



Government of India
Bhabha Atomic Research Centre
Reactor Engineering Division

Engg. Hall 7,
Trombay,
Mumbai 400 085

Ref: RED/ITDS/ND/MF//2022 | P-31847 25 February, 2022

**Sub: Minor Fabrication Work – Invitation to quote for two part tender for
“Fabrication of aluminium structural module assembly” as per Annexure-I**

Dear Sir/Madam,

Sealed quotations are invited on behalf of the President of India by Head, Reactor Engineering Division for “Preparation of fabrication drawings, procurement of material, fabrication, assembly, testing and safe delivery of *aluminium structural modules assembly*” as per Annexure – I.

General Notes:

- 1) The work will be carried out at the supplier's premise and supplier shall provide all necessary infrastructures for carrying out the work.
- 2) Supplier shall arrange sufficient number of qualified/experienced manpower to carry out the assignment.
- 3) Quotations shall be submitted in two parts i.e. “TECHNICAL” & “FINANCIAL”. These quotations shall be put in two separate envelopes and sealed properly. These two envelopes shall be put in a main envelope and sealed properly.
- 4) The reference no. of this letter, date and time of opening of bids must be clearly mentioned on the all sealed envelopes containing the quotation.
- 5) Quotations shall be provided on a company letterhead describing Name, address and contact details. All quotations must be complete with proper reference number, signed and stamped by the authorized representative of the bidder. Without this information the offer will be treated as invalid.
- 6) In “TECHNICAL” bid, supplier shall furnish the details of manpower, equipment, machinery, infrastructure and work experience of similar type of work specified in Annexure-I for assessment by the purchaser. Copy of work order/completion certificates of the similar assignment carried out in the recent past shall be attached with the quotations. Without this information the offer will be rejected.

- 7) The "TECHNICAL" quotation must clearly indicate compliance with the technical specification as per Annexure-I. Offers that do not comply with the technical specification in all respects will be rejected.
- 8) The "TECHNICAL" quotation must be given in the letter head of the supplier. All documents being submitted for "TECHNICAL" quotation shall be listed in this letter.
- 9) The quotations must reach to Shri Nirupam Das, Head/ITDS, Reactor Engineering Division latest by 15/03/2022 before 16:00 hrs. Quotations will be opened on 16/03/2022 at 11:00 hrs.
- 10) The quotations have to be sent by speed post only. Hand delivered quotation will not be entertained.
- 11) The bidder may contact Shri Nirupam Das, Head/ITDS on telephone no. 022-2559-3973(022 6929 3973) or email: ndas@barc.gov.in for enquiries related to MF.
- 12) "TECHNICAL" part of quotations will be opened first and "FINANCIAL" part of quotation will be opened only if the "TECHNICAL" bid is found to be acceptable as per terms and conditions of technical specifications.
- 13) Payment will be made as per government rules, ONLY after the completion of the work to purchaser's satisfaction against submission of original bill in triplicate and advance stamped receipt.
- 14) Income tax @2% and GST as applicable will be deducted from the bill. Taxes if applicable shall be paid as per government rates.
- 15) Bidder shall mention their PAN and VAT/GST nos. in the quotation.
- 16) The offer shall be kept open for acceptance for a minimum period of 60 days from the date of opening of the quotation.
- 17) The bidder shall furnish the detailed information regarding whether an ex-employee of BARC is working in their organization or whether any of their relative is working in DAE/BARC or whether he/she is an ex-employee of DAE/BARC. In case of absence of such information, or wrong information the quotation or contract is likely to be rejected or cancelled.

CONFIDENTIALITY CLAUSES:

I. Confidentiality:

No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing

This clause shall apply to the sub-bidders, consultants, advisers or the employees engaged by the party with equal force.

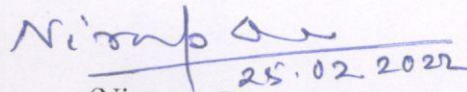
II. “Restricted information” categories under Section 18 of the Atomic Energy Act, 1962 and “Official Secrets” under Section 5 of the Official Secrets Act, 1923:-

Any contravention of the above-mentioned provisions by any bidder, sub-bidder, consultant, adviser or the employees of a bidder will invite penal consequences under the aforesaid legislation.

III. Prohibition against use of BARC’s name without permission for publicity purposes:-

The bidder or sub-bidder, consultant, adviser or the employees engaged by the bidder shall not use BARC’s name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

Thanking you,


25.02.2022

(Nirupam Das)

Head, Innovative Technology Development Section

Enclosure: Annexure - I

ANNEXURE - I

Technical specification for fabrication

of

"Aluminium Structural Module Assembly"

PART – I - Scope of Supply:

1. Scope of Work:

Preparation of fabrication drawings, procurement of material, fabrication, assembly, testing and safe delivery of *aluminium structural modules assembly* as per this technical specification, drawings No.Solar/GG/01 to drawings No. Solar/GG/06(No. of drawings: 6) and Bill of Materials (BOM).

PART – II - Technical Specifications

The following is a brief description of the work included in the scope of supply of structural module assembly.

1. Job Details:

The work involves fabrication of Aluminium parts (designated AL-01 to AL-16) made by machining, cutting, grinding, drilling and welding of box sections, pipes, plates, etc. and assembly of the fabricated parts as per attached drawings described in Section 2 below.

The total quantity of fabrication is estimated to be 3600 kg approx. of Aluminium. However, the same must be estimated by supplier based on drawings provided and the same is to be considered for arriving at quoted price.

All fabrication and assembly will be done at the supplier's premises. The items is to be delivered safely to the purchaser's premise without any damage. Testing of the materials is to be done from government approved test laboratory (NABL).

2. Drawing Description:

The details of the parts (AL-01 to AL-16), to be fabricated for structural module assembly, and their general arrangement is provided in drawing no. *SOLAR/GG-01* to *SOLAR/GG/-05*.

Drawing no. *SOLAR/GG/-01* shows an existing frame (designated as E-01 to E-10) to which structural module assembly will be eventually attached. This existing frame is not to be fabricated by the supplier and the same exists at BARC site.

Drawing no. *SOLAR/GG/02* contains layout of Aluminium connectors (AL-01) Aluminium Cross (AL-02 to AL-07), Aluminium Tee (AL-08) and Aluminium Pipe (AL-09 and AL-10) to be fabricated by the supplier. These connectors will be welded to the existing structure (E1-E10). However, welding to existing structure is not to be performed by the supplier.

Drawing no. *SOLAR/GG/03* provides details of Aluminium connectors (AL-01), Aluminium Cross (Part No. AL-02 to AL-07), Aluminium Tee (Part No. AL-08) and Aluminium Pipe (AL-09 and AL-10) to be fabricated by the supplier.

Structural module assembly consists of holding frames made of Aluminium as shown in Drawing no. *SOLAR/GG/04*. There are total 348 holding frames of 17 different types. Holding frame type 1 to 12 are 24 in nos. each (total 288) while holding frame type 13 to 17 are 12 in nos. each (total 60). Design of backup structure (AL-11) and backup plate (AL-12) is different in shape and size for different holding frame types. However, the basic arrangement is the same as shown in the drawing.

Detail drawing of all types of holding frames is not provided. Only General Arrangement drawing of a typical holding frame (i.e, holding frame type 4) is shown in drawing no. *SOLAR/GG/05*. The fabrication drawing of all the holding frames is to be made by supplier in consultation with and as per input from the purchaser.

Drawing no. *SOLAR/GG/06* (Detail D1 of Drawing no. *SOLAR/GG/05*) gives typical part details of various components of holding frame type 4. Part no. AL-11 is welded to Part No. AL-12 and Part no. AL-16 is welded to part no. AL-11. Part nos. AL-13, AL-14 and AL-15 are to be supplied in loose condition.

All the materials to be supplied is given in Bill of Material (B.O.M). Cutting and wastage allowance has not been considered in the B.O.M.

3. Applicable Codes and standards:

The aluminum material supplied should adhere to specification contained in,

- a. IS 733 - 1983 - Specification for wrought Aluminium and Aluminium Alloy Bars, Rods and Sections for General Engineering Purposes
- b. IS 737 - 2008 - Wrought Aluminum and Aluminum Alloy sheet and Strip for General Engineering Purposes – Specification

- c. IS-1285 - 2002 - Wrought Aluminum and Aluminum Alloys - Extruded Round Tube and Hollow Sections for General Engineering Purposes — Specification
- d. IS-2678 - 1987 - Dimensions and Tolerances for Wrought Aluminium and Aluminium Alloy Drawn Round Tubes.
- e. IS- 5052 – 1993 (Re-affirmed 2003) – Aluminum and its alloys - Temper Designations
- f. IS- 3658 – 1999 Code of Practice for Liquid Penetrant Flaw Detection

4. Free Issue Material:

No free issue material will be provided by the purchaser.

5. Inspection and Testing:

Material shall be inspected and approved by the authorized representative of the purchaser. Fabrication work shall not start without approval of the authorized representative of the purchaser. The aluminum structure shall be welded by GTAW/MIG so as to produce minimal distortion. Welder shall be qualified for the structural fabrication work to produce quality weld joints.

Visual inspection shall be carried out and Dye Penetration Test (DPT) of all welds shall be witnessed by authorized representative of the purchaser. The fabricated structure will be subjected to inspection and acceptance by authorized representative of the purchaser. Inspection and testing is binding to the supplier.

Following inspection and testing shall be carried out by the authorized representative of the purchaser.

- a) A minimum of 6 nos. of Aluminum specimen shall be tested. Specimen will be selected by the purchaser or his representative from the structural materials offered for fabrication. Supplier has to arrange for testing of the specimens from government approved test laboratory (NABL) for Chemical composition, Mechanical properties - Yield Strength (YS), Ultimate Tensile Strength (UTS), percentage elongation as per relevant IS codes mentioned in Section 3 of this specification.
- b) All the structural materials offered for fabrication shall be new. Used and reconditioned materials will not be accepted.
- c) Materials shall be straight and free from bends and kinks.
- d) Material offered for supply shall be smooth and free of rust, scratches, void, bend and dents.

- e) The material test certificates and manufacturer's test certificate in standard format shall be submitted along with the materials prior to start of fabrication work.
- f) Material will be rejected if it does not conform to the above testing requirement.
- g) All the tests shall be carried out by government approved test laboratory (NABL).
- h) Dimensions of all the materials offered for supply shall be measured.
- i) Fabricator shall prepared detailed fabrication drawing for the approval of the purchaser.
- j) Surface/edge preparation will be carried out before welding. Welding shall be uniform and free from defects such as undersized welds, undercut, spatter, overlap, surface porosity etc.
- k) Structural components shall be subjected to dimensional check. A document containing measurements taken for dimension check is to be prepared and shall be submitted for acceptance by purchaser.

