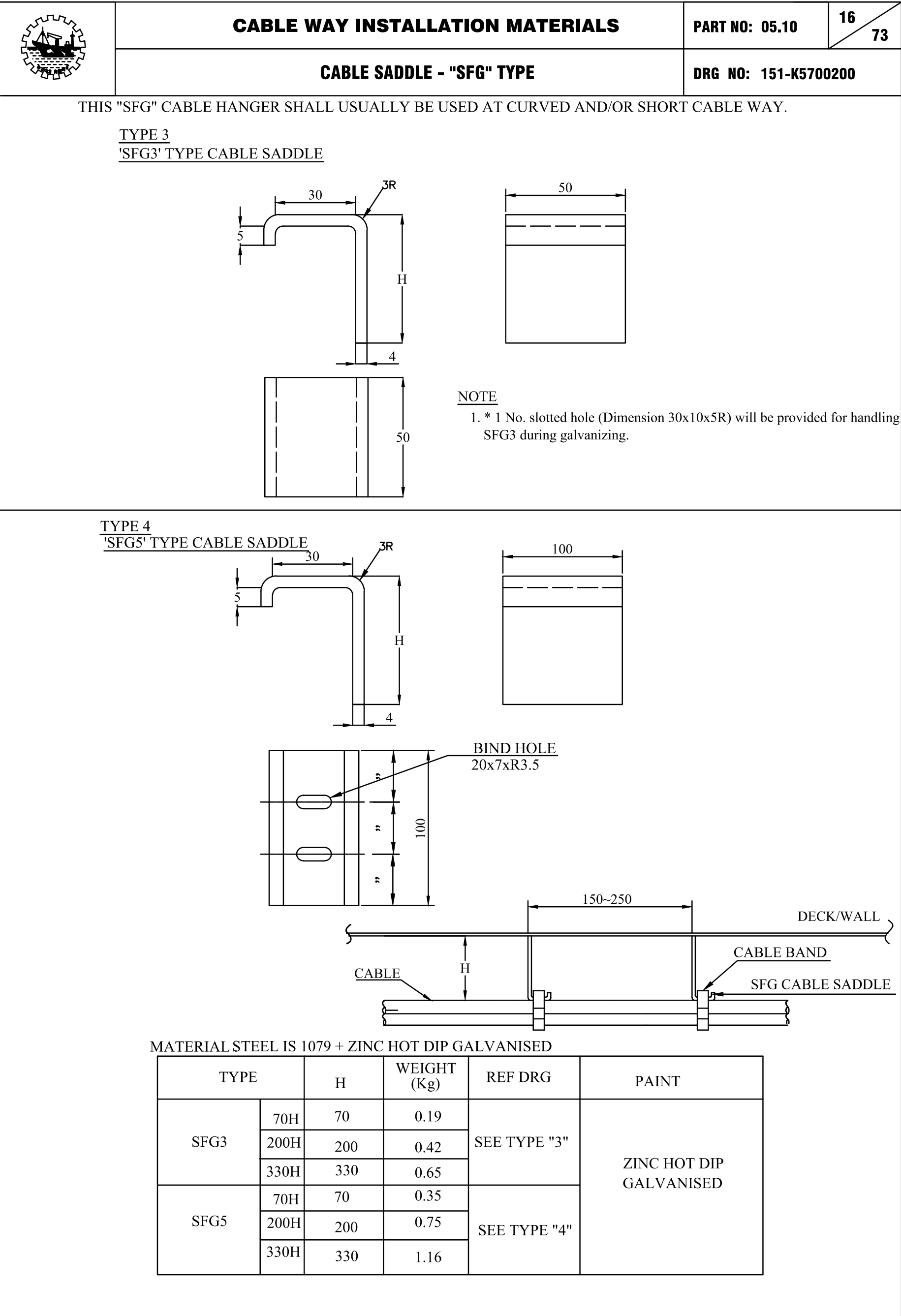
TYPE	HANGER	RUNNER BAR			W	W1	X**		WEIGHT(kg)
		SIDE PLATE	FITTING HOLE	BOLT			1	2	
ZSR- 10	L - 10	40 X 4t F.B.	9 X 20X4.5R	M8 X 20 L	100	108	168	188	2.35
ZSR- 15	L - 15	"	"	"	150	158	218	238	2.99
ZSR- 20	L - 20	"	"	"	200	208	268	288	3.53
ZSR- 30	L - 30	"	"	"	300	308	368	388	5.51
ZSR- 40	L - 40	"	"	"	400	408	468	488	6.94
ZSR- 50	L - 50	"	"	"	500	508	568	588	8.39
ZSR- 60	L - 60	"	"	"	600	608	668	688	9.84

NOTE

1. * SUPPORT
1. H < 650 or W≤ 500 : FLAT BAR 40X6
 2. H < 1000 or W≤ 500 : 30 X 30 X 3 EQUAL ANGLE
 3. H ≥ 1000 or W≥600 : 40X40X5 EQUAL ANGLE
 4. SPECIAL CASES AS INDICATED IN DRAWINGS.

** CASE 1. IF ANGLE IS OF 30x30x3
CASE 2. IF ANGLE IS OF 40x40x5






	CABLE WAY INSTALLATION MATERIALS	PART NO: 05.11	17 73
	FITTING MATERIAL	DRG NO: 151-K5700200	

TABLE-1

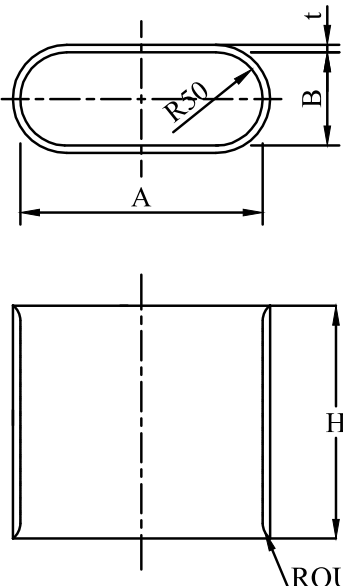
DESCRIPTION		DRY SPACE (ENCLOSE AREA)		WEATHER EXPOSED DECK (WET SPACE)		UNDER LIQUID
ITEM	TYPE	MATERIAL	PAINT/GALV.	MATERIAL	PAINT/GALV.	(IN TANK)
CABLE HANGER LADDER TYPE	CROSS PIECE	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	STEEL SHEET IS 1079	ZINC HOT DIP GALV.	
	SUPPORT	MS (IS 2062)	SHOP PRIMER (WITH 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 I S	SHOP PRIMER (WITH FINAL PAINT)	STEEL SHEET I S	SHOP PRIMER (WITH FINAL PAINT)	
	DC					
	PIPE COAMING	SCH.40	SHOP PRIMER (WITH FINAL PAINT)	SCH.40	SHOP PRIMER (WITH FINAL PAINT)	
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.

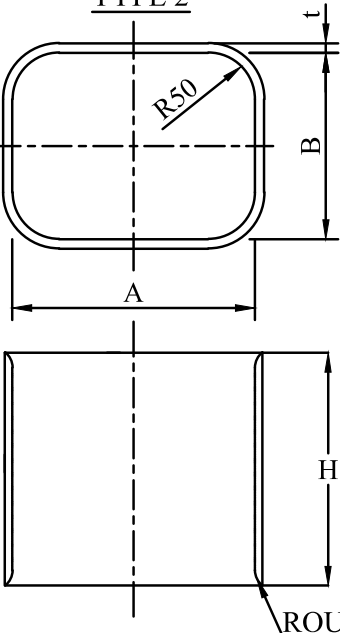
I S : INDIAN STANDARD

	CABLE PENETRATION					PART NO: 06.01		18 73	
	CABLE COAMING					DRG NO: 151-K5700200			

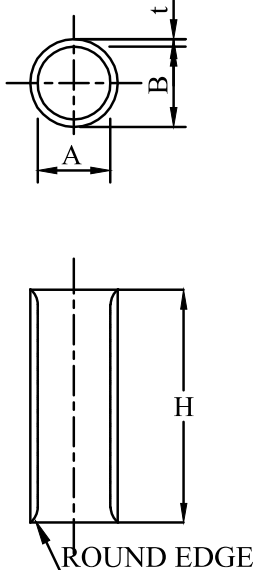
TYPE 1



TYPE 2



TYPE 3




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

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

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

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

	CABLE PENETRATION	PART NO: 06.02	19
	MARINE WATERTIGHT CABLE GLANDS BULKHEAD / DECK MOUNTED TYPE	DRG NO: 151-K5700200	73

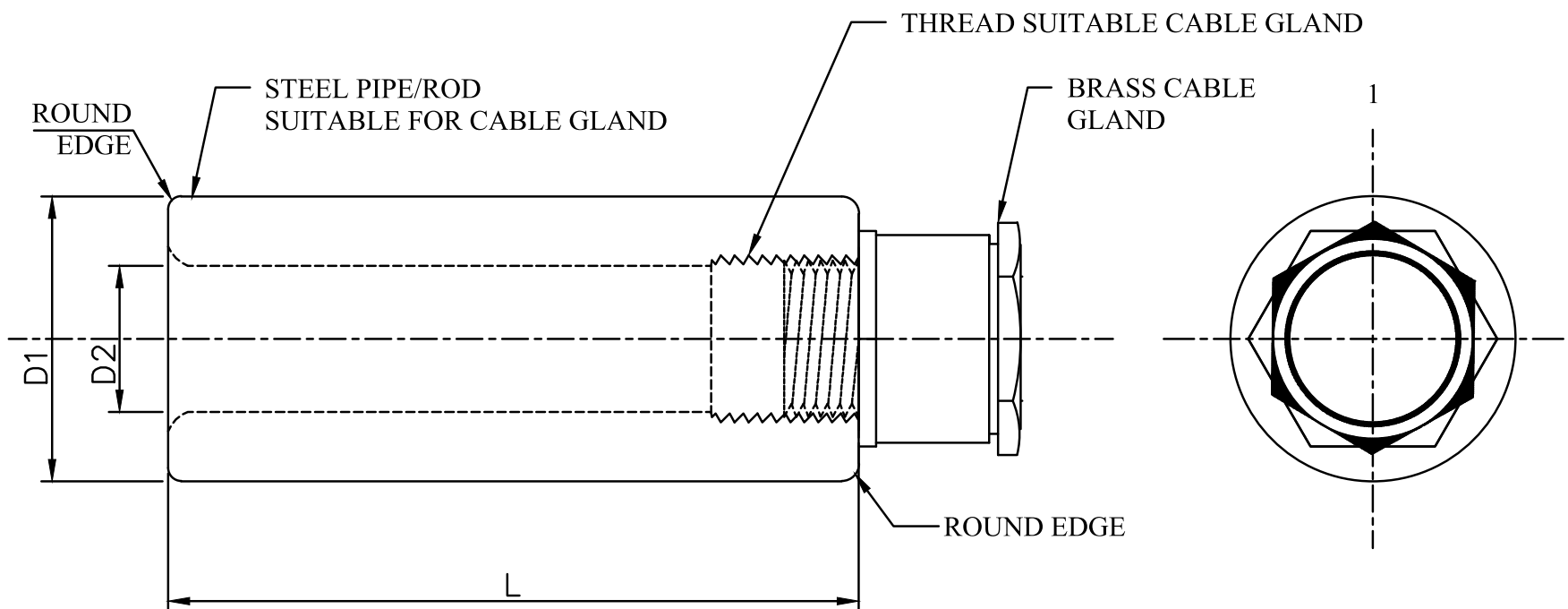


TABLE-1

NO.	*NAME	LENGTH (L) (MM)
1	G15-150	150
2	G20-050	50
3	G20-150	150
4	G20-200	200
5	G25-050	50

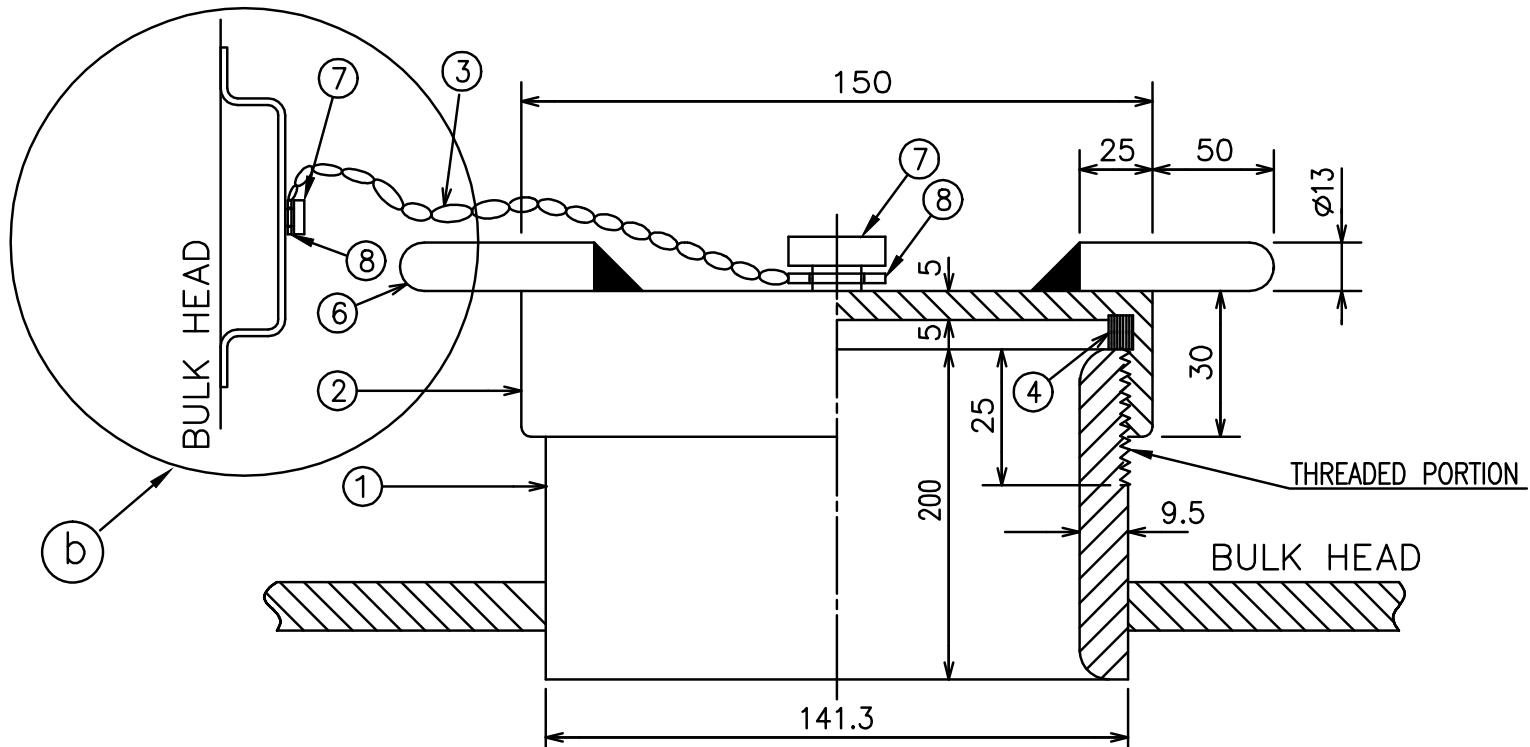
L= VARY AS PER THE THICKNESS OF INSULATION / OTHER REQUIREMENTS.

* G15, G20, G25 MEANS THE GLAND SIZE USED FOR INSTALLATION

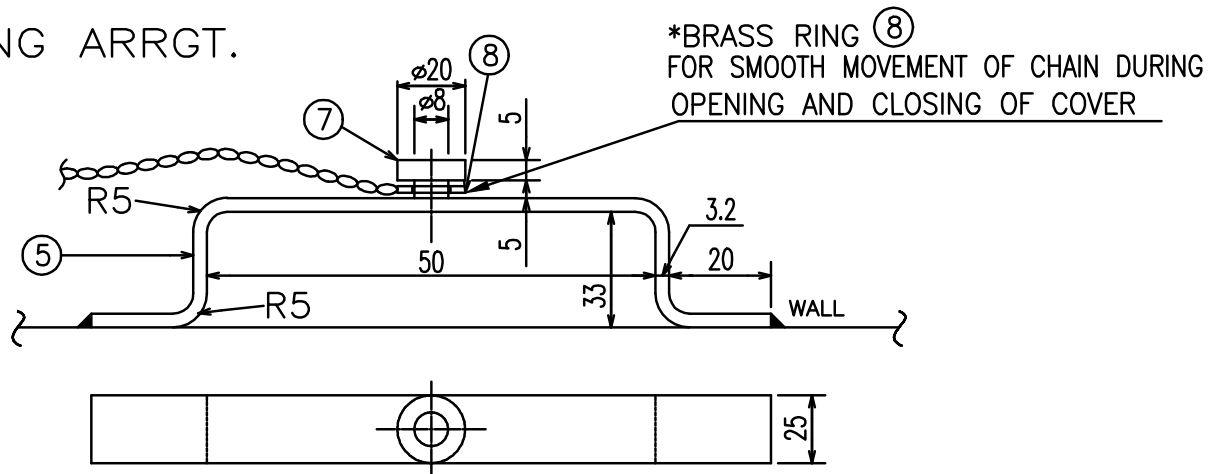
The cable glands penetrating to weather deck to be positioned below the cable entry point of the equipment to which it serve so as to prevent the water dripping into the equipment.
Location of the pipe glands will be clearly indicated in the respective yard plans.

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

	CABLE PENETRATION	PART NO: 06.03	20
	TYPICAL SHORE CONNECTION PIECE-PGS-125A (SCREW TYPE)	DRG NO: 151-K5700200	73




DETAIL (b)
CHAIN HOLDING ARRGT.

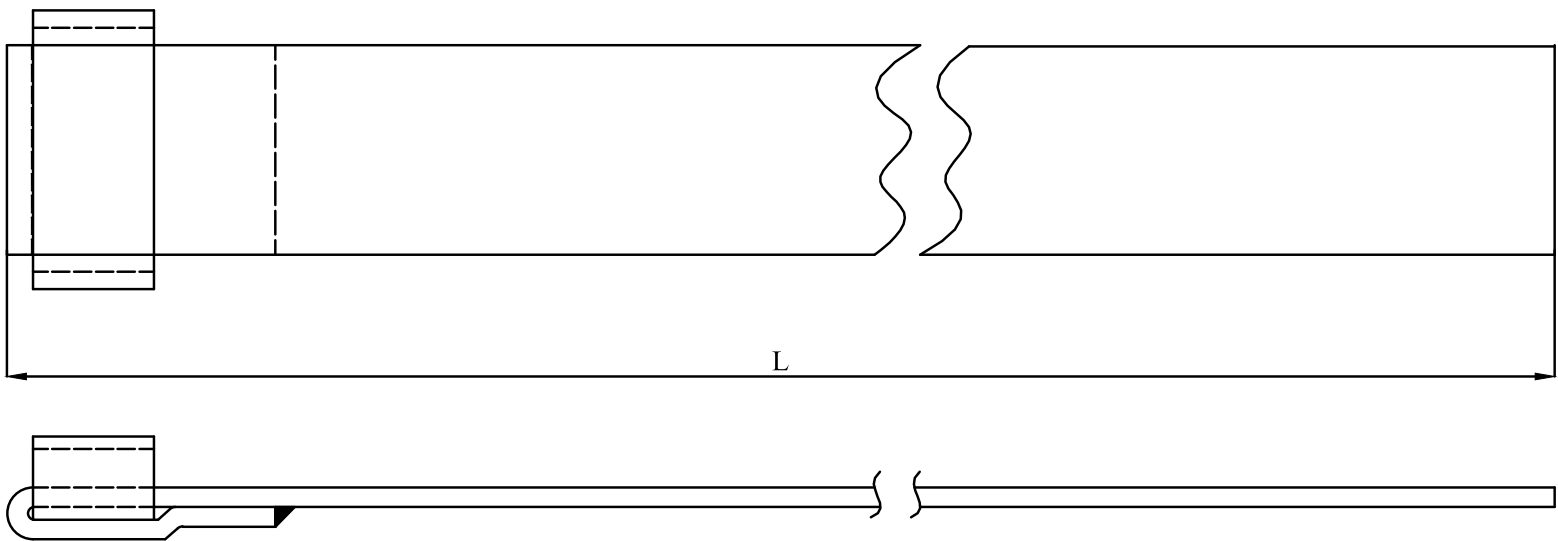


*DIMENSION SHOWN IS FOR SHORE CONNECTION PIECE WITH 125NB PIPE. EXACT DIMENSION WILL BE AS PER ACTUAL CABLE SIZE.

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-XXXX (XXX DENOTED PIPE N.B)
 - 2) PIPE EDGES TO BE SMOOTHEN AFTER FABRICATION FOR AVOIDING DAMAGE TO CABLES.

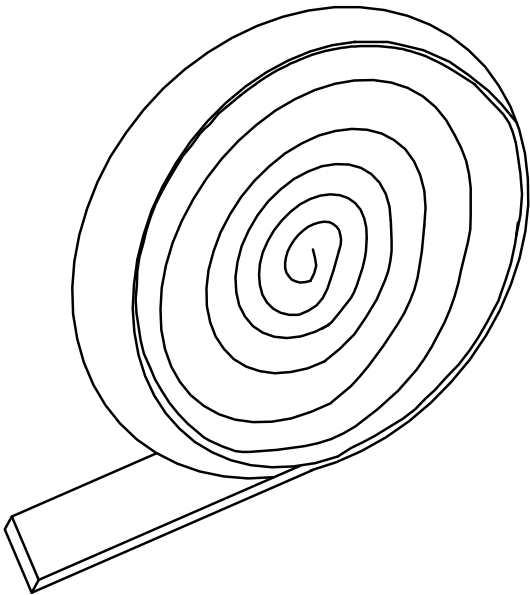
	CABLE INSTALLATION MATERIALS	PART NO: 07.01	21 73
	ELECTRIC CABLE BAND WITH BUCKLE (316 STAINLESS STEEL)	DRG NO: 151-K5700200	



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

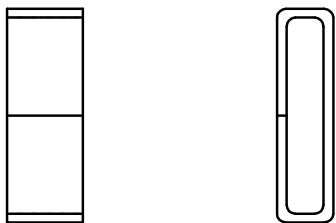
	CABLE INSTALLATION MATERIALS	PART NO: 07.02	22
	ELECTRIC CABLE STRAP FOR BANDING & BAND BUCKLE	DRG NO: 151-K5700200	73

CABLE STRAP

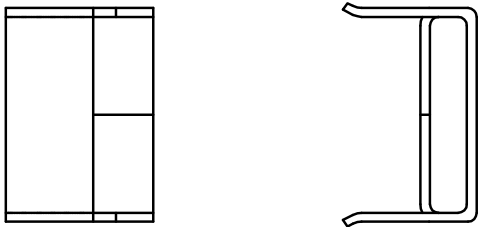


BAND BUCKLE

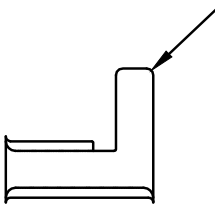
TYPE1



TYPE2




ROUND EDGE

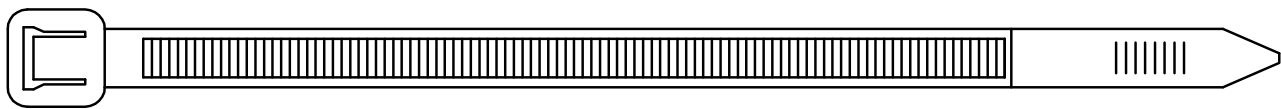


NOTE

- 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	PART NO: 07.03	23 73
	CABLE TIES	DRG NO: 151-K5700200	

LOCKING CABLE TIE



NOTE


- 1. MATERIAL : WEATHER RESISTANT NYLON, FLAME RETARDANT
- 2. LENGTH AND WIDTH : SHALL BE DECIDED BY THE CABLE SIZE
- 3. COLOUR : NATURAL / WHITE FOR TEMPORARY CABLE TYING.
BLACK FOR INSIDE ELECTRICAL CONTROL PANELS.

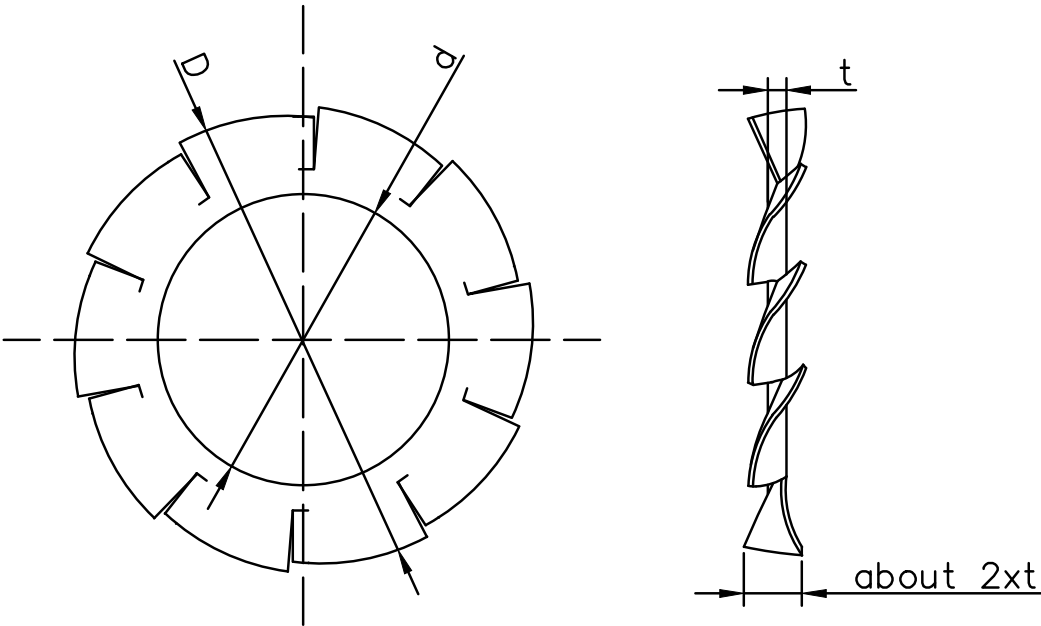
	CABLE INSTALLATION MATERIALS	PART NO: 07.04	24 73
		DRG NO: 151-K5700200	

INTENTIONALLY LEFT BLANK

	CABLE INSTALLATION MATERIALS	PART NO: 07.05	25 73
		DRG NO: 151-K5700200	


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	CABLE INSTALLATION MATERIALS	PART NO: 07.06	26 73
	TOOTHED LOCK WASHER FOR EARTHING	DRG NO: 151-K5700200	



MATERIAL: SPRING STEEL

DESIGNATION	NOMINAL SIZE	d		D		t		NO.OF TOOTH	WEIGHT (gm)
		PREFERRED DIMENSION	TOLE RANCE	PREFERRED DIMENSION	TOLE RANCE	PREFERRED DIMENSION	TOLE RANCE		
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	18	0.90		2.5			
	12	12.5	+ 0.40	21	−0.60	1.00	±0.055		3

	GENERAL REFERENCE	PART NO: 08.01	27
	INSTALLATION OF CABLES	DRG NO: 151-K5700200	73

INSTALLATION OF CABLES:-

GENERAL


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


PRACTICE FOR INSTALLATION OF CABLES

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

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

- All cables shall be effectively supported and secured without damaging the outer covering of the cables.
- Cables liable to be exposed to mechanical damage shall be protected by suitable means e.g. by using galvanized steel pipes, steel conduits, flexible steel pipes etc.
- During hot works, all cables exposed to sparks from welding/blow pipe works shall be properly protected by suitable means of an incombustible material.
- No cables shall generally be painted. Any paint and over-spray shall be cleaned off all cabling.

	GENERAL REFERENCE	PART NO: 08.01	28
	INSTALLATION OF CABLES	DRG NO: 151-K5700200	73
<p>- Cables for essential/emergency power for lighting, internal communication or signals shall be routed clear of galley, laundry, machinery spaces and other area of high fire risk as stipulated by class.</p> <p>- The minimum internal bending radius for power and control cables shall be in accordance with the manufacturers recommendations.</p> <p>- Clips, saddles bands and supports shall not present any sharp edges against the cables.</p> <p>- Where duplicate supply is required for the same service, the routes are to be different.</p> <p>- All the cables must be with corresponding cable tags and for core identification,ferules can be used</p> <p>The general practice of laying cable is on cable Hangers for main cable ways. Cable saddles are used for less number of cables. Angle supports are used for supporting cable hangers and racks to the main structure. Cables may be installed directly on wooden walls or other non-rusting materials where frequent painting is not required.</p> <p>Cables are held in position on hangers racks and cable saddles by means of metallic Clips.The metal should be of Stainless steel. Inside panel boards nylon cable ties can be used for dressing Cables exposed to weather deck shall secured with stainless steel band with buckles .</p> <p>Cables shall be supported so close to an enclosure entry through cable gland to avoid mechanical stress cable gland.</p> <p>Refer drawing 151-K5000080, Electro Magnetic Compatibility (EMC) Plan for detailed EMC plan for cable installation.</p> <p>Guidelines from cable manufacturer’s including fibre optic cables & relevant class rules shall prevail over “Electrical outfitting practice & standard” in case of any discrepancy.</p> <p>High quality long lasting rubber grommets to be inserted to avoid cable chaffing on edges where cable passes through holes made on metal or wooden panels.</p>			

	GENERAL REFERENCE	PART NO: 08.01	29
	INSTALLATION OF CABLES	DRG NO: 151-K5700200	73

- 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.

Multiple single core cables are arranged with three or six cables in one bundle and configured according to normal ship building standards.

The cables shall be revolved two (2) times with equal distance if over 30 m long. If over 80 m long, cables shall be revolved five (5) times with equal distance.

	GENERAL REFERENCE	PART NO: 08.02	30
	TYPICAL ARR'T OF ELECTRICAL APPARATUS IN ACCOMMODATION	DRG NO: 151-K5700200	73
<div><div><div>-</div><div>HEIGHT OF RECEPTACLE ;</div><div>THE HEIGHT OF RECEPTACLES SHALL BE AS FOLLOWS;</div><div>A) 1200mm ABOVE THE FLOOR TO BOTTOM FOR WALL MOUNTED EQUIPMENTS</div><div>B) FOR DRINKING WATER FOUNTAIN, REFRIGERATOR : 300mm ABOVE EQUIP, OR INSIDE COVERING BOX</div><div>C) FOR IRON IN LAUNDRY : 300mm ABOVE IRON BOARD AND 100mm OFF FROM THE END OF THE IRON BOARD.</div><div>D) FOR ELEC. SHAVER : BUILT IN THE LIGHTING FIXTURE OR TOILET CABINET.</div><div>E) FOR TOASTER,RANGE,COFFEE POT : 400mm ABOVE TABLE.</div></div><div><div>-</div><div>JUNCTION BOX :</div><div>TO BE LOCATED WHERE ACCESSIBLE FOR CHECKING.</div></div><div><div>-</div><div>BUZZER AND CALLING PUSH BUTTON :</div><div>A) PUSH BUTTON FOR PROVISION/COLD STORE : 1400mm ABOVE FLOOR.</div></div></div>			
<div>NOTE: THESE ARE GENERAL REFERENCE OF ELECTRICAL EQUIPMENTS INSTALLATION BEING USED AS A GUIDE LINE. THE ACTUAL FITMENT MAY VARY ACCORDING TO THE REQUIREMENTS BEST SUITING THE LOCATION.</div>			

	GENERAL REFERENCE	PART NO: 08.02A	30A 73
	INSTALLATION OF ELECTRICAL APPARATUS	DRG NO: 151-K5700200	


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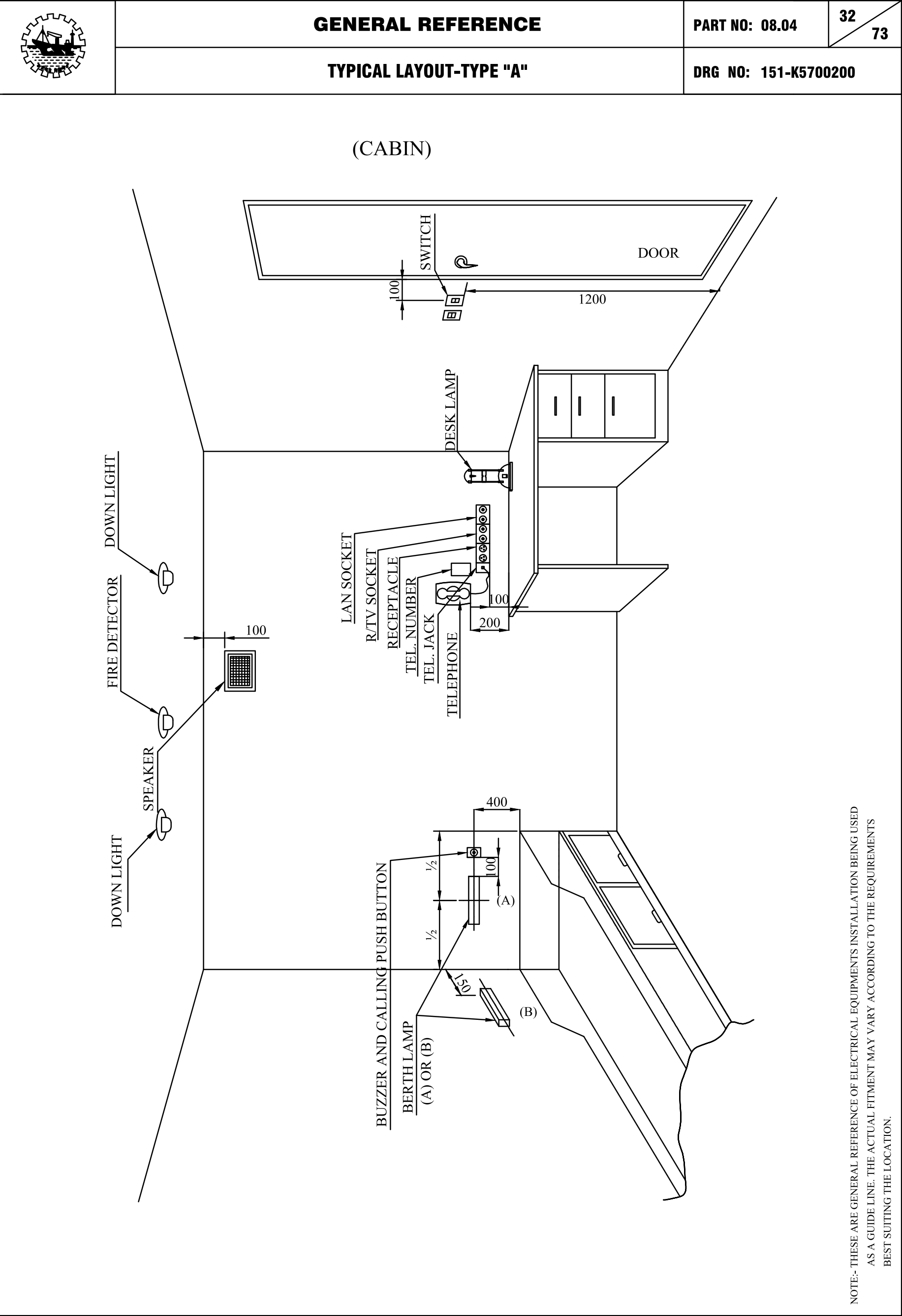
FIRE DETECTORS

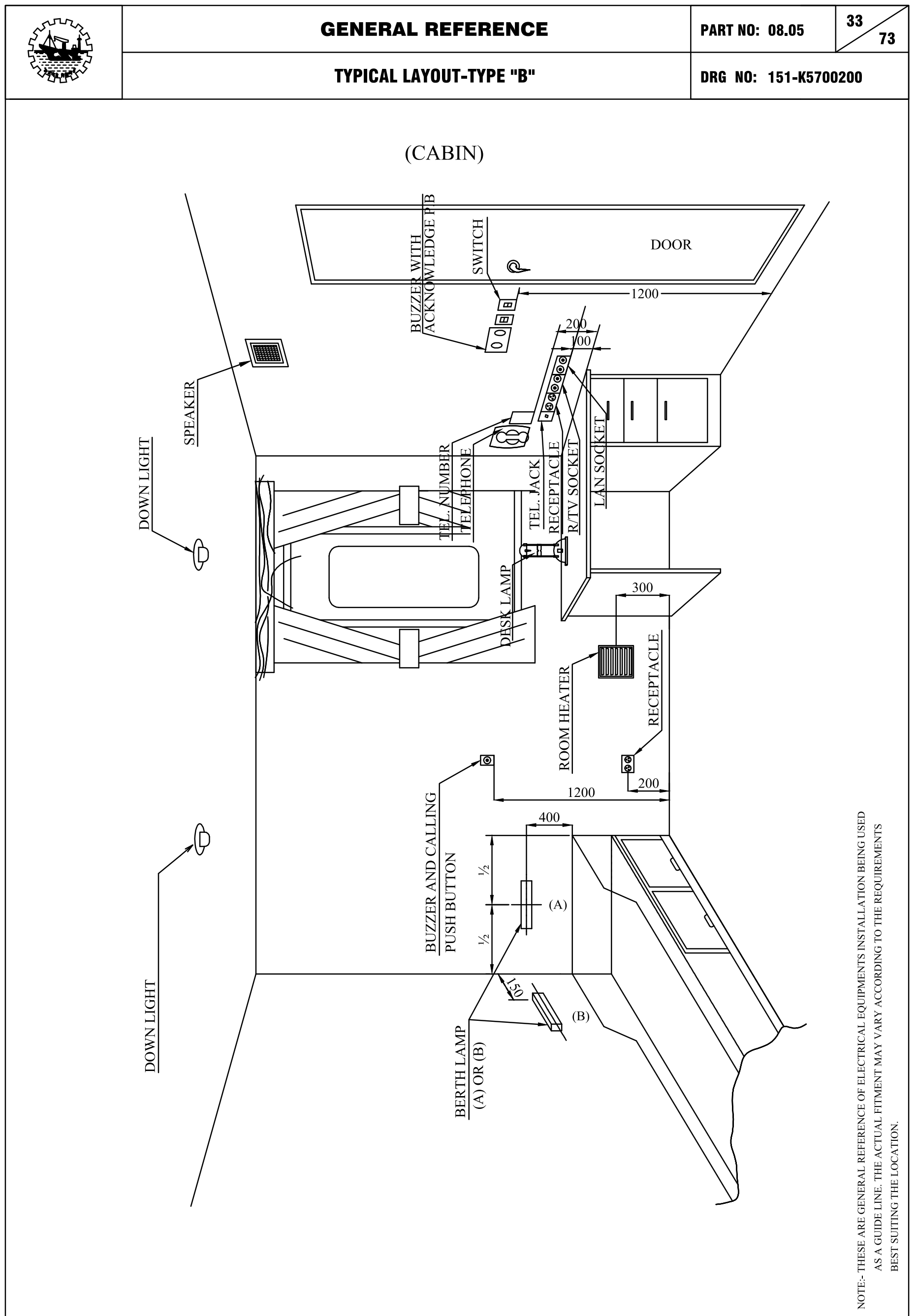
FIRE DETECTORS (SMOKE) ARE NOT TO BE INSTALLED CLOSE TO AIR VENTS (SUPPLY AIR DIFFUSER/ AIR GRATINGS).

