



Ref: BARC/NRG/TDD/HCEAS/DSS/Yoke/OPA/113362

08/06/2018

NIT for Minor Fabrication Due date: 22/06/2018

Sealed quotations are invited for and on behalf of the President of India for the work as described below. The last date of submission of sealed quotation is 22/06/2018 up to 15:00 hrs at 315, CDCFT Building, Near WIP, Trombay, Mumbai 400085, of Technology Development Division. Please mention the reference number on the front cover of the sealed quotation. Sealed quotation shall only be sent through Postal Speed Post/Normal Post only. Hand delivery of the quotations is strictly not allowed. The sealed quotation will be opened on the same day at 15:30 hrs. in the office of authorized tender opening officer, TDD, NRG, BARC.

Description of work	Duration
"Procurement of materials, fabrication, assembly, testing, painting and supply of two numbers (02 nos.) of Yokes along with associated rigging items as per scope drawings and technical specifications."	60 Days

Important Notes:-

- Vendor Evaluation Criteria:** Vendors meeting the following evaluation criteria should only participate in bidding: The firm should have previous experience of successful completion of works such as fabrication & testing lifting yokes (i.e. spreader beams) or similar kind of specific works.
- Copies of relevant work order should be attached along with the bids.
- The work shall be completed within **60 Days** from the date of issue of the work order.
- Any deviation from specification shall be clearly mentioned in your offer.
- The quotation shall be printed only on letter head and GST number should be mentioned on it. Quotations that are received in computer generated form are to be construed as invalid and will be rejected.
- Income tax @ prevailing rate at the time of execution of work and applicable surcharge on Income Tax as applicable & education cess on IT & SC as applicable will be deducted from the bill.
- The enquiries should be sent only by speed post/Normal Post through Indian Postal Service and should be addressed to:

Devendra Sandhanshive, Scientific Officer-F
Room No. 315, CDCFT Building, Near WIP,
Technology Development Division, Nuclear Recycle Group
Bhabha Atomic Research Centre, Trombay, Mumbai-400085
Ph no 022-25591279/6721/5502 Email: sdev@barc.gov.in/shashirk@barc.gov.in

- The following information should be written on the sealed offer:**
 - Our Enquiry no.
 - Subject
 - Due Date
 - Sender's full address.
- The bids sent by any other mode (e.g. manual, courier etc) shall be rejected without assigning any reasons as per terms and conditions of Accounts, BARC.**
- The offer shall be kept valid for a period of 45 days from the date of opening.
- Quotation shall clearly mention basic cost, rate of GST and any other taxes/levies applicable separately. It may please be noted that BARC has been declared as R&D organization and concessional rate of GST is applicable. Necessary exemption certificate will be made available to successful vendor.
- Offers will be evaluated on overall total cost basis.
- Full payment shall be made only after successful completion and acceptance of the work. In general after submission of all the papers mentioned in work order, it takes about a month period for releasing the payment, as per standard practice followed in BARC.

Devendra Sandhanshive,
SO/F, TDD, NRG, BARC

Technical Specification

1. "Procurement of materials, fabrication, assembly, testing, painting and supply of two numbers (02 nos.) of Yokes along with associated rigging items as per scope drawings and technical specifications."

2. Detailed Scope of Work:-

"Preparation of detailed fabrication drawings & Quality Assurance Plan, approval of the same from engineer in charge, Procurement of raw materials (in form of plates, beams, channel & angles) and bought out items including filler wires etc, non destructive testing of raw materials and bought out items, fabrication by deploying SMAW/GTAW welding, assembly, testing, epoxy painting (2 coats of epoxy primer and 2 coats of epoxy paint) and supply of two numbers of Yokes (Spreader Beams) and MS stands as per scope drawings and technical specifications."

Imp Notes:-

- a) No materials will be issued as Free Issue Materials. Entire material required for fabrication and bought out items is in the scope of Vendor.
- b) Any materials and bought out components to be used will be subjected to the purchaser's approval before starting the fabrication/ assembly.
- c) Supplier should maintain high quality of workmanship in the manufacturing.
- d) Supplier shall provide a self declaration that the scope of the work is properly understood by him and he will complete the works in time as per the schedule of the contract.

Nomenclature: - Yoke-1:- Yoke for Rod Box & Yoke-2 :- Yoke for Enclosure.

3. Preparation of detailed Fabrication drawing, QAP & its approval from purchaser.

The firm should prepare detailed fabrication drawings and quality assurance plan based on the scope drawings and this technical specification and submit the same for approval of the engineer in charge. The firm should not start any fabrication activity until the fabrication drawings and QAP are approved by the purchaser.

Welds details should be clearly shown in the fabrication drawings. Butt weld joints shall be indicated where tensile loading is expected.

Contractor shall prepare fabrication drawings based on information of these scope drawings indicating complete fabrication details, dimension tolerances, weld size, bill of materials etc and submit two copies of these drawings for department's approval. The purchaser shall scrutinize these drawings and comments on these shall be marked on one set of the drawings and returned to the contractor for making necessary corrections on the drawings. If major corrections are required the corrected drawings shall be resubmitted for approval. When the drawings are approved contractor shall submit the reproducible of the approved drawings along with 2 sets of the drawings.

4. Procurement of raw materials & their NDT Testing :

Materials, processes and workmanship which are not specifically designated here in and which are necessary for the fulfillment of this specification shall be of good quality. All material shall be new. All components shall be machined true to a standard acceptable to the purchaser and shall be free from objectionable flaws / imperfection like cracks etc. All structural steel shall be accurately fabricated, true to line and free from warp or twist. All similar parts shall be made to

gauge wherever possible. No patching, plugging, shimming, or other such means of overcoming defects, discrepancies or errors shall be restored to without permission of the purchaser. Unless otherwise stated material shall be in accordance with the following specifications. If manufacturer uses materials other than those indicated below such deviation should be indicated / approved item wise.