6. Acceptance Criteria

The finished items will be accepted based on the following acceptance criteria,

- a. Approval of all the material test certificates,
- b. Approval of Welder qualification certificates,
- c. Visual inspection and DP test of all the welds,
- d. Dimensional inspection of all the fabricated parts as per drawing,
- e. Approval of dimension check documents by the purchaser and
- f. Acceptance of tolerances as mentioned in the attached drawings and specification.

7. Delivery:

Supplier has to deliver this material safely to the following address,

*REZ store,
Bhabha Atomic Reseach Centre (BARC)
Trombay, Mumbai-400 085.*

Supplier has to bear the cost of delivery. Delivery period of the items is 3 Months from the date of acceptance of order.

8. Terms and Conditions:

All the materials, manpower, welding machines, welding consumables, tools and accessories required for the work is in the scope of fabricator. The work shall be subject to review by the purchaser or his authorized representative. Work shall be conducted under their guidance and to the full extent of satisfaction of the purchaser.

PART – III - Notes to Bidder:

- a) **Compliance statement:** The bidder shall submit **point wise compliance statement** of the above technical specifications in their offer.
- b) **Bidder Evaluation Criteria:**
 - i. The bidder shall have prior experience in manufacture of components of accuracies required in this tender. Sufficient documentary evidence shall be submitted for evaluation.
 - ii. The bidder shall have own fabrication facility with sufficient equipment and manpower required for fabrication and inspection. Details of the required equipment available at the vendor's facility together with other details shall be submitted for evaluation.
 - iii. The vendor shall submit documentary proofs of 2 nos. of similar works that they have successfully completed in the past 5 years.
- c) **Sub contract:** No sub-contracting of any part of the job is acceptable without prior approval from the purchaser. The bidder shall clearly indicate any work intended to be sub-contracted to any other party in the offer itself. Sub-contracting will be permitted only if the purchaser is satisfied with the capability of the sub-contractor. The bidder is responsible for all the operations carried out by the sub-contractor.
- d) The offer shall contain sufficient documentary evidences to meet the bidder evaluation criteria. Further during evaluation of their offer the purchaser reserves right to evaluate their capabilities of their facility in person. During such a visit the purchaser shall give free access to all their facilities relevant to meet the requirements in this tender. Failing to meet the bidder evaluation criteria would lead to rejection of their offer.
- e) During the process of fabrication or prior to it, the purchaser reserves the right to incorporate minor changes to the reference sketch which do not necessitate a change in machining procedure, inspection procedure or size of raw material. This shall not be taken as a reason for revision of quoted price.

- f) Inspection from the purchaser does not relieve the supplier of his responsibilities towards fabrication of job as per specifications.
- g) The purchaser reserves the right to undertake additional inspections, if deemed necessary by him.
- h) The drawing along with the enquiry gives both detail and assembly of the components. In case of any deviation, the bidder shall mention this in his quotation. The deviation could be accepted without sacrificing actual function of the structural module assembly.

In case of any ambiguity or doubt, the bidder shall not assume any dimension or configuration. The purchaser shall be contacted to clarify the doubts.

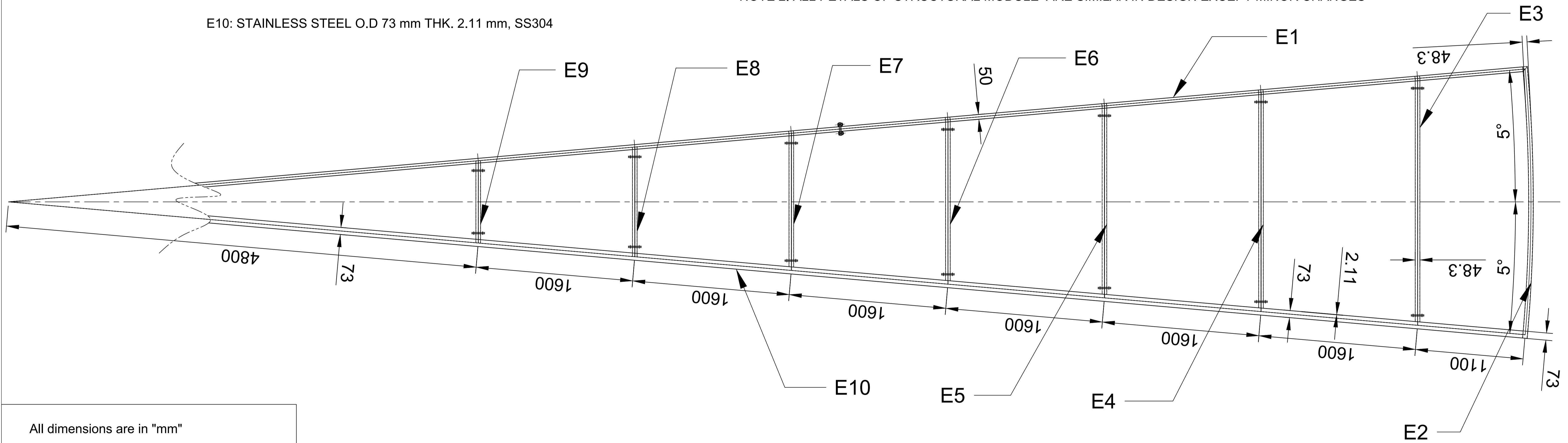
E1 : ALUMINIUM O.D O.D 50 mm THK. 2.5 mm, 6061 T6

E2 - E9: CARBON STEEL 48.3 mm THK. 1.65 mm, IS1239

E10: STAINLESS STEEL O.D 73 mm THK. 2.11 mm, SS304

NOTE 1. STRUCTURAL MODULE ASSEMBLY IS MADE OF 12 PETALS. ONLY DRAWING OF ONE SUCH PETAL IS GIVEN HERE

NOTE 2. ALL PETALS OF STRUCTURAL MODULE ARE SIMILAR IN DESIGN EXCEPT MINOR CHANGES



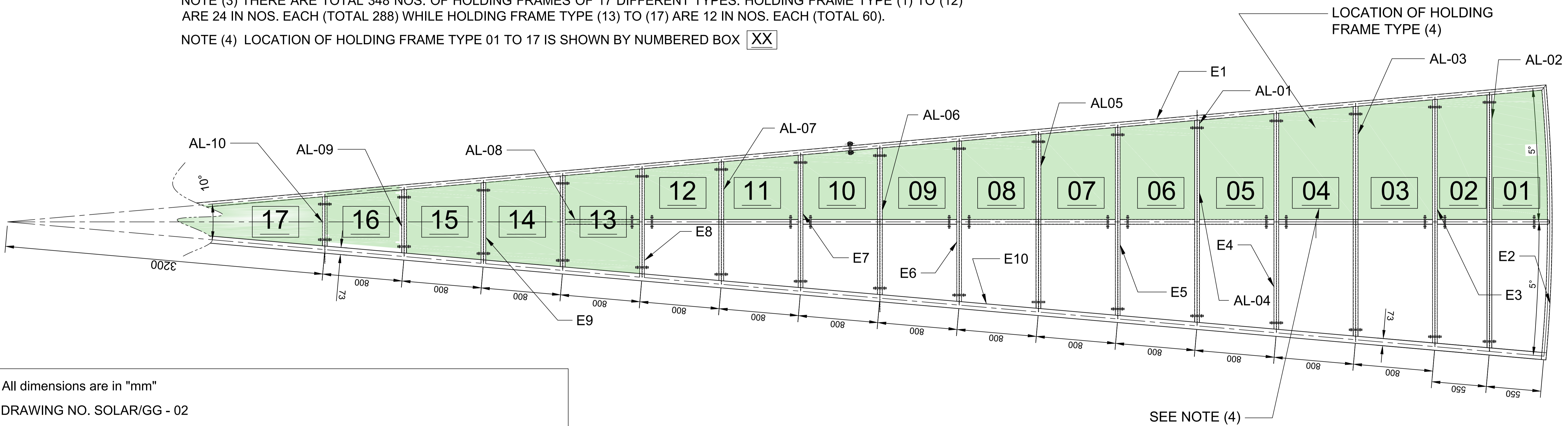
All dimensions are in "mm"
DRAWING NO. SOLAR/GG - 01
TITLE: EXISTING STRUCTURE

NOTE (1) STRUCTURAL MODULE ASSEMBLY IS MADE OF 12 PETALS. ONLY DRAWING OF ONE SUCH PETAL IS GIVEN HERE

NOTE (2) ALL PETALS OF STRUCTURAL MODULE ARE SIMILAR IN DESIGN EXCEPT MINOR CHANGES

NOTE (3) THERE ARE TOTAL 348 NOS. OF HOLDING FRAMES OF 17 DIFFERENT TYPES. HOLDING FRAME TYPE (1) TO (12) ARE 24 IN NOS. EACH (TOTAL 288) WHILE HOLDING FRAME TYPE (13) TO (17) ARE 12 IN NOS. EACH (TOTAL 60).