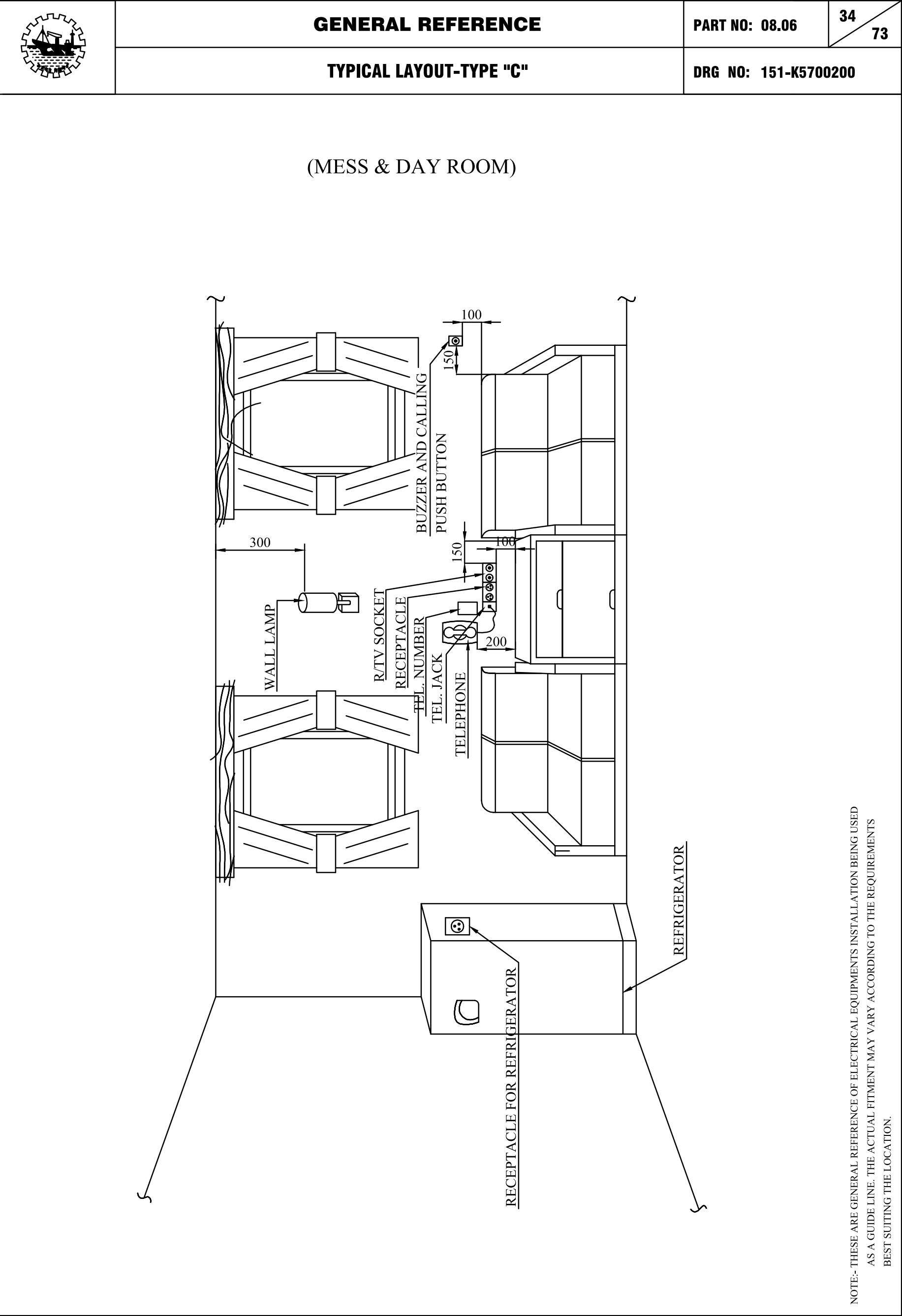
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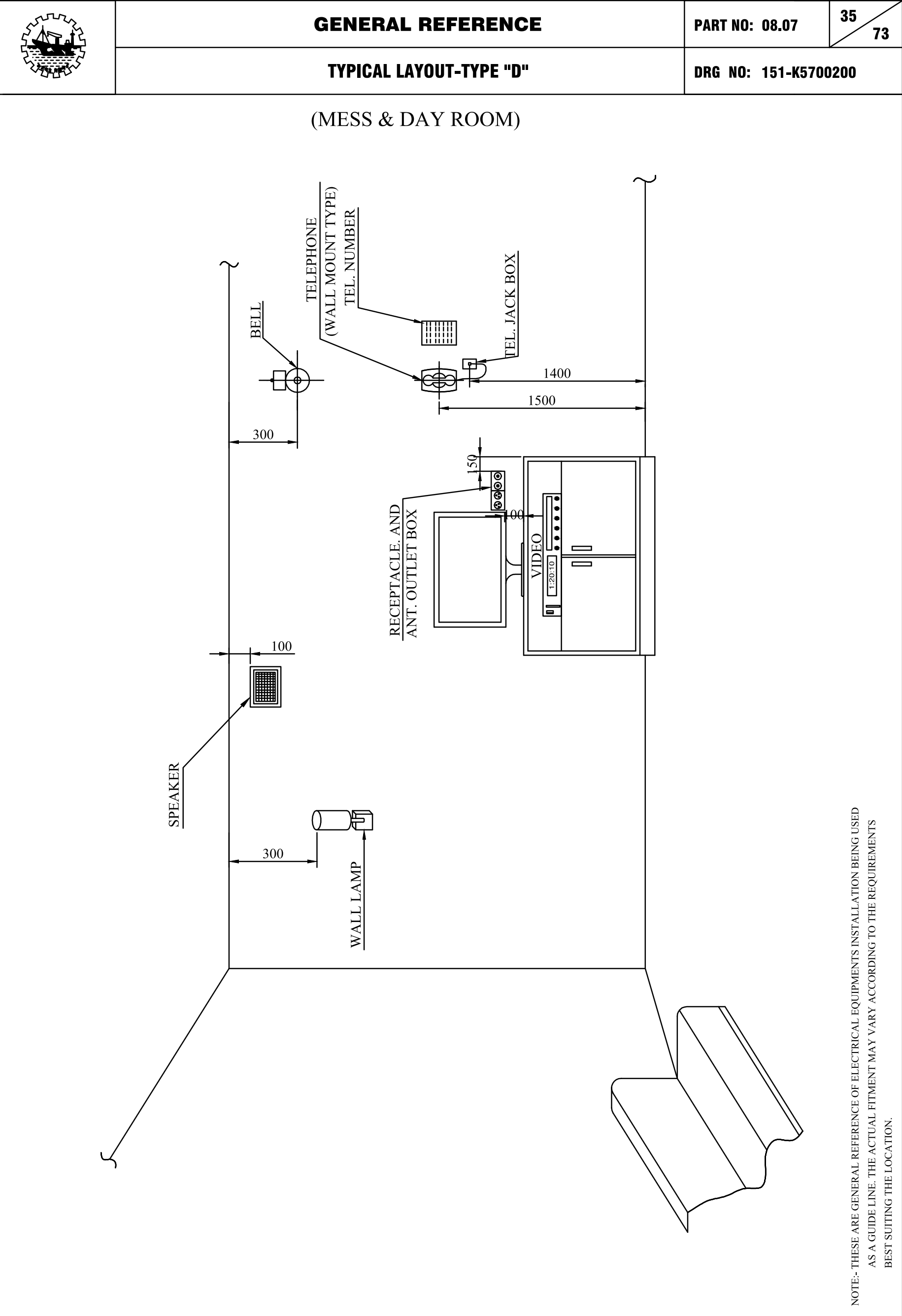
UNPROTECTED ELECTRICAL EQUIPMENT SHALL NOT BE PLACED BELOW VENTILATION WHERE WATER CONDENSATION MAY OCCUR.

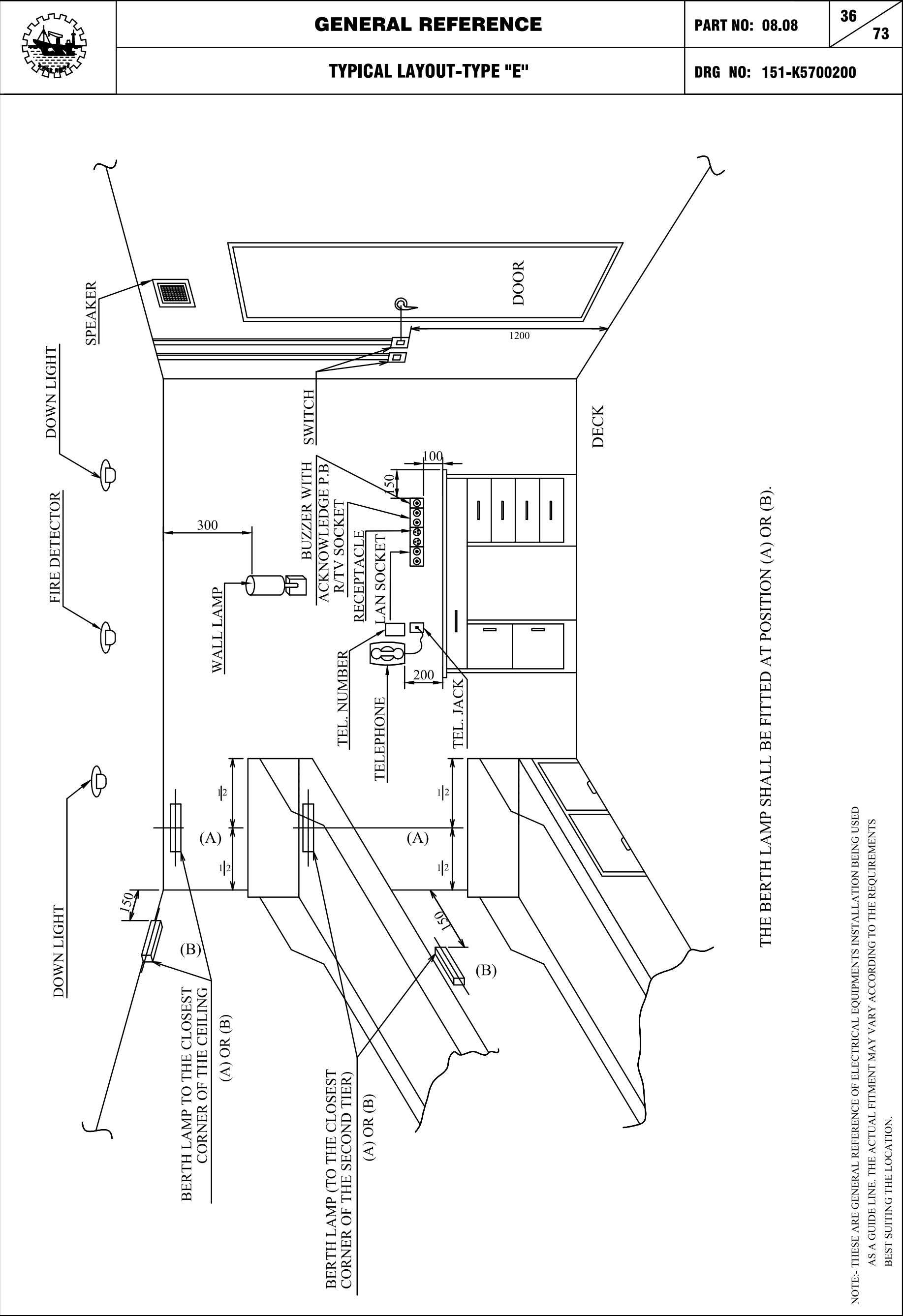
	GENERAL REFERENCE	PART NO: 08.03	31
	INSTALLATION PRACTICE ON EARTHING	DRG NO: 151-K5700200	73
<p><u>INSTALLATION PRACTICE ON EARTHING:-</u></p> <p><u>GENERAL</u></p> <p>Generally all metal parts of the electrical installation, other than current carrying parts be earthed. Earthing may however be omitted for double insulated equipment, low voltage equipment etc.</p> <p>The connection of earth conductors to the earth bar and to the hull, shall be made by corrosion-resistant screws or clamps. Cross section shall correspond to the earth conductor</p> <p>Earthing of instrumentation and communication cable screens shall be done according to makers requirement. For these cables with only one screen the cable screen shall be earthed in both ends.</p>			




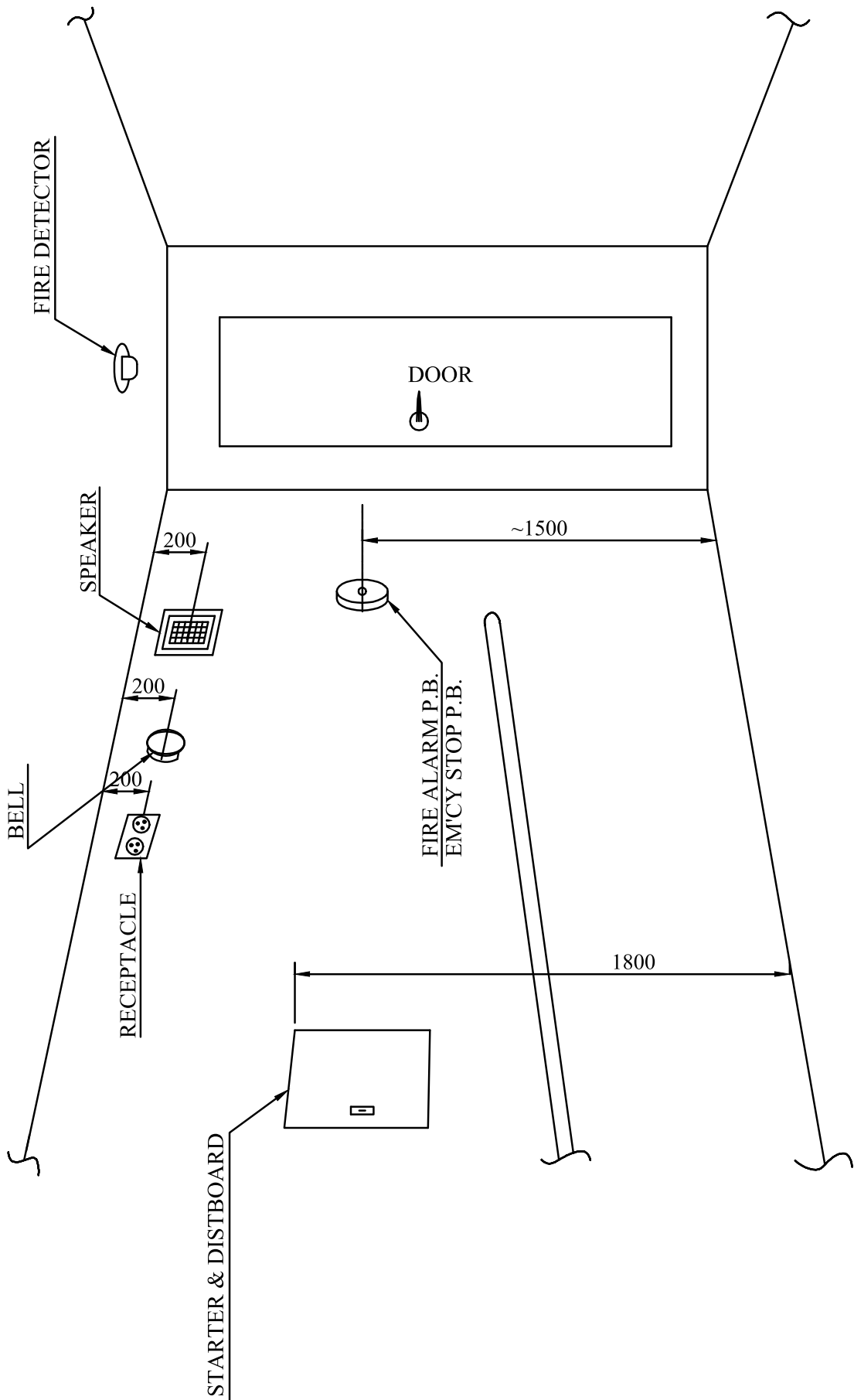




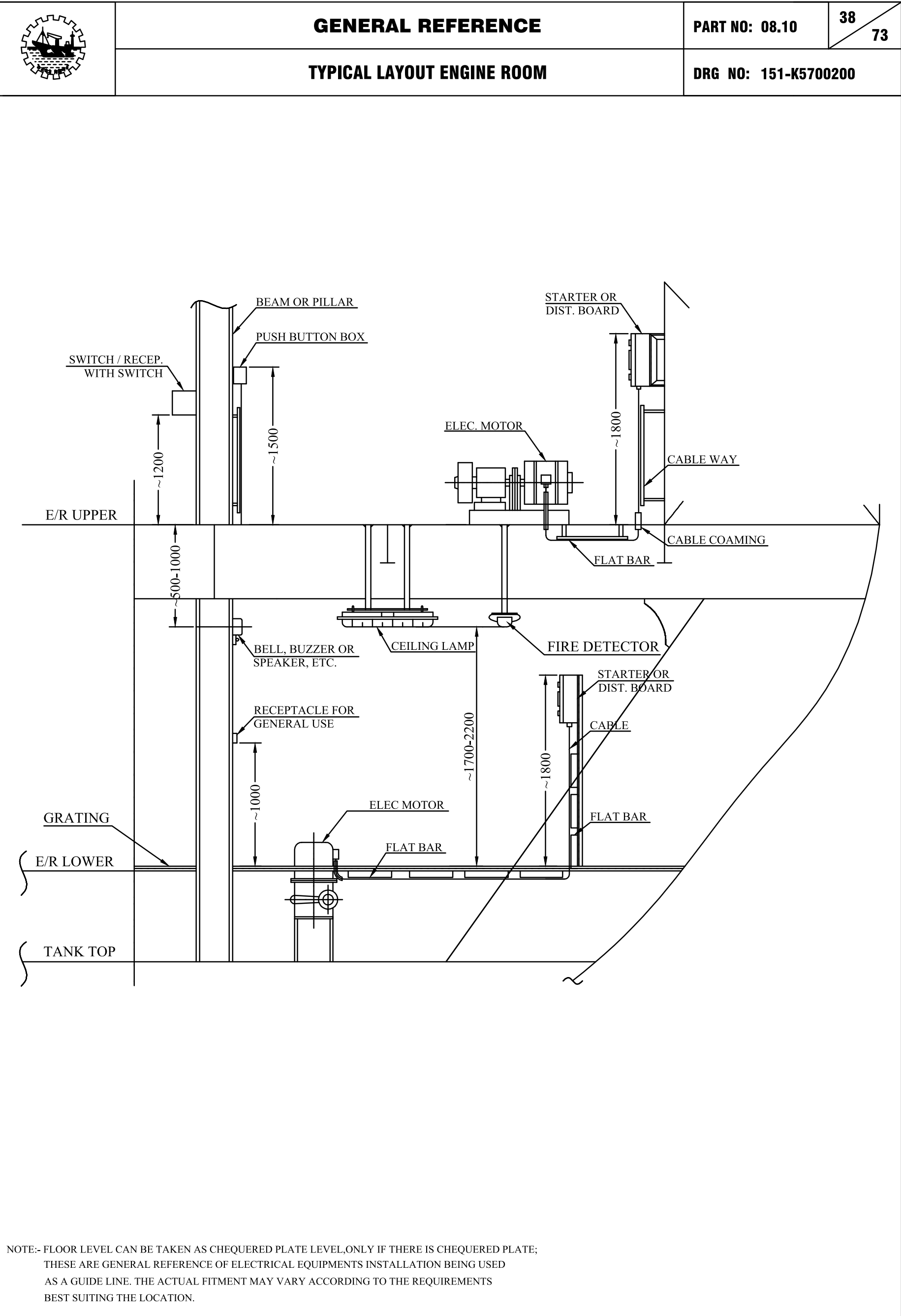





	GENERAL REFERENCE	PART NO: 08.09	37
	APPARATUS IN ACCOM. PASSAGE-TYPICAL LAYOUT	DRG NO: 151-K5700200	73



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



	GENERAL REFERENCE	PART NO: 08.11	39
	CABLE PENETRATION	DRG NO: 151-K5700200	73

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.

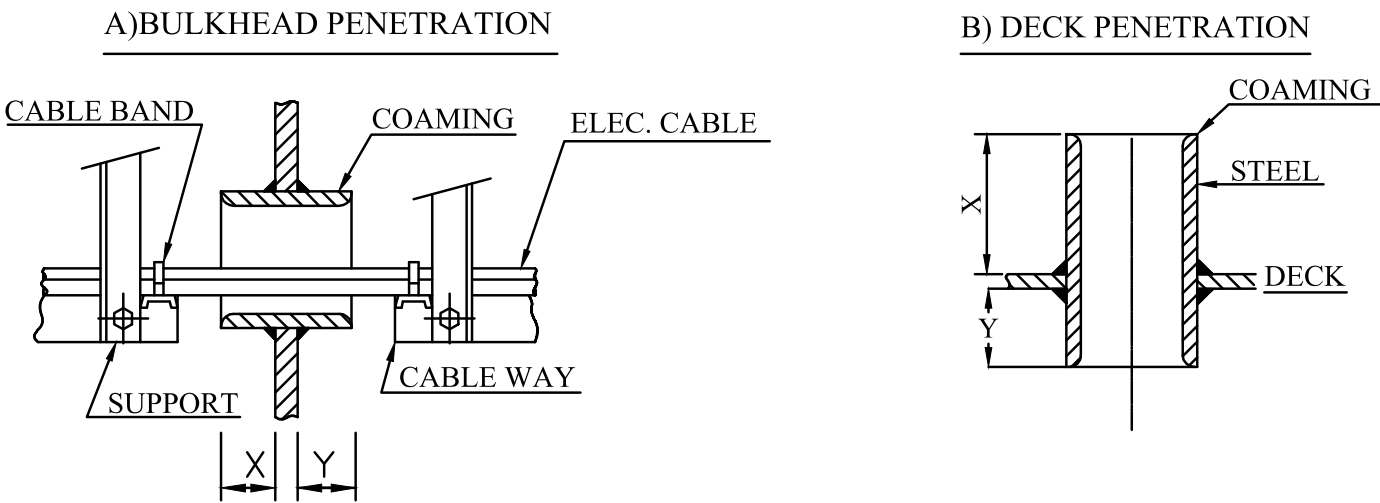
WITH FOLLOWING CONCEPT.

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.

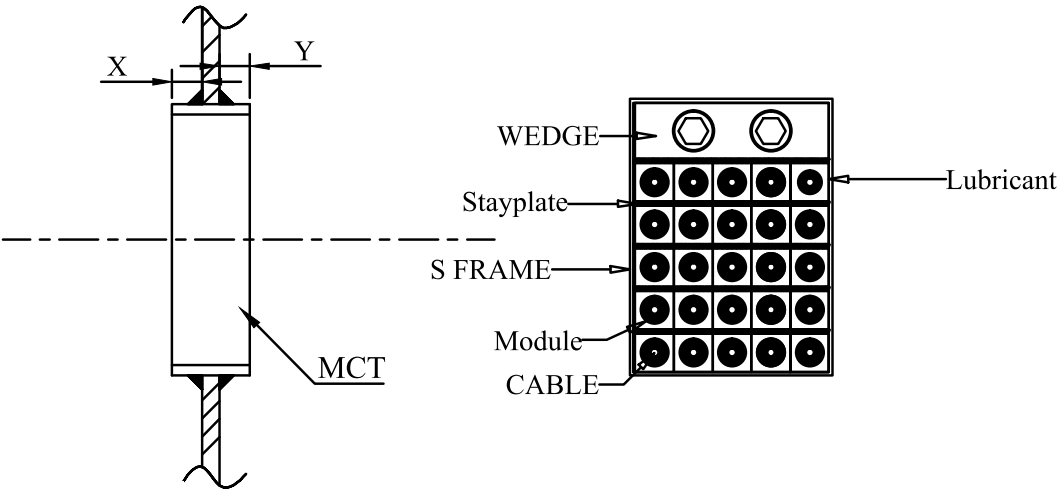
IN CASE THAT ELEC.CABLES PASS THROUGH NON CLASSIFIED STRUCTURE, I.E. NON-GASTIGHT, NON-FIRETIGHT OR NON WATERTIGHT, BELOW METHODS SHALL BE APPLIED.




2) WATER TIGHT BULKHEADS/DECKS PENETRATION

I. BULKHEAD PENETRATION

A) MULTI CABLE TRANSIT (MCT)

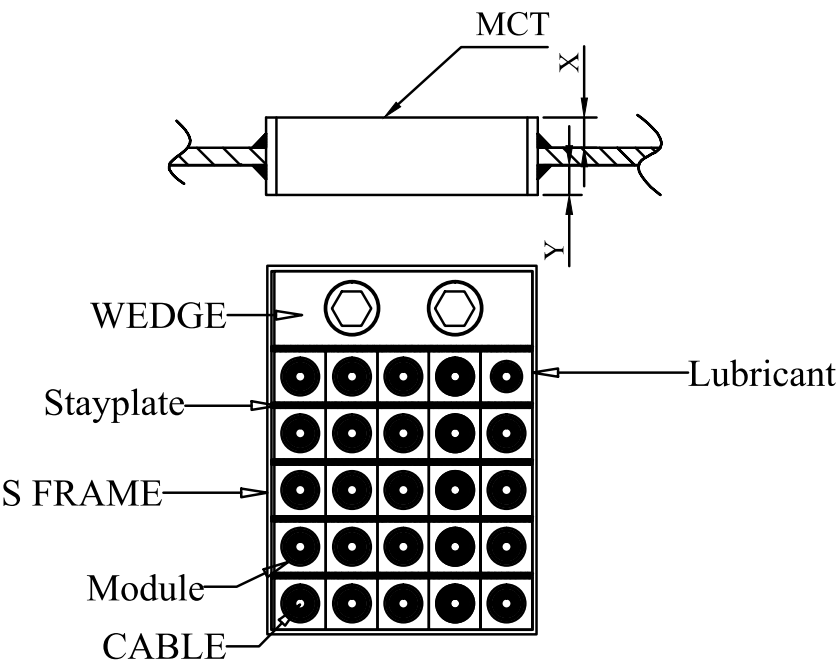


X,Y DIMENSIONS WILL BE AS INDICATED IN THE FIT. ARRG. DRG.

	GENERAL REFERENCE	PART NO: 08.11	40
	CABLE PENETRATION	DRG NO: 151-K5700200	73

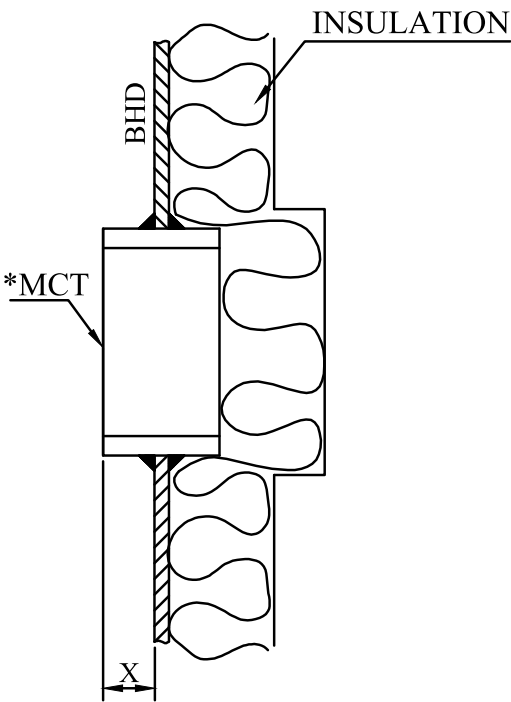
II. DECK PENETRATION

A) MULTI CABLE TRANSIT (MCT)

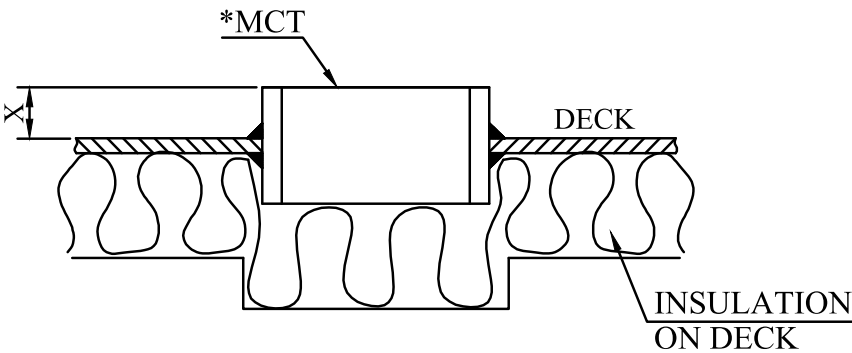


III.) IN CASE OF INSULATION / FLOATING FLOOR

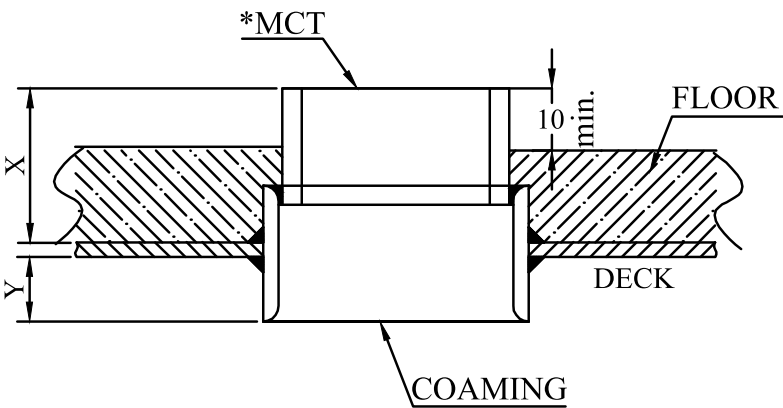
A. BULKHEAD PENETRATION



B. DECK PENETRATION-1



C. DECK PENETRATION-2




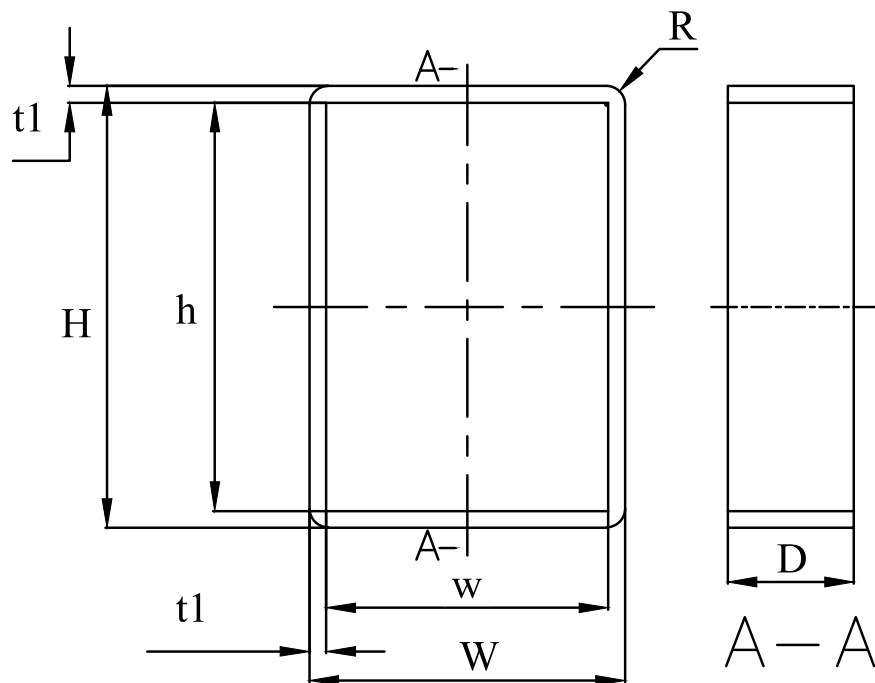
* MCT FIXING IS AS PER THE FIT. ARR. DRG.

**INSULATION TO BE PROVIDED OVER MCT AS REQUIRED BY THE TYPE APPROVAL
CERTIFICATE DETAILS**

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

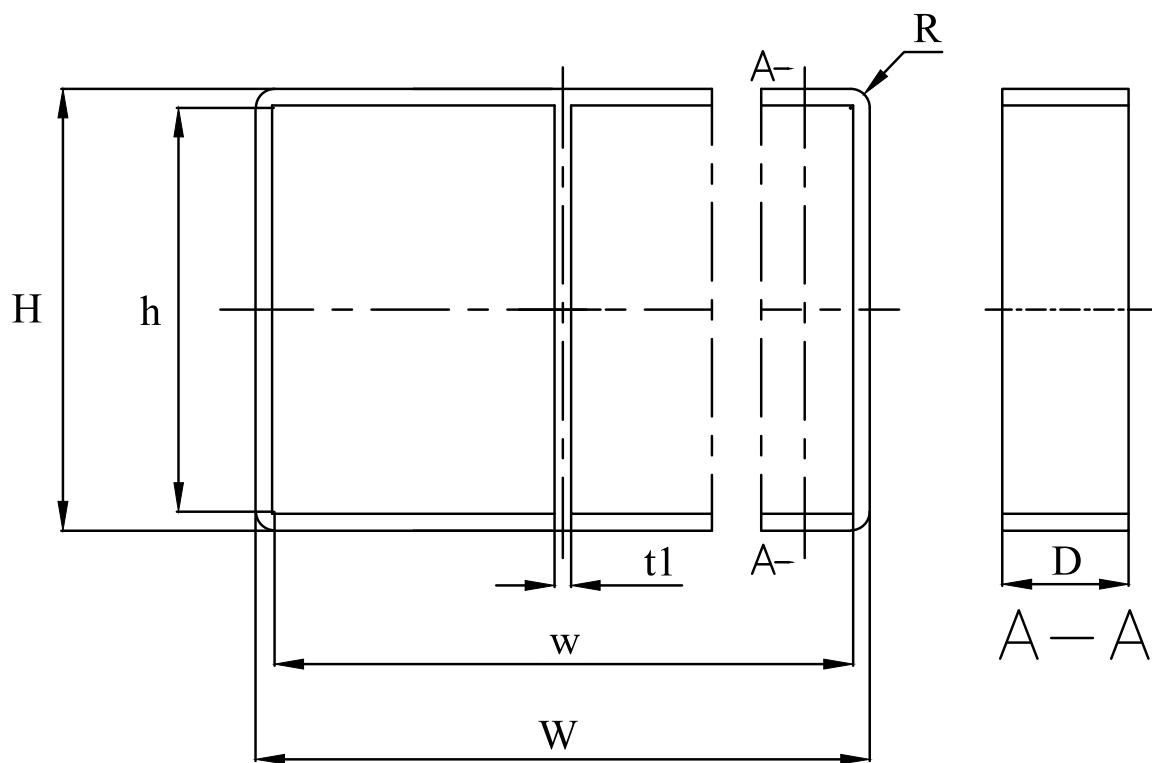
X,Y DIMENSIONS WILL BE AS INDICATED IN THE FIT. ARR. DRG.