Steel plates and Bars	IS 2062 with P&S contents not exceeding 0.05% each.
High tensile bolts	IS 1367.
Wire Ropes	IS 2266
Lifting hooks	Forge steel as per IS 15560
Eye Hooks of Mild steel	IS 2758
Pipes	ASTM-A-106 grade B
Shafting, pins & screws	Under 4" dia. cold rolled steel: EN-8 of BS: 970 having BHN 175 to 241 Over 4" dia. forgings: EN-8 of BS: 970
Miscellaneous forging	Plain carbon steel

3.1 NDT Raw Materials:-

Identification and testing of the materials:

Mill TC:- Supplier shall maintain the identification marks on the each piece of the material to be used and make available to the purchaser mill test report for proper correlation of the material with reference to the identification marks.

Physical & chemical Testing:- Inspection and testing of the material such as Beams and Plates shall be carried out as per IS 2062 E250 Grade Br from Government approved laboratories. To access the physical and chemical properties of material, the test coupon will be taken out by departmental person and supplier will arrange for testing of material from the approved test laboratories at his own cost. Material that is approved/ stamped by the purchaser will be used for the fabrication of the components.

Ultrasonic Testing of the Plates. Inspection and testing of the material shall be carried out as per ASME section V. All Plates used for yoke fabrication shall be 100% tested by ultrasonic testing. Purchaser will witness the UT particularly for plates used for fabrication of pad eye materials. Acceptance criteria will be as per ASME Sec VIII-Div-1.

5. Procurement of Bought-out items & their Testing:-

The supplier shall submit the list of the all bought out components with their make and specification. All components shall be of reputed make as mentioned below, having high reliability.

6. Wire Rope Slings: - All the wire ropes slings should be steel core and of reputed make such as Usha martin or equivalent. The wire ropes should meet acceptance criteria of relevant IS 2266. Wire ropes should have factor of safety 5:1. Minimum Grade of wire should be 1770 N/mm². Higher grade wire permitted but the safe working load is to be calculated on the basis of 1770 only. Wire rope slings should be as per IS 2762. The length of soft eye should be minimum 12 times the rope diameter. Soft eye should be formed by mechanical splicing confirming to IS 10942. Eye shall be reinforced with thimble. Manufacturer's test & guarantee certificate is must.

Testing:- A sample rope shall be tested for breaking load as per IS 2266 and the same will be witnessed by BARC. After fabrication of slings, each sling length shall be tested to proof

force equivalent to twice its safe working load.

7. **Master & intermediate Links (Rings) for slings:-** Steel ring shall conform to IS 2760. The main and intermediate rings shall withstand the respective rated safe working load for the sling legs. Master link should be circular in shape and intermediate Links can be oval in shape.

Rated load for master link :- 18.3 Ton

Rated load for intermediate link :- 10 Ton

Testing: - Master & intermediate Links shall be proof tested at twice the SWL and should meet the relevant acceptance criteria.

8. **Screw Pin Bow shackles:** - All the shackles should be of reputed make such as Crosby or equivalent designed for a minimum factor of safety 4:1. The shackles should be as per IS 2415/6132. Manufacturer's certificate of conformity for type testing of the shackles is must.

Testing: - Each shackles shall have proof tested at twice the SWL as per IS 2415 and should meet acceptance criteria as mentioned in it.

9. **Standard Trapezoidal Section Point Hooks with Shank:** -

The shank hooks shall be free from defects and shall be cleanly forged in one piece. The shank hook shall conform and meet the requirements of IS 15560. Please refer the tender drawing of "Yoke for Enclosure" for details about the shank length and details of threaded connection. Details of threaded connection in the drawing are representative and it should be done as per the IS 15560/IS 3815.

Grade of Shank Hook: - L grade.

Material of construction of the shank: - as per IS-1875 class-1A.

Lifting capacity of Shank Hook: - 6.3 Ton.

Safety Latch for the hook: - Not required.

Manufacturer's certificate for test and examination of shank hooks as per relevant IS code (IS 7847).

Marking of hook should be as per IS 15560 after proof testing in presence of purchaser's representative.

Testing:-

- a. Proof Testing at twice the rated loads. Testing and acceptance criteria as per IS 15560.
- b. UT & Magnetic particle test of shank hooks after proof testing as per ASME section V & Acceptance criteria will be as per ASME Sec VIII-Div-1 and same will be witnessed by BARC.

10. **Fabrication:**

Before starting the fabrication, contractor shall get all the raw material, consumables, bought out equipments etc inspected / approved by purchaser and shall also submit the following documents for approval.

- i) Fabrication procedure
- ii) Inspection procedure
- iii) Cutting plan
- iv) Welding procedure

Fabrication shall be done in accordance with approved fabrication procedure and inspection will be carried out at various stages laid down on inspection procedure. Similarly electrodes, which are approved by purchaser, shall only be used. All work of fabrication shall be done in accordance with ASME section VIII division I. Workmanship and finish shall be in every respect subject to the close inspection / approval by the purchaser.

Straightening of material shall be done before being laid or worked out in any way by methods that will not injure it. Heating & hammering is not permissible unless the material is heated to a forging temperature. Marking of plates and other materials shall be done as per approved cutting plan.

Each piece shall be marked for identification. Cutting of plate can be done by shearing or by oxygen cutting. Cut edges of plates, sections shall be uniform, smooth and free from scale & slag. To achieve uniform edge of cut edge should be ground.

All the butt welds and the fillet welds in the external surface shall be ground flush with the surface. All the sharp corners shall be ground to radius of 3mm to avoid the injury to operational persons. Cleaning of edges: weld groove edge of the material will be cleaned as per the approved procedure.