NOTE (4) LOCATION OF HOLDING FRAME TYPE 01 TO 17 IS SHOWN BY NUMBERED BOX XX

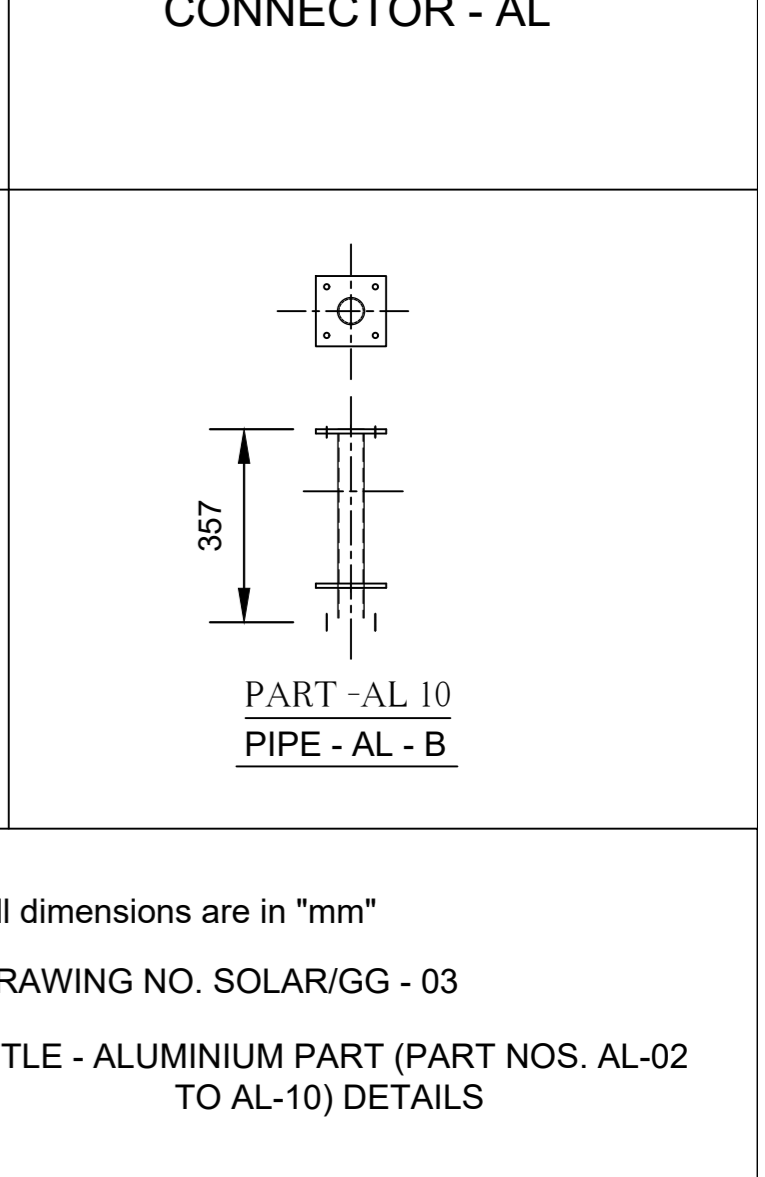
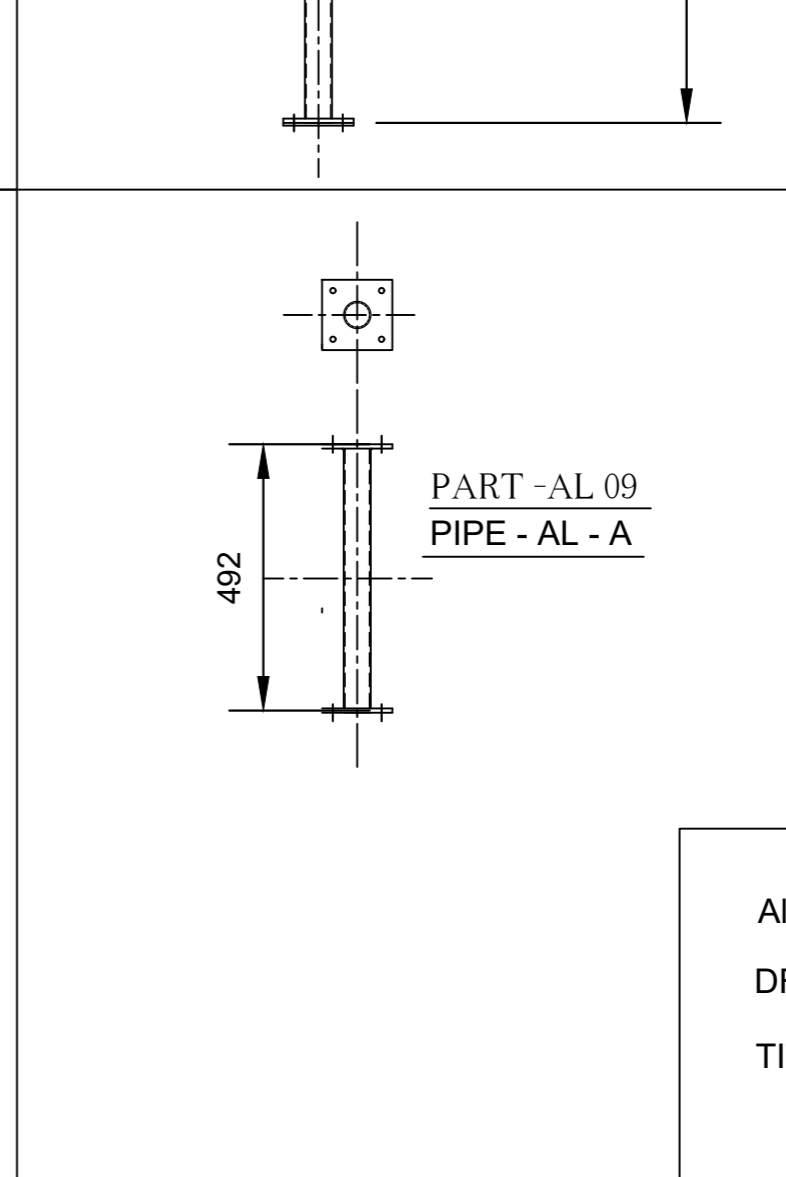