	GENERAL REFERENCE	PART NO: 08.12	41
	MCT FRAME	DRG NO: 151-K5700200	73



SZx1

Z=Frame size
N=Number of Horizontal
openings



SZxN

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



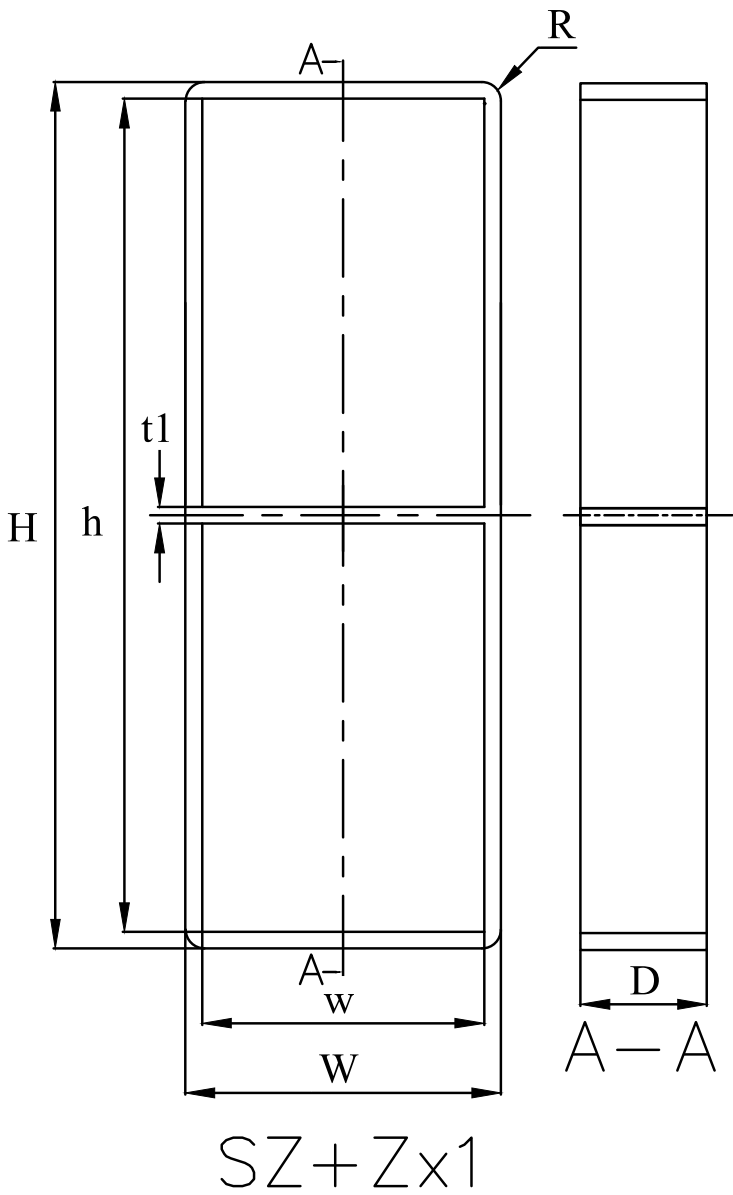
GENERAL REFERENCE

PART NO: 08.12

42
73

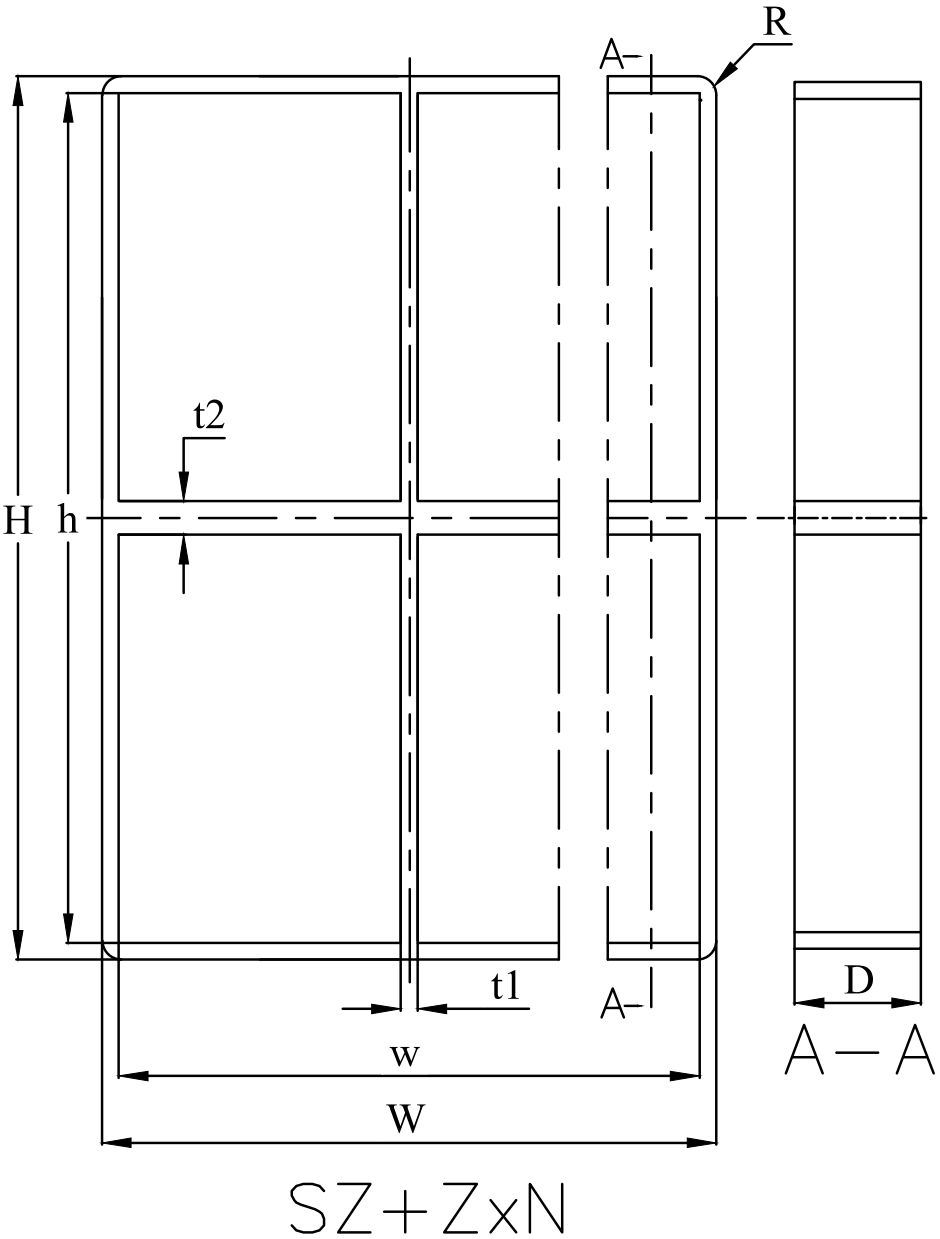
MCT FRAME


DRG NO: 151-K5700200

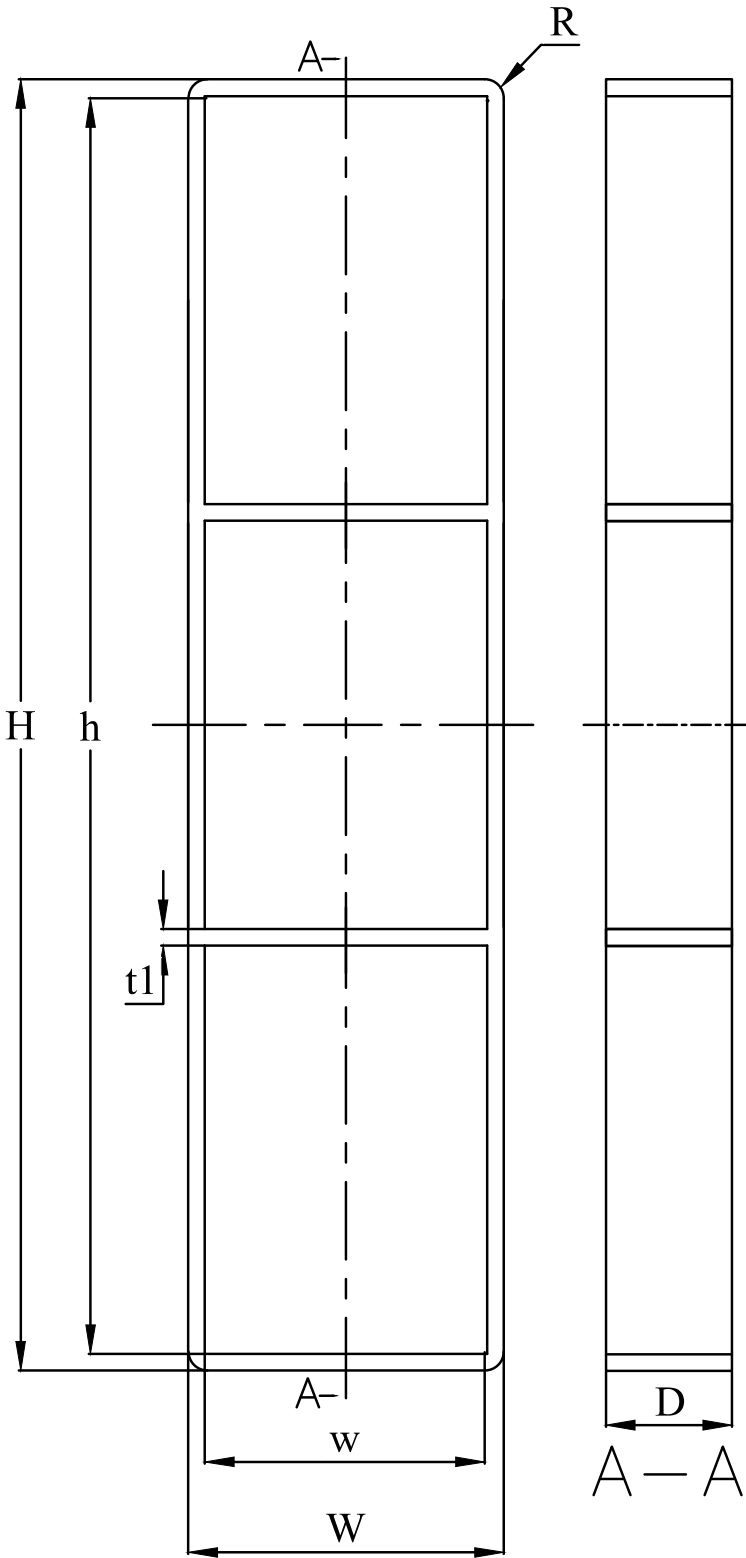


Z=Frame size
N=Number of Horizontal
openings

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



	GENERAL REFERENCE	PART NO: 08.12	43
	MCT FRAME	DRG NO: 151-K5700200	73



$SZ + Z + Z \times 1$

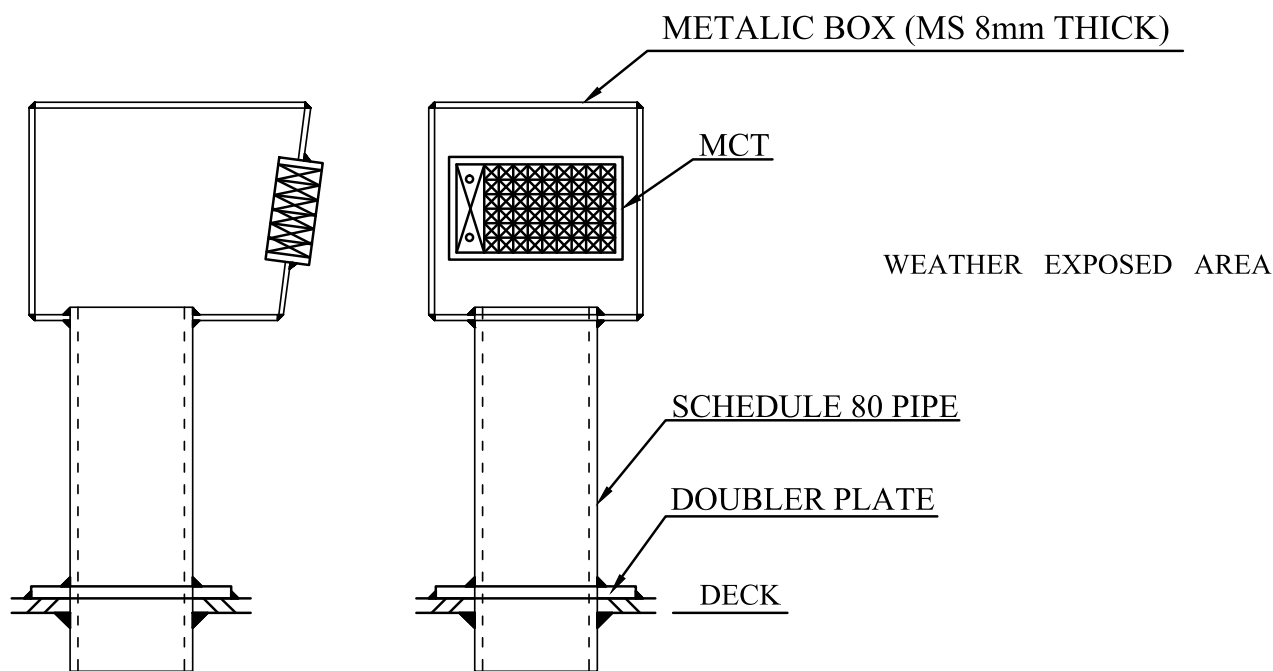
Z=Frame size

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

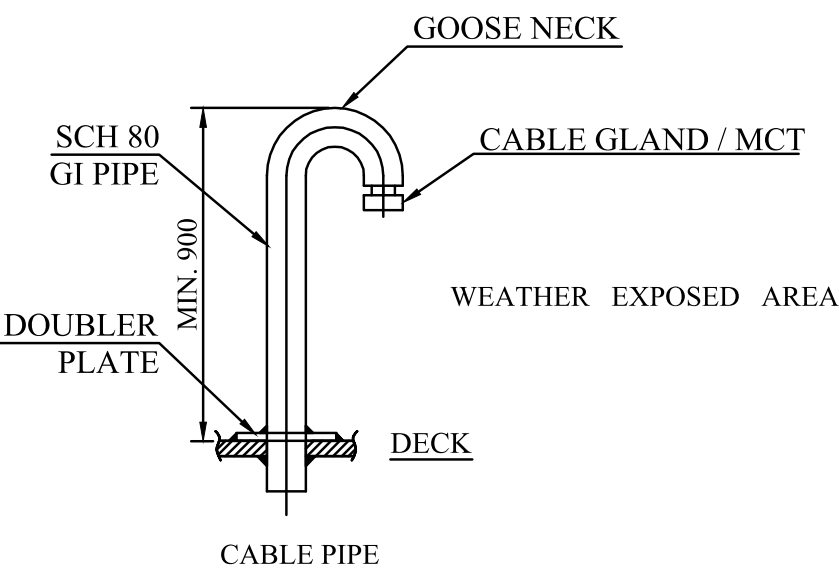
NOTES:
THE CABLE TRANSITS INSTALLATION IN A, B OR F CLASS DIVISIONS SHALL BE IN ACCORDANCE WITH THE TRANSIT MANUFACTURER'S INSTRUCTIONS OR WITH INFORMATION GIVEN IN THE TYPE APPROVAL CERTIFICATE.

	GENERAL REFERENCE	PART NO: 08.13	44
	CABLE PENETRATION TO WEATHER EXPOSED AREA	DRG NO: 151-K5700200	73

CABLE PENETRATION PIPE



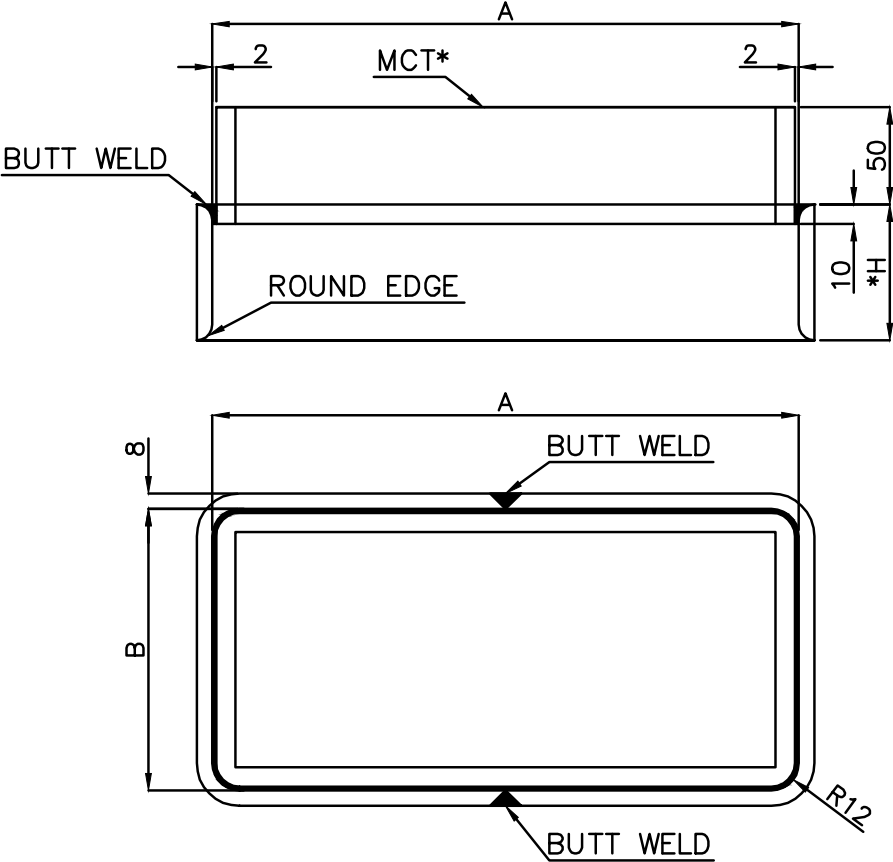
GOOSE NECK



* MCT CAN BE USED FOR MULTIPLE CABLE INSTALLATION

	GENERAL REFERENCE	PART NO: 08.14	45
	CABLE COAMING WITH MCT	DRG NO: 151-K5700200	73


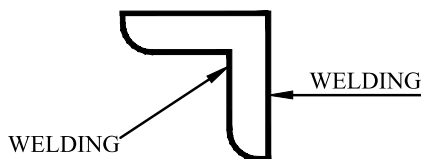
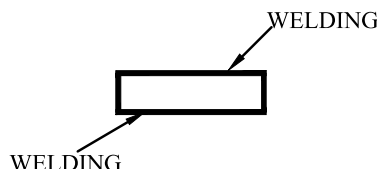
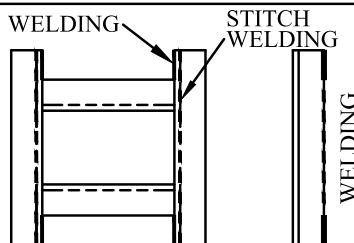
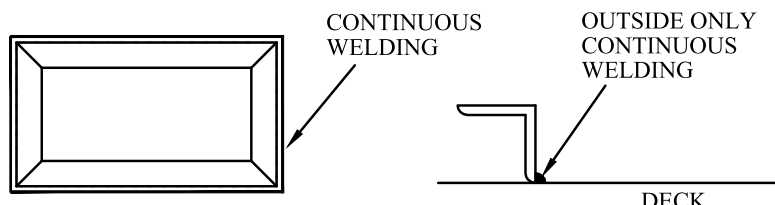
CABLE COAMING WITH MCT IS USED WHERE FLOATING FLOOR IS THERE IN DECK



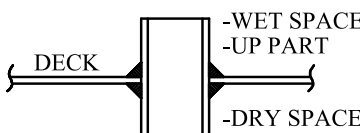
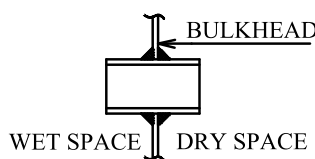
MATERIAL: 8 THICK STEEL PLATE

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

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

	GENERAL REFERENCE		PART NO: 08.15		46 73
	WELDING METHOD			DRG NO: 151-K5700200	
1. THE SUPPORT FOR ELECTRIC EQUIPMENT SUCH AS CABLE HANGER, ELECTRIC LIGHTING, STARTER, PANEL TO BE WELDED AS FOLLOWS.					
1) ALL AREA (DRY SPACE, WEATHER & WET SPACE ETC.)					
ITEM	WELDING METHOD	WELDING		APPLICATION AREA	
		LEG LENGTH	METHOD		
ANGLE TYPE SUPPORT		t < 8 : 3.5 t ≥ 8 : 4.5	BOTH SIDE FULL WELDING	ALL AREA	
FB TYPE SUPPORT		t < 8 : 3.5 t ≥ 8 : 4.5	BOTH SIDE FULL WELDING	ALL AREA	
DIRECT WALL TYPE SEAT		t < 8 : 3.5 t ≥ 8 : 4.5	ENDSIDE BOTH WELDING OUTSIDE STITCH WELDING	ALL AREA	
DECK MOUNTING TYPE SEAT (MSB, ECC, ETC-)				WHEEL HOUSE ENGINE CONTROL RM & SIMILAR SPACE ENGINE S/G RM OPEN AREA AND SIMILAR SPACE	

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

TYPE	INTERNAL DECK	INTERNAL BULKHEADS
COAMING & COLLAR		


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

1. ALL CABLE ROUTES ON SIDE SHELL, OUTER BULKHEADS / DECKS AND TANK BOUNDARIES.

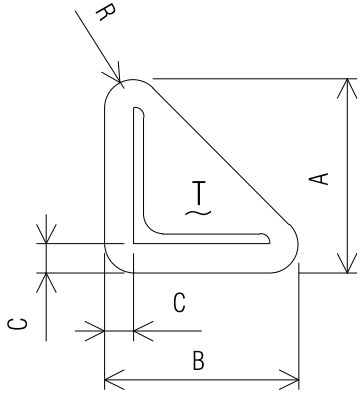
2. MAIN CABLE ROUTES ON INNER DECKS / BULKHEADS (400MM WIDTH AND ABOVE).

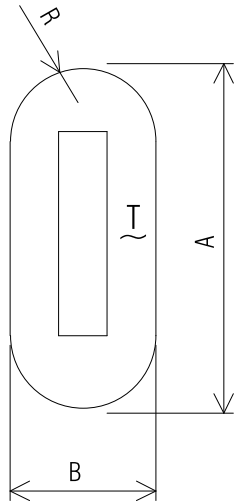
3. ALL TYPES OF EQUIPMENT SEATS ON SIDE SHELL, OUTER BULKHEADS / DECKS AND TANK BOUNDARIES.


4. EQUIPMENT SEATS EXCEPT SEATS WITH PERFORATED PLATES ON INNER BULKHEADS / DECKS.

	GENERAL REFERENCE	PART NO: 08.16	47
	PAD DETAILS	DRG NO: 151-K5700200	73

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 INDIAN STANDARD

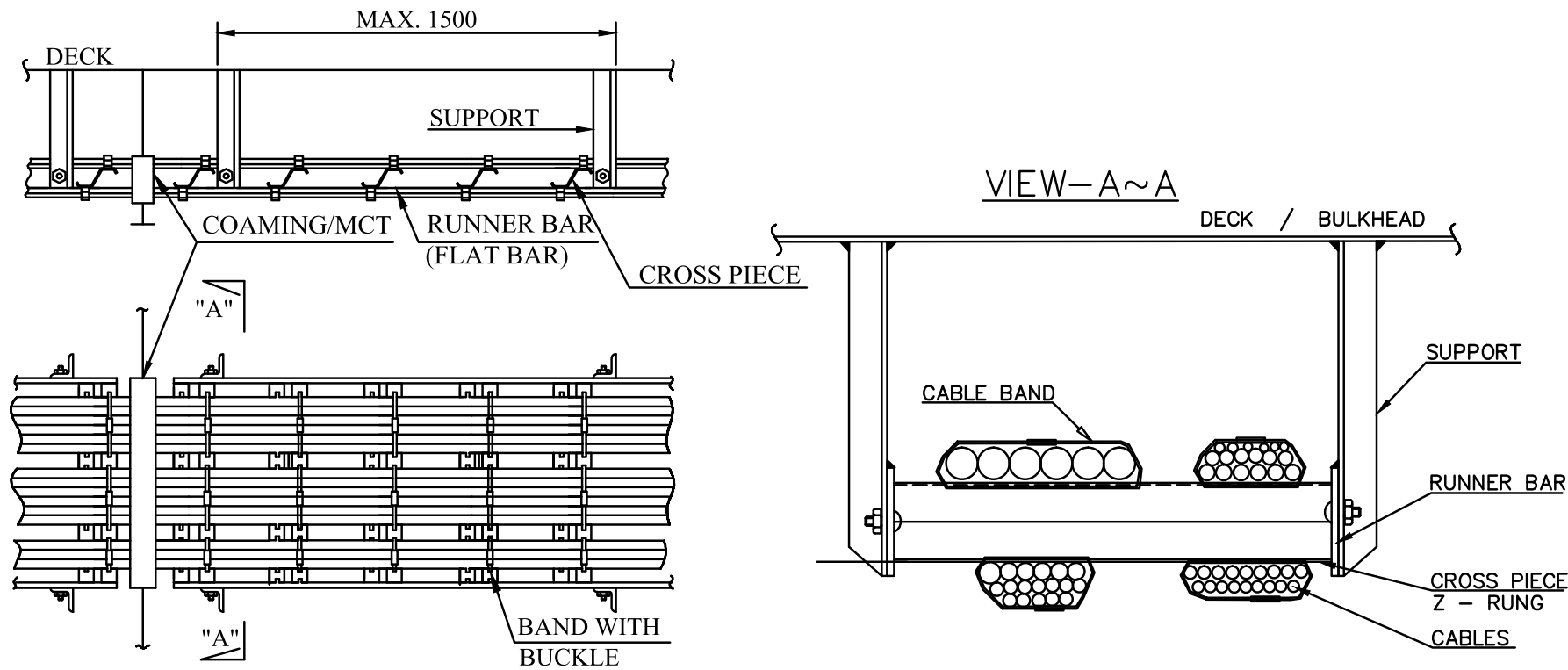
ANGLE SUPPORT PAD DIMENSION								
TYPE		DIMENSION					WEIGHT (Kg/M)	ANGLE DIMENSION
PIECE MARK	SKETCH	A	B	C	R	T		
L1		55	55	12	10	6	0.09	30X30X5, 30X30X3
L2		65	65	12	15	6	0.15	40X40X3, 40X40X5, 40X40X6
L3		70	70	12	15	6	0.17	45X45X5, 45X45X6
L4		75	75	12	15	6	0.20	50X50X6, 50X50X4
L5		85	85	12	15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

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

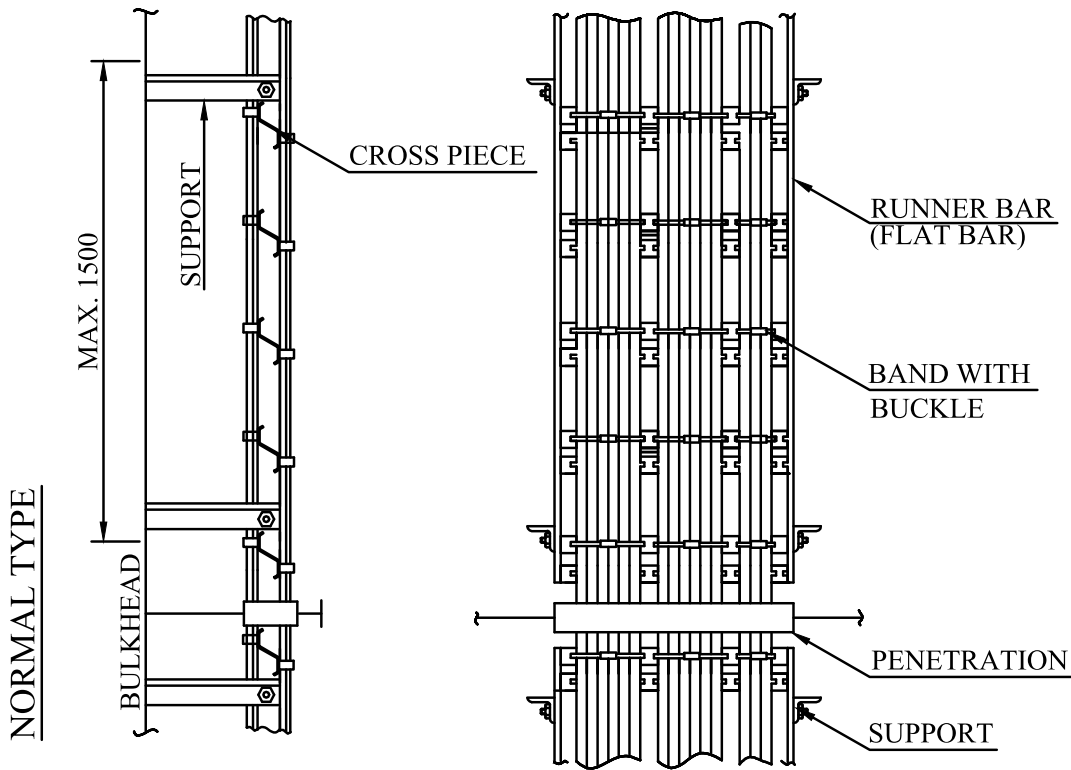
	INSTALLATION OF CABLE WAY	PART NO: 09.01	48
	HORIZONTAL CABLE RACK Z TYPE	DRG NO: 151-K5700200	73


TYPICAL ARRANGEMENT

NORMAL TYPE

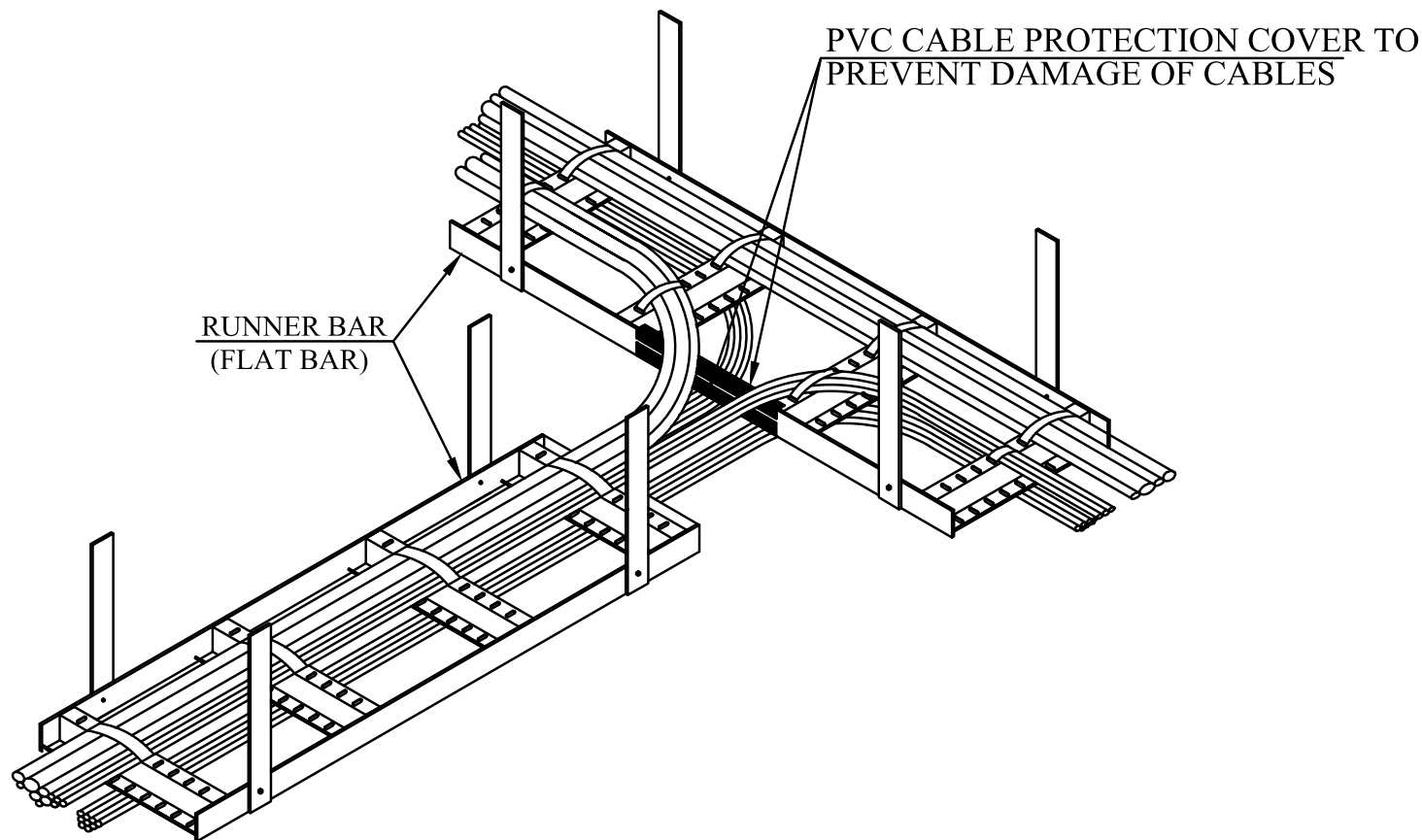


VERTICAL TYPE CABLE RACK Z TYPE



	INSTALLATION OF CABLE WAY	PART NO: 09.02	49
	TURNING METHOD OF MAIN CABLE WAY (TYPICAL)	DRG NO: 151-K5700200	73

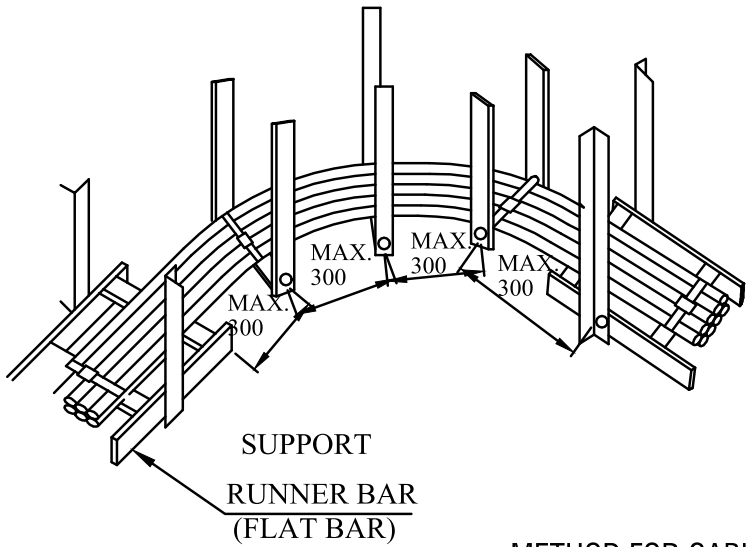
TURNING METHOD OF MAIN CABLE WAY



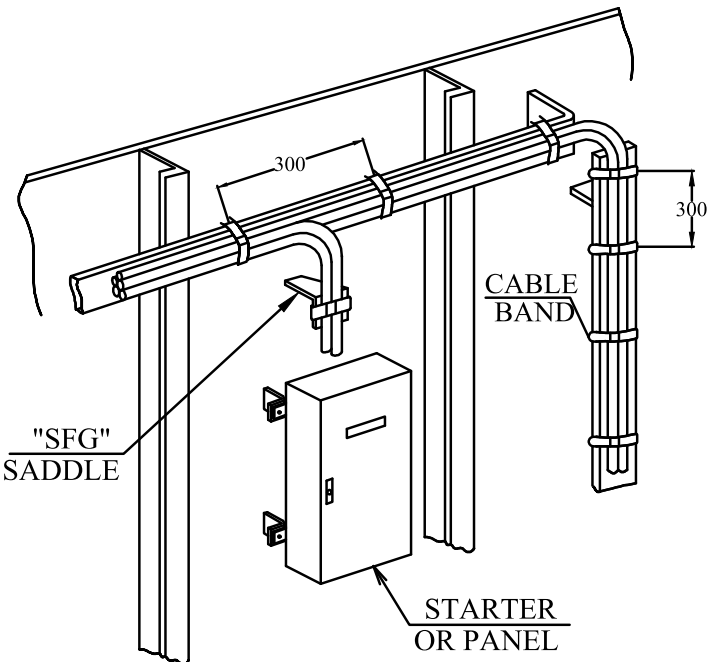
WHERE CABLE WAY CURVED

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

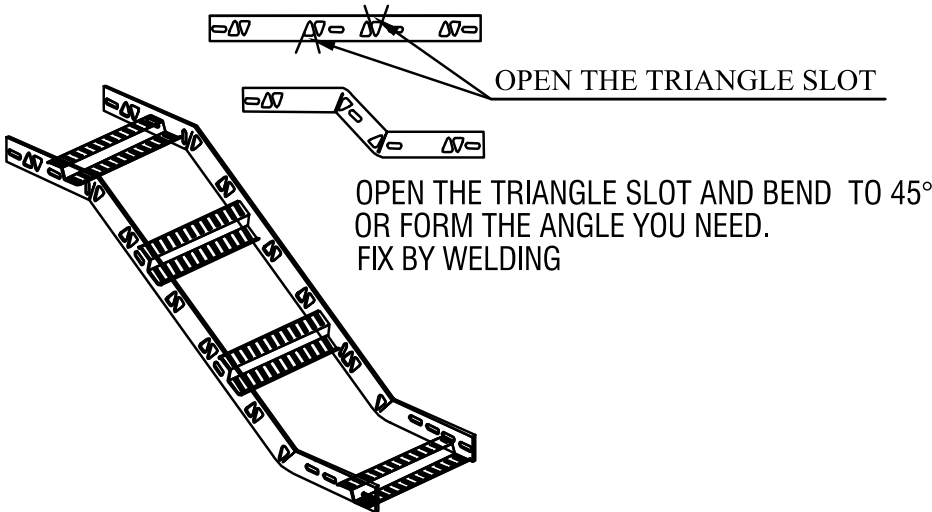
BENDING RADIUS OF HANGER ROUTE TO BE AS PER CABLE MAKERS DETAILS.