Weld groove geometry, edge preparation, fit up, alignments etc shall be in accordance with ASME Section VIII Division-I.

Shapes rolled and welded shall maintain its geometry as per the limits specified in ASME Sec. VIII Div. I.

Plates to be joined by butt-welding shall be matched carefully so that misalignment, incomplete joints, shall not exceed the limits specified in ASME Sec. VIII Div. I.

Welding

Only approved procedure and qualified welders as per ASME section IX shall be permitted to carry out the welding. M.S to M.S welding should be carried out by SMAW with the welding electrodes approved by the purchaser. Weld reinforcement, distortion / warping of the welded structure will not exceed the limits prescribed in the ASME Section VIII Div I.

11. Inspection :

During the fabrication, purchaser's authorized inspector shall have free access at all reasonable time to inspect the materials and part under fabrication. Contractor shall offer all reasonable facilities for satisfying that the fabrication is being undertaken in accordance with the provision of codes. Defects, which may appear during fabrication, shall be repaired in a manner acceptable to the purchaser at the supplier's cost.

NDT of welds:

All the NDT test shall be carried out in conformity with ASME Section V by the contractor and he shall keep reasonable qualified persons who shall perform the inspection / non-destructive testing and keep up to date record of joint wise fit ups, dimensional checks and the NDT carried out on the job.

The work of welding, inspection and testing shall be subject to the overall supervision and approval of purchaser. The qualification and experience of the inspection / testing personnel of the contractor will be subjected to approval of quality surveillance section of purchaser. Acceptance standard and method of repairs of the defects shall be as per ASME Section VIII

division I.

Following NDT on the welding shall be carried out during and after the welding.

- i) The weld groove surfaces and heat-affected zones shall be 100% tested by D.P. test.
- ii) Root run and final run of butt welds shall be 100% D.P. tested.
- iii) Root run and Final run of fillet welds shall be 100% D.P. tested.
- iv) **If any Butt weld & T joints is tension the same shall be 100% radio-graphed.**

Besides other non-destructive examination, visual examination will be carried out at various stages of inspection for checking the dimensions, tolerances, distortion fit ups, alignment, quality, workmanship etc. Supplier at his own cost shall rectify any defect noticed by purchaser.

12. Load Testing Of Yoke Assemblies:

a) Handling trials for Yoke-2:- The yoke -2 will be remotely engaged/dis-engaged with the enclosure to be handled and for ensuring smooth handling of the same following trial needs to be demonstrated by the firm. Modifications in the yoke as may be required for the smooth operations should be carried out by the firm:-

Trials of remote engagement and disengagement of Yoke-2 with enclosure at Enclosure Manufacturer's place (Wagale Estate, Thane) or at BARC, Trombay as may be the case at that time. Vendor will have to arrange necessary material handling equipments like Crane, Forklift etc. as well as manpower for the same.

b) Load lifting simulation trials for yoke-1:- Yoke-1 is meant for handling of special packages and hence the handling performance of the yoke-1 needs to be checked before acceptance of the same. Load lifting trials shall be simulated at the firm's workshop in line with attached handling drawing for Yoke-1.

c) Inspection after load testing:- DP testing of typical weld joints and suspected areas as decided by the engineer in charge shall be carried out after the above load testing.

13. Painting:

All the exposed carbon steel surfaces will be given two coats of epoxy primer of 3 mil (mili inch) each (i.e. 35 micron Dry Film Thickness per coat) and 2 coats of 3 mil each epoxy paint of yellow color.

DFT shall be measured and reported.

All the surfaces to be painted shall be cleaned by wire brushing and sand blasting as per relevant IS codes or as directed by purchaser's representative. Color coding and marking of numbers for the number of holes drilled on the Yoke-1 on both sides for ease of identification during operations.

14. Guarantee:

The supplier shall give the guarantee for satisfactory performance for a period of 18 months from the date of delivery or 12 months from the date of commissioning at the site whichever is earlier. Guarantee shall cover failure occurring to the units caused by defective workmanship or material and will be limited to replacement of parts recognized as being defective.