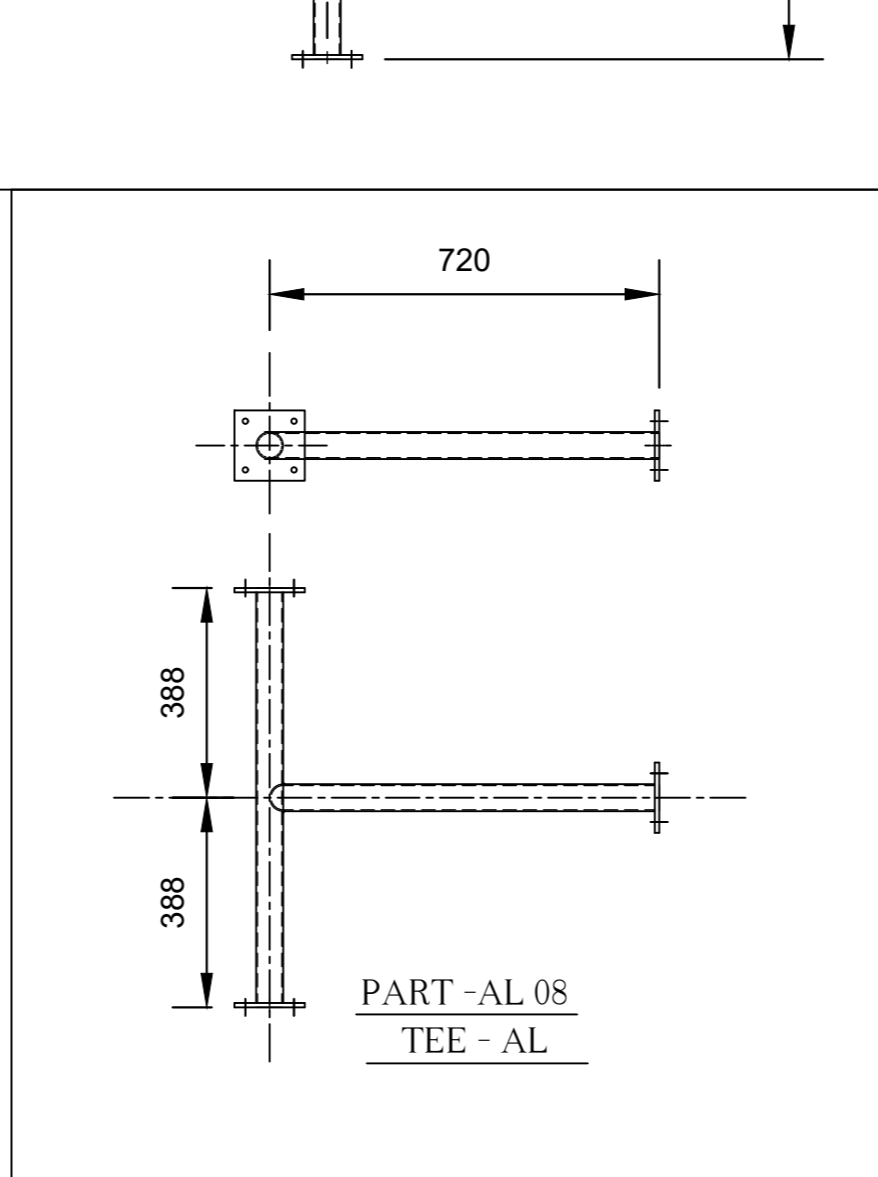
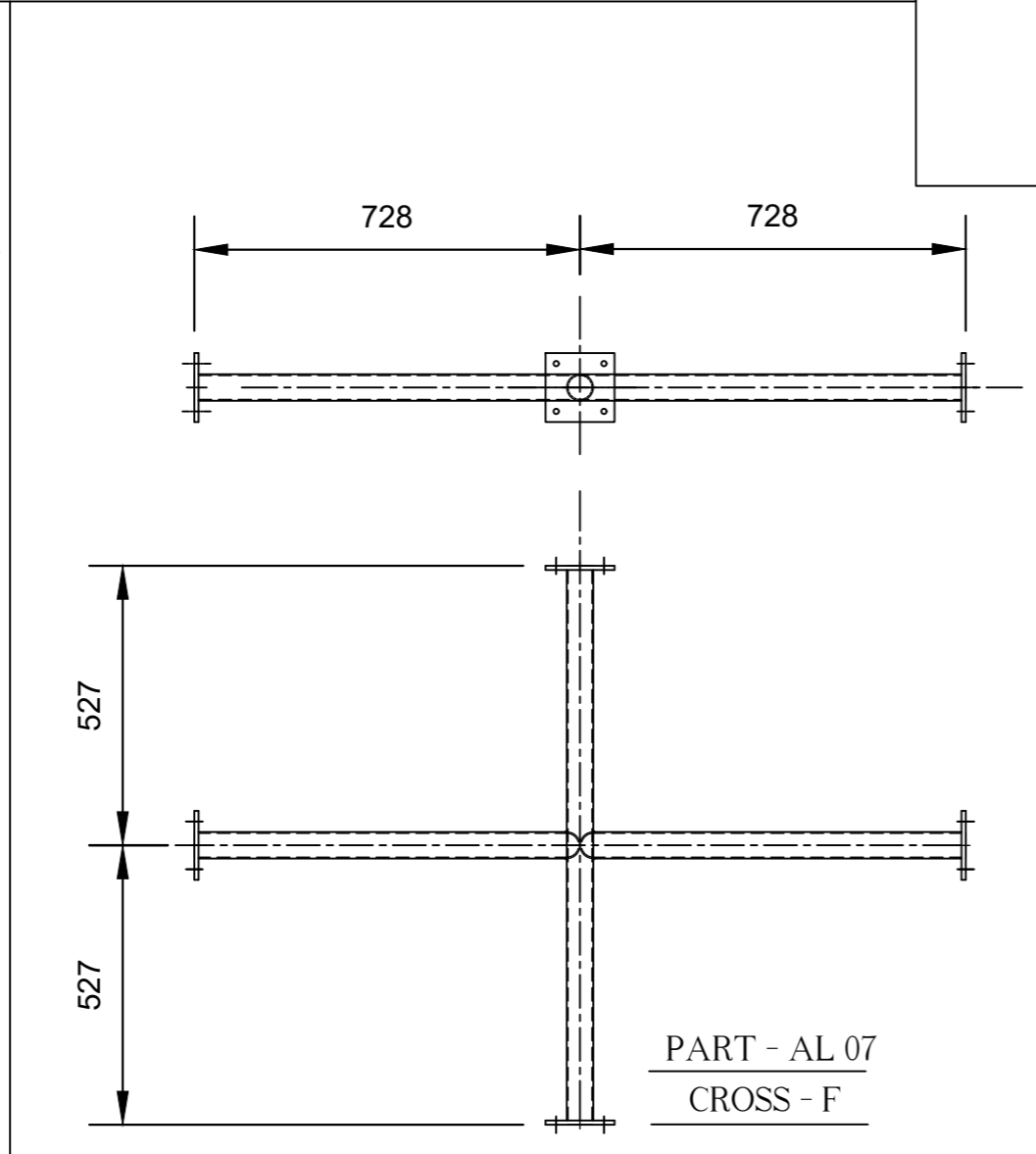
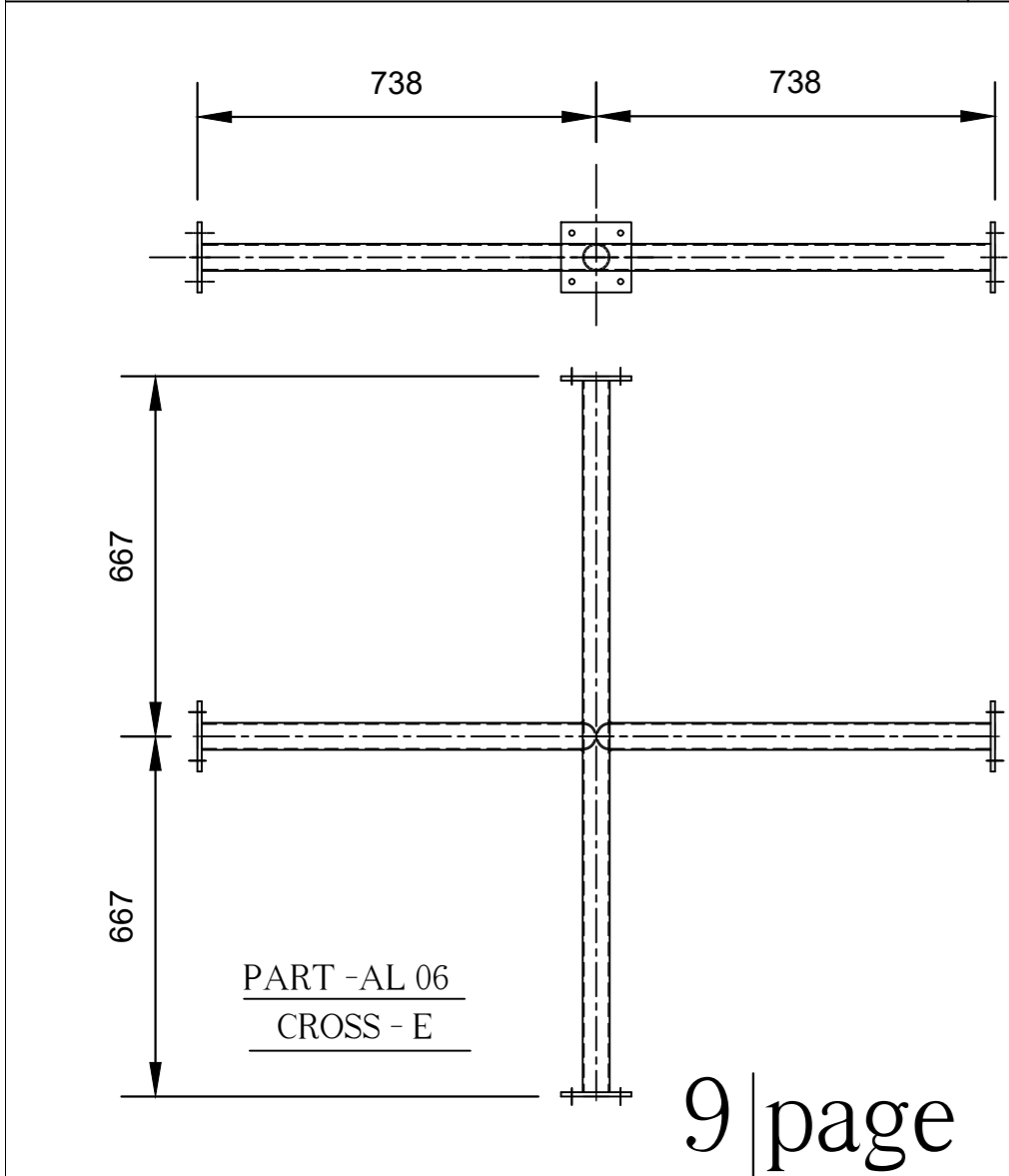
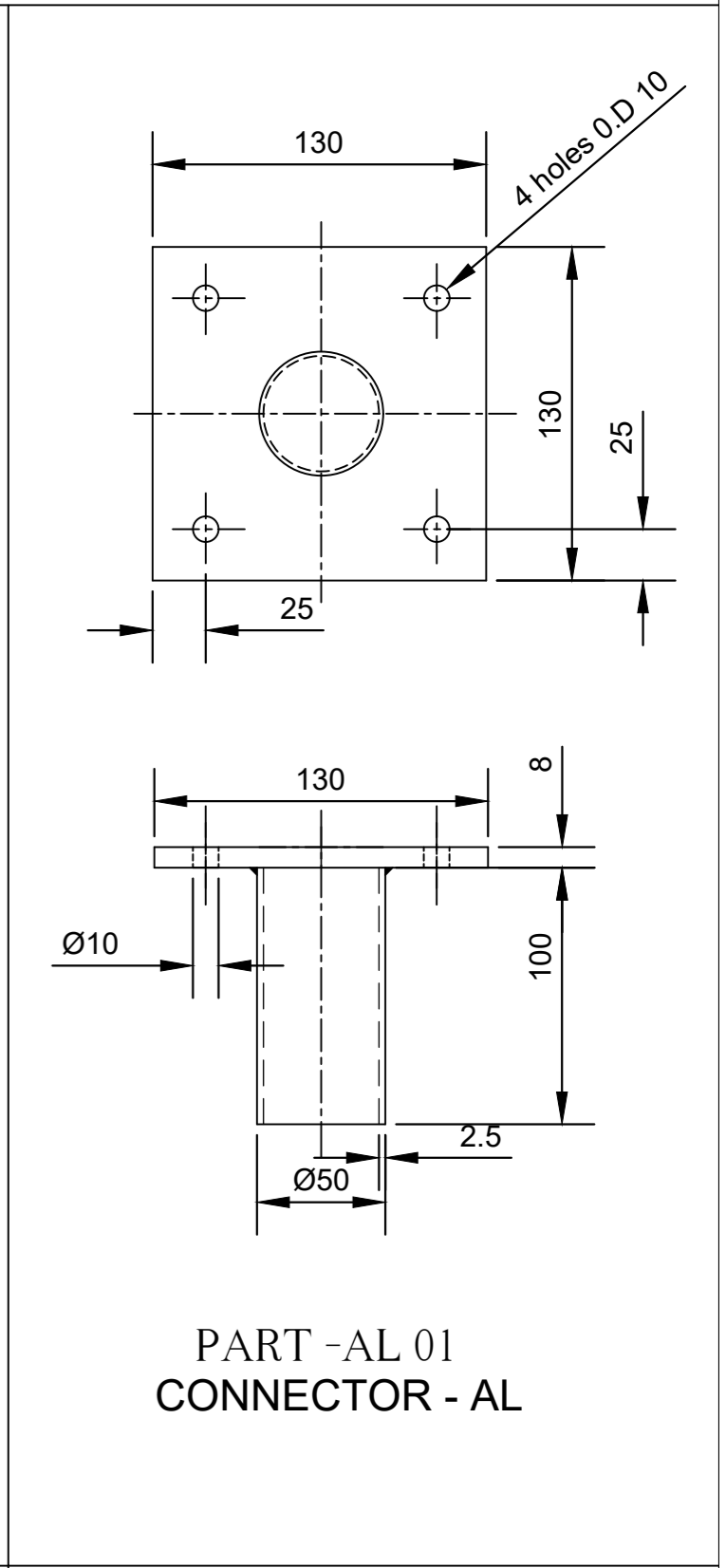