CURVED & BRANCH CABLE WAY

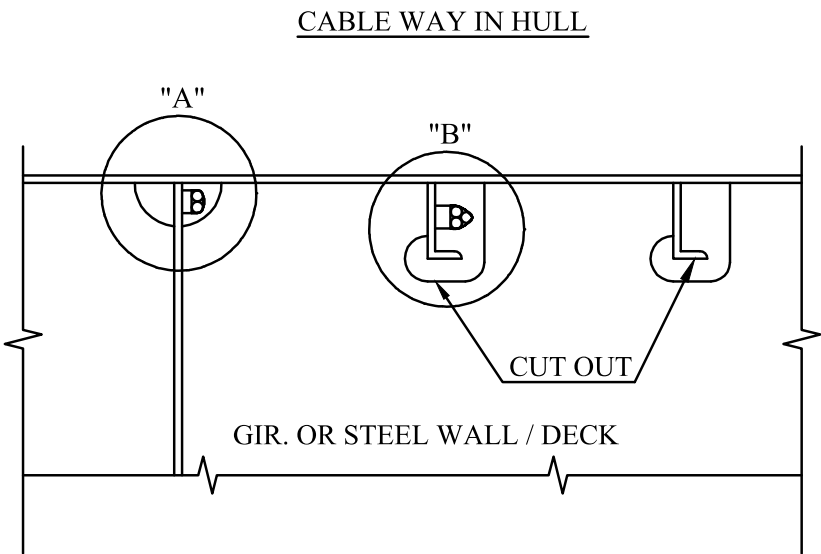


METHOD FOR CABLE WAY BENDING ~45°

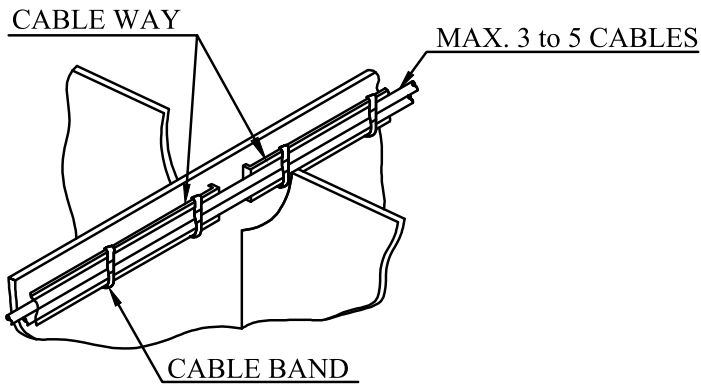


	INSTALLATION OF CABLE WAY	PART NO: 09.03	50
	CABLE WAY IN HULL CUTOUTS AND NEAR HOT PIPES	DRG NO: 151-K5700200	73

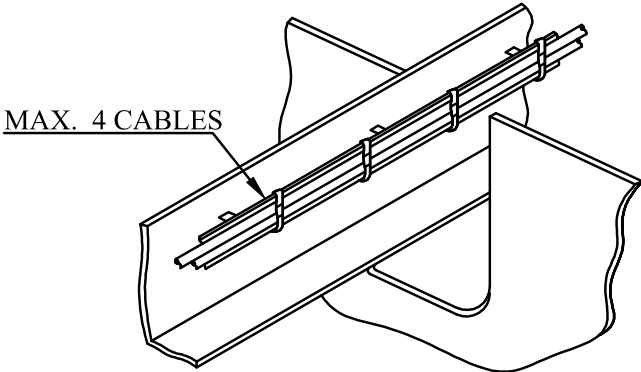
IN CUT OUT



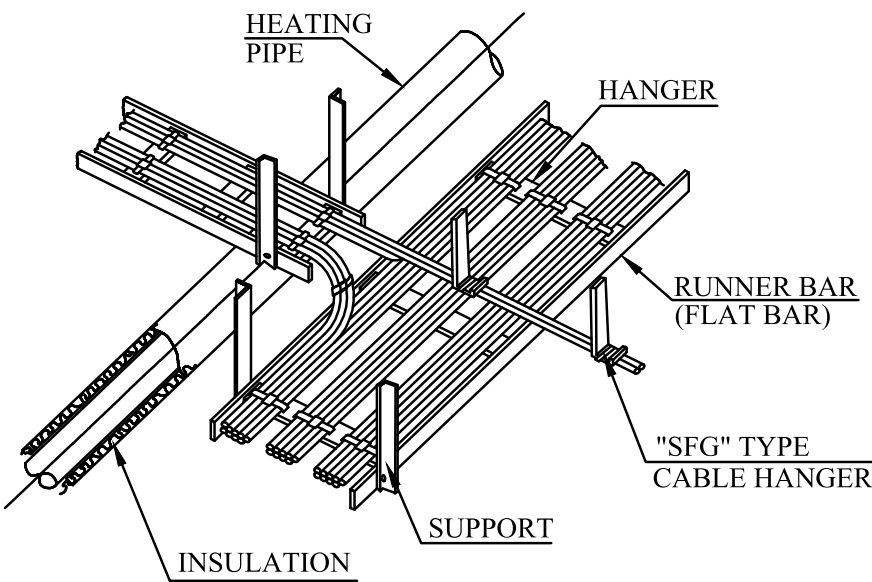
DETAIL "A"



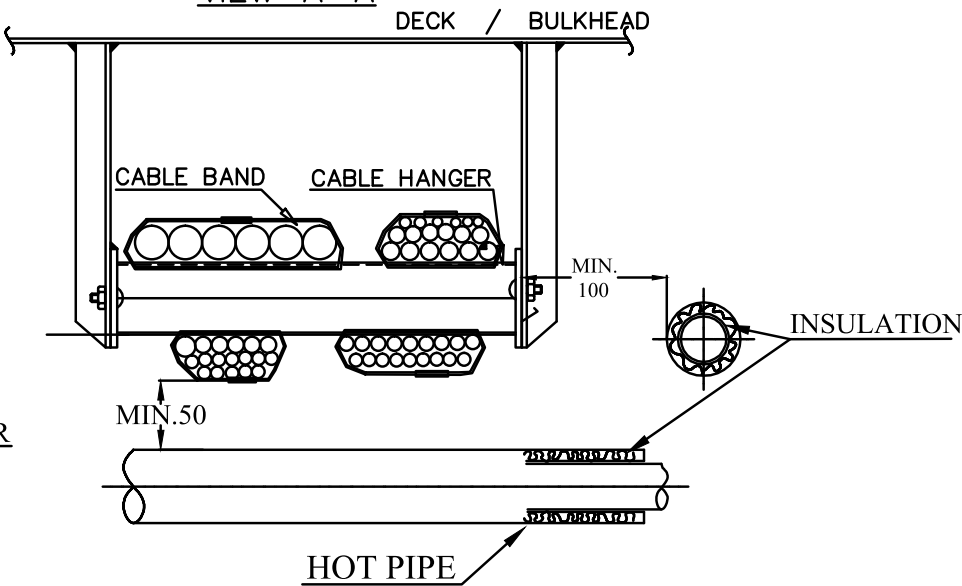
DETAIL "B"



DISTANCE FROM HOT PIPE




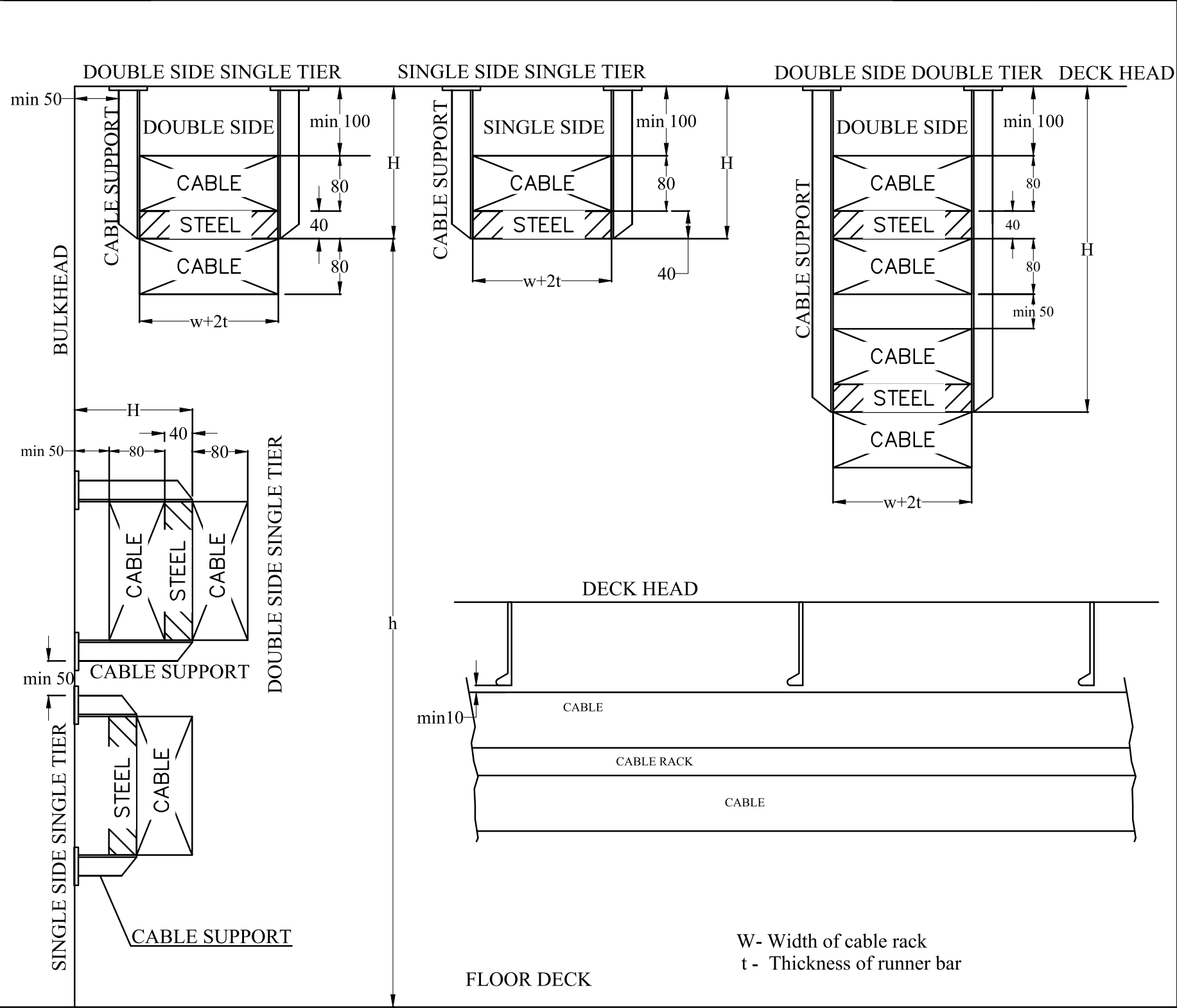
VIEW-A~A



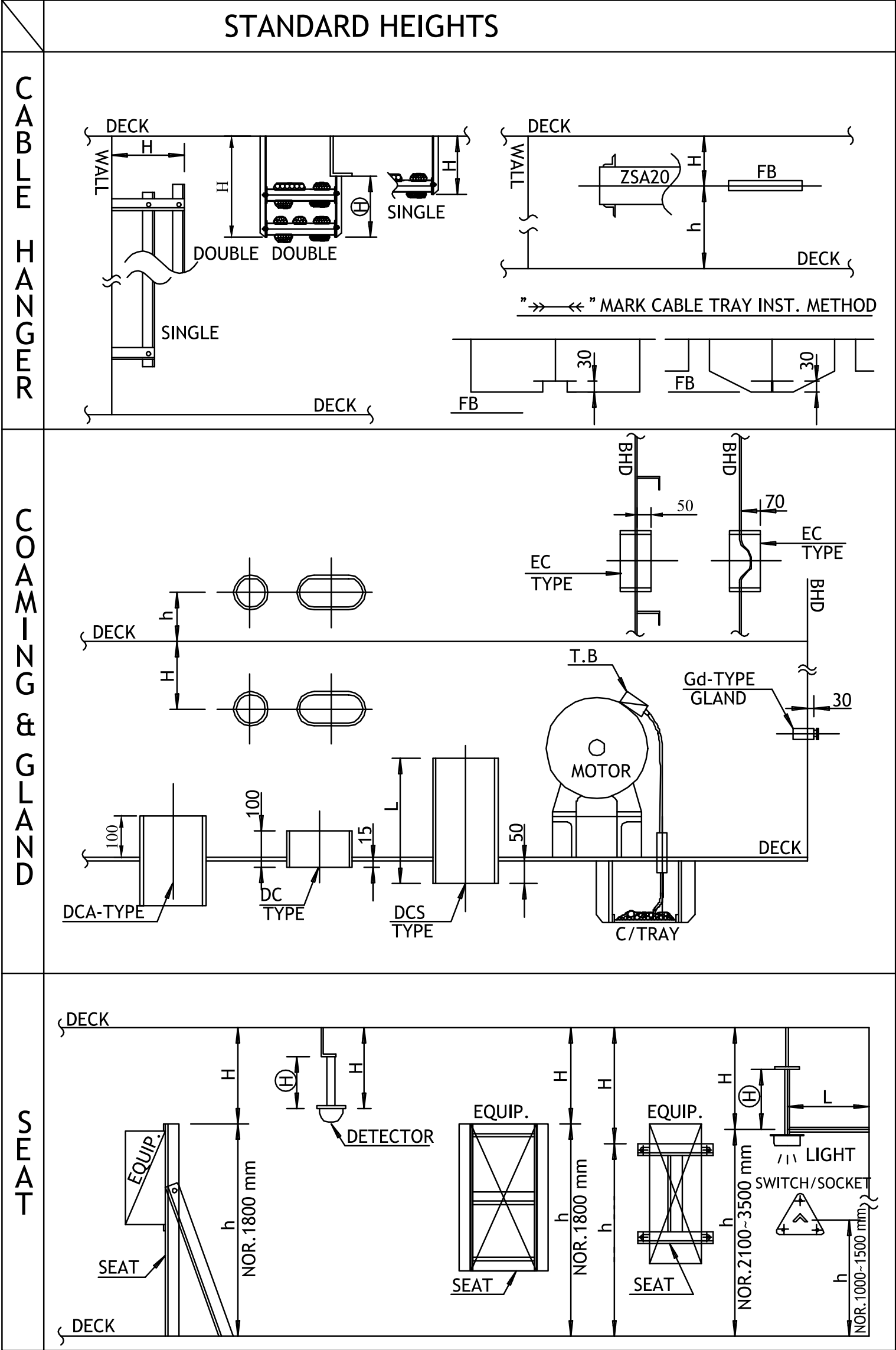
NOTE


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

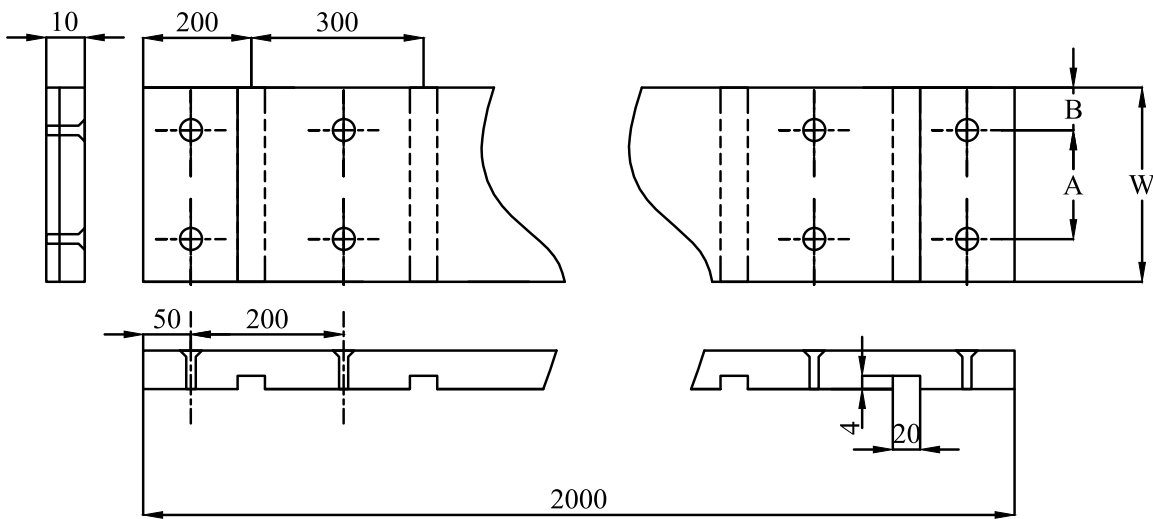
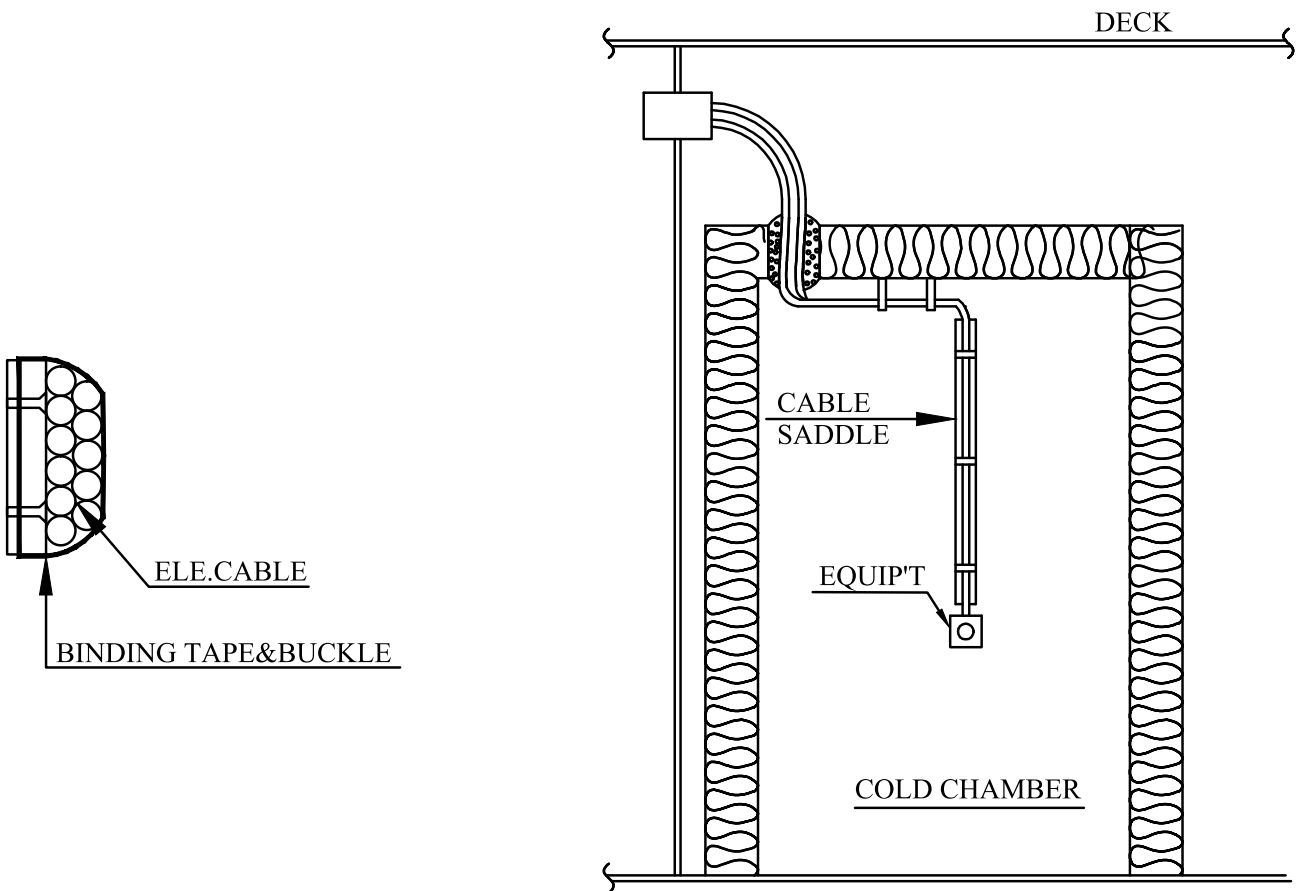
	INSTALLATION OF CABLEWAY	PART NO: 09.04	51
	INSTALLATION METHOD OF CABLE WAY	DRG NO: 151-K5700200	73




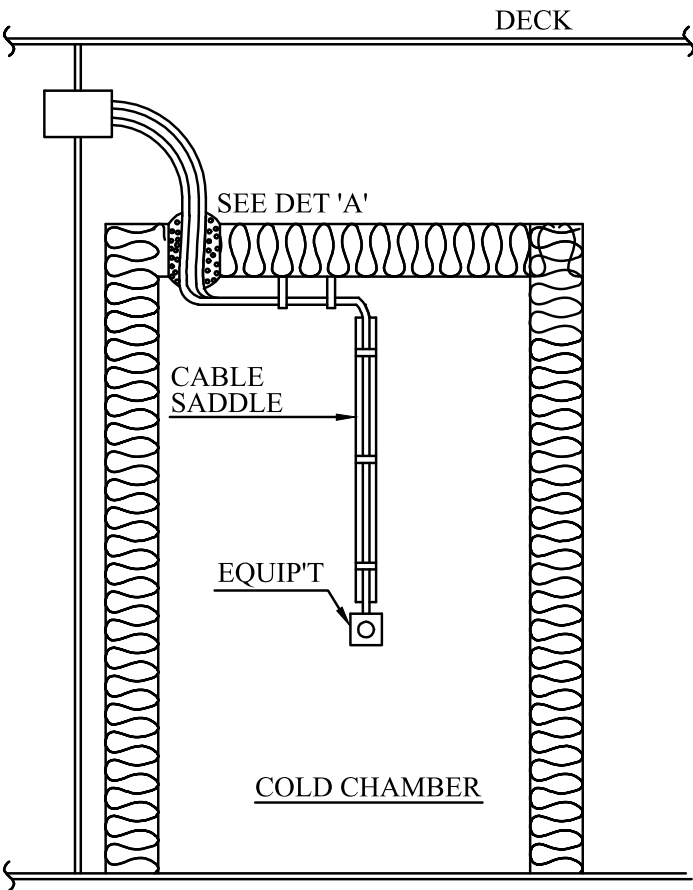
	INSTALLATION OF CABLEWAY	PART NO: 09.05	52
	STANDARD HEIGHTS	DRG NO: 151-K5700200	73



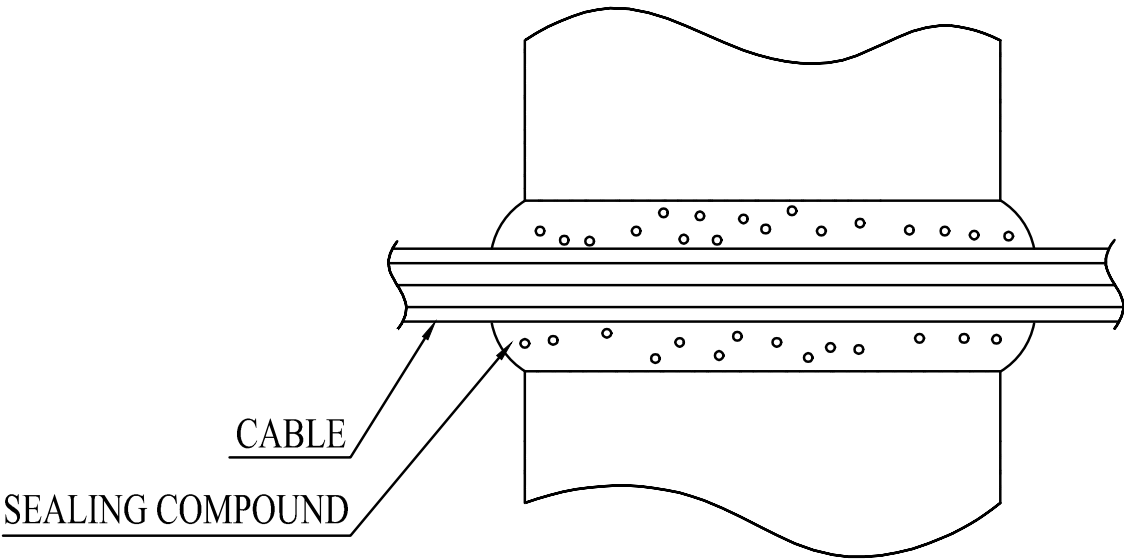
	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	PART NO: 10.01	53
	CABLE WAY- NYLON TYPE	DRG NO: 151-K5700200	73




	INSTALLATION OF CABLE WAY REFRIGERATION CHAMBER	PART NO: 10.02	54
	INSULATION PENETRATION	DRG NO: 151-K5700200	73



INSTALLATION METHOD

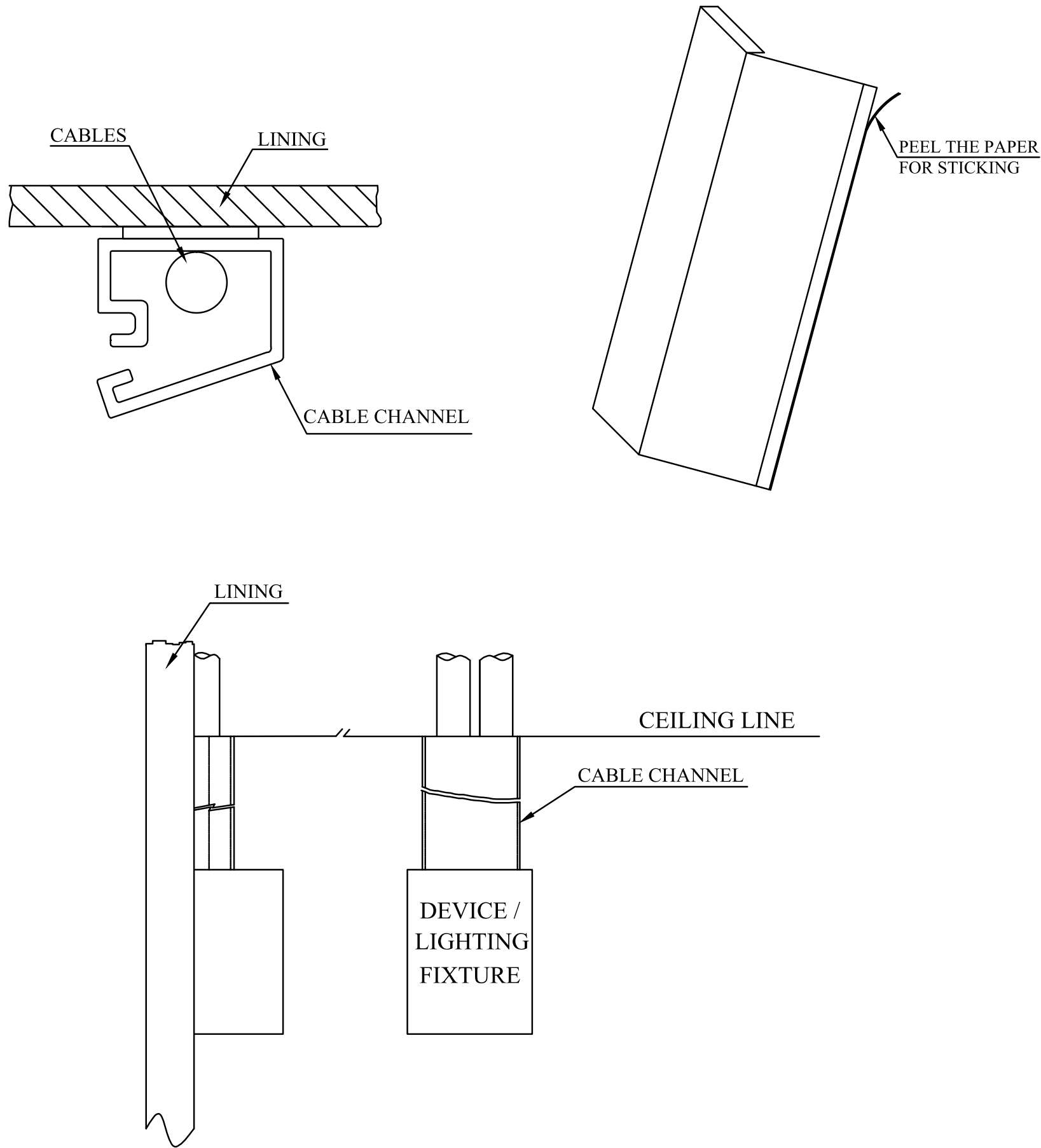


DETAIL 'A'


	INSTALLATION OF CABLE	PART NO: 11.01	55
	CABLE CHANNEL	DRG NO: 151-K5700200	73

CABLE CHANNEL (STICKING TYPE)

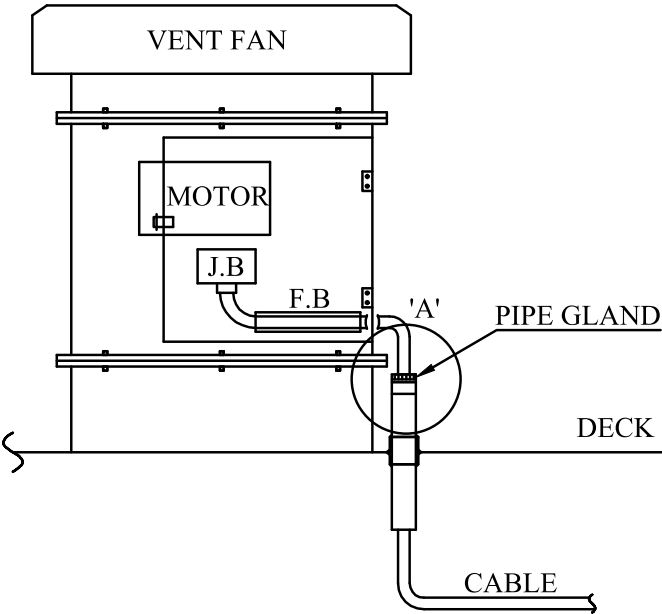
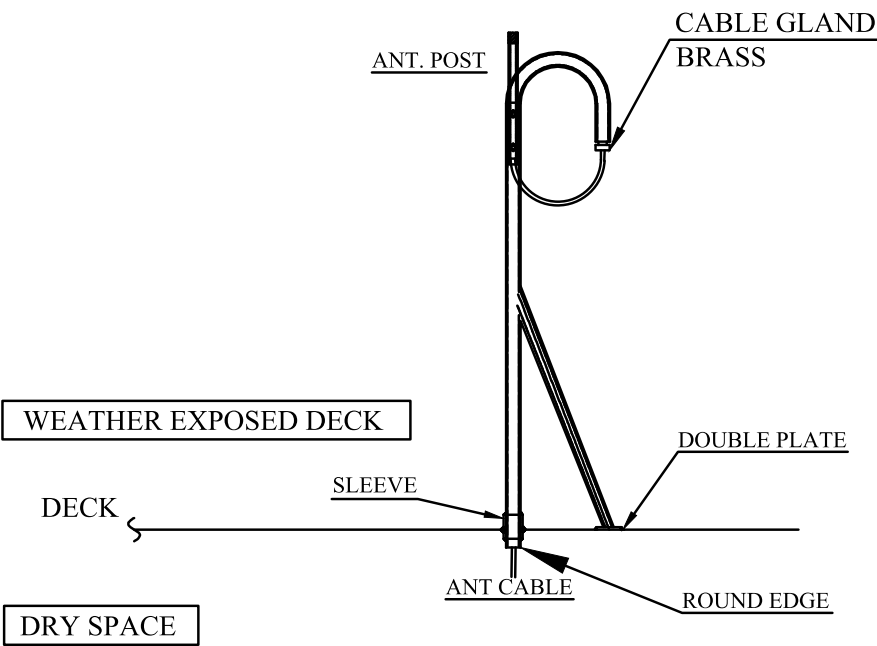
Plastic cable channel or accommodation panelling channels shall be used for covering cables in accommodation spaces where cables can not be concealed.