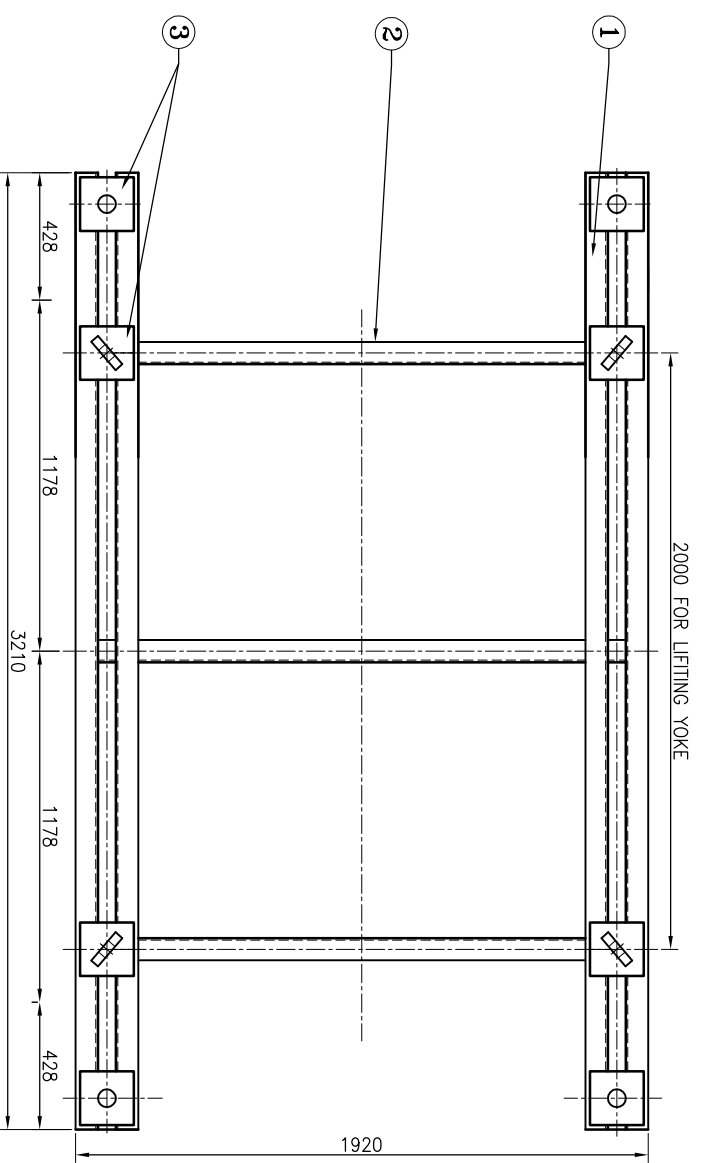
Bill of Quantities

Ref.: BARC/NRG/TDD/HCEAS/Yoke/OPA/

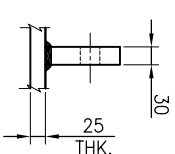
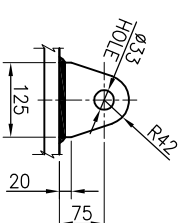
Date: 07/06/2018

Sr No	Name of items	Qty	Unit	Rate (Rupees)	Estimated Cost (Rupees)
1	Preparation of detailed fabrication drawing, Procurement of raw materials (in form of plates, beams, channel & angles), fabrication, assembly, testing, painting and supply of type-I & Type-II yokes. Refer Drg No. A3-3635-M95 &96. Imp Note:- This item does not cover the lifting hooks, belts, shackles, slings of the yokes as the same are covered below in item No. 3.	Kg	1500		
2	Fabrication & supply of MS stand for yoke-2 as per scope drawings No. A3-3635-M-97.	kg	250		
3	Procurement/fabrication, testing, assembly with the yoke structure and supply of various rigging bought items as give below:-				
3.1	Fabrication, testing and Supply of Mild steel Shank hook of trapazodial section, 6.3 ton capacity, threaded end with M60 nut, as per IS 15560 and as shown in drawing.	No.	4		
3.2	Procurement, testing and supply customized load lifting belts of 3 ton load capacity, 6 meter long, 150 mm wide.	No.	8		
3.3	Fabrication and Supply of customized shackles of 2 Ton capacity each but having width of 150 mm for supporting the belt as shown in scope drawings.	No.	14		
3.4	Supply of Round Screw Pin anchor Bow shackles of 8.5 Ton capacity, Make :- Crosby or equivalent reputed make.	No.	4		
3.5	Supply of Round Screw Pin anchor Bow shackles of 4.75 Ton capacity, Make :- Crosby or equivalent reputed make.	No.	14		
3.6	Supply of Single leg slings of 18mm dia steel core, 4.3 ton lifting capacity, length :-2000mm each . Make:- usha martin or equivalent reputed.	No.	8		
3.7	Supply of 4 leg slings as shown in drawings with master and intermediate links, 26mm dia steel core slings, the 4 leg lifting capacity should be 18.2 Ton. Length of each sling will be 3000 mm. Make :- Usha martin or equivalent reputed.	Set	1		
4	Sub Total (Rs.)				
5	GST & any other taxes levies etc				
6	Grand total (Amount in word :- Rupees _____)				