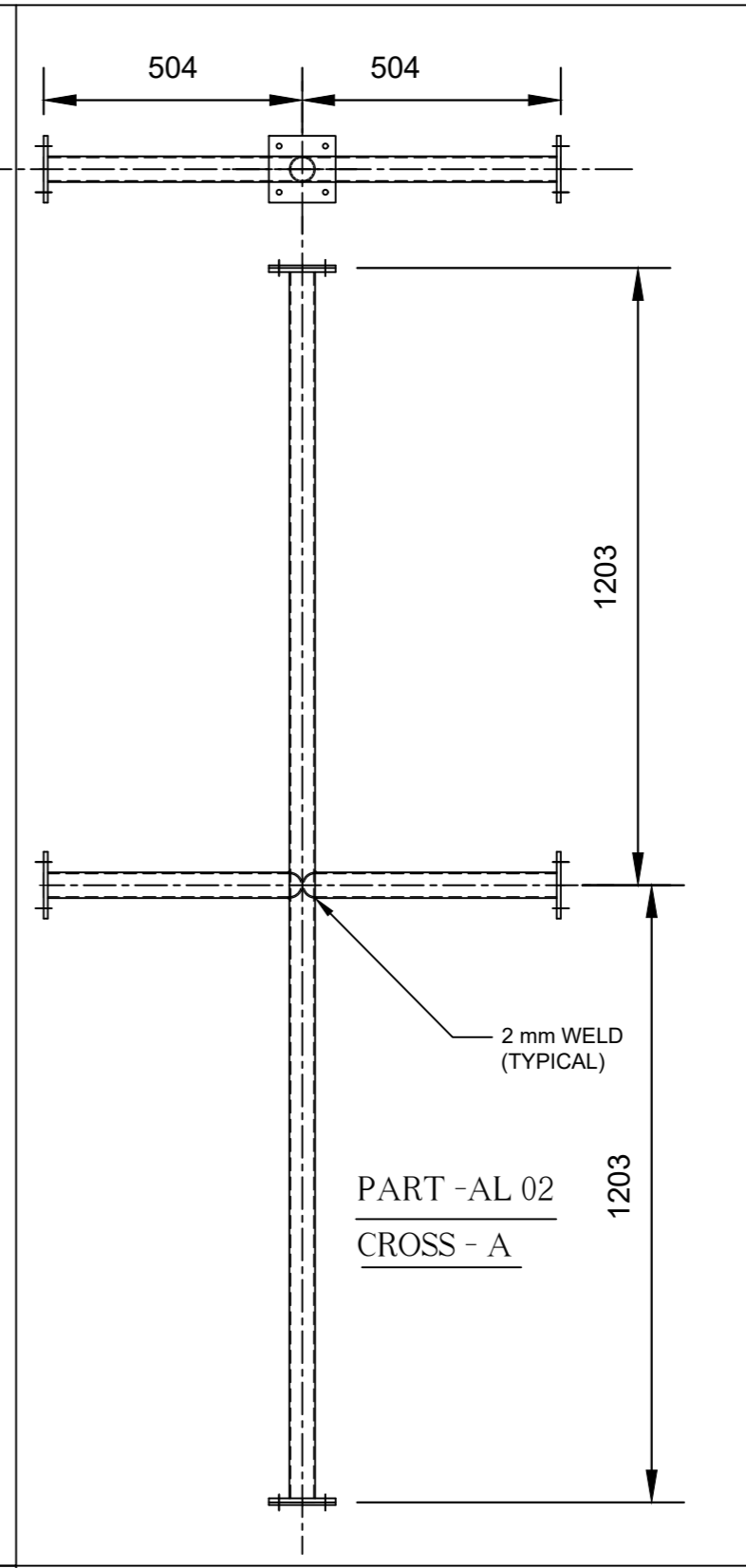
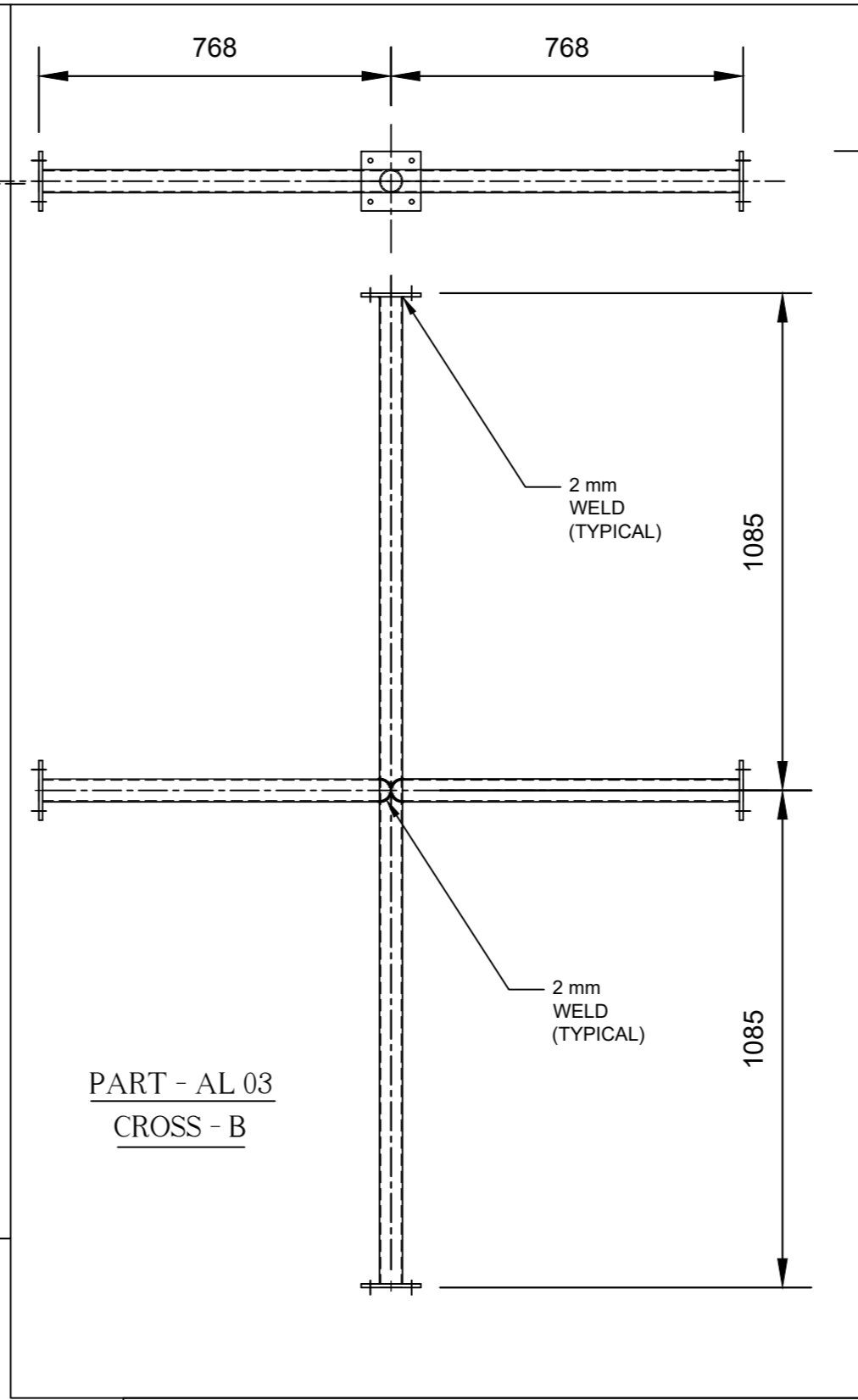
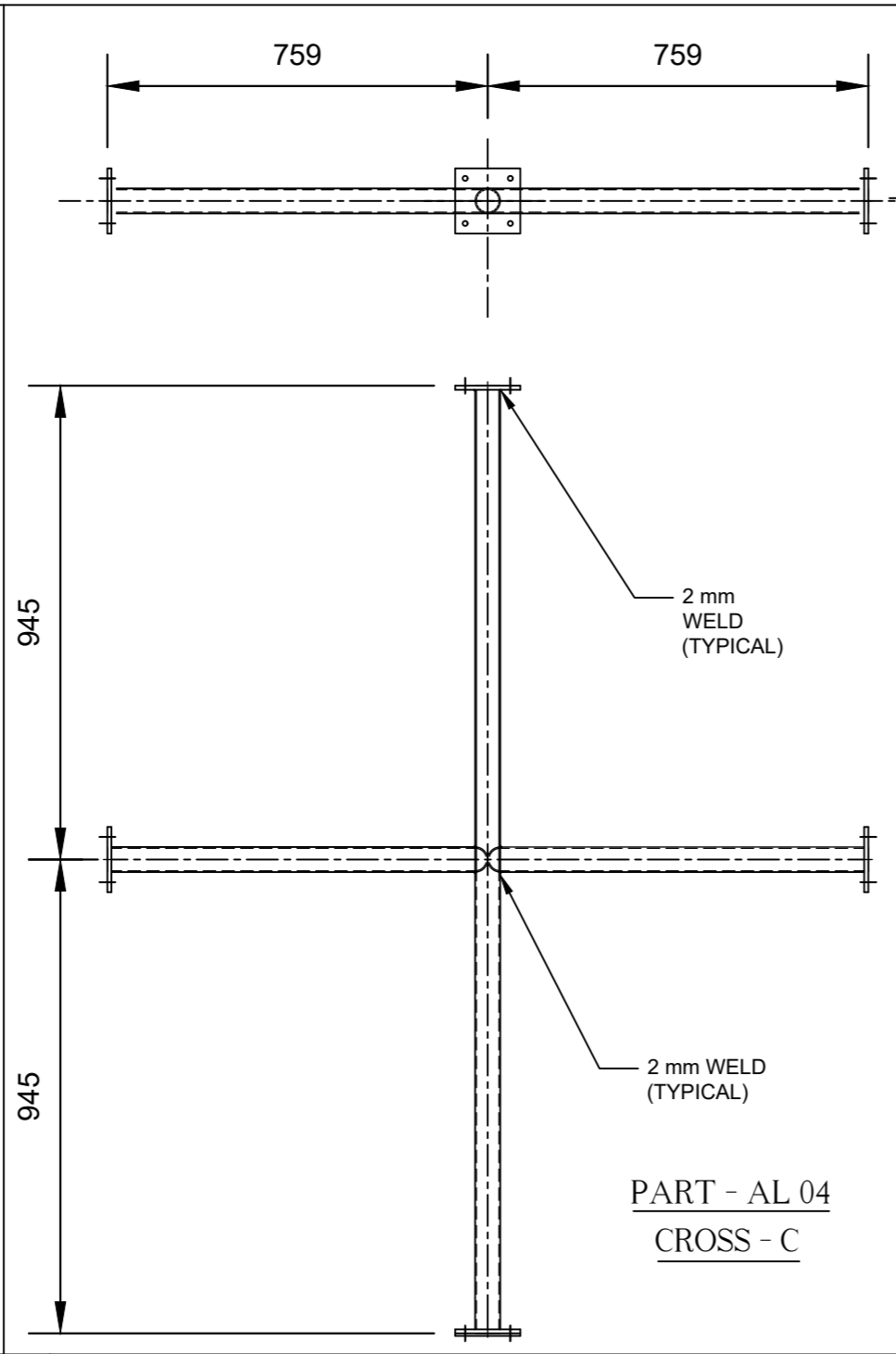
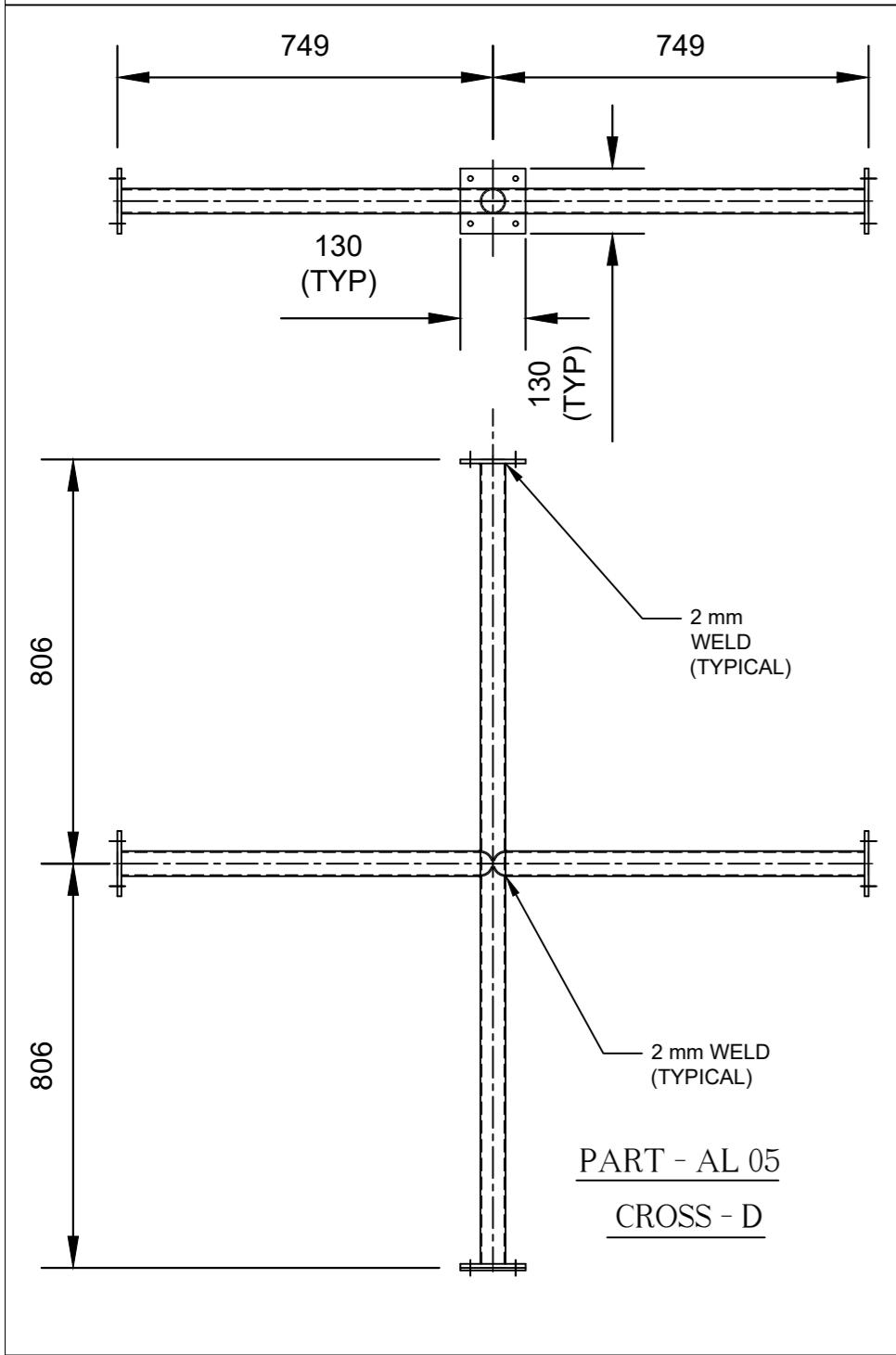