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

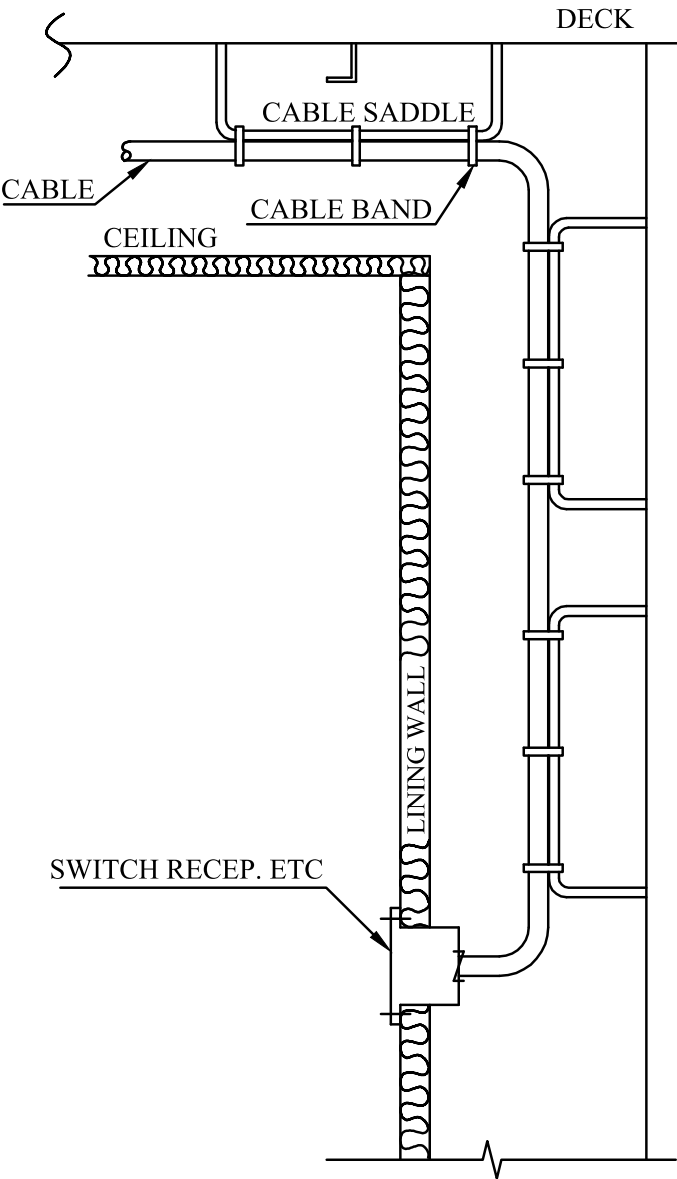
	INSTALLATION OF CABLE	PART NO: 11.02	56
	BRANCHED CABLE- WEATHER EXPOSED AREA	DRG NO: 151-K5700200	73

2. ANTENNA CABLE AT WEATHER EXPOSED AREA

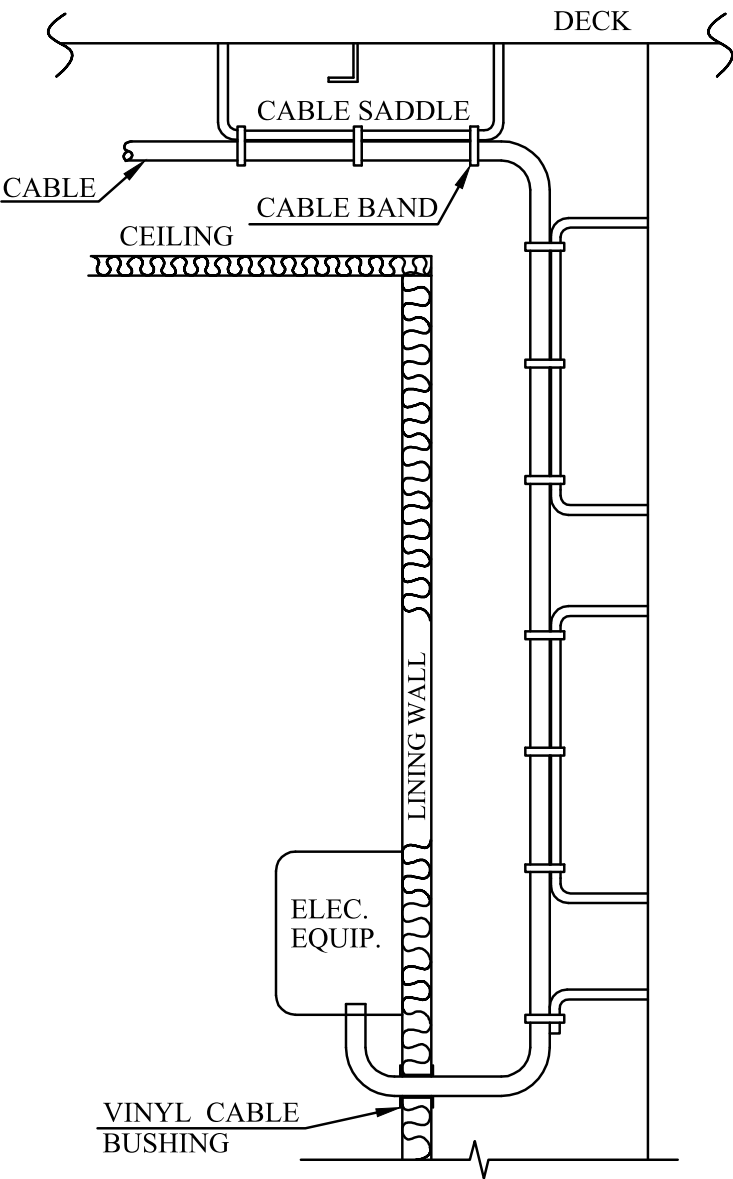


	INSTALLATION OF CABLE	PART NO: 11.03	57
	BRANCHED CABLE - ACCOM. SPACE	DRG NO: 151-K5700200	73

1. BRANCH CABLE WAY BETWEEN STEEL BULKHEAD AND LINING WALL

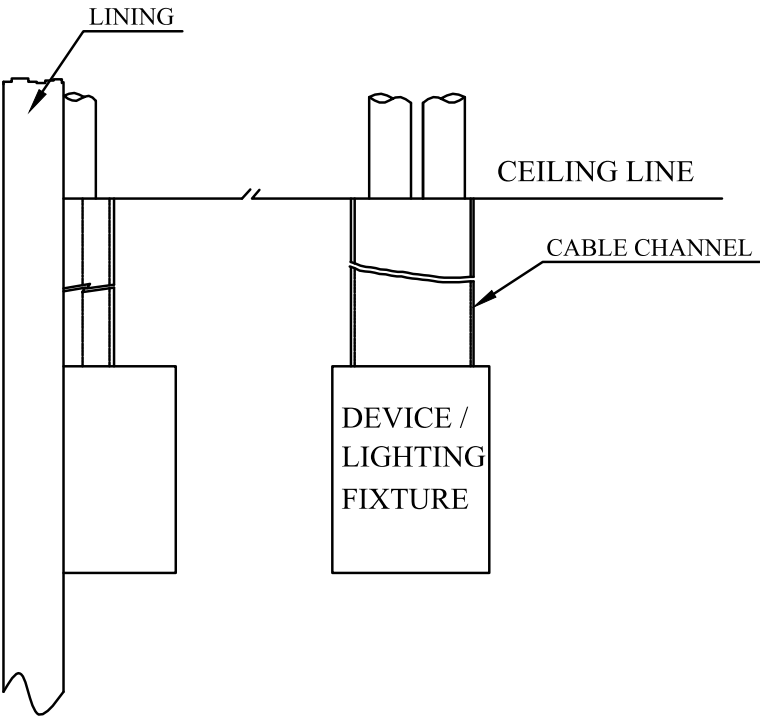


FLUSH TYPE EQUIP

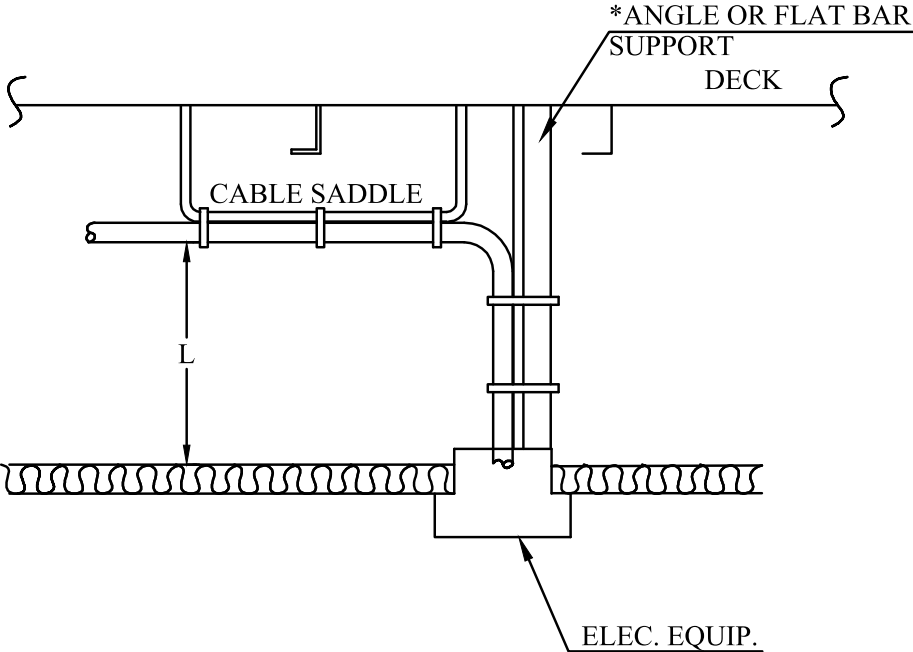


SURFACE TYPE

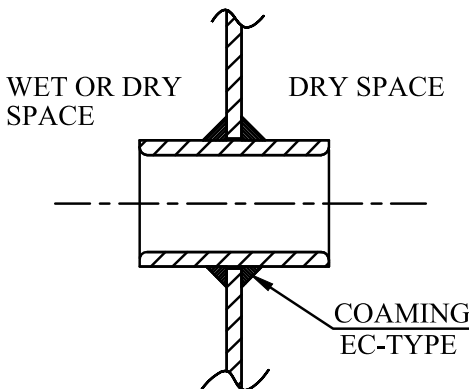
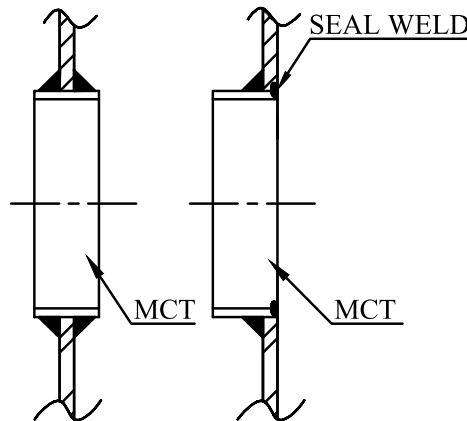
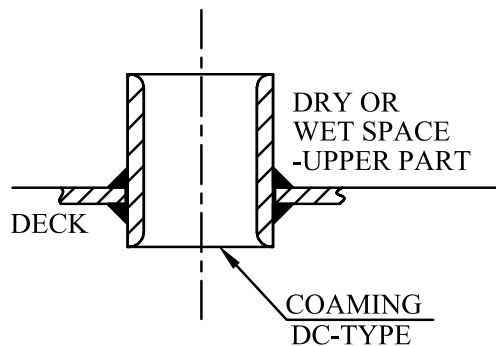
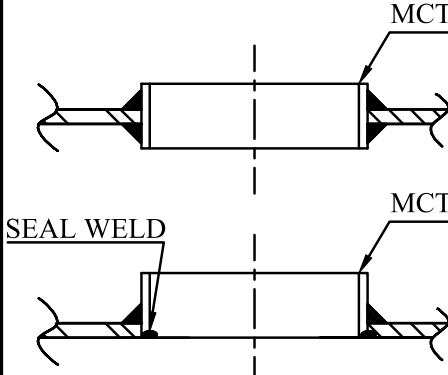
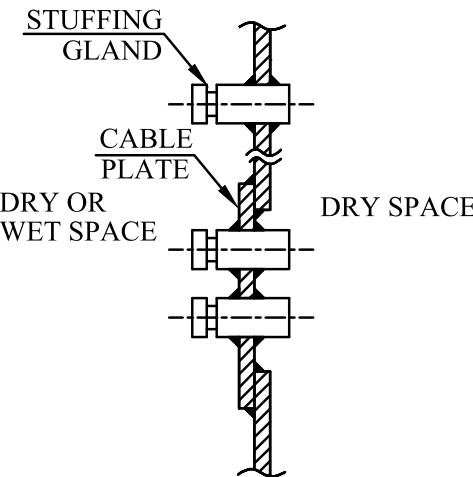
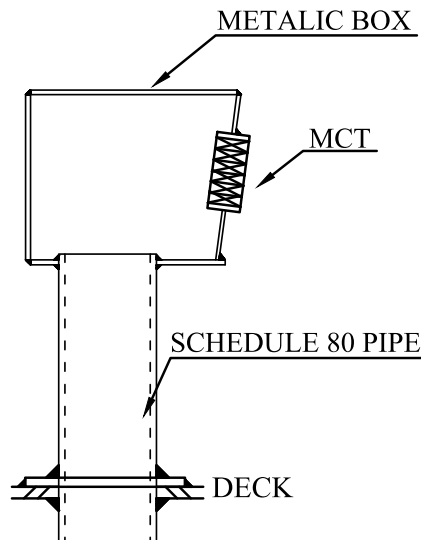
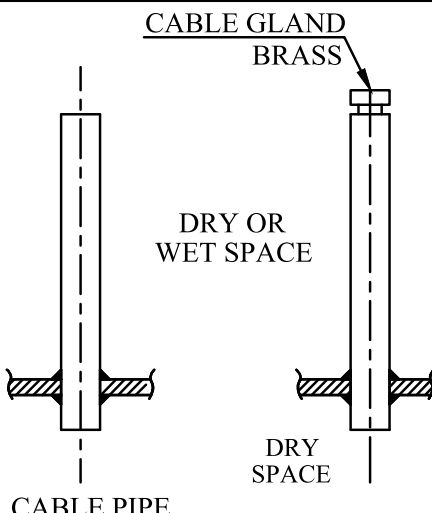
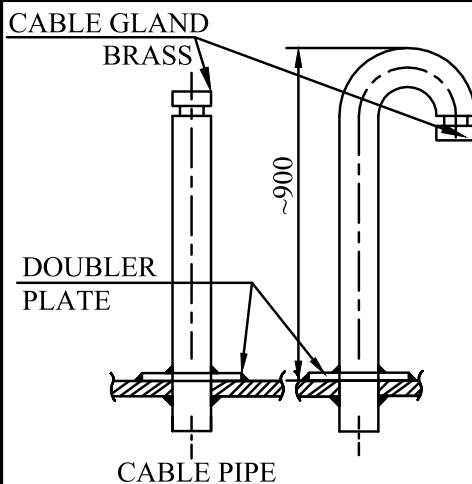
2. BRANCH CABLE WAY IN LINING PANEL




3. BRANCH CABLE WAY IN CEILING



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

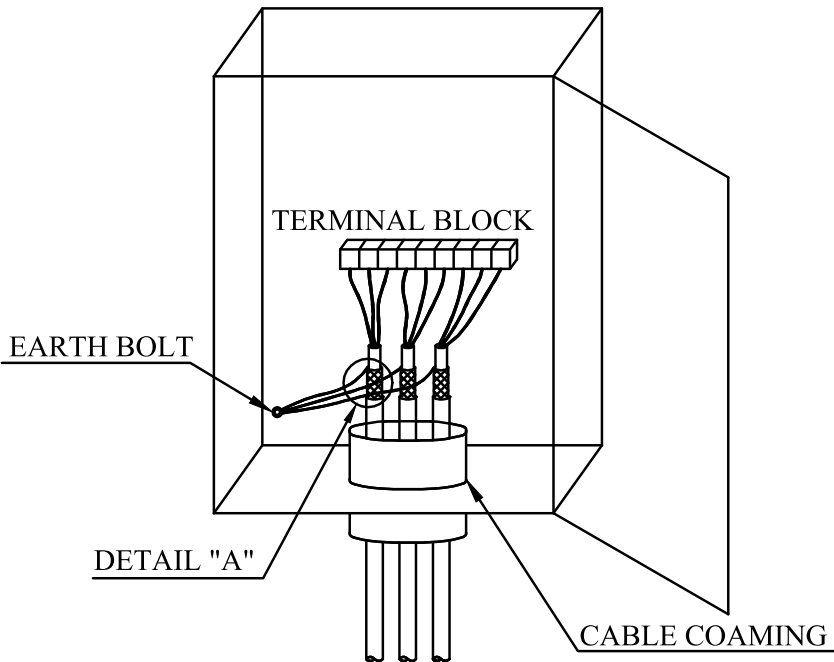
	INSTALLATION PRACTICE ON PENETRATIONS		PART NO: 12.01	58 73	
	INSTALLATION METHOD OF CABLE COAMING		DRG NO: 151-K5700200		
ALL FILLET WELDING (SIDE OF WELD = MINIMUM 4.0mm)					
TYPE	BOTH SIDES		BOTH SIDES		
	FIG	AREA	FIG	AREA	
GIRDER BEAM/ BHD		ACC.		WT BHDS / DECKS	
		E/R		(A60) CLASS DIVISION	
		NWT BHD			
DECK		ACC.		WT BHDS / DECKS	
		E/R		(A60) CLASS DIVISION	
		NWT DECKS			
DECK BULKHEAD GIRDER BEAM		ACC.		WEATHER EXPOSED AREA	
		E/R			(A,B) CLASS DIVISION
		WEATHER EXPOSED AREA			WT BHDS / DECKS
		(A60) CLASS DIVISION			
DECK (CABLE PIPE)		ACC.		WEATHER EXPOSED AREA	
		E/R			(A,B) CLASS DIVISION
		(A,B) CLASS DIVISION			

	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	59
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	73

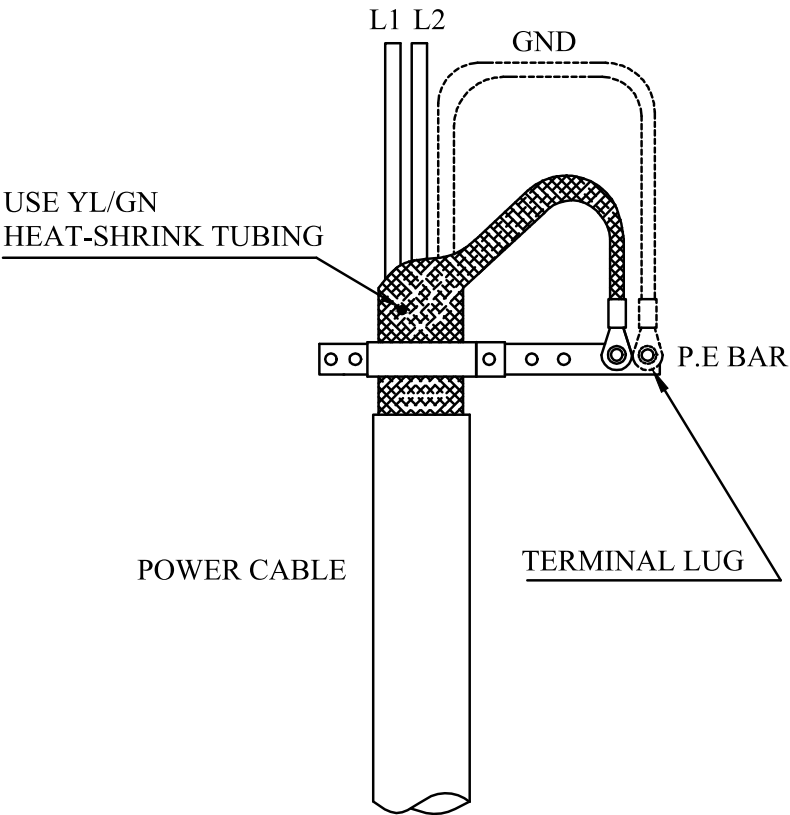
POWER CABLE TERMINATION (PIGTAIL)

1) EARTHING METHOD OF CABLE COAMING SIDE

FIG. 1 CABLE COAMING
(WITH OUTER PROTECTION CABLE)

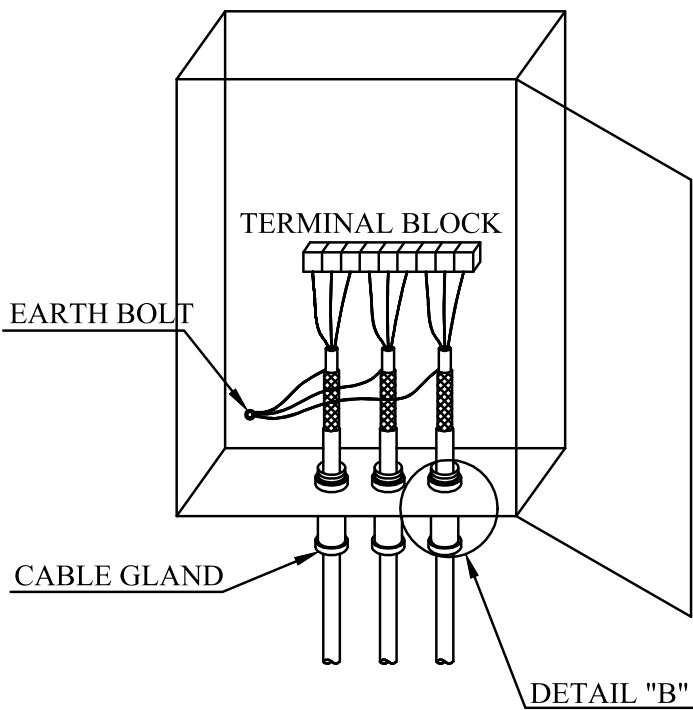


DETAIL "A"

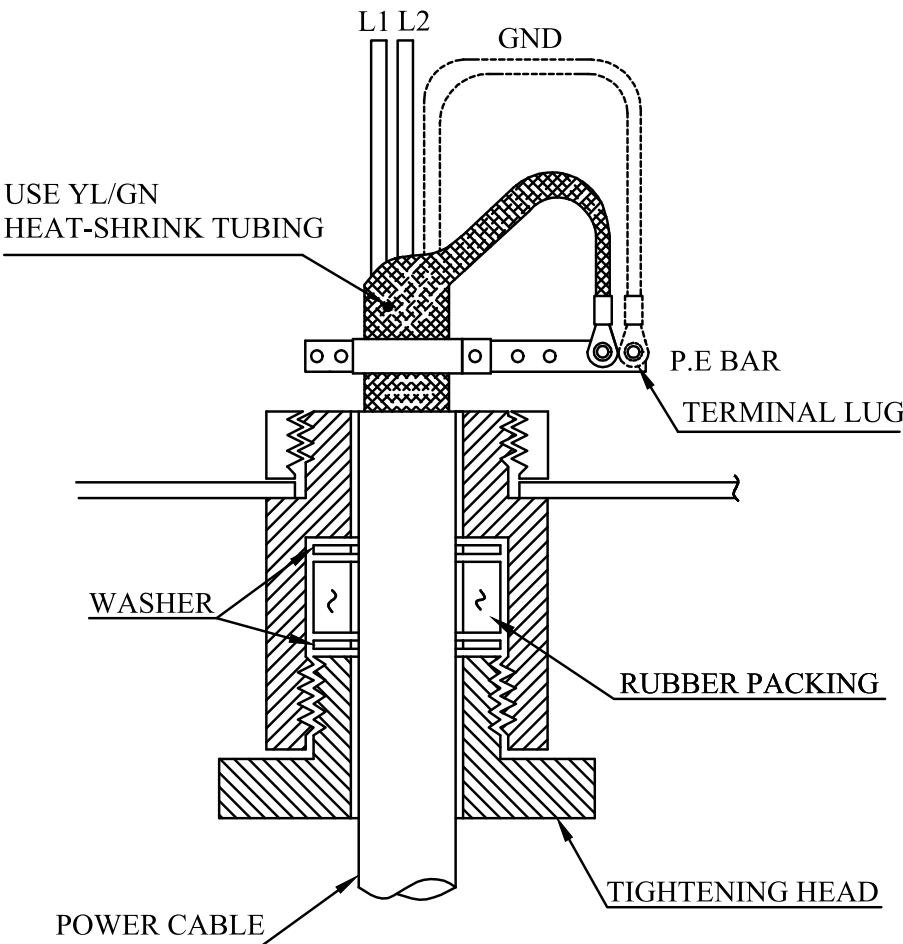



2) EARTHING METHOD OF CABLE GLAND SIDE(WITH OUTER PROTECTION)

FIG. 1 CABLE GLAND

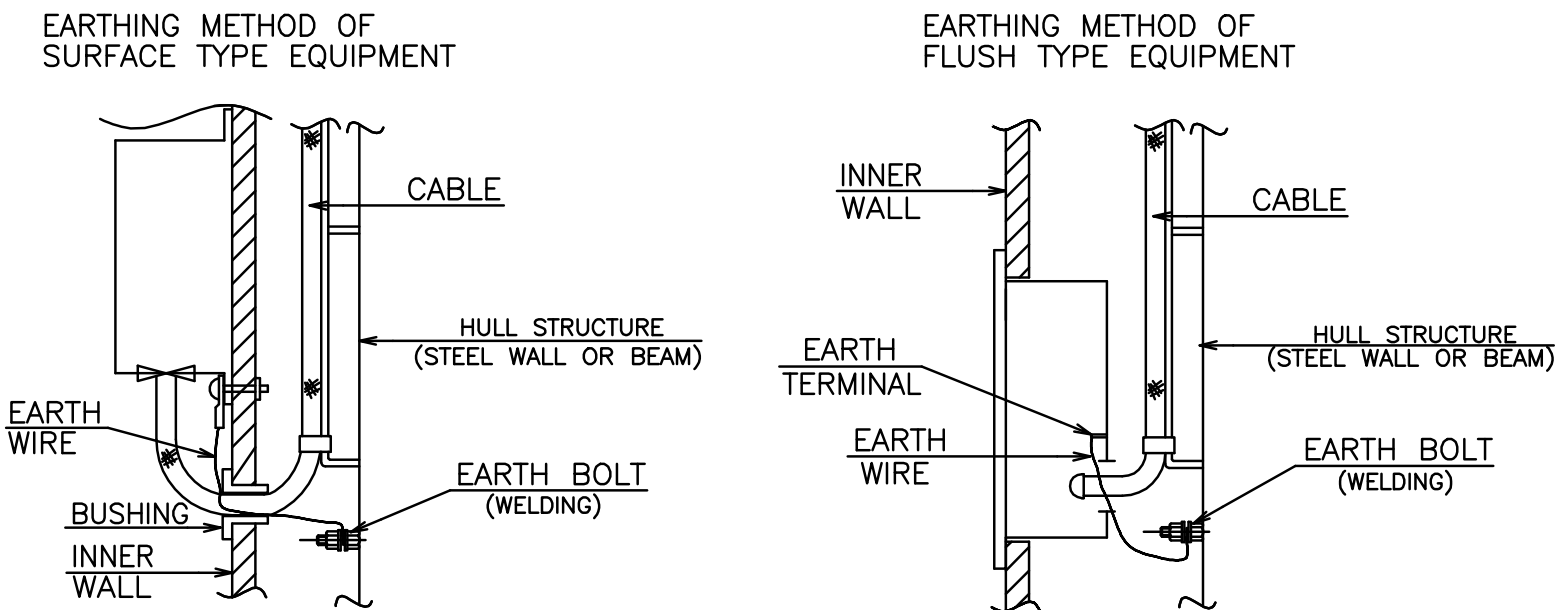


DETAIL "B"



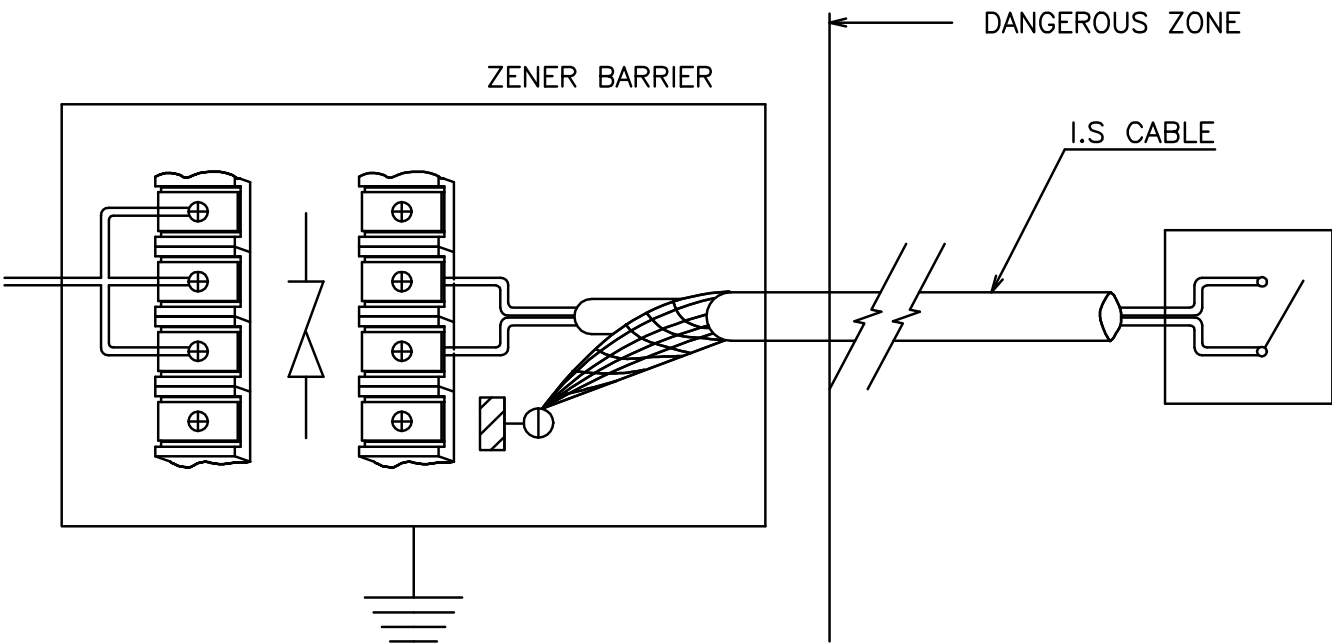
	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	60
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	73

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



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.

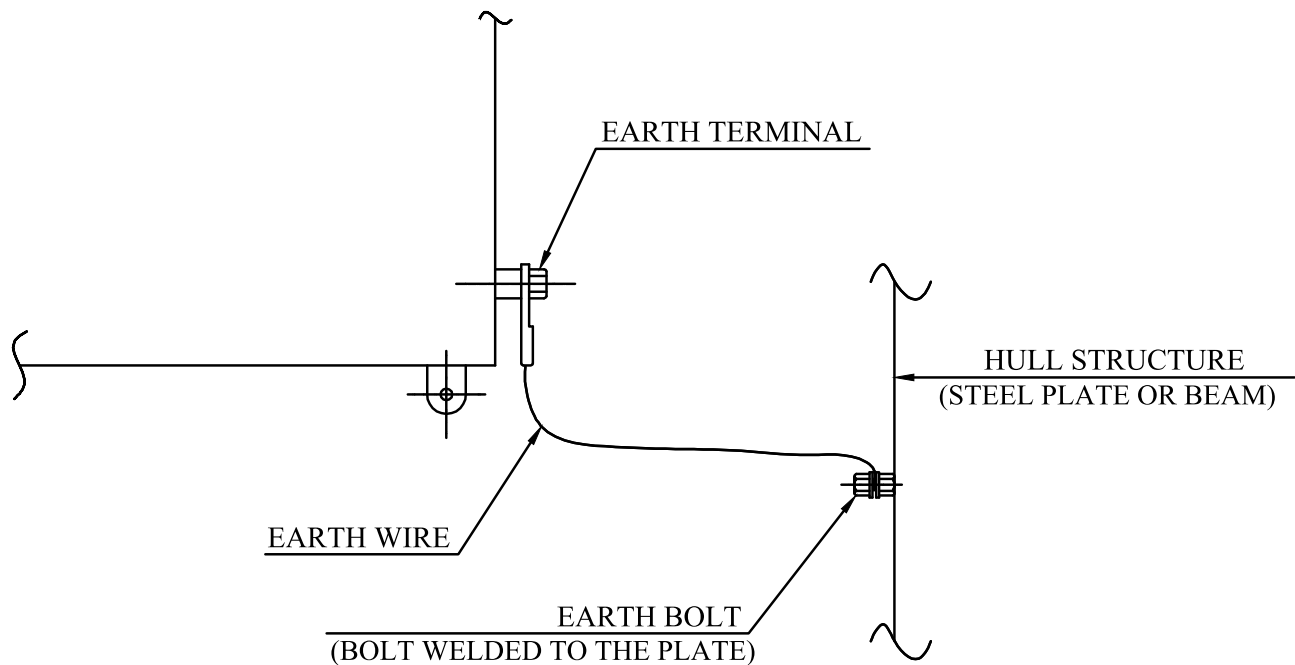


	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	61 73
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	


- 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

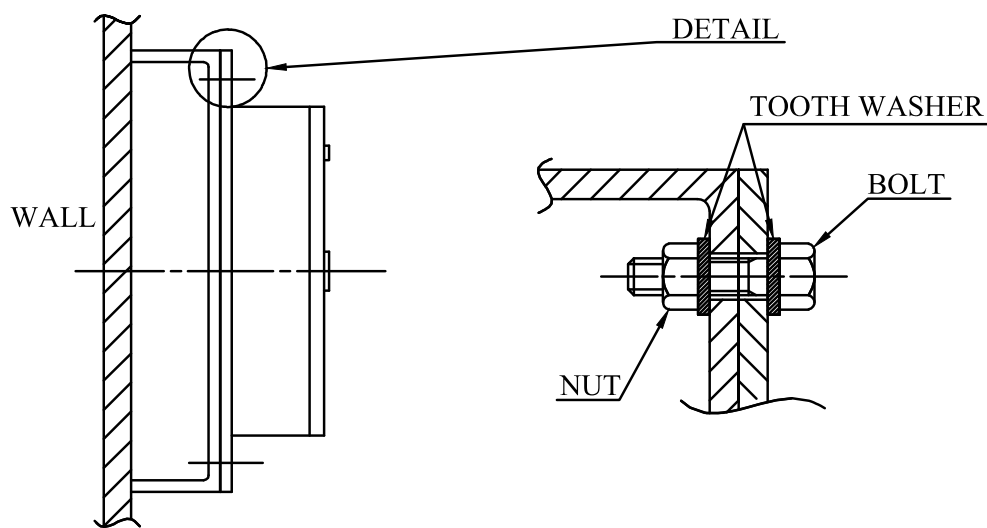
ARRANGEMENT OF EARTH CONDUCTOR	CROSS-SECTION(Q) OF ASSOCIATED CURRENT CARRYING CONDUCTOR (ONE PHASE OR POLE)mm ²	MINIMUM CROSS-SECTION OF COPPER EARTHING CONDUCTOR
1. A) INSULATED EARTH CONDUCTOR IN CABLE FOR FIXED INSTALLATION. B) COPPER BRAID OF CABLE FOR FIXED INSTALLATION. C) SEPARATELY INSULATED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



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

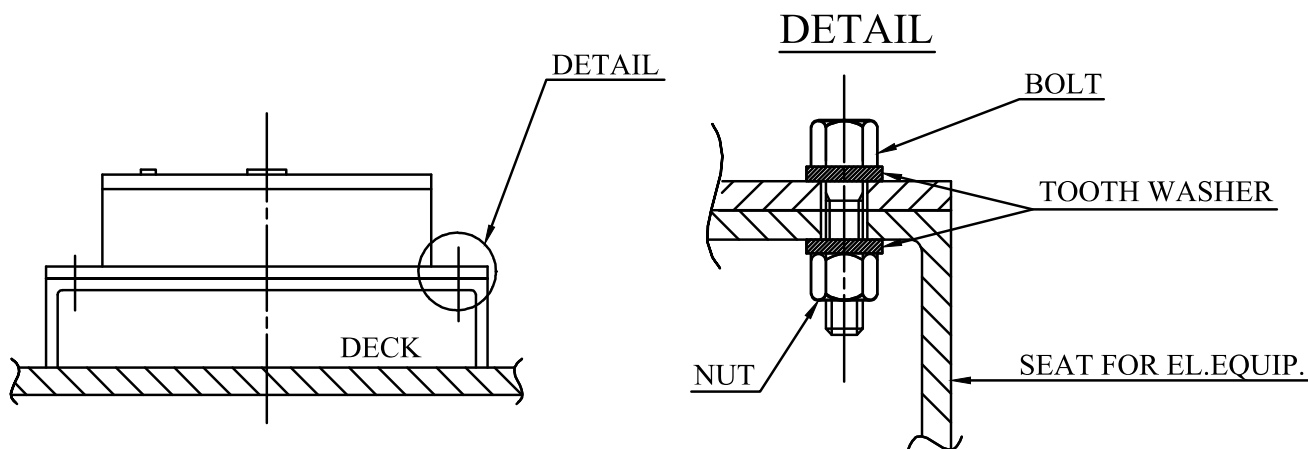
	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	62 73
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	

- 6) METALLIC CONTACT METHOD.
- i) METHOD THAT METAL FRAMES OR ENCLOSURES OF ELECTRICAL EQUIPMENT ARE IN METALLIC CONTACT WITH VESSEL'S STRUCTURE.
 - ii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL WALL.




NOTE ; 1 POINT SHALL BE EARTHED.

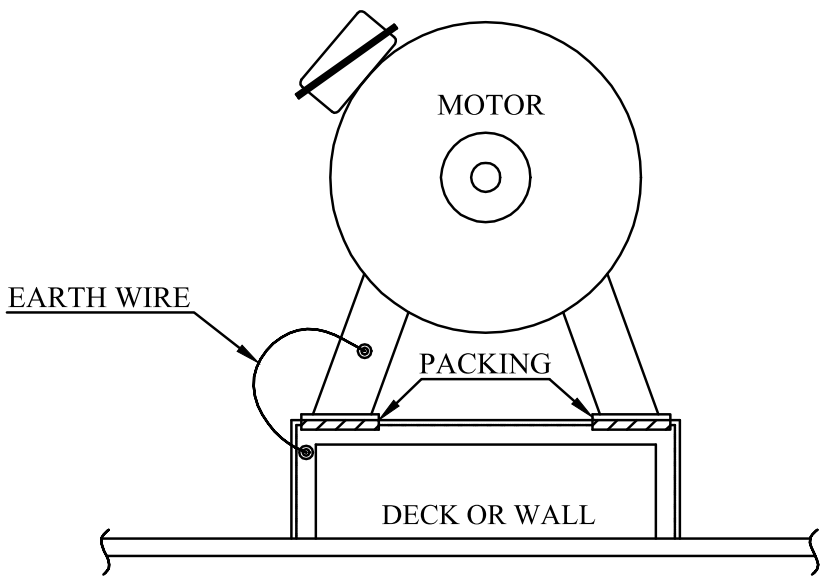
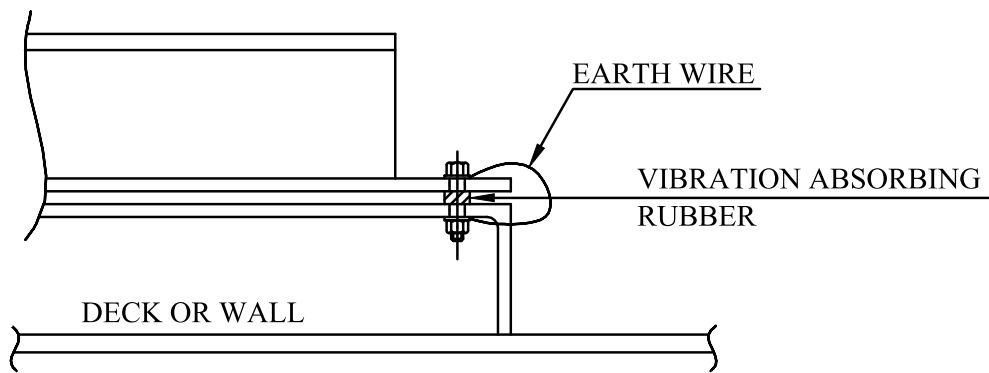
- iii) EARTHING METHOD OF EQUIPMENT INSTALLED ON STEEL DECK.