Signature & Seal of the Vendor



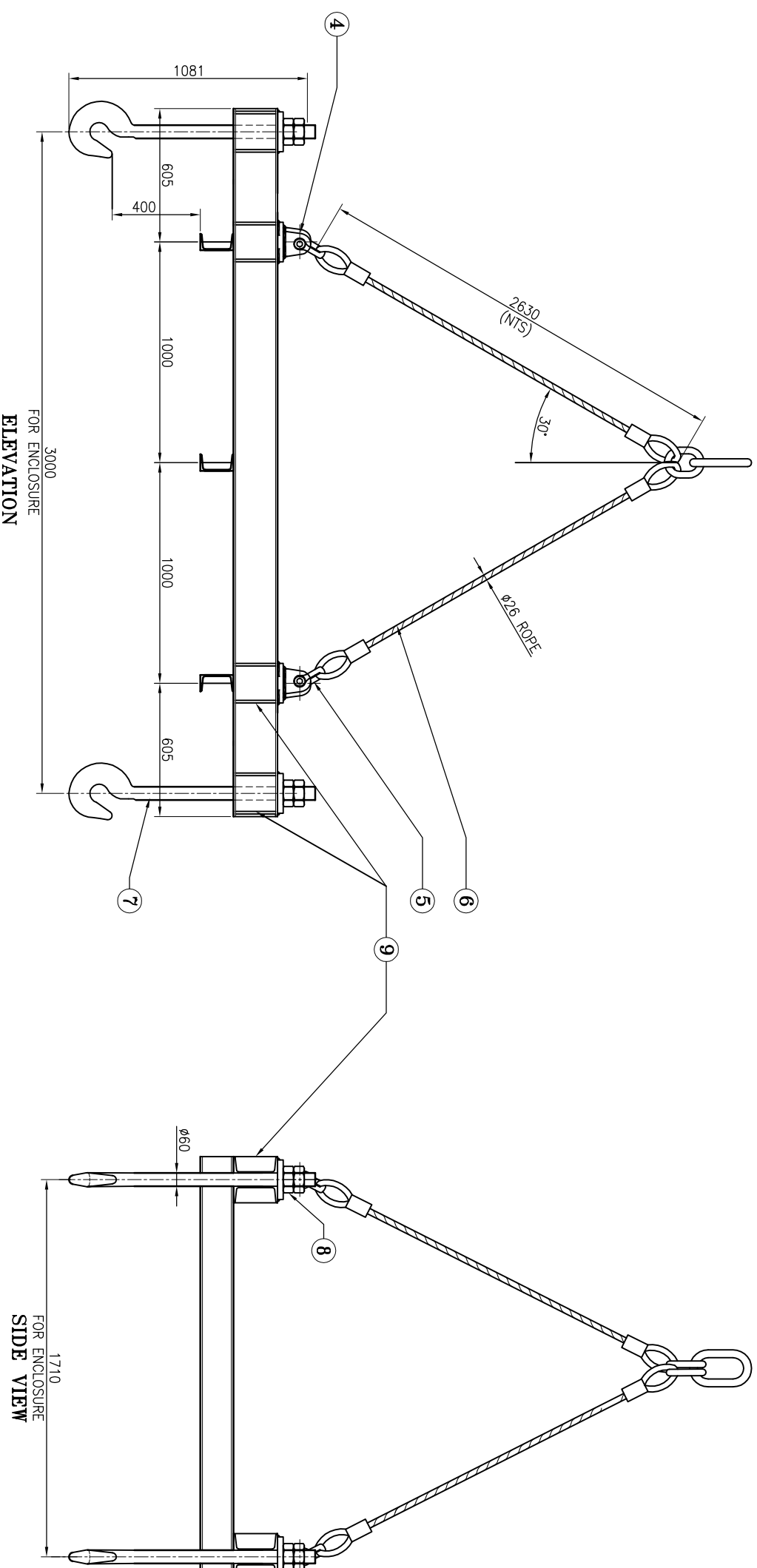
PLAN



YOKE LIFTING LUG (4)
DETAILED VIEW

NO.	ITEM DESCRIPTION	Size/capacity	QTY (NO.S.)	MCC
1	ISM 200x75	3210 LONG	4	MS
2	ISM 150x75	1920 LONG	3	MS
3	PLATE 25THK.	180x180	8	MS
4	YOKE LIFTING LUG	AS SHOWN	4	MS
5	SCREW PIN BOW-SHACKLE Capacity:- 8.5 Ton	STD.	4	STD.
6	FOUR LEG SLINGS(φ26mm) WITH MASTER LINKS	2600mm Lg.(EACH)	1 SET	STD
7	SHANK HOOK (CAP 6.3 T)	AS SHOWN	4	STD
8	NUT FOR SHANK HOOK M60	STD.	8	MS
9	STIFFING PLATE 12 THK.	AS SHOWN	32	MS