All dimensions are in "mm"

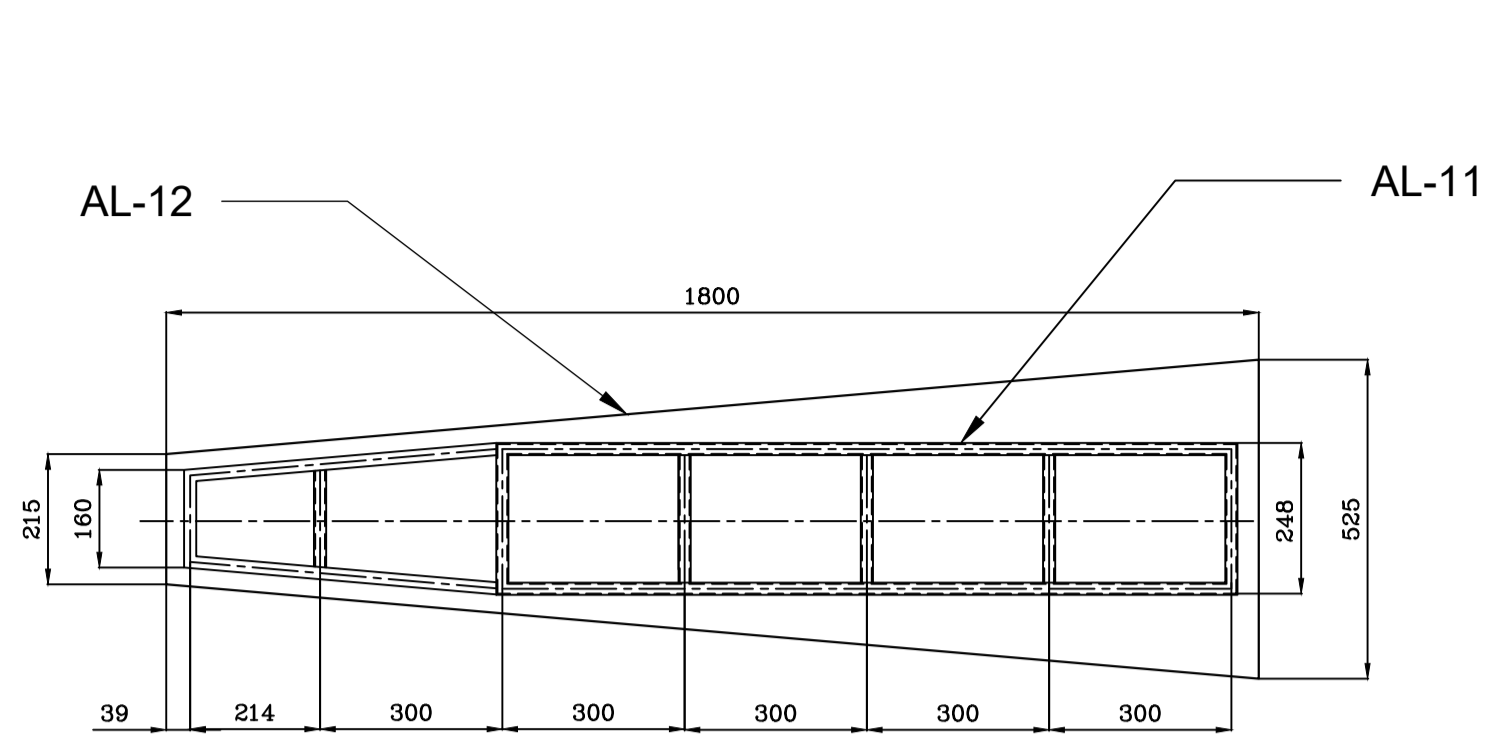
DRAWING NO. SOLAR/GG - 02

TITLE : PART NOS. AL-01 TO AL-10 WITH EXISTING STRUCTURES (E01 TO E10)

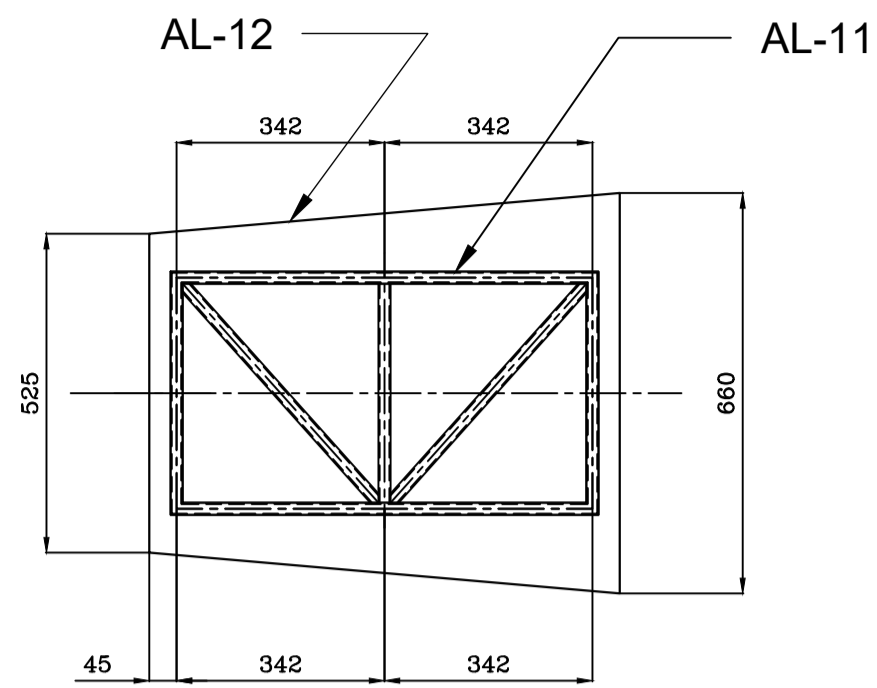
NOTE (1) ALL FLANGES ARE IDENTICAL WITH DIMENSION 130X130X8 AND HAVING 4 HOLES DIA. 10 mm
 NOTE (2) ALL WELDS ARE FILLET WELD OF SIZE 2 mm
 NOTE (3) ALL PIPES HARE HAVING O.D. 50 AND THICKNESS 2.5 mm
 NOTE (4) ACCEPTABLE TOLERANCE ON LENGTH FOR EVERY 1000 mm IS +/- 5 mm
 NOTE (5) ACCEPTABLE TOLERANCE FOR OUT OF STRAIGHTNESS FOR EVERY 1000 mm LENGTH IS +/- 3 mm



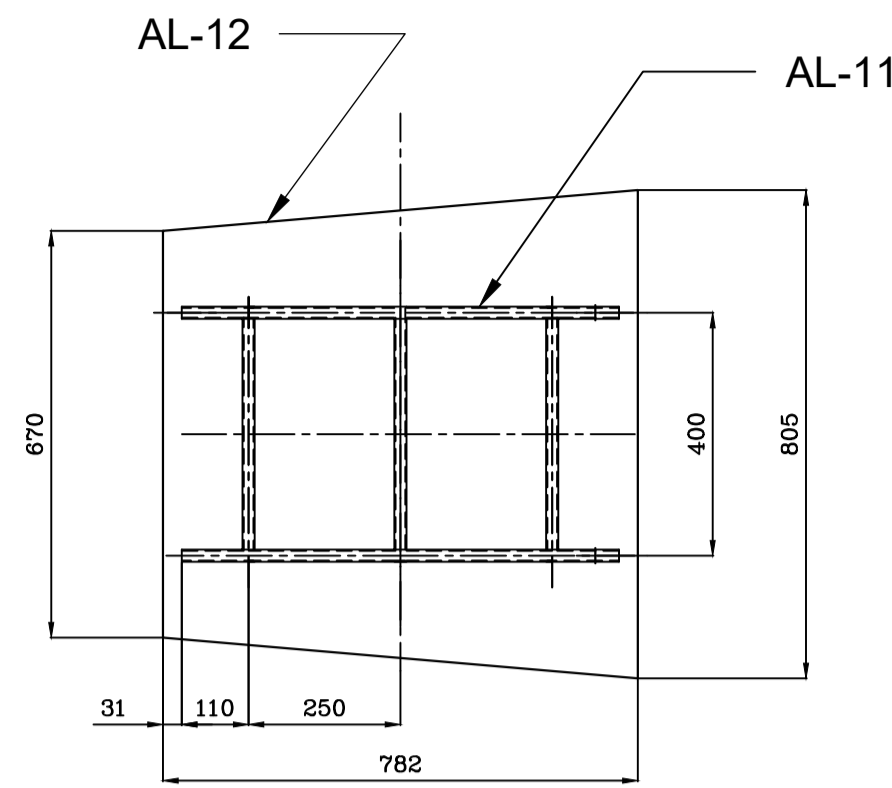
All dimensions are in "mm"
 DRAWING NO. SOLAR/GG - 03
 TITLE - ALUMINIUM PART (PART NOS. AL-02 TO AL-10) DETAILS