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

	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	63
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	73

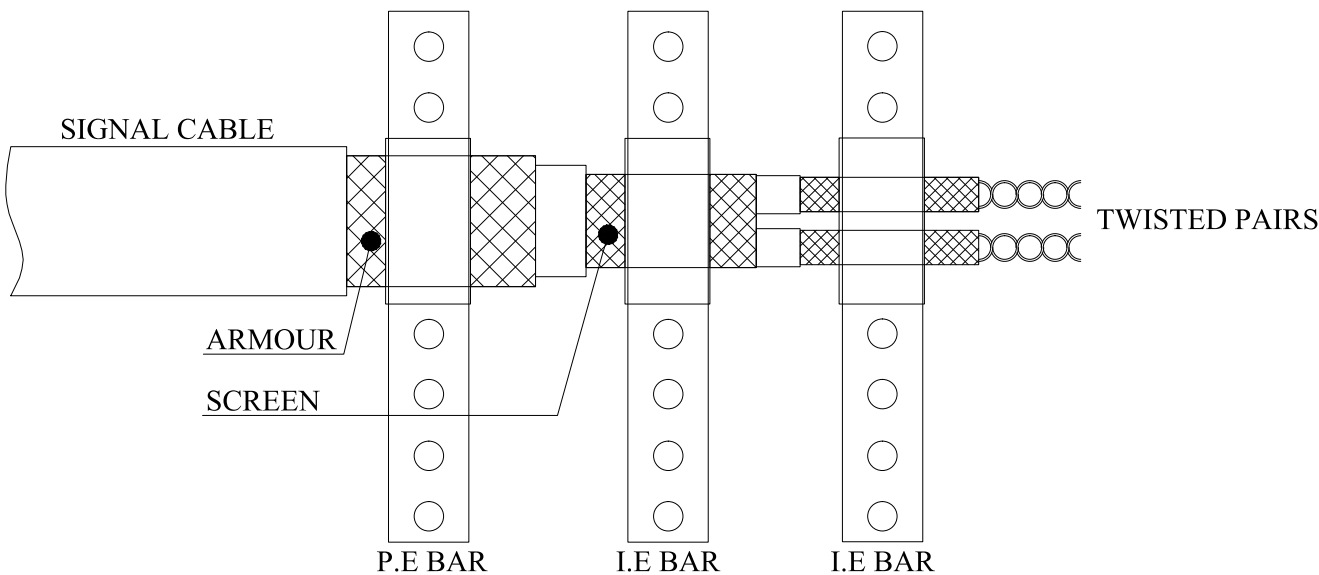
iv) EARTHING FOR AN EQUIPMENT WITH VIBRATION ABSORBING RUBBER OR CORROSION PREVENTING PACKING.




7) TERMINATING METHOD OF CABLE SCREEN

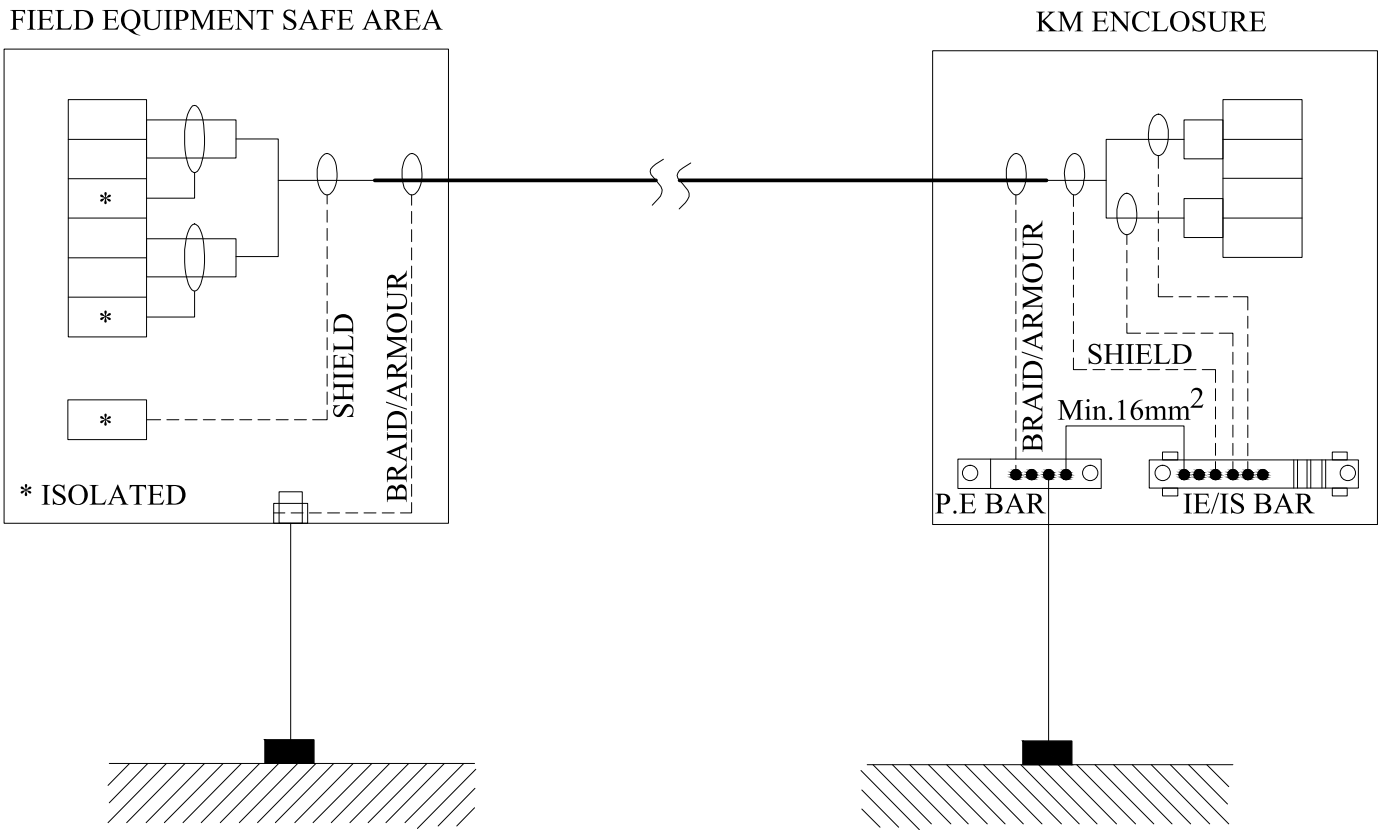
INNER SHIELD SHALL BE CONNECTED TO THE IE-BAR WITHIN THE KM ENCLOSURE AND SHALL BE LEFT INSULATED IN ALL FIELD INSTRUMENTS.

i) SIGNAL CABLE WITH ARMOUR TERMINATION

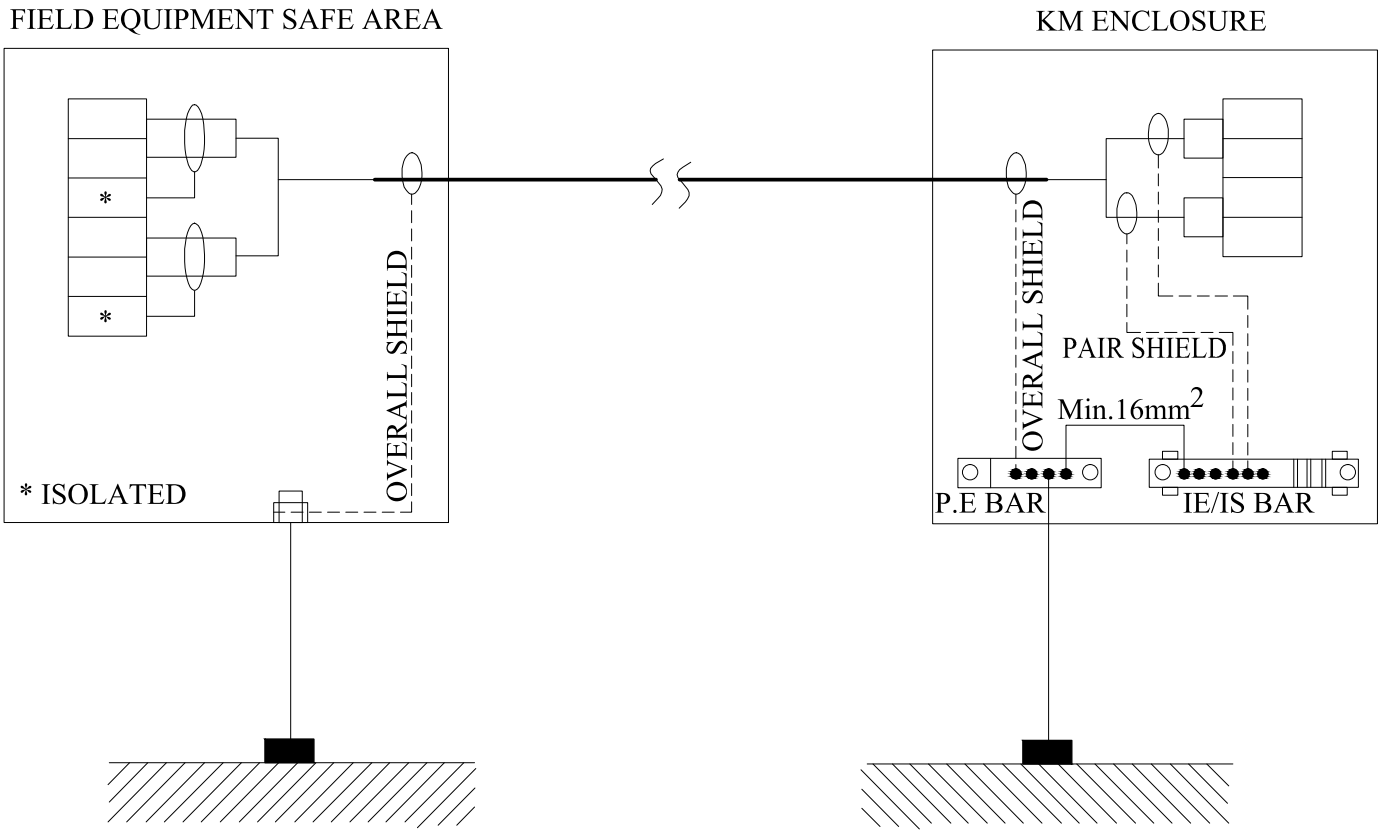



	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	64
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	73

ii) INSTRUMENT CABLE WITH ARMOUR/SHIELD AND INNER (PAIR) SHIELD

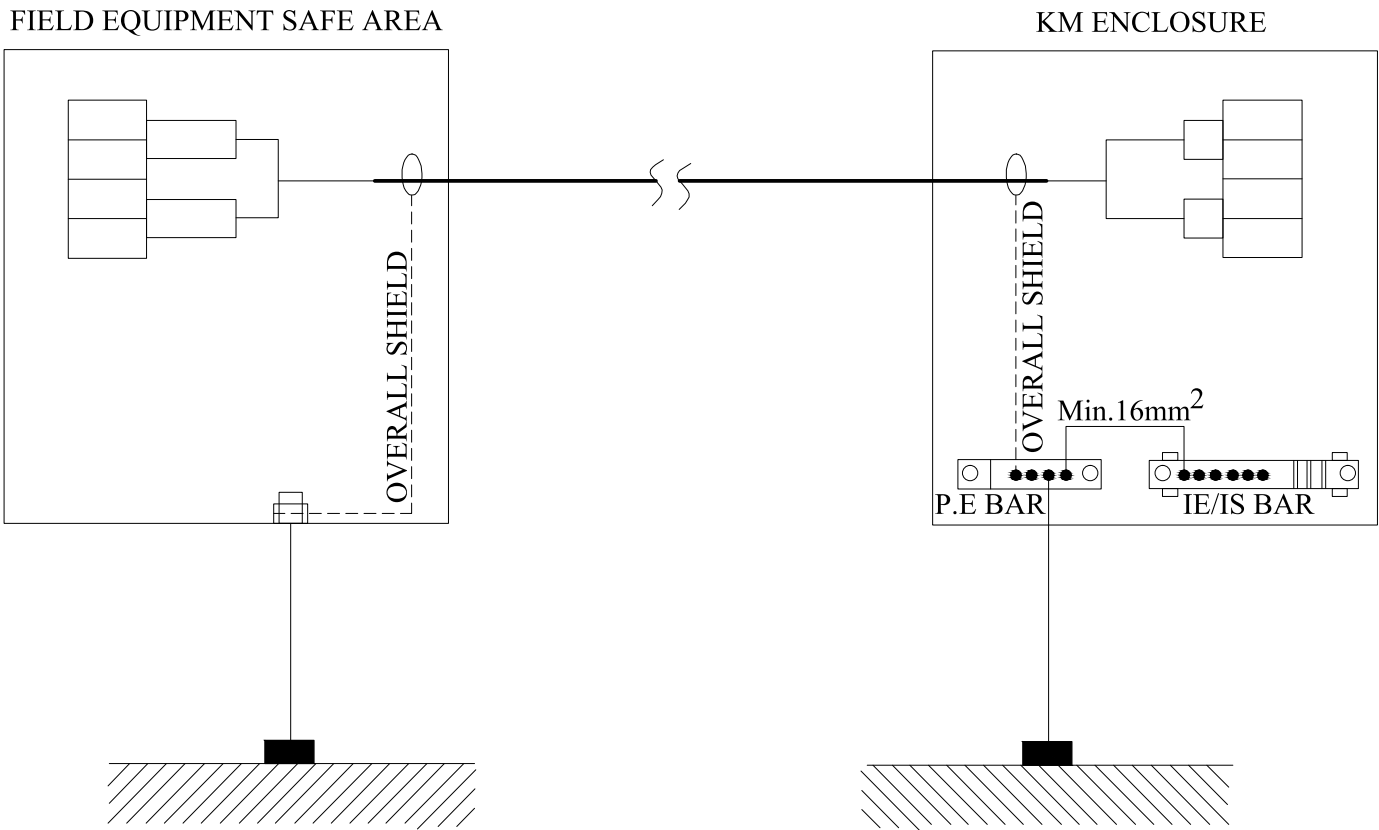


iii) INSTRUMENT CABLE WITH OVERALL SHIELD AND INNER (PAIR) SHIELD



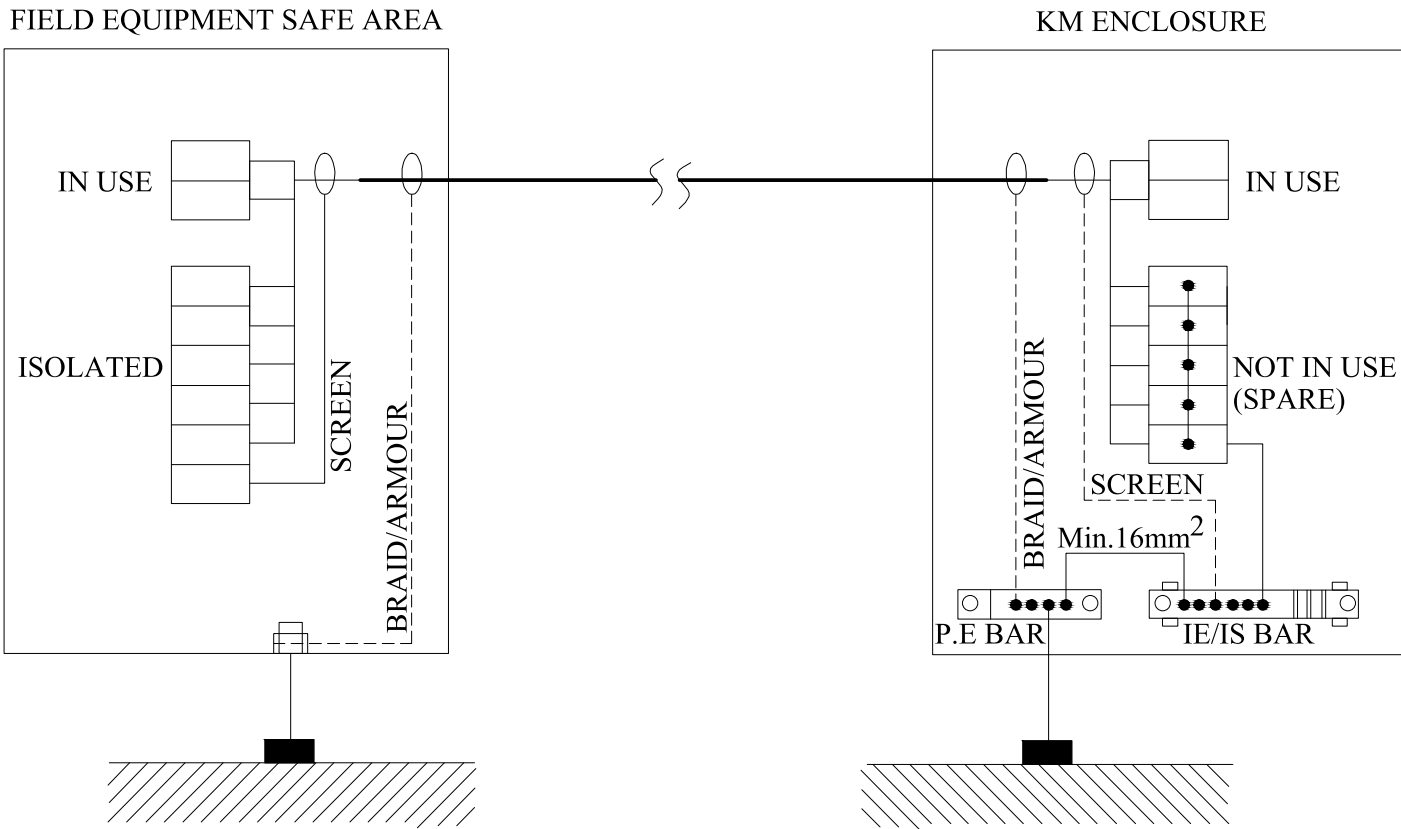
	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	65
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	73


iv) INSTRUMENT CABLE WITH OVERALL SHIELD



8) SPARE CONDUCTORS

SPARE CONDUCTORS IN INSTRUMENT CABLES SHOULD BE TERMINATED TO THE IE-BAR (OR TO THE PE-BAR WHEN THERE IS NO IE-BAR) AND LEFT INSULATED AT THE FIELD END.



	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.01	66 73
	GENERAL DESCRIPTION	DRG NO: 151-K5700200	

NOTES:

1) WHERE THE SCREEN IS LEFT DISCONNECTED OR FLOATING (E.g. FOR FIELD INSTRUMENTS), IT SHALL BE SEALED AND INSULATED WITH AN ISOLATING CAP.

2) THE CABLE ARMOUR SHALL BE EARTHED AT BOTH ENDS (EXCEPT FOR SINGLE CORE CABLES). FOR SINGLE CORE CABLES INSTALLED IN NON-HAZARDOUS AREAS, THE ARMOUR IS TO BE EARTHED AT THE FEEDER END ONLY.

3) WHERE CABLES PASS THROUGH JUNCTION BOXES OR MARSHALLING BOXES, THE SCREENS SHALL BE CONTINUED, VIA TERMINALS, THE SCREENS SHALL NOT BE EARTHED WITHIN THE JUNCTION BOXES OR MARSHALLING BOXES. AT THE FIELD END THE SCREENS SHALL BE TERMINATED IN DEDICATED TERMINALS AND ISOLATED FROM EACH OTHER AND EARTH.

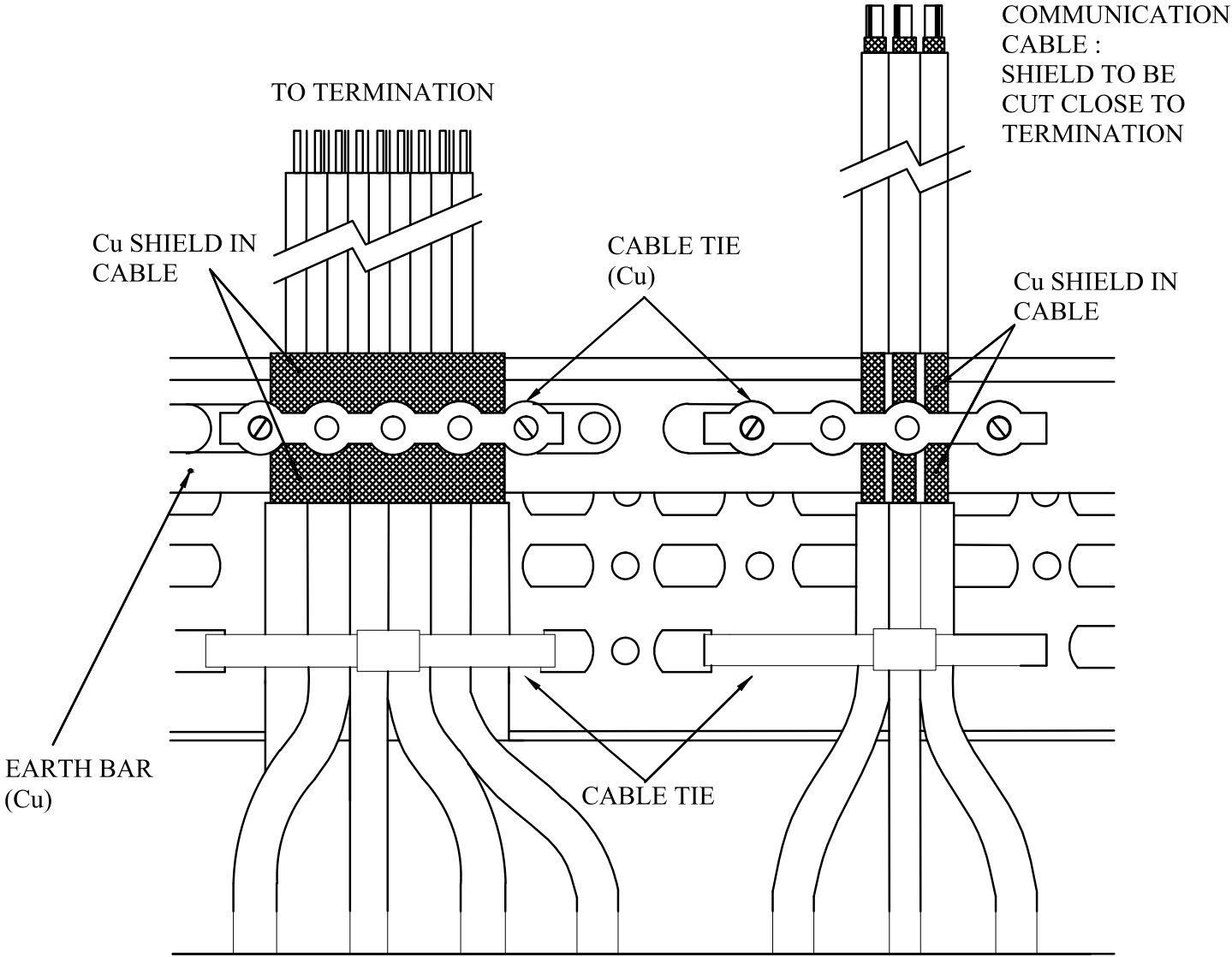
4) METHODS OF SECURING DISSIMILAR MATERIALS, OFTEN INCLUDE INSULATION TO PREVENT GALVANIC CORROSION BETWEEN THE MATERIALS. IN SUCH CASES, A SEPARATE BONDING CONNECTION SHALL BE PROVIDED BETWEEN, FOR EXAMPLE, WHICH SHALL BE MADE IN SUCH A MANNER THAT GALVANIC CORROSION IS AVOIDED AND THE POINTS OF CONNECTION MAY BE READILY INSPECTED.


5) CONNECTION TO THE EARTH BOSS SHALL BE BY CORROSION RESISTANT STAINLESS STEEL STUD BOLTS, NUTS AND WASHERS. SPRING WASHERS SHALL BE USED TO ENSURE THAT THE EARTH CONNECTION DOES NOT COME LOOSE.

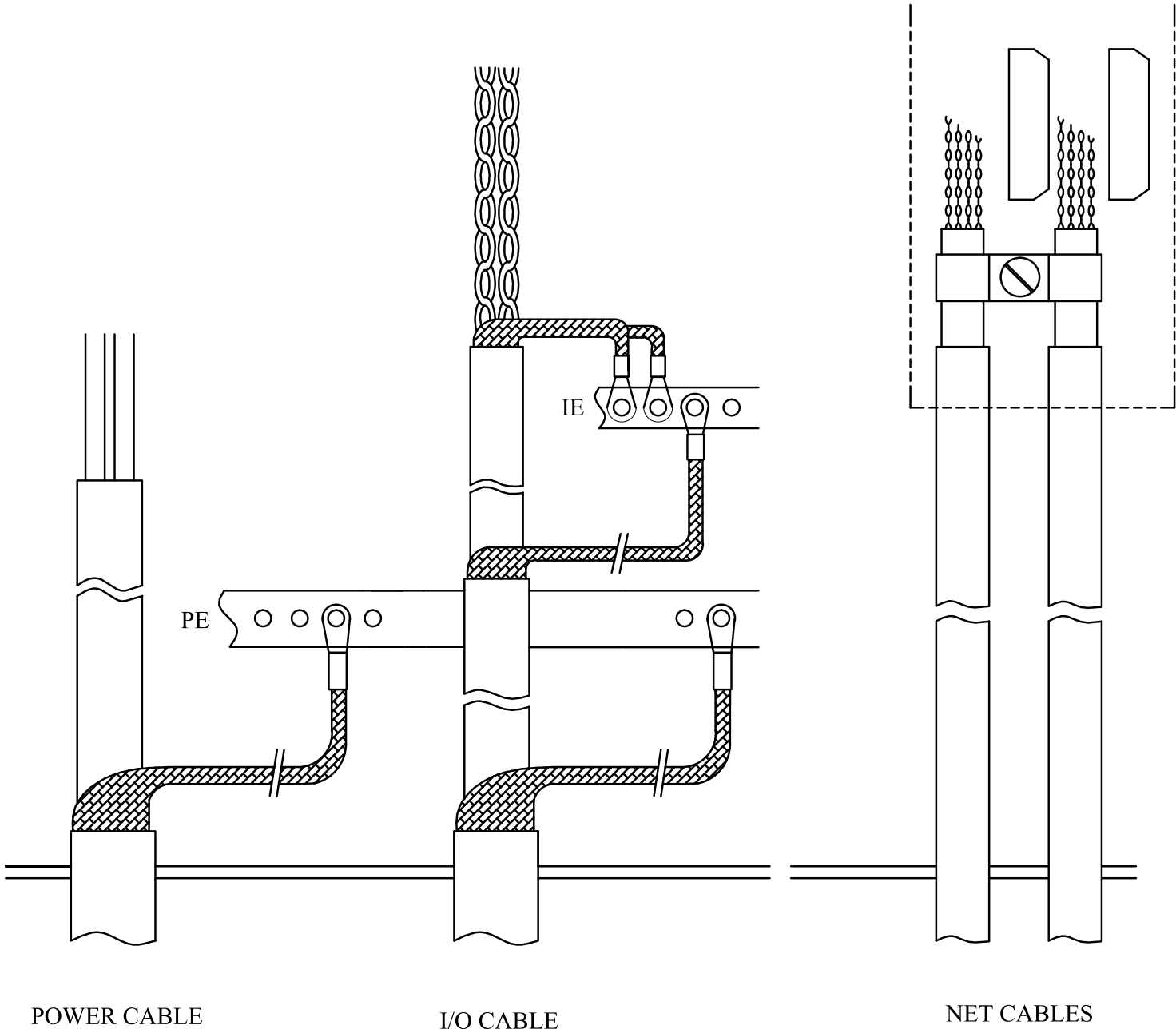
6) OTHER THAN GENERAL EARTHING PRACTICE, ALL KM EQUIPMENT, FIELD EARTHING AND TERMINATION PRACTICE SHALL BE ACCORDING TO KM DOC K-161012 KONGSBERG 700 FAMILY SPECIFICATION OF EARTHING, SHIELDING AND POWER DISTRIBUTION PRINCIPLES.

	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.02	67 73
	GROUNDING OF CABLE SHIELD AT CABINET ENTRY	DRG NO: 151-K5700200	

GROUNDING OF CABLE SHIELD
AT ENTRY OF THE CABINET

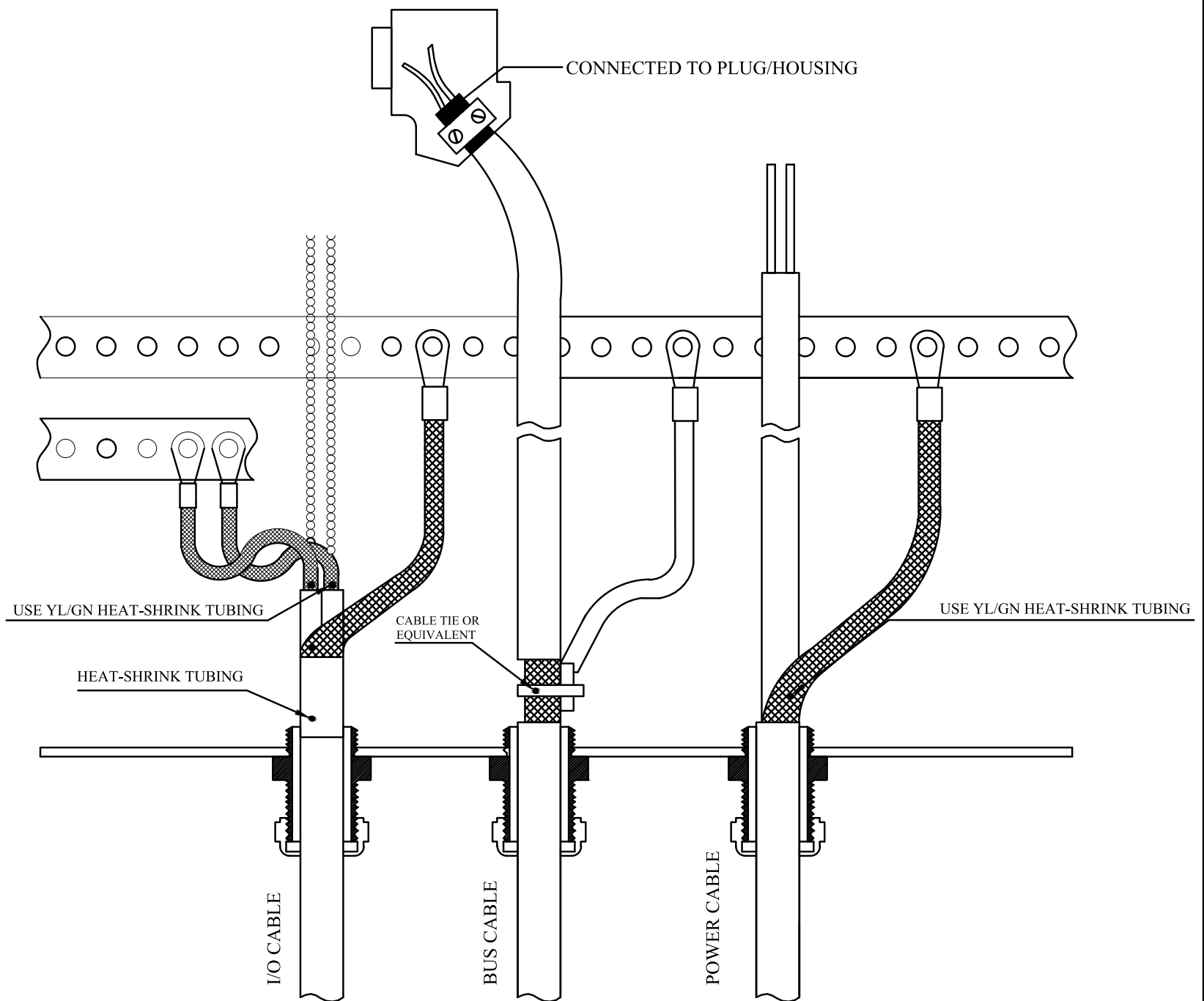



	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.03	68
	GROUNDING THE S/FTP CABLE SCREEN	DRG NO: 151-K5700200	73

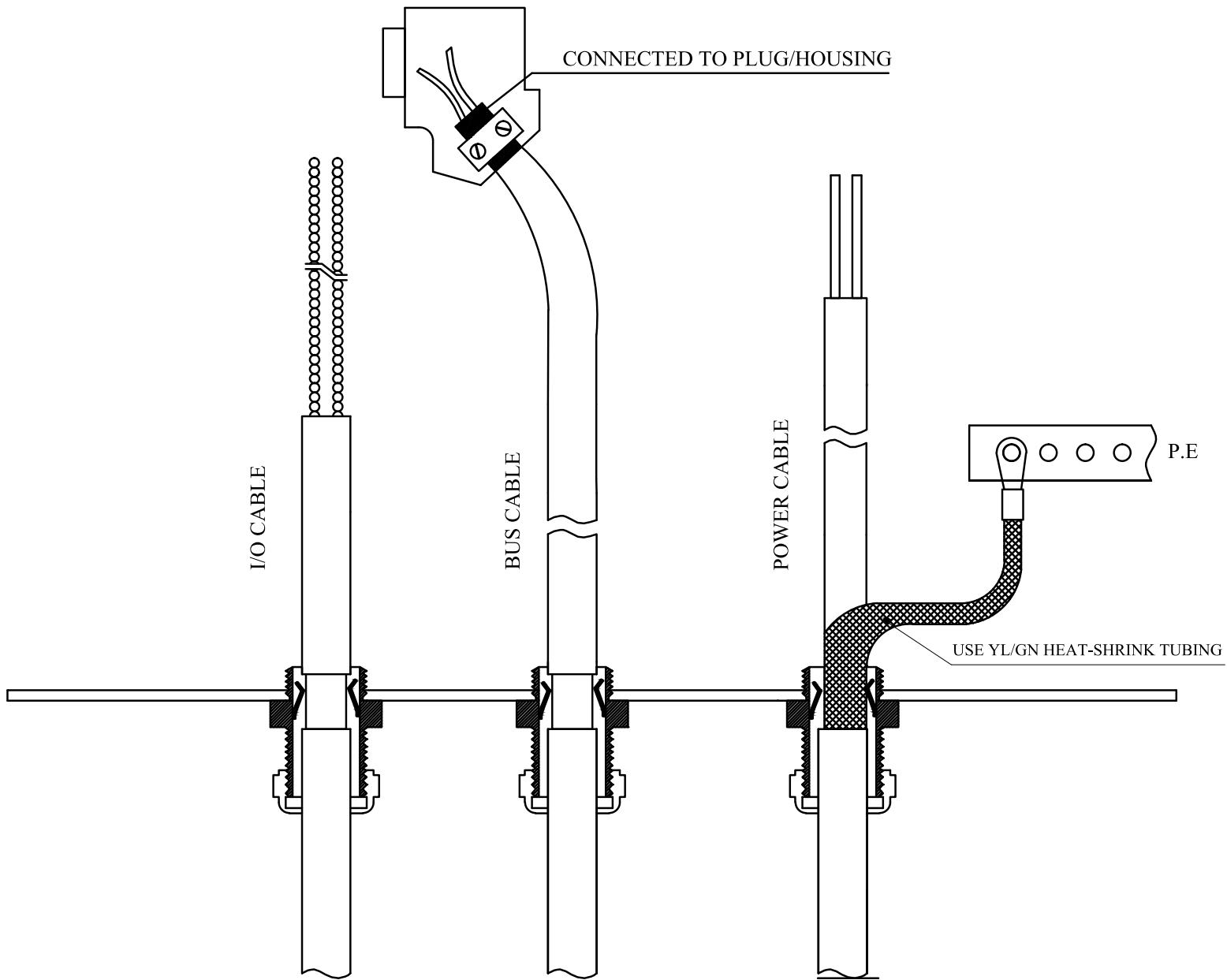



When 360 degrees grounding is not obtainable (neither by means of glands nor MCT) every cable entering the enclosure shall be grounded with a pigtail that is as short as possible.
The outer shield on the installation cables (power or signal) is to be grounded to the P.E. bar and the inner or twisted pair shield (signal) is be grounded to the I.E bar.
Network cables shall be grounded to the patch panel only, or to the network connector.