BILL OF MATERIAL



FOR ENCLOSURE
ELEVATION

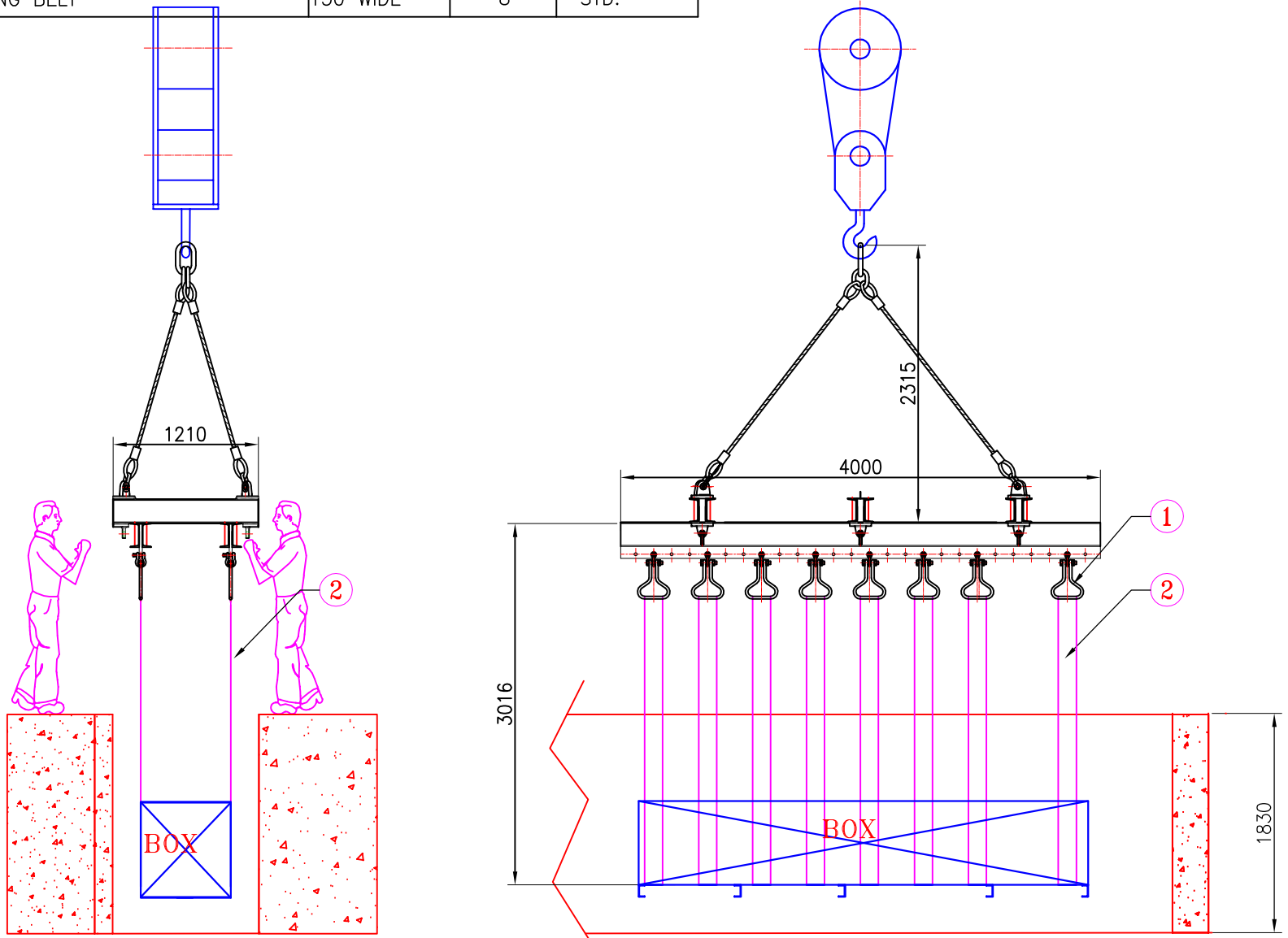
FOR ENCLOSURE
SIDE VIEW

SCOPE DRAWING OF
YOKE FOR ENCLOSURE
(FOR TENDER)

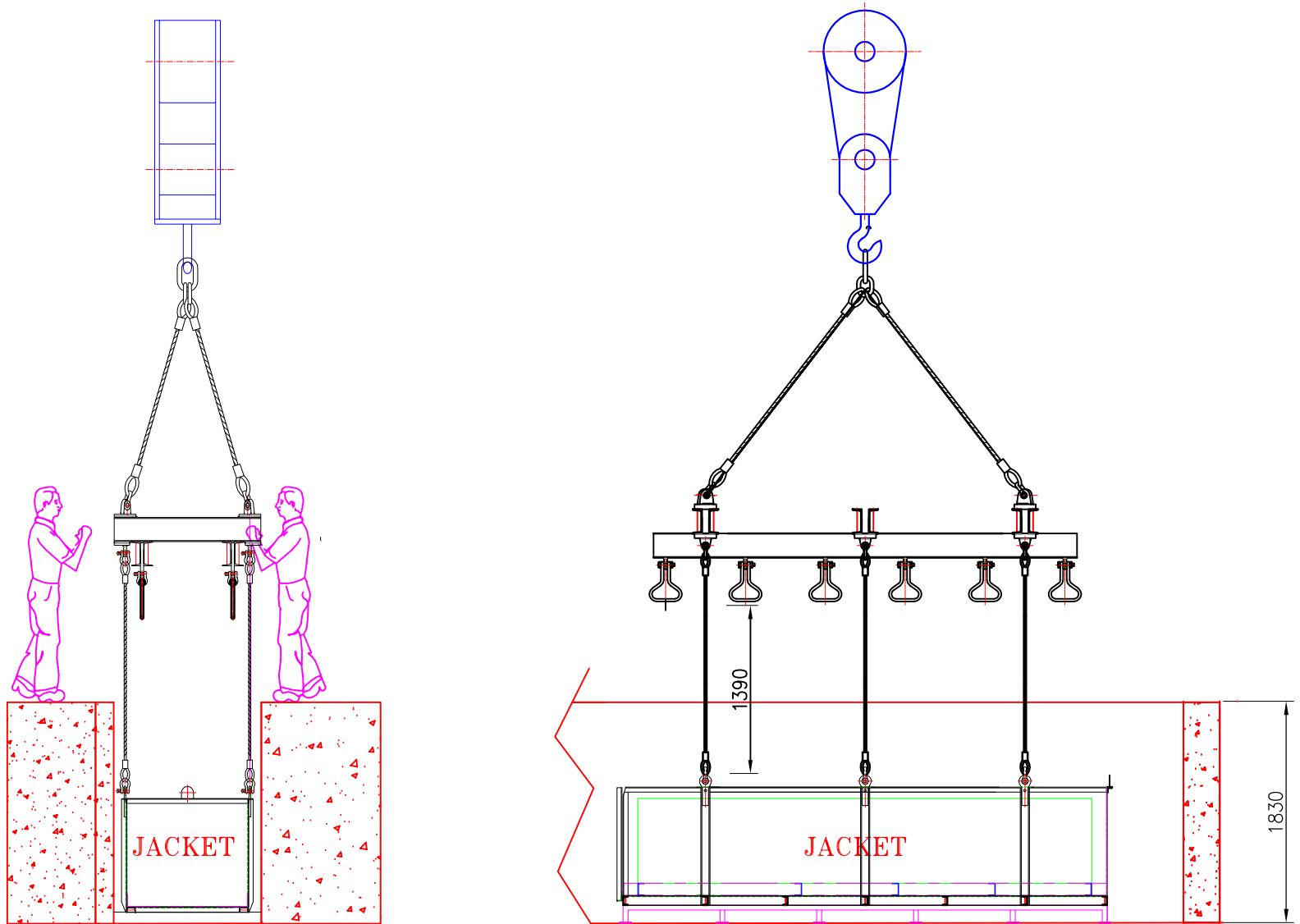
DRG.NO. A2-3635-M-96

BILL OF MATERIAL

NO.	ITEM DESCRIPTION	SIZE	QTY.(NOS.)	MOC
1	CUSTOMIZED SHACKLE 2 Ton Cap WIDTH 120mm FOR LIFING BELT	AS SHOWN	14	MS
2	LIFING BELT	150 WIDE	8	STD.