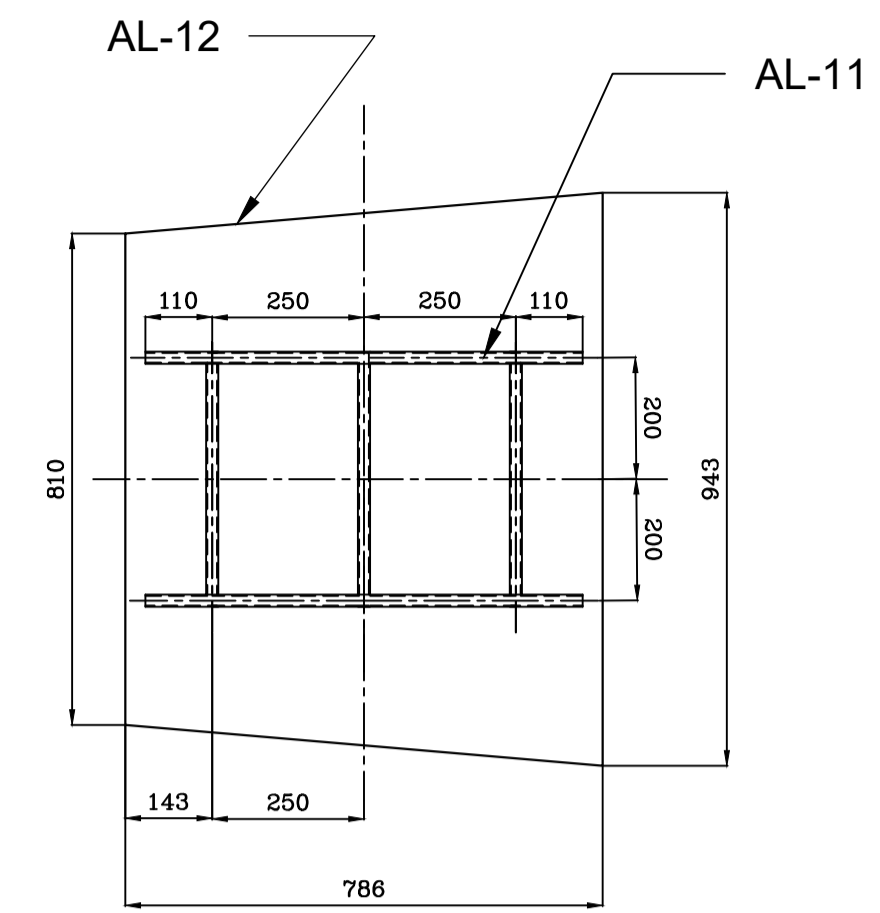
HOLDING FRAME TYPE 17
(12 nos.)



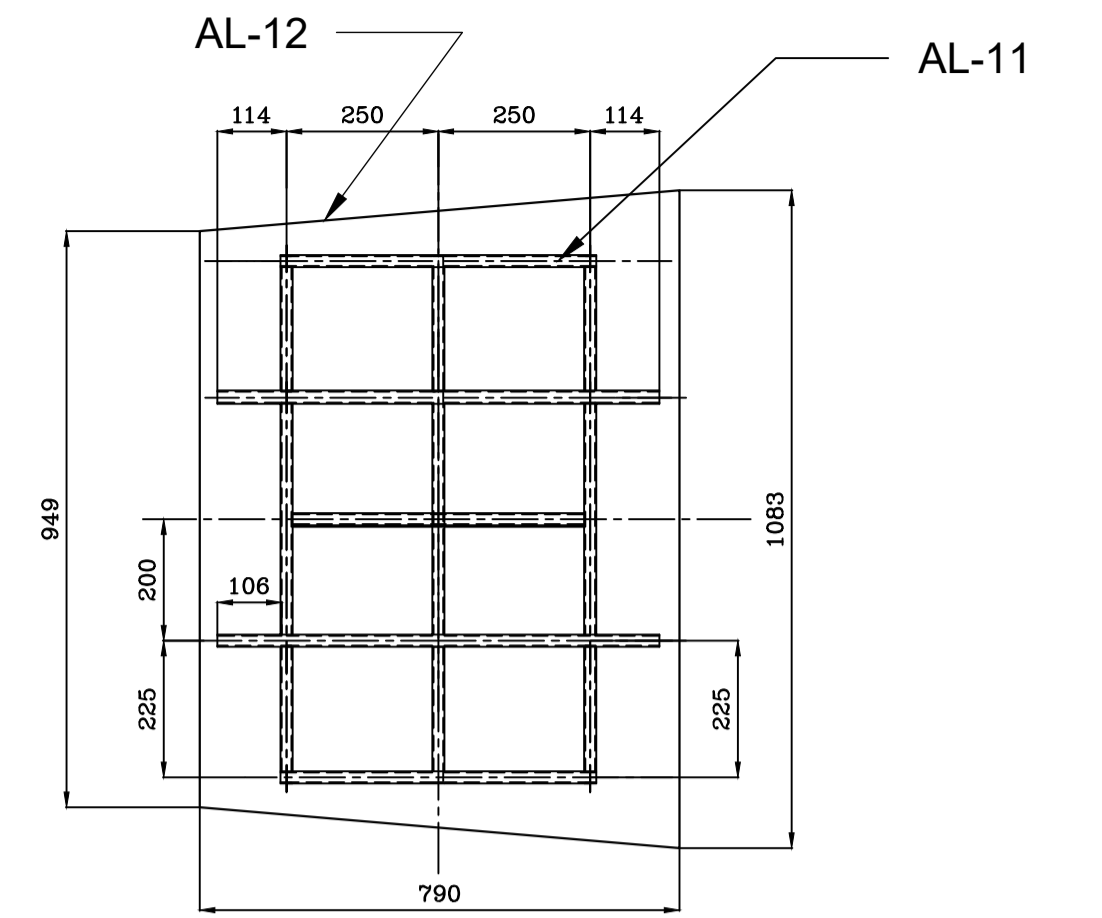
HOLDING FRAME TYPE 16
(12 nos.)



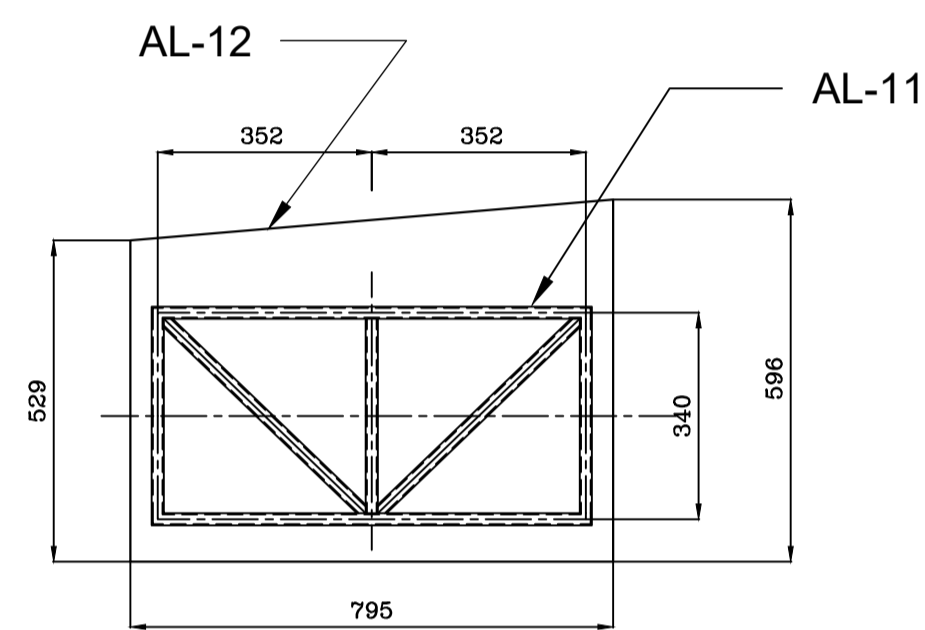
HOLDING FRAME TYPE 15
(12 nos.)



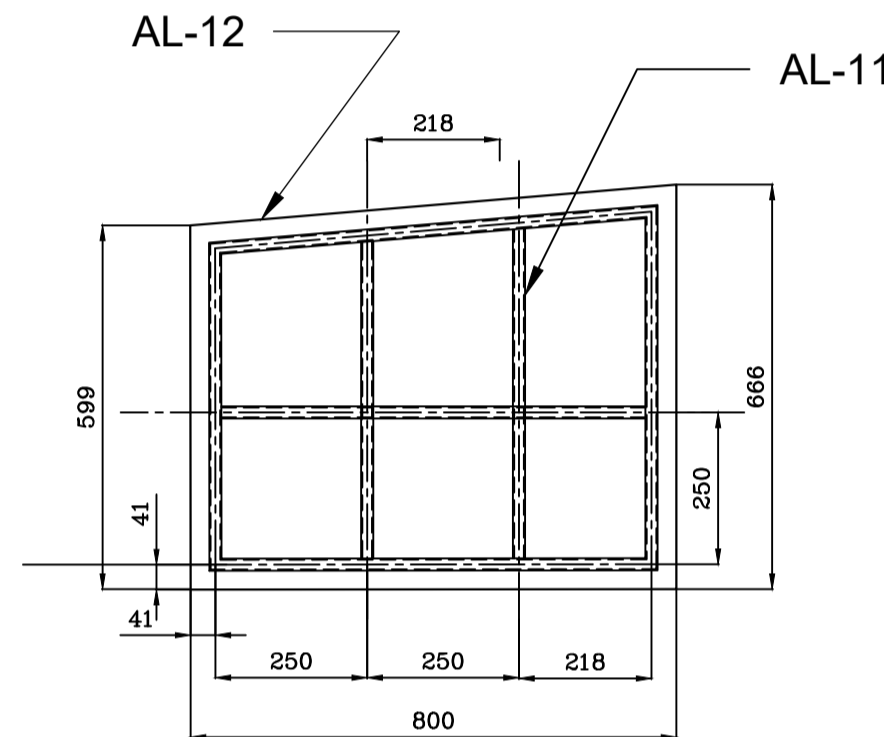
HOLDING FRAME TYPE 14
(12 nos.)



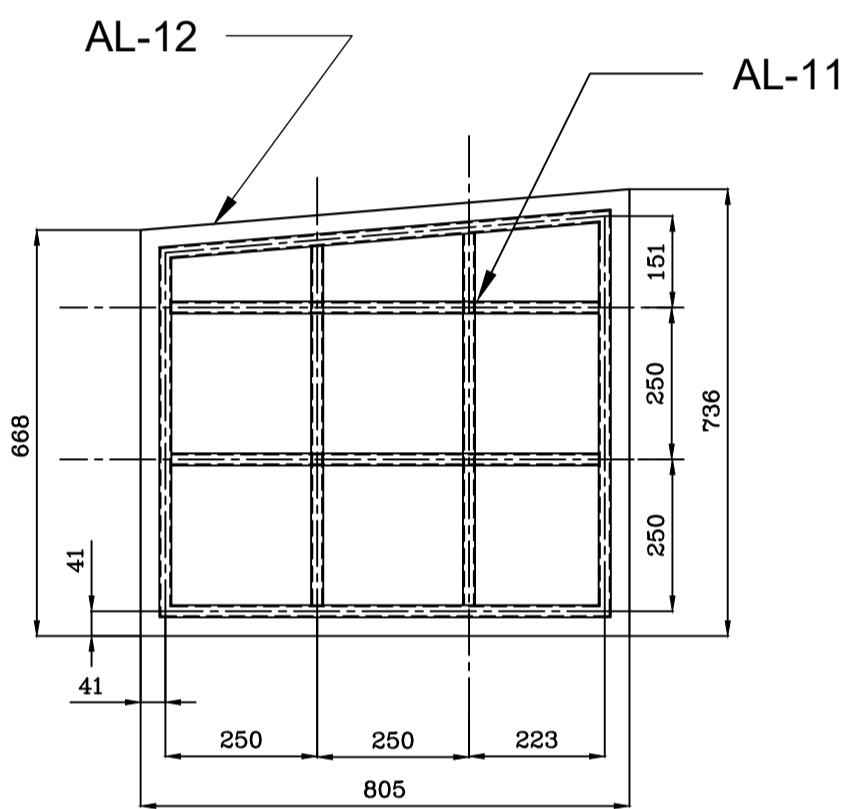
HOLDING FRAME TYPE 13
(12 nos.)