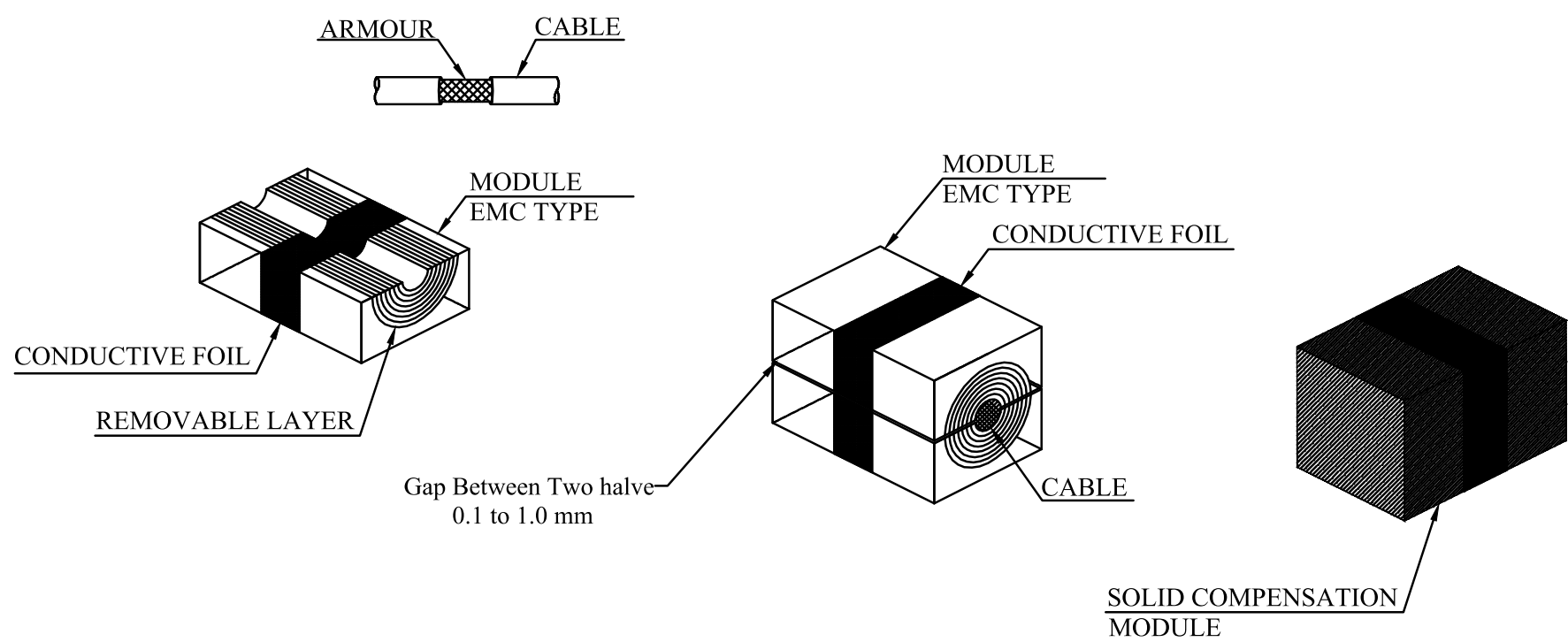
	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.04	69 73
	NON-EMC ENTRY OF SIGNAL, BUS AND POWER CABLE	DRG NO: 151-K5700200	



	INSTALLATION PRACTICE ON EARTHING	PART NO: 13.05	70 73
	EMC ENTRY OF SIGNAL, BUS AND POWER CABLE	DRG NO: 151-K5700200	


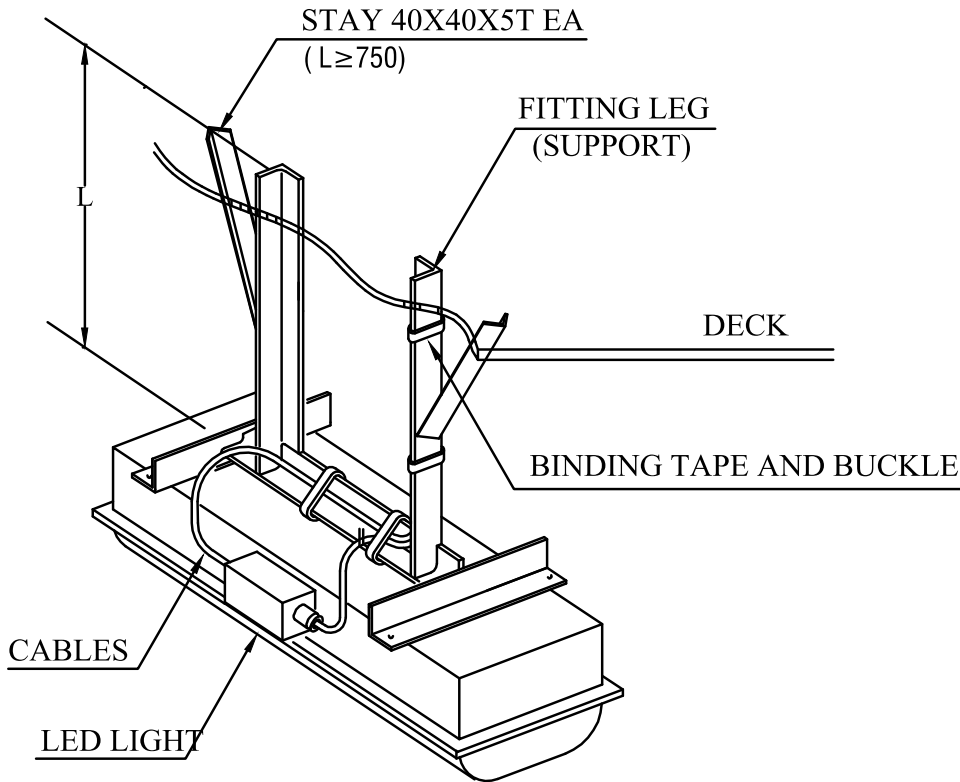



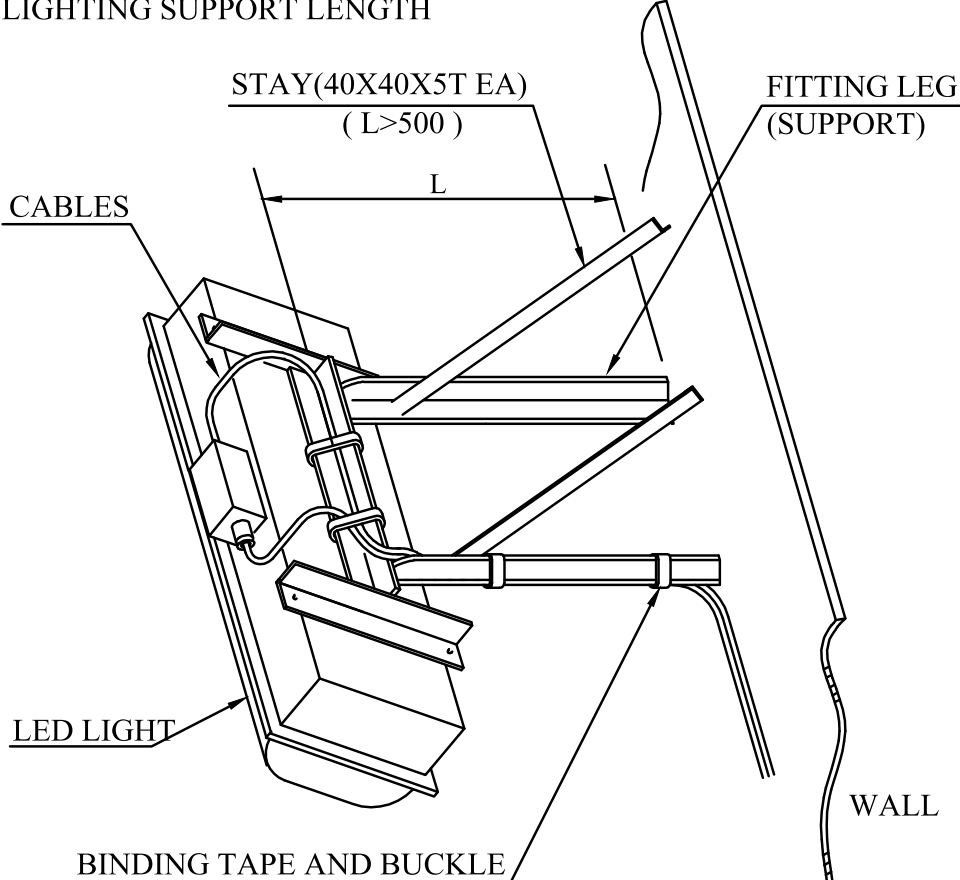
	MCT EMC MODULE	PART NO: 13.06	71
	CABLE PENETRATION	DRG NO: 151-K5700200	73



EARTHING INSIDE MCTS

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

	INSTALLATION METHOD FOR LIGHTING FIXTURE		PART NO: 14.01	72 73
	DECK MOUNTING TYPE		DRG NO: 151-K5700200	
<div><div><div>DECK MOUNTING</div><div>APPLICATION</div><div><div>- ACCOMMODATION</div><div>- CASING</div><div>- FOR SIGHT GLASS LIGHTING</div><div>- LOW VIBRATION AREA</div><div>- E/R FLOOR UNDER GRATING</div><div>- ESCAPE TRUNK ETC</div></div><div>APPLICATION OF FITTING LEG</div><div><div><div>$L \geq 1000$</div><div>50x50x3t EA</div></div><div><div>$1000 > L$</div><div>40x40x5t EA</div></div></div><div>APPLICATION OF STAY</div><div><div>- $L \leq 750$: NO STAY</div><div>- $L > 750$: 40X40X5T EA</div></div></div></div> <div><div>DECK MOUNTING</div><div>L : LIGHTING SUPPORT LENGTH</div><div></div><div>NOTE: LIGHT FITTING BELOW CARGO DECK AND IN ENGINE ROOM TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENTION</div></div>				

	INSTALLATION METHOD FOR LIGHTING FIXTURE		PART NO: 14.02	73 73
	WALL MOUNTING TYPE		DRG NO: 151-K5700200	
<div><div>WALL MOUNTING</div><div>APPLICATION</div><div><div>- ACCOMMODATION</div><div>- CASING</div><div>- FOR SIGHT GLASS LIGHTING</div><div>- LOW VIBRATION AREA</div><div>- E/R FLOOR UNDER GRATING</div><div>- ESCAPE TRUNK ETC</div></div><div>APPLICATION OF FITTING LEG</div><div>40x40x5t EA</div><div>APPLICATION OF STAY</div><div><div>- L ≤ 500: NO STAY</div><div>- L > 500: 40X40X5T EA</div></div></div>		<div><div>WALL MOUNTING</div><div>L : LIGHTING SUPPORT LENGTH</div><div></div><div>NOTE: LIGHT FITTING BELOW CARGO DECK AND IN ENGINE ROOM TO BE MOUNTED WITH VIBRATION ARRESTING RUBBER SUSPENTION</div></div>		

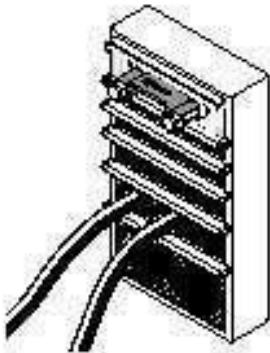


COCHIN SHIPYARD LTD

MCT Installation Checklist

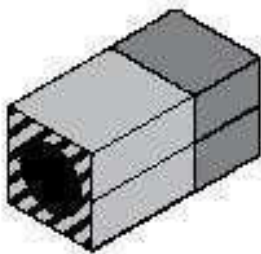


**Installation instructions
Roxtec RM PE B systems**

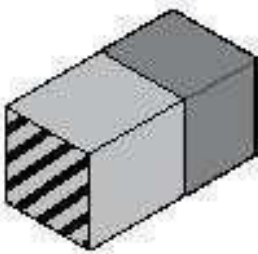


Safety information
Roxtec recommends that all installations are performed without facility operation. Follow national regulations and installation codes. Any action affecting the raised service should be performed according to manufacturer recommendations.

Components



Roxtec PE B module



Roxtec solid PE B module



Roxtec Lubricant

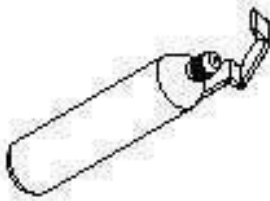
Tools



13 mm spanner
(not included)



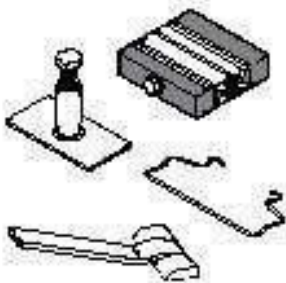
Cable jacket removal guide
(not included)



Cable stripper tool.
Recommended by the cable manufacturer
(not included)



Continuity tester
(not included)



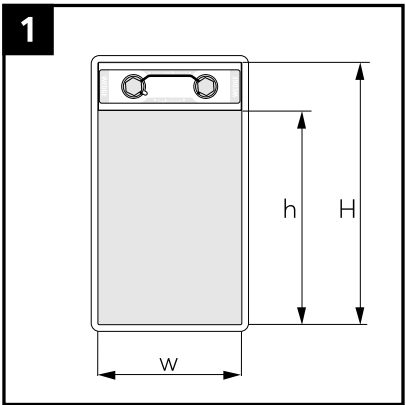
Roxtec tools
(not included)

Technical data

Name	For cable/pipe Ø (mm)
RM 15 PE B	3 – 11
RM 15w40 PE B	3.5 – 10.5
RM 20 PE B	4 – 14.5
RM 20w40 PE B	3.5 – 16.5
RM 30 PE B	10 – 25
RM 30H90 PE B	10 – 25
RM 40 PE B	21.5 – 34.5
RM 40 10–32 PE B	9.5 – 32.5
RM 40H80 PE B	21.5 – 34.5
RM 60 PE B	28 – 54
RM 60 24–54 PE B	24 – 54
RM 80 PE B	48 – 71
RM 90 PE B	48 – 71
RM 120 PE B	67.5 – 99
RM 5w120/0 PE B	0
RM 10/0 PE B	0
RM 10w120/0 PE B	0
RM 10w60/0 PE B	0
RM 15/0 PE B	0
RM 20/0 PE B	0
RM 30/0 PE B	0
RM 30H90/0 PE B	0
RM 40/0 PE B	0
RM 40H80/0 PE B	0
RM 60/0 PE B	0

The diameter range of the modules indicates the smallest diameter of the exposed cable shield to the largest diameter of the cable jacket. Modules with core are spare capacity.

Packing space



S	H	w	h
1	101	60	60
2	101	120	60
3	160	60	120
4	160	120	120
5	218	60	180
6	218	120	180
7	278	60	240
8	278	120	240

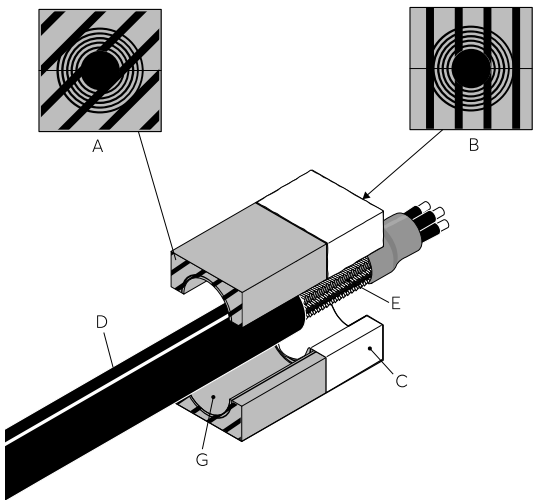
Measure your frame height (H) and check the corresponding packing height (h) in the table. Consider your packing height when inserting the modules.

Cable placement in module

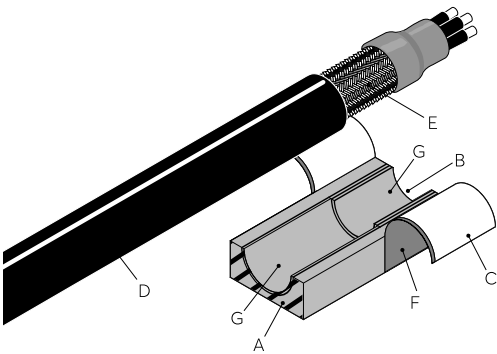
A: Environmental side
B: Termination/interior side
C: Conductive tape

D: Cable jacket
E: Cable shield
F: Plastic film

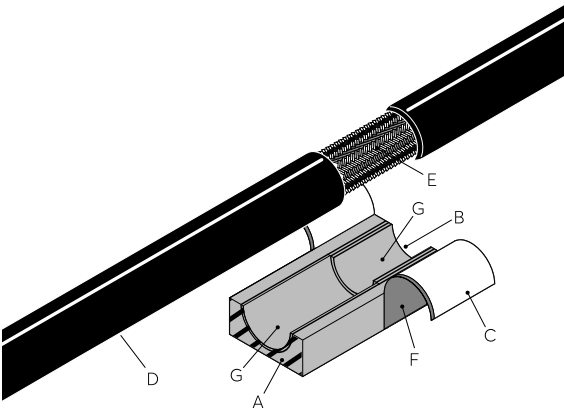
G: Removable layers



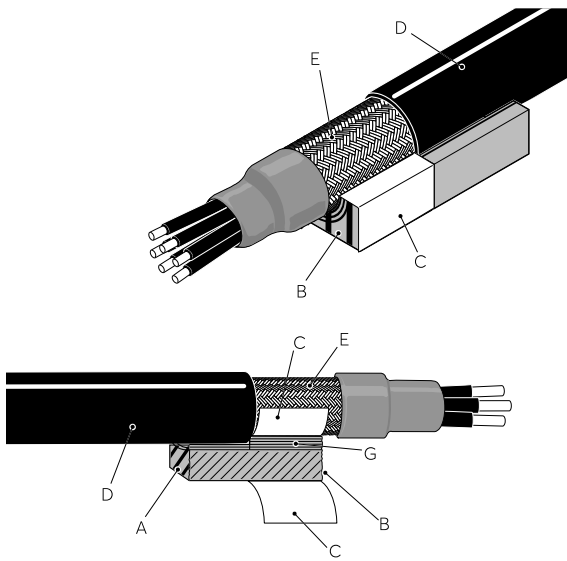
The tape is folded in.



Cable with terminated shield.

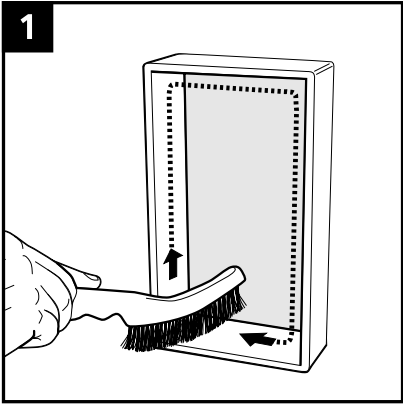


Cable with pass-through shield.

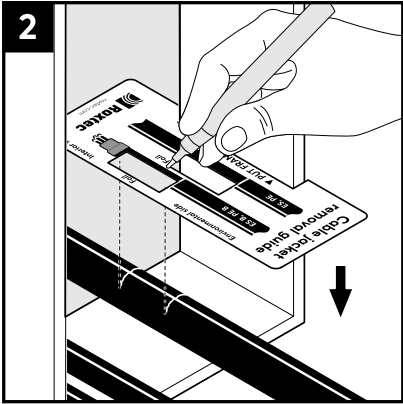


Cable placement in the module half. The cable jacket edge shall be in contact with the edge of the removable layers.

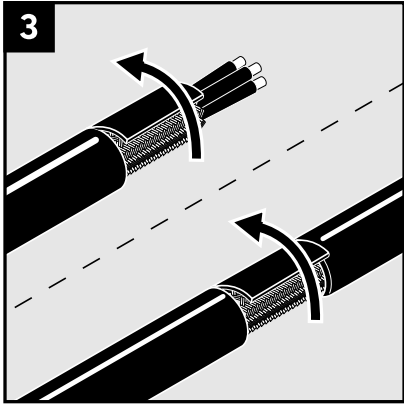
Installation



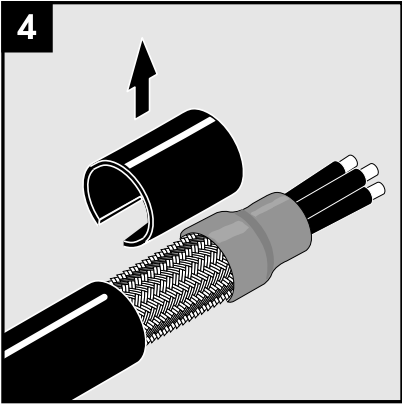
1 Clean the frame. Ensure continuous electrical contact with the structure.



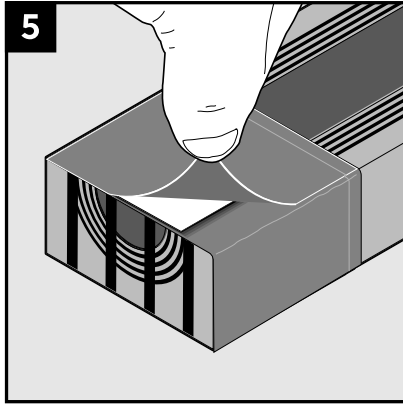
2 Hold the cable in its final position. Mark where the cable jacket is to be removed using the guide.



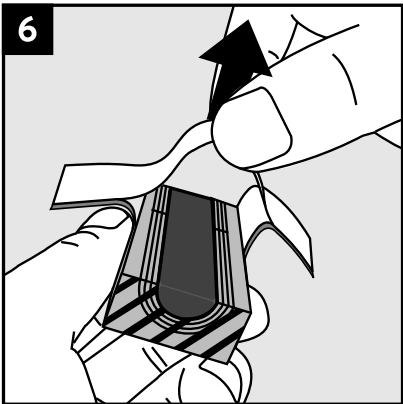
3 Remove the outer jacket and any plastic foil. The cable shield shall be clean and conductive.



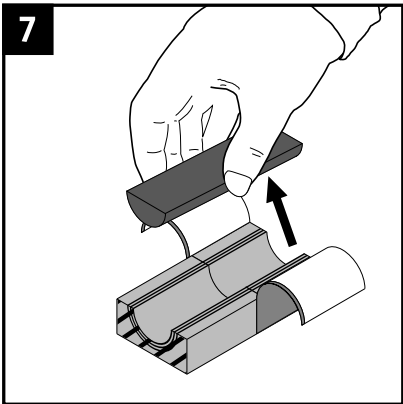
4 Secure the end of the cable shield. See suggestions for cable preparation on roxtec.com.



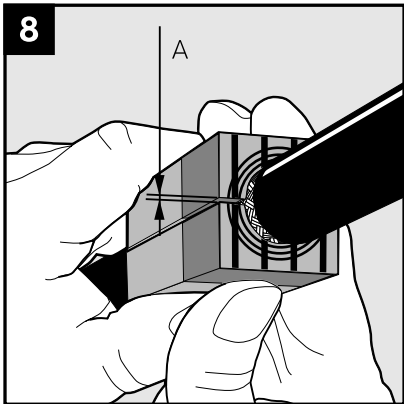
5 Lift the conductive tape and plastic film.



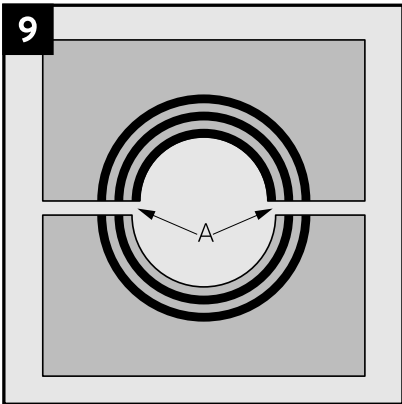
6 Remove the protection paper from all modules and fold out the conductive tape.



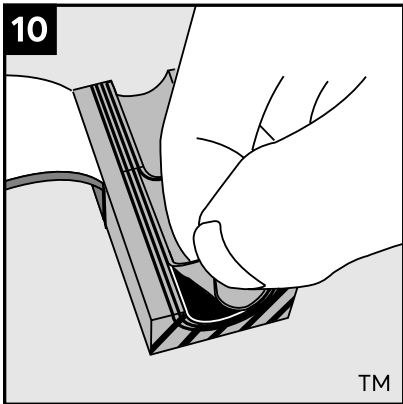
7 Remove the cores on all modules except spares.



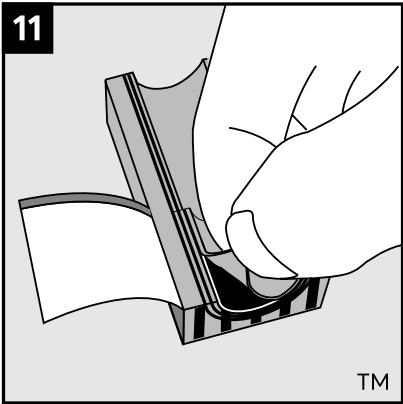
8 Achieve a gap of 0.1-1.0 mm (A) between the module halves by peeling off layers.



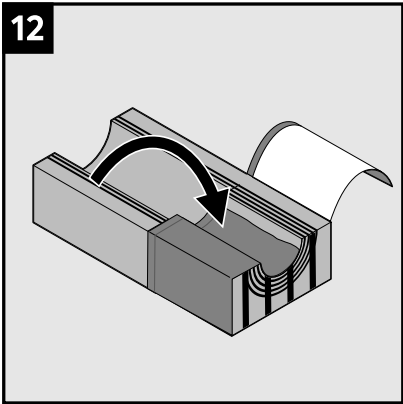
9 The number of layers between the corresponding module halves may not differ (A) by more than one layer.



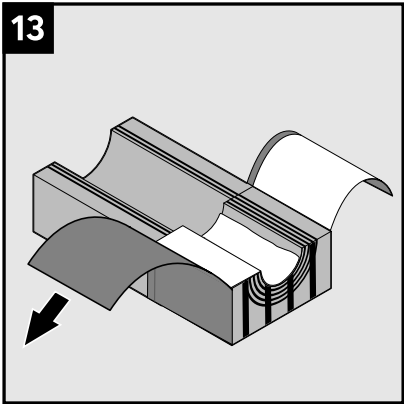
10 Adapt the layers that are in contact with the cable jacket.



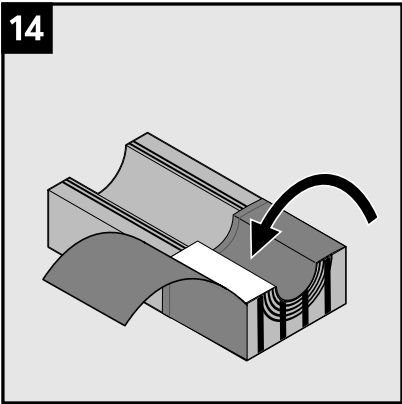
11 Adapt the layers that are in contact with the cable shield.



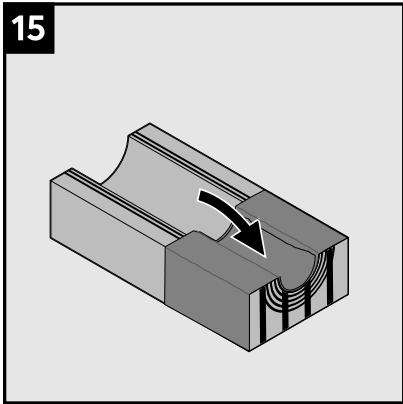
12 Fold the conductive tape tightly inside the module half from one side.



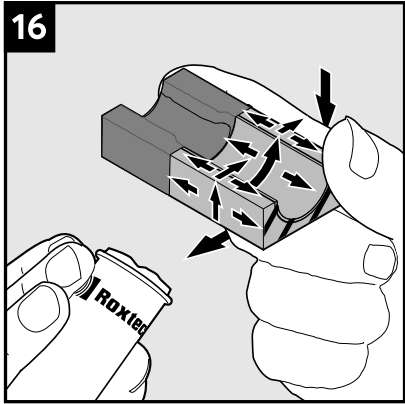
13 Separate the plastic film from the conductive tape and fold it to the side.



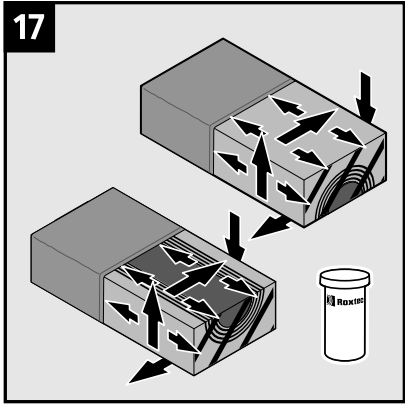
14 Fold the tape on the other side tightly inside the module half.



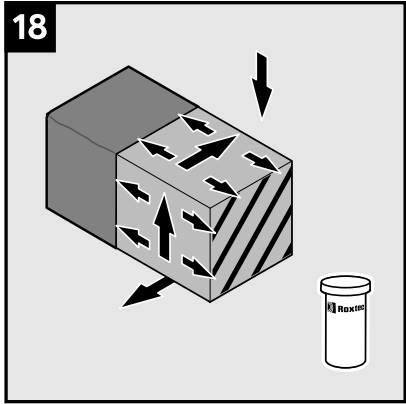
15 Fold the plastic film back inside the module half.



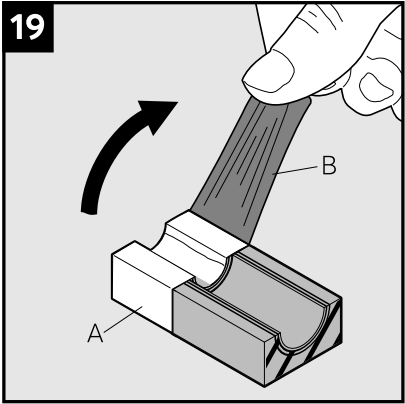
Lubricate the sealing surfaces of all modules. Do not lubricate the plastic film.



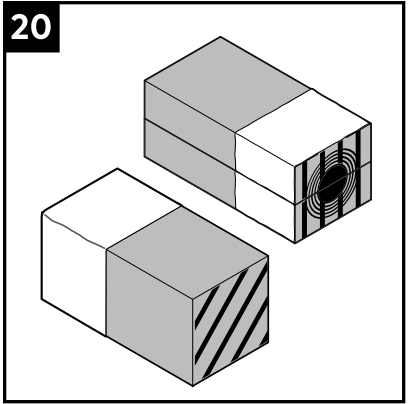
Lubricate the sealing surfaces of the spare modules. Do not remove the cores.



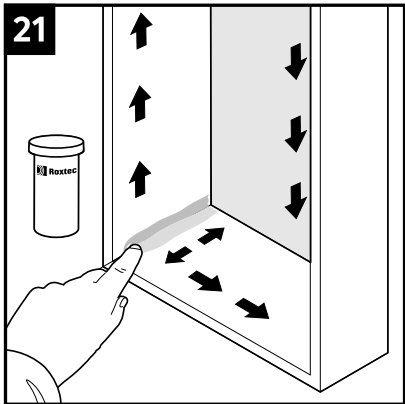
Lubricate the sealing surfaces of the solid modules.



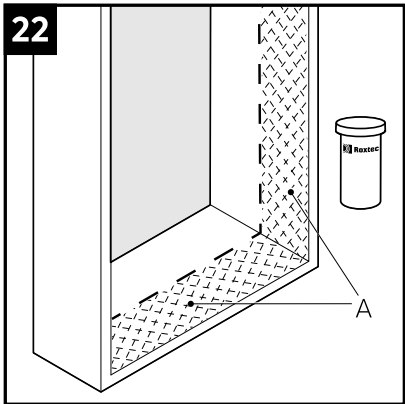
Remove the plastic film (B) on all modules. Keep the conductive tape (A) clean.



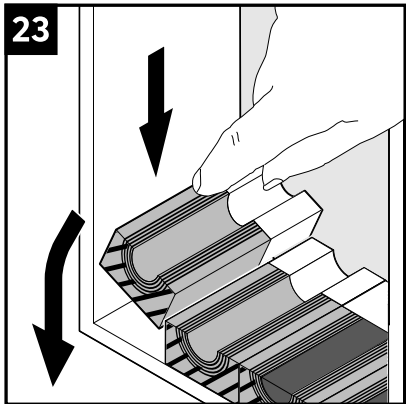
Plastic must be removed also on solid and spare modules.



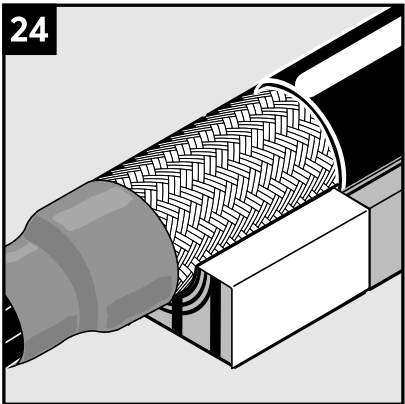
Lubricate the inside surfaces of the frame and especially its corners.



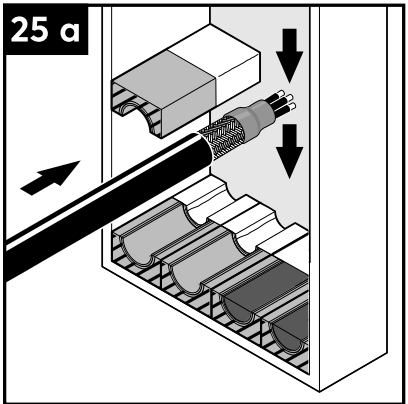
Lubricate the area (A) that will be in contact with the tape sparsely.



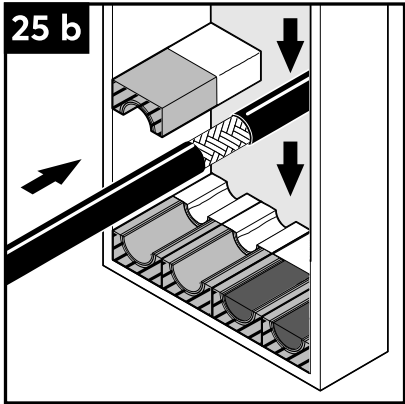
Place modules, according to your packing plan.



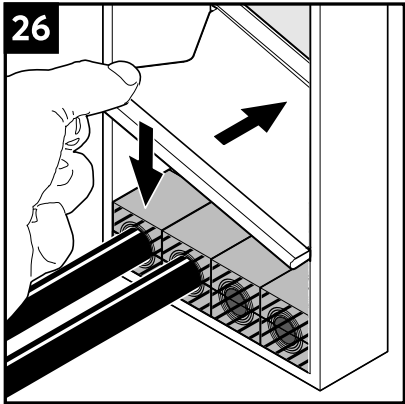
The cable shield shall be visible outside the module at the termination side.



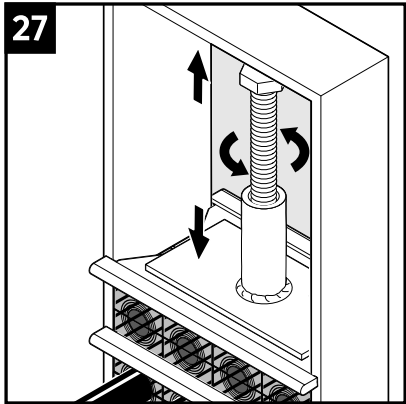
Place cables and the corresponding module halves on top.



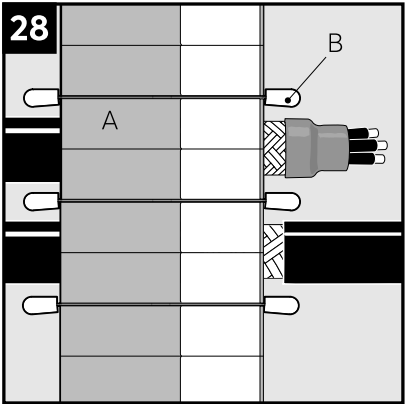
For pass-through cables, cable shield shall be visible on the termination side.



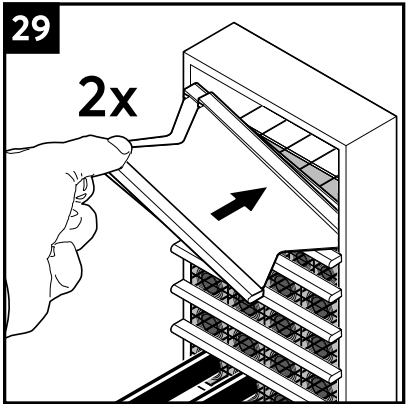
Insert a stayplate on top of every finished row of modules.



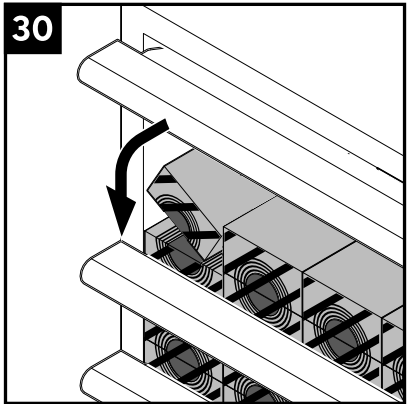
To simplify installation, the use of a pre-compression tool is recommended.



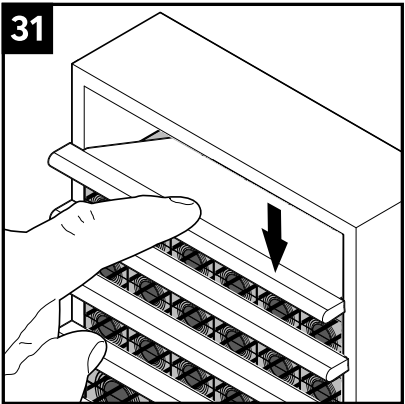
Ensure that the modules (A) are secured within the stayplate (B) edges.