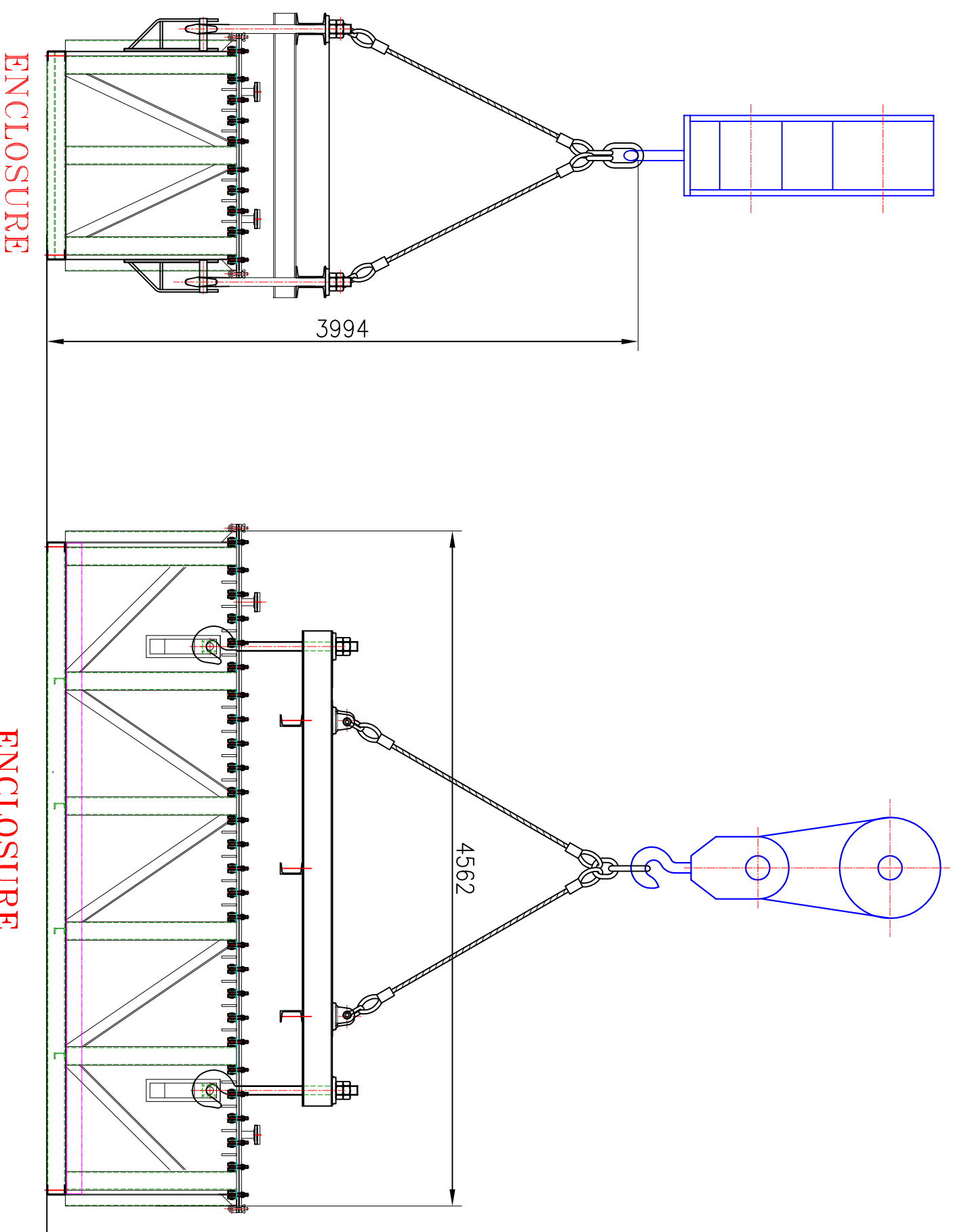


Handling Using Yoke- I



Jacket Handling Using Yoke- I

TENDER REFERENCE DRAWING
HANDLING DIAGRAM FOR YOKE-1

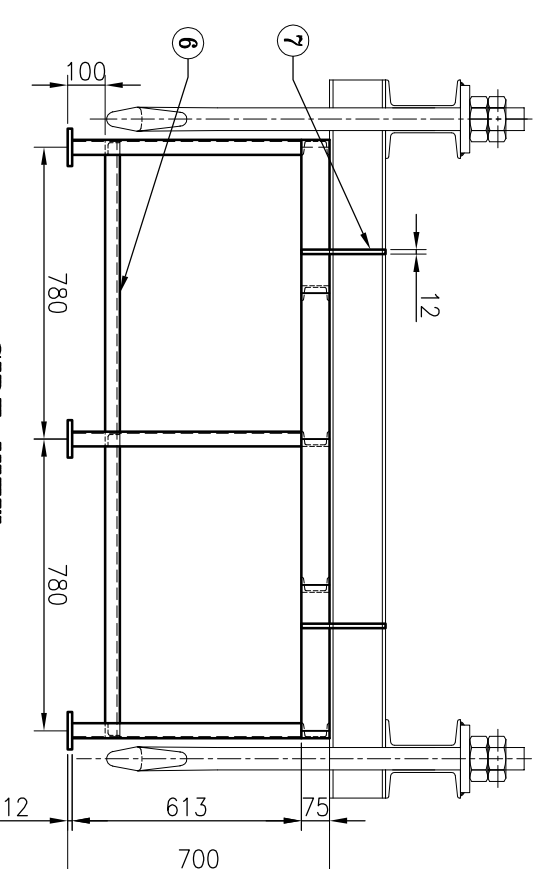
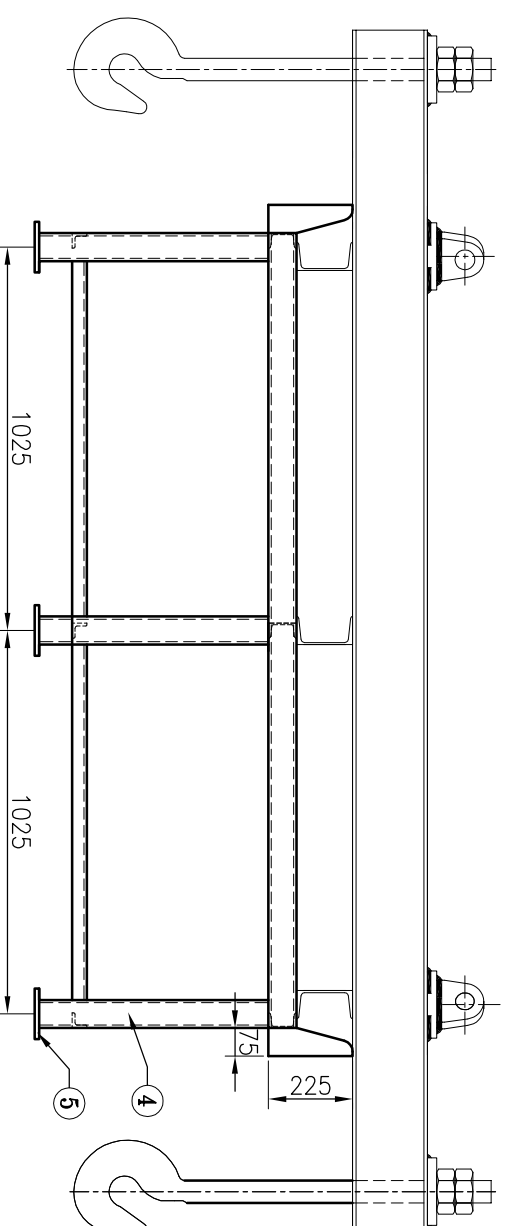
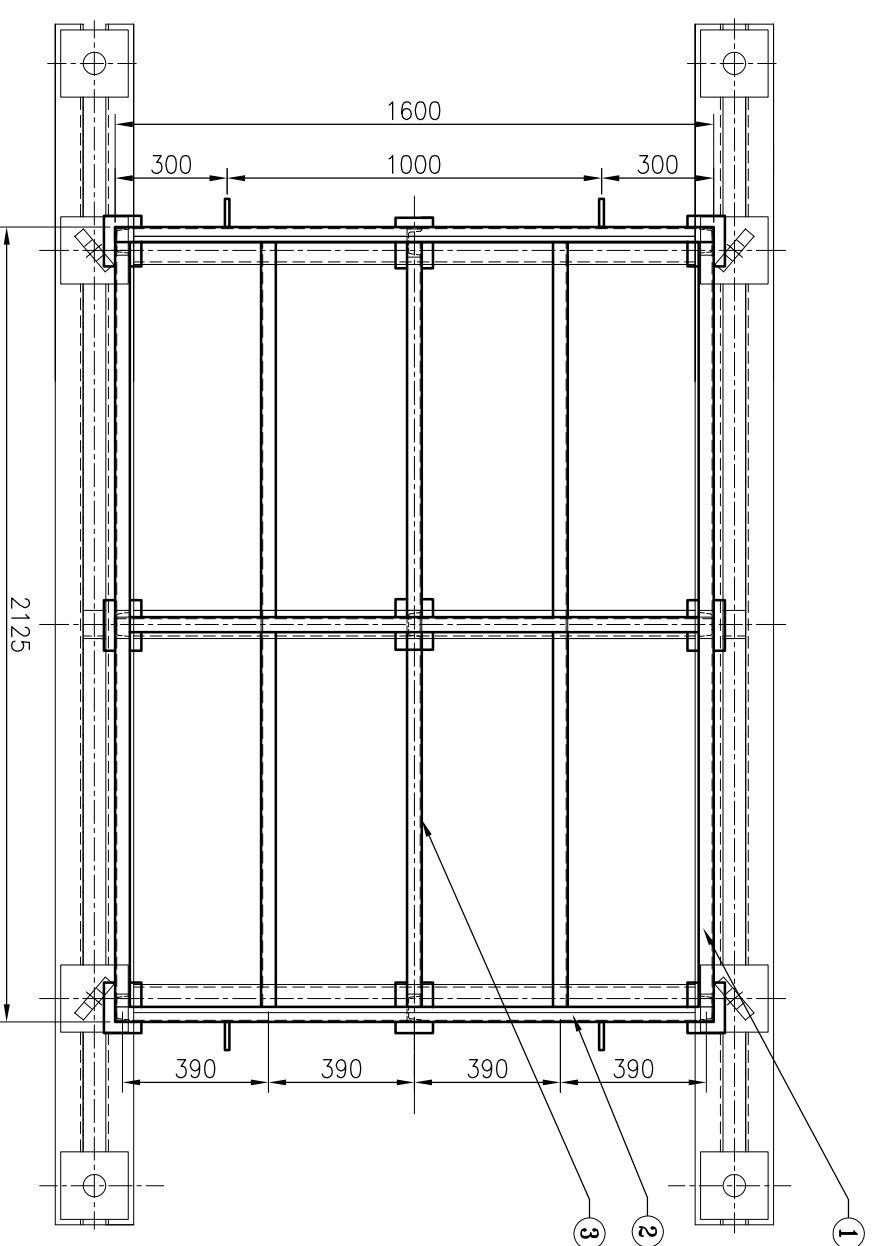


Enclosure Handling by Yoke- 2

TENDER REFERENCE DRAWING

BILL OF MATERIAL

NO.	ITEM DESCRIPTION	SIZE	QTY.(NOS.)	MOC
1	ISMC 75	2125 LONG	2	MS
2	ISMC 75	1600 LONG	2	MS
3	ISMC 75	1020 LONG	6	MS
4	ISMC 75	613 LONG	9	MS
5	BASE PLATE	135x100x12THK.	9	MS
6	ISA 40x40x8	775 LONG 950 LONG	6 6	MS MS
7	LOCATING GUIDE PLATE	AS SHOWN	4	MS



**SCOPE DRAWING OF
STAND FOR KEEPING YOKE FOR ENCLOSURE
(FOR TENDER)**

DRG.NO. A3-3635-M-97