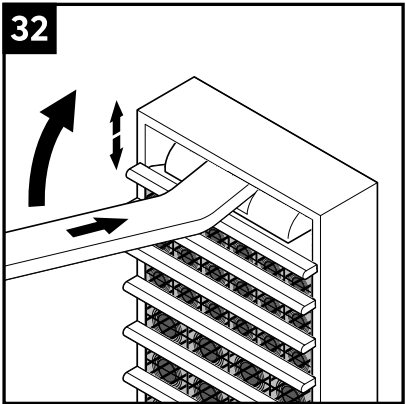
Before inserting the final row of modules, insert two stayplates.



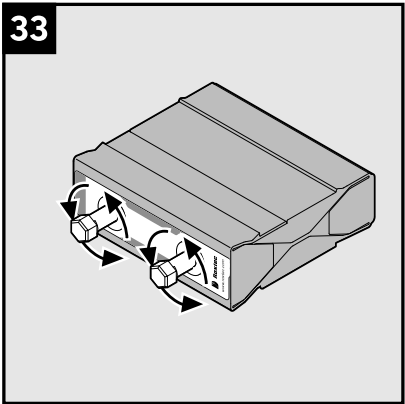
30 Separate the two stayplates and insert the final row of modules between the stayplates.



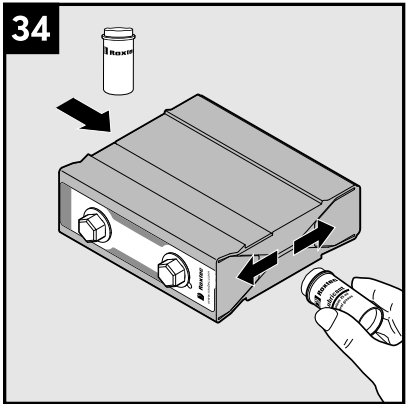
31 Place the upper stayplate on top of the modules.



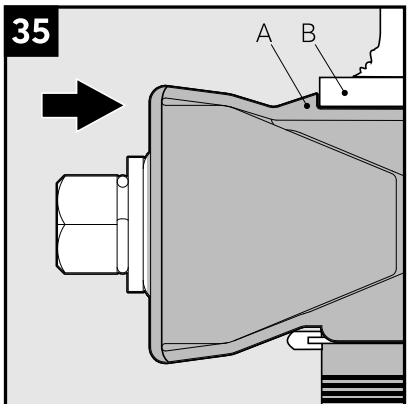
32 The use of a pre-compression tool is recommended.



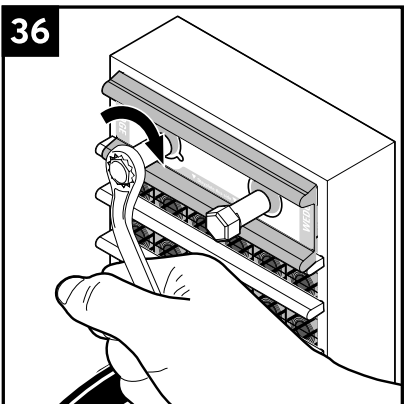
33 Turn the screws of the wedge counter clock-wise to full stop before inserting it.



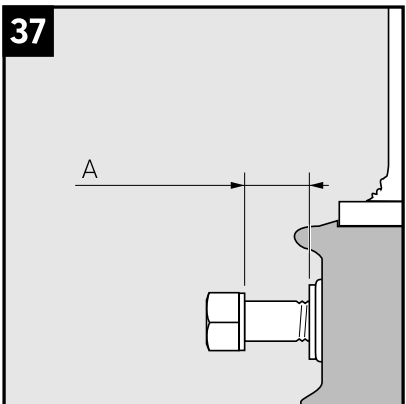
34 Lubricate the marked areas of the wedge.



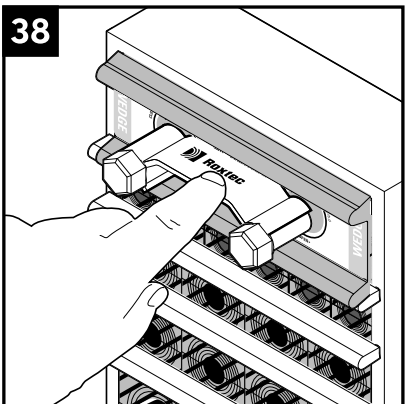
35 Insert the wedge so the stop flange (A) makes contact with the frame (B).



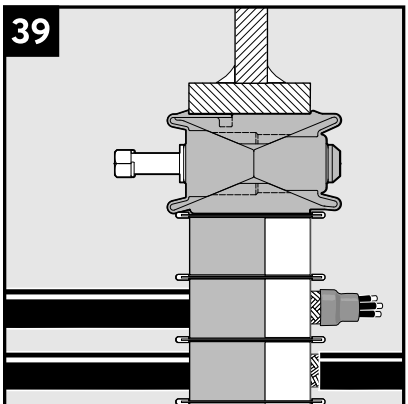
36 Tighten the screws alternately until full mechanical stop, max 20 Nm.



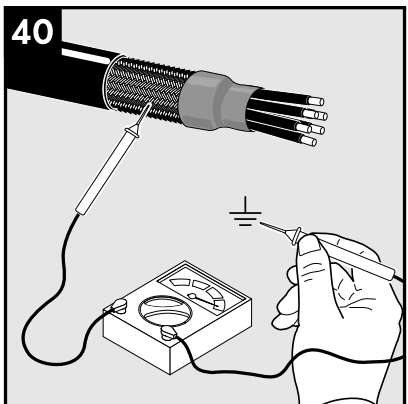
37 25 mm (A) of the screws shall be exposed.



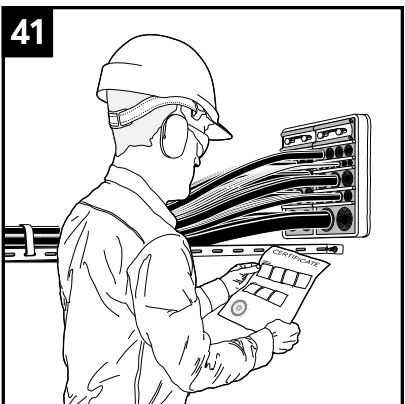
38 Attach the wedge clip to the wedge screws to complete the installation.



39 Completed installation.

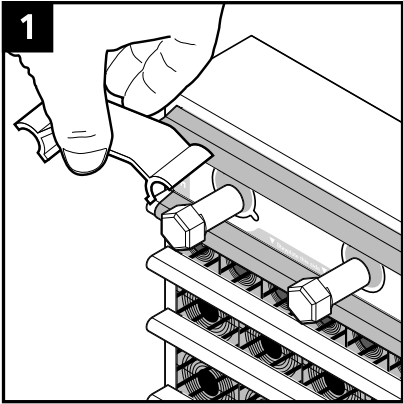


40 Electrical continuity testing is recommended.

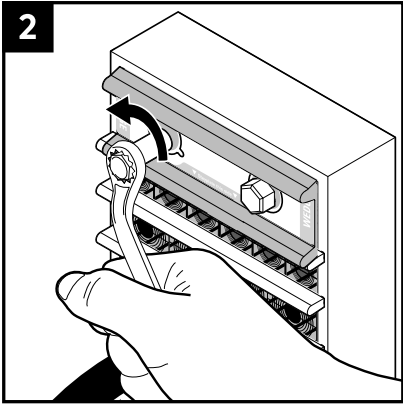


41 Check additional documentation, if applicable.

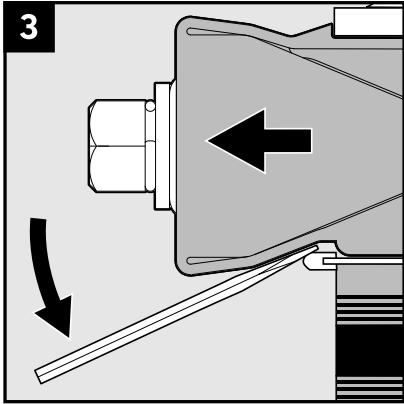
Disassembly



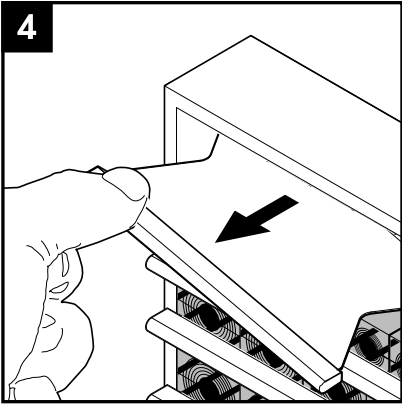
Remove the wedge clip from the wedge.



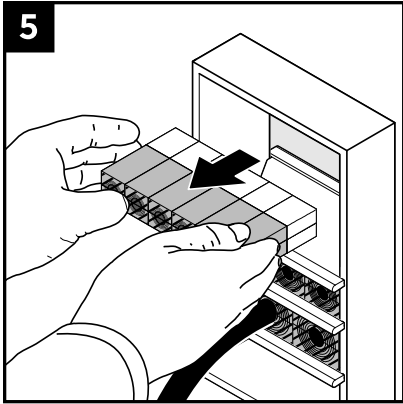
Loosen the screws alternately to full stop. Do not exceed 20 Nm.



Lift the wedge over the stop flange. Roxtec tools are available.

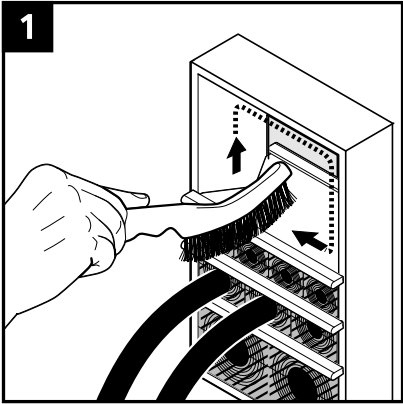


Remove modules and stayplates.

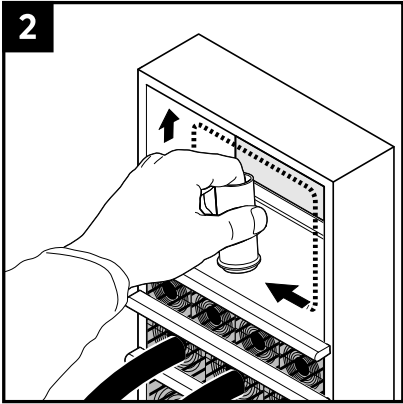


Keep the rows sorted. If a module is damaged or replaced, all modules in that row must be replaced.

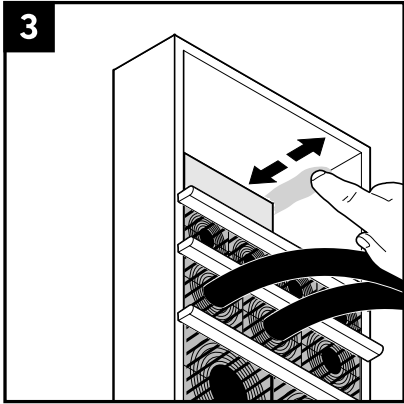
Reinstallation



The inside surfaces of the exposed packing space shall be clean and conductive.



Lubricate the inside surfaces. Lubricate the area that will be in contact with the tape sparsely.



Lubricate all corners carefully. Continue the reinstallation.

Note

- Integrated environmental sealing system for EMI grounding of shielded/armored cables.
- To be used with Roxtec RM PE B modules.
- An incorrectly adapted module shall be replaced (layers shall not be reused).
- For optimum reliability, wait 24 hours or longer after installation before exposing the cables or pipes to strain or pressure.
- Corrosion preventing primer must be removed to achieve electrical conductivity, where applicable.
- Conductive gaskets are available.
- Cables shall go straight through the frame.
- Cable/pipe with a considerable weight needs to be supported.
- Partially installed openings shall be compressed if left unattended.
- If the conductive tape is damaged, the module must be replaced.
- Approvals or certificates may include amendments or limitations related to this application.
- The latest version of this and related documents are found at roxtec.com.

Disclaimer

"The Roxtec cable and pipe entry sealing system ('the Roxtec system') is a modular-based system of sealing products consisting of different components. Each and every one of the components is necessary for the best performance of the Roxtec system. The Roxtec system has been certified to resist a number of different hazards. Any such certification, and the ability of the Roxtec system to resist such hazards, is dependent on all components that are installed as a part of the Roxtec system. Thus, the certification is not valid and does not apply unless all components installed as part of the Roxtec system are manufactured by or under license from Roxtec ('authorized manufacturer'). Roxtec gives no performance guarantee with respect to the Roxtec system, unless (I) all components installed as part of the Roxtec system are manufactured by an authorized manufacturer and (II) the purchaser is in compliance with (a), and (b), below.

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(b) Installation shall be carried out in accordance with Roxtec installation instructions in effect from time to time.

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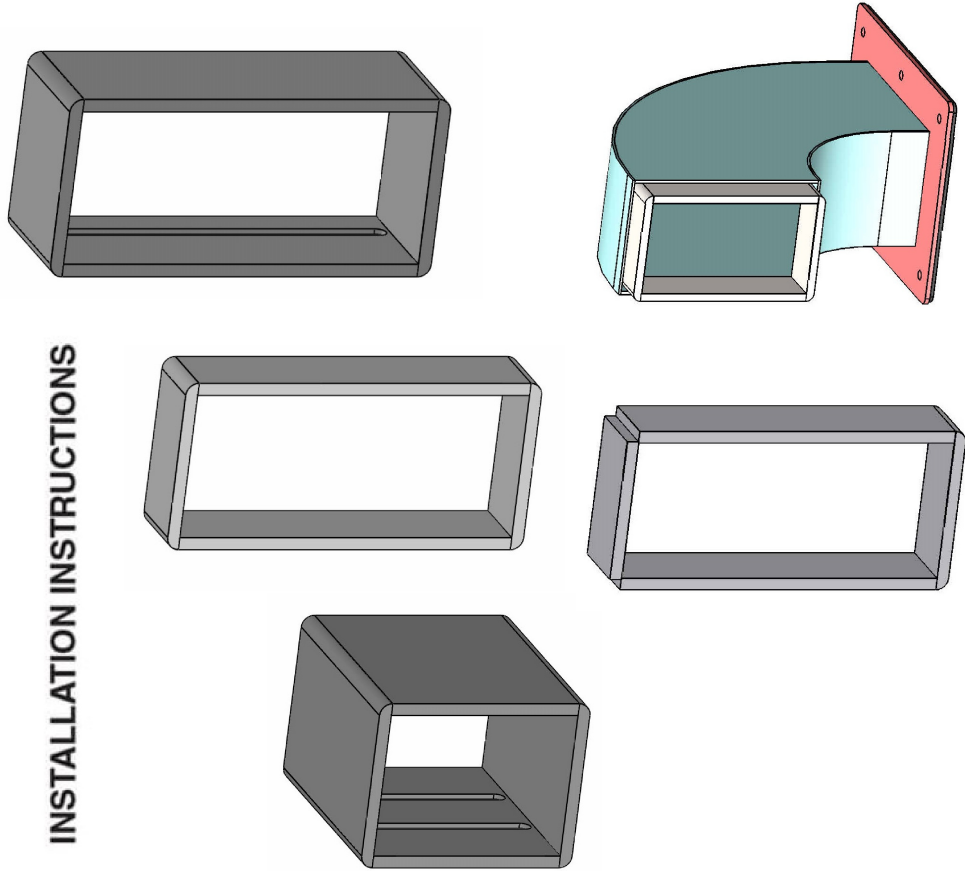
Roxtec International AB
Box 540, 371 23 Karlskrona, SWEDEN
+46 455 36 67 00, info@roxtec.com
www.roxtec.com

WRF / WRF2 / WRFD WRFO / WDF

WallMax Rectangular Frame Series with Multicolor Modules

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INSTALLATION INSTRUCTIONS



WARNINGS!

Installation of products must be performed by qualified, trained and experienced personnel. Installation personnel must be correctly and safely equipped. Mounting instructions and warnings must be read prior to installation. Warnings alert you to possible dangers about improper use of product. Failure to observe warnings may result in injury to you or others.

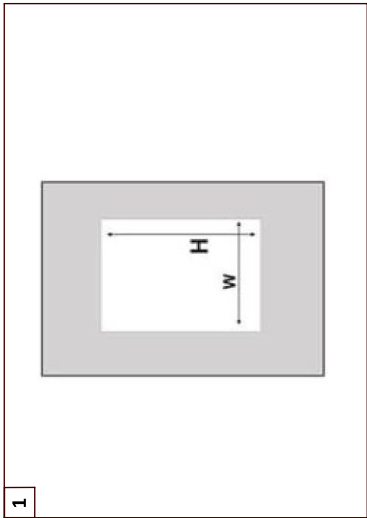


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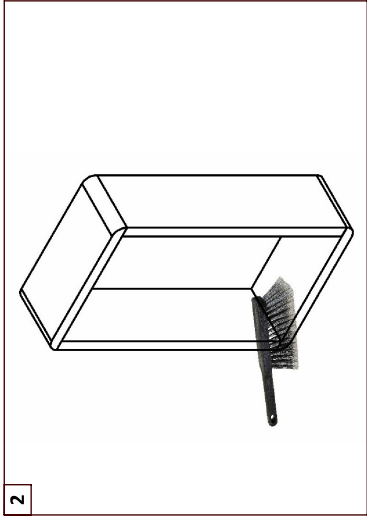
WARNINGS!

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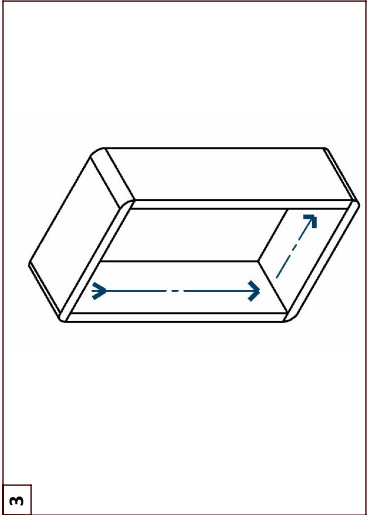
1

Cut an opening on the wall with size H and W as the frame. Keep the opening atleast 2mm larger on each side.



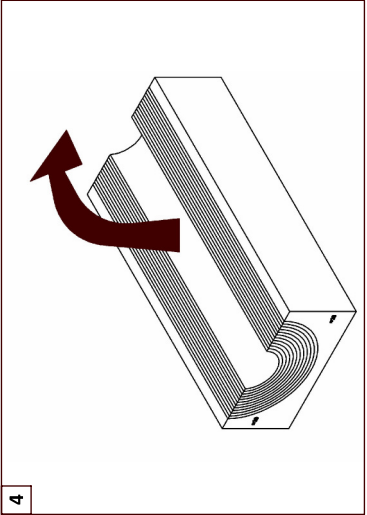
2

Clean inside surface of the frame to remove impurities and foreign particles.



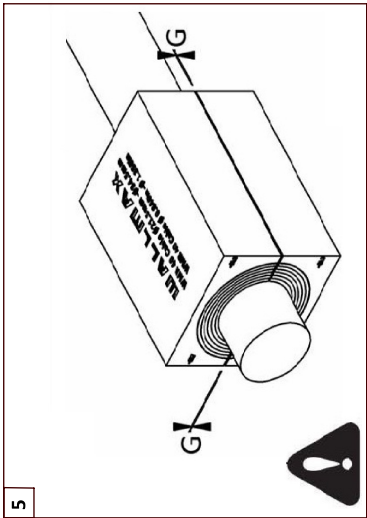
3

Thoroughly lubricate the inside of the frame with WallMax lubricant.



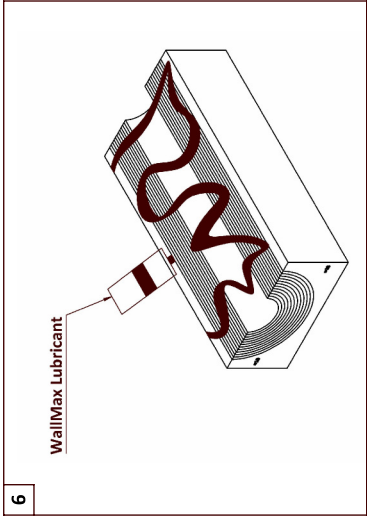
4

Peel layers off module halves, to adjust the central openings to cable diameters.



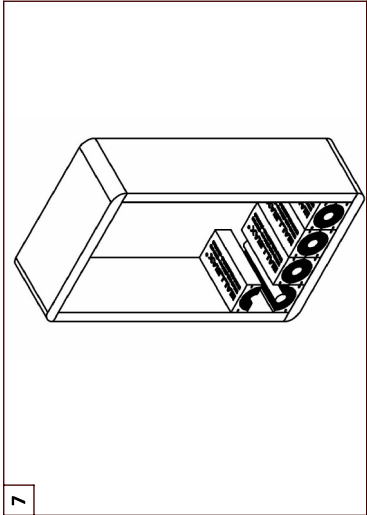
5

Fit halves around cable. 0.1 -1.0mm gap between the halves should be achieved. The number of layers may not differ by more than 1 between the two halves.



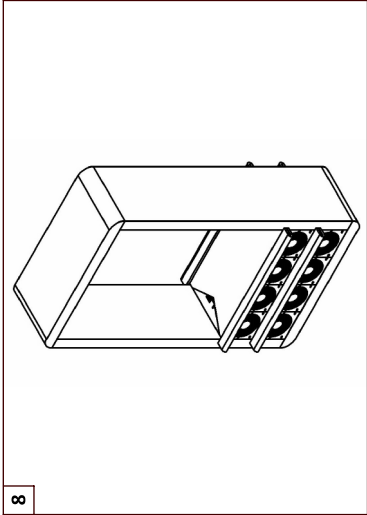
6

Lubricate both inner and outer sides of each module with WallMax lubricant.



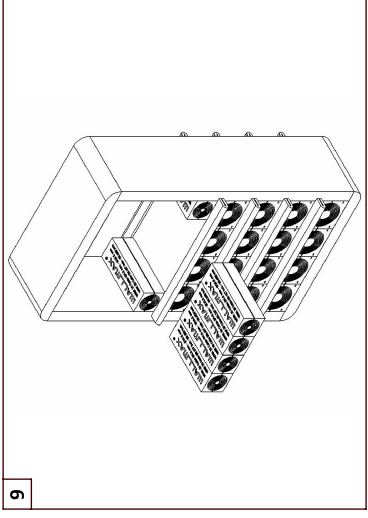
7

Assemble modules around routed cables and into the frame. The largest modules are usually the first to be inserted.



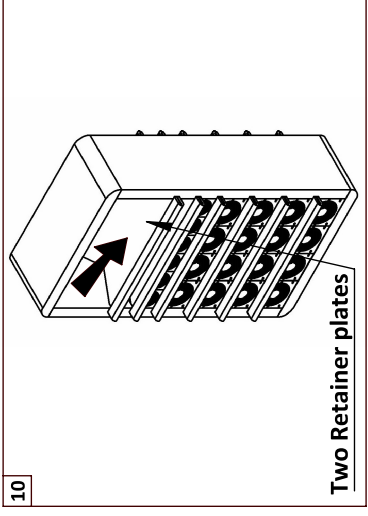
8

Insert a retainer plate on top of each finished row of modules.



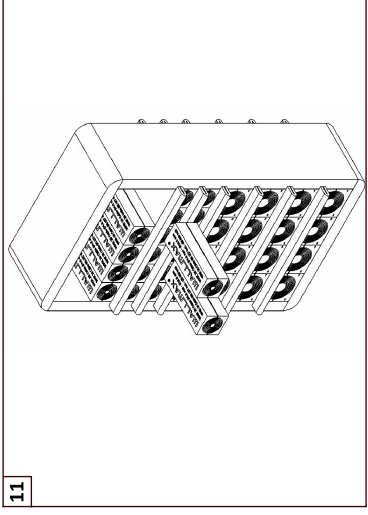
9

Fill up the packing space with cables, modules and retainer plates.



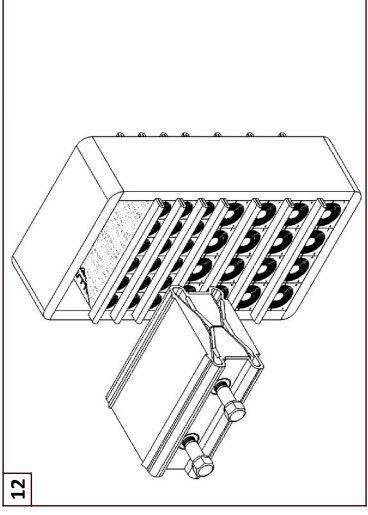
10

Before inserting the final row of modules, insert the last two retainer plates.



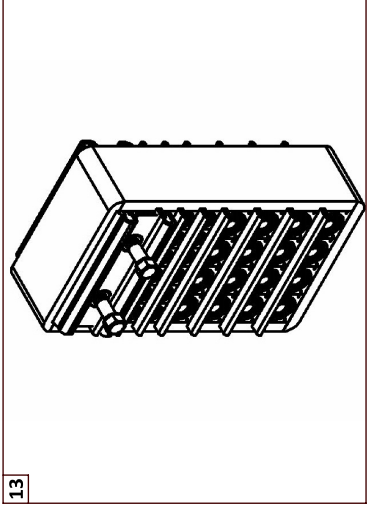
11

Insert the final row of modules between the retainer plates.



12

Lubricate all the surfaces of WallMax Expander inside and outside, then insert it in the frame. Read the marking on the frame before inserting it.



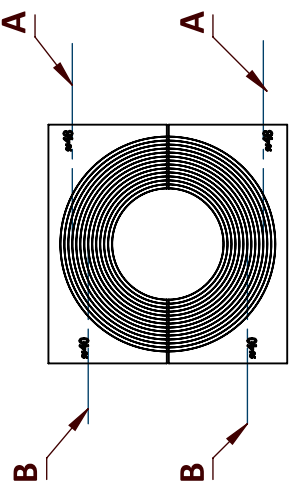
13

Tighten the bolts until stop to maximum torque value of 20 Nm. The wedge will compress and seal the transit.

WALLMAX®

Disassembly: To disassemble follow the reverse order.

Multicolor Module Assembly guide



A: Inner diameter of first red layer
B: Inner diameter of first violet layer

Note:

- It is recommended to wait 24 hours or longer after installation before putting the system to pressure conditions.
- Cables shall go straight through the frames.
- For frames with multiple openings, fill all the openings first and then tighten the wedges.



COCHIN SHIPYARD LTD

EMC Management Control Document - 151-K5000080

This Document contains 7 Pages							
		COCHIN SHIPYARD LIMITED COCHIN – 682 015					
YARD No.	BY 151-152	UT 5520 MH					
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APPROVED	BILJU M DEVASSY						
CHECKED	ANOOP T S						
PREPARED							
DATE	18.04.2023	SCALE	NTS	DWG No.	151-K5000080	REV	0

EMC PLAN FOR CSOV PROJECT BY 151-152

3. Introduction

The scope of this document is to encompass all activities planned and to be carried out for the CSOV project to ensure EMC is achieved for the vessel as an integrated system. This document will be used as guideline during engineering design and for onboard outfit activities.

2. Background

Variety of power, electrical, control and communication devices and systems installed on-board a ship, create quite demanding electromagnetic environment in which those systems are expected to operate without performance degradation. Measures should be taken to ensure satisfactory function of the system in its environment, as well as to ensure not to introduce intolerable electromagnetic disturbances for other equipment in the environment.

The compliance to the requirements shall start from initial stages of design activities.

Following measures will be implemented for the CSOV project for EMI-EMC compliance.

3. Segregation of different cable categories

Segregation of different cable categories while cable routing should be used as a major preventive measure to minimize electromagnetic disturbance. Each cable shall be categorized to a cable category based on the following definitions.

Category	Cables for	Level	Emission/ Immunity Rating	Typical Cable Types
Category 1	Power supply, Lighting	10V to 1000V	Potentially disturbing	Below deck: non shielded Above deck/Inside bridge: twisted, shielded
Category 2	Analogue and digital signals, Telephone signals, Loudspeaker signals, Control signals, Alarm signals	0,1V to 115 V	Sensitive	Twisted single shielded shielded twisted pairs
Category 3	Radio receiver signals, TV receiver signals, Video signals	0,1 mV to 500 mV	Extremely sensitive	Coaxial
Category 4	High-power transmission Signals, Pulsed high-power Signals, High powered semiconductor convertor	10 V to 1000 V	Extremely disturbing	Coaxial shielded power

The numbers for above cable categories are taken from IEC 60533

- Fibre cables are not relevant with respect to EMC and can be routed together with all categories (no conductive parts in the fibre cable).

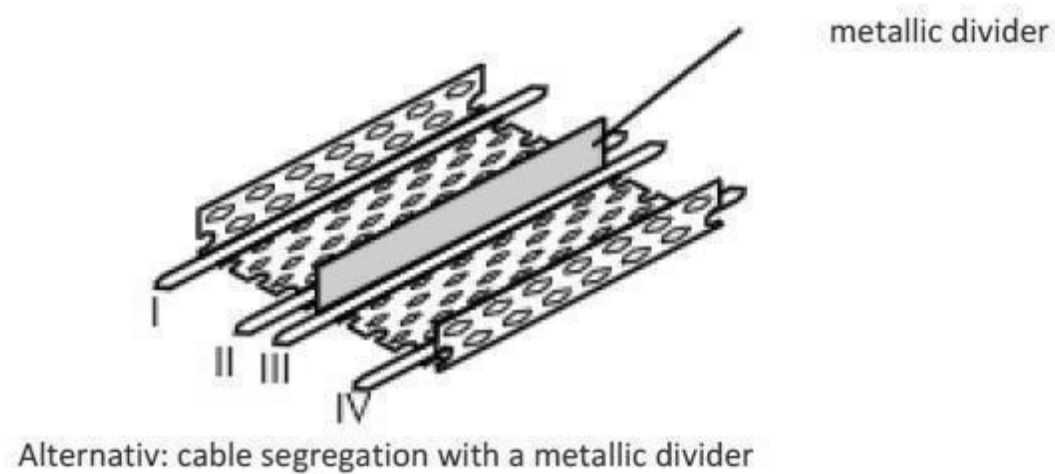
4. Routing of cables with recommended distance between different categories

All cables running in parallel over distances exceeding **1mtr**, should be divided into categories as mentioned at Para 3 according to different signal types they carry and voltage levels of those signals. As a general rule, sufficient cable trays to meet the cable segregation requirements should be implemented. The cable routing design and installation goal is to meet the minimum distance (in cm) between different cable categories as per the Matrix shown below.

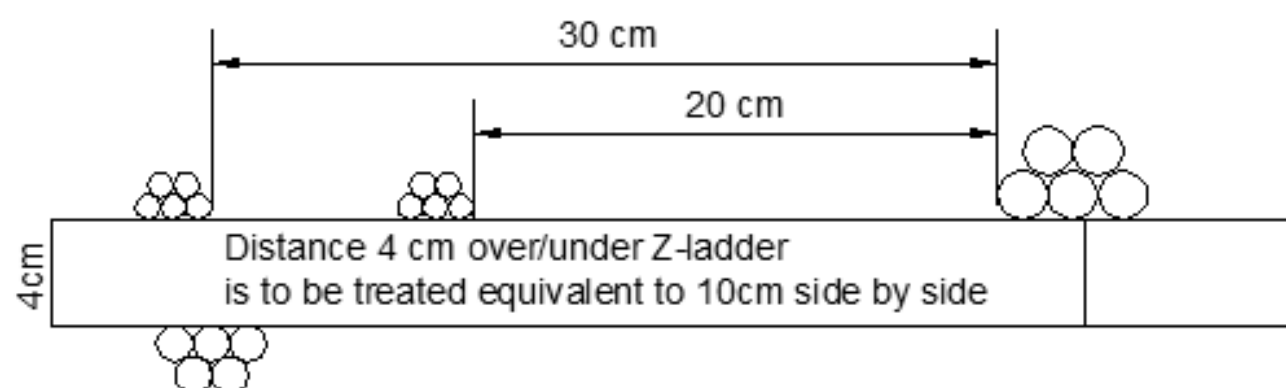
	Cat 1 (Power)	Cat 2 (Control)	Cat 3 (Video/Antenna)	Cat 4 (High Power)
Cat 1 (Power)	-	10cm	10cm	30cm
Cat 2 (Control)	10cm	-	10cm	30cm
Cat 3 (Video/Antenna)	10cm	10cm	-	30cm
Cat 4 (High Power)	30cm	30cm	30cm	-

Notes

- If cables are routed through conductive tubes/pipes connected to ground plane, then above separation requirements can be disregarded. The conductive tubes/pipes shall have min 1mm thickness.
- In cases where cables of different categories, due to physical limitations, must be distributed together in a relatively long distance, following methods can be employed –
 - The cables should preferable be separated by a conductive plate connected to the ground plane.



- ii. Cables with high shielding effectiveness (for example dual shielded) can be used.
 - iii. Cables that need to be brought closer together than the specified minimum distances should be separated again as soon as possible when sufficient space is there.
- c) Crossing of different cable categories should be done as close to 90 degrees as possible.
- d) By using a traditional Z-type cable ladder it will be possible to reduce distance requirement between categories. Vertical distance of 4cm between cables is treated equivalent to 10 cm side by side. i.e., it is possible to route Cat 1 cables on topside and Cat 2 cables on underside of Z type cable ladder provided the vertical distance between them is 4cm.



- e) The cables penetrations can be shared between different cable categories as long it falls under the minimum paralleling distance of 1mtr. Care should be taken to separate the cables into different categories as soon as cable comes out of the cable penetrations.

Note: EMI/EMC type cable penetrations shall be used for EMC cables

5 Bonding of Cable Trays/Ladders

The cable trays will be connected to ground at least every 1.5m. For bonding cable trays to ground, cable support and cable trays will be welded (one weld joint).

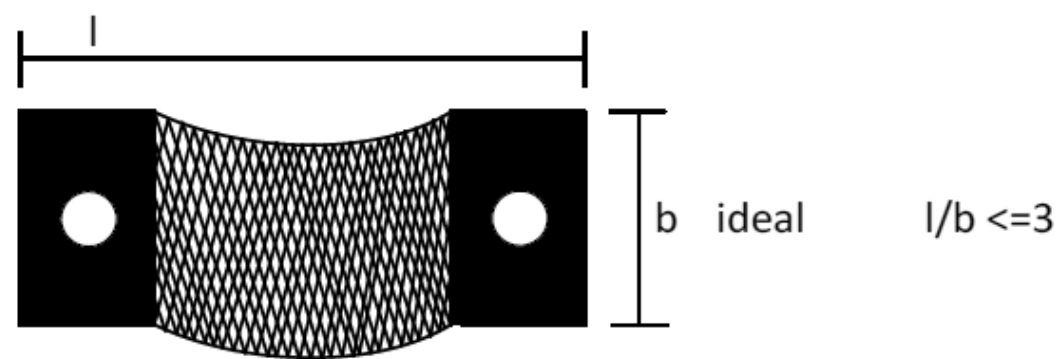
6 Grounding Guidelines

- a) In practice, the installation goal is to include EMC grounding where equipment is designed to be bonded and according to manufacturer's recommendations.

b) The hull of the vessel will act as the main part of the ground system, both for safety grounding and for EMC grounding. The method employed for safety grounding and grounding for EMC purpose are entirely different.

Safety Grounding - Electrical and electronic equipment cabinets, cases, housings and exposed metal (conductive) components including voltages of more than 50 V shall be connected to ground potential by installation of a ground wire.

EMC Grounding/Bonding - For EMC grounding the surface area is more important than the cross-section due to skin effect. For EMC grounding earthing straps to be used (with length/width ≤ 3) instead of normal round conductors.



b) While grounding bare metal to metal contact to be ensured. Paint and other debris can compromise the bare metal to metal contact.

c) Unused wires inside cabinets should be connected on both sides to ground potential or they may act like antennas.

7 Cable Screen Termination

a) By providing a good rf connection between the cable screen and ground, EMI coupled to the screen will follow a low impedance path to ground. Cable screen terminations to be carried out for as per manufacturers recommendations.

b) Cable screens are normally bonded (360 degrees) while entering the EMI/EMC compliant enclosures as recommended by manufacturer. This can be achieved either by using EMI/EMC cable glands or EMI MCTs. Lack of proper 360° termination has been identified as reason for EMI/EMC related problems on ships.

c) The cable screen terminated via pig-tail to ground bar is also not acceptable from EMI/EMC point of view when manufacturer has recommended 360-degree termination, as this type of connection does not provide efficient grounding for higher frequencies.

d) The conductivity of the cable screen to be maintained when a junction box is introduced. Special care to be taken in this regard for maintaining continuity of screens for echo sounder cables.

Abbreviations

EMC	Electro Magnetic Compatibility is the ability of an equipment or system to operate together with other equipment/systems without - causing electromagnetic interference to the other systems. - being disturbed by the electromagnetic emissions of other systems.
EMI	Electro Magnetic Interference. An electromagnetic or electrostatic disturbance that causes malfunctioning or undesirable responses in one or more equipment (receiver).
IEC 60533	Electrical and electronic installations in ships – Electromagnetic compatibility