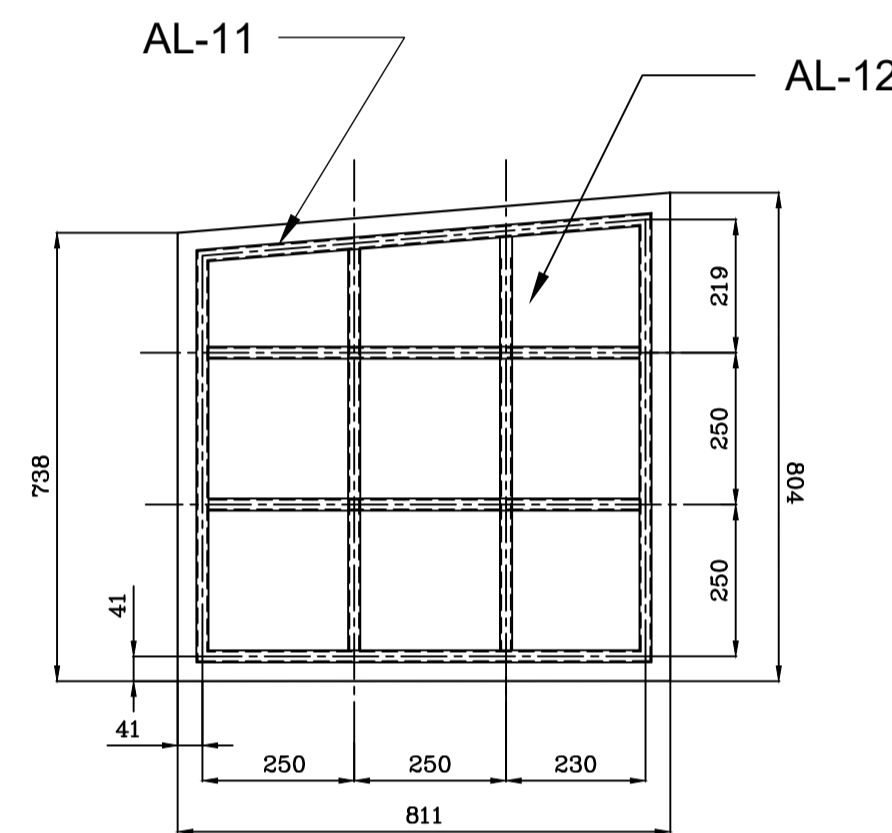
HOLDING FRAME TYPE 12
(24 nos.)



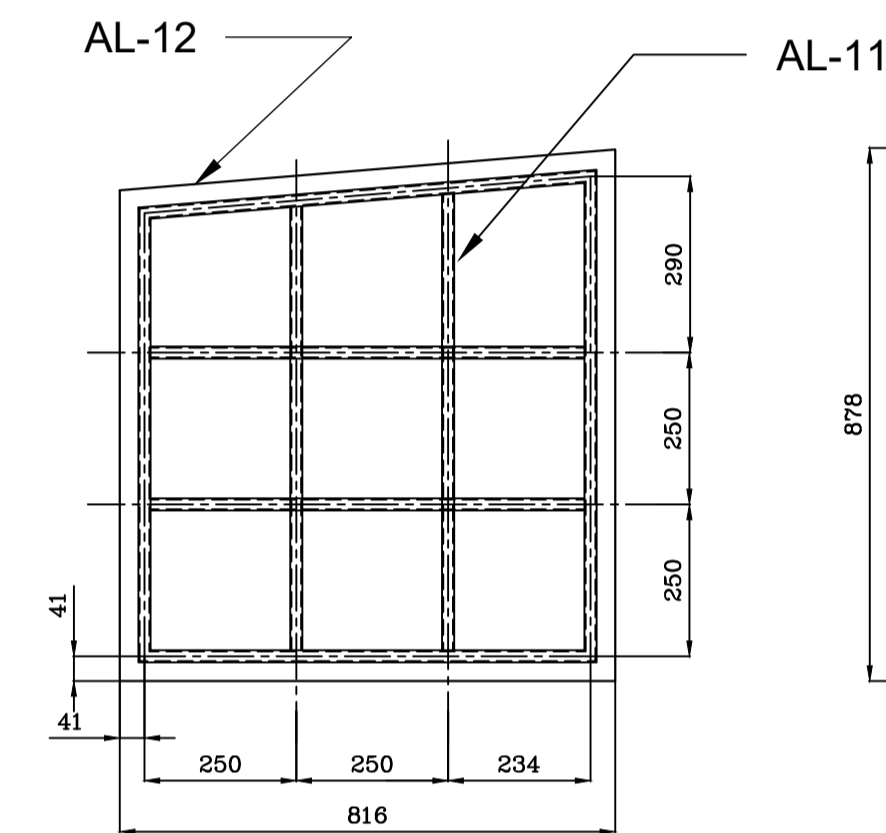
HOLDING FRAME TYPE 11
(24 nos.)



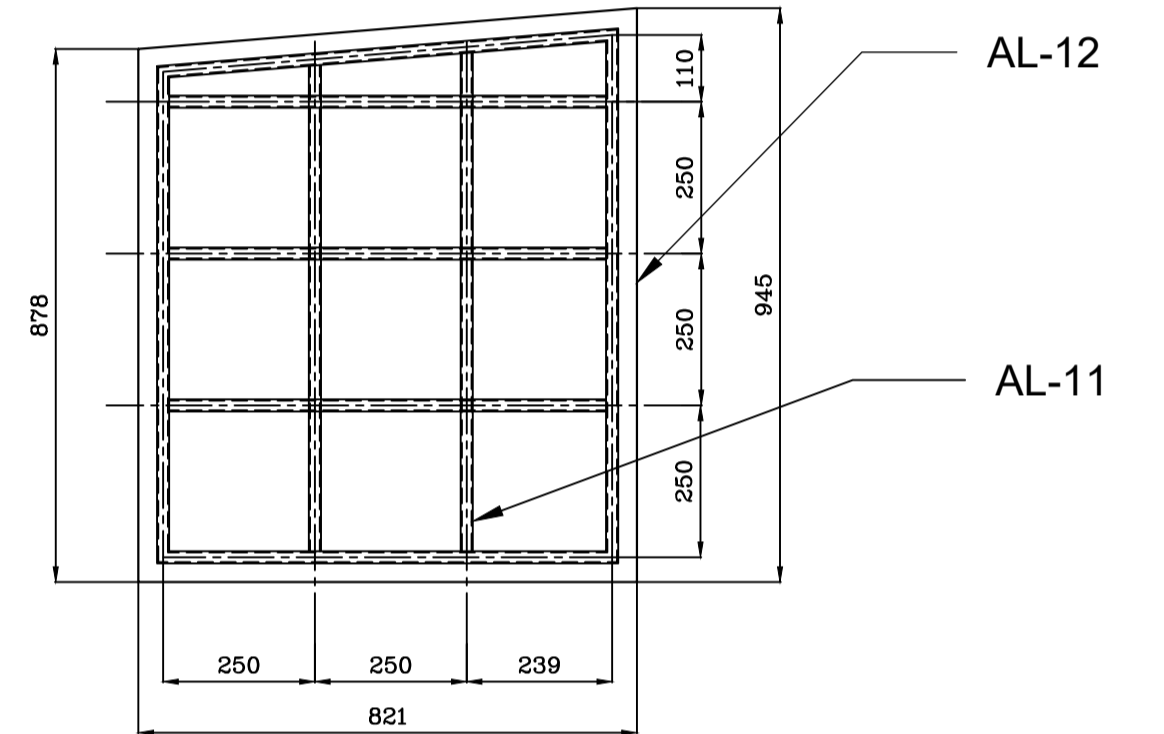
HOLDING FRAME TYPE 10
(24 nos.)



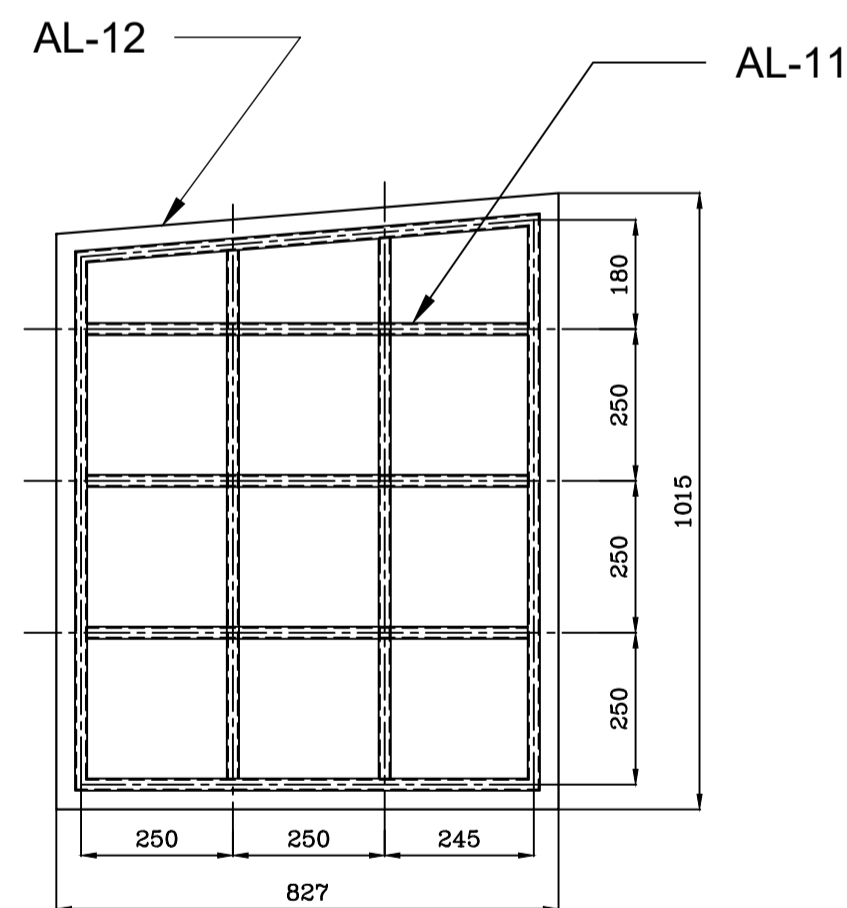
HOLDING FRAME TYPE 9
(24 nos.)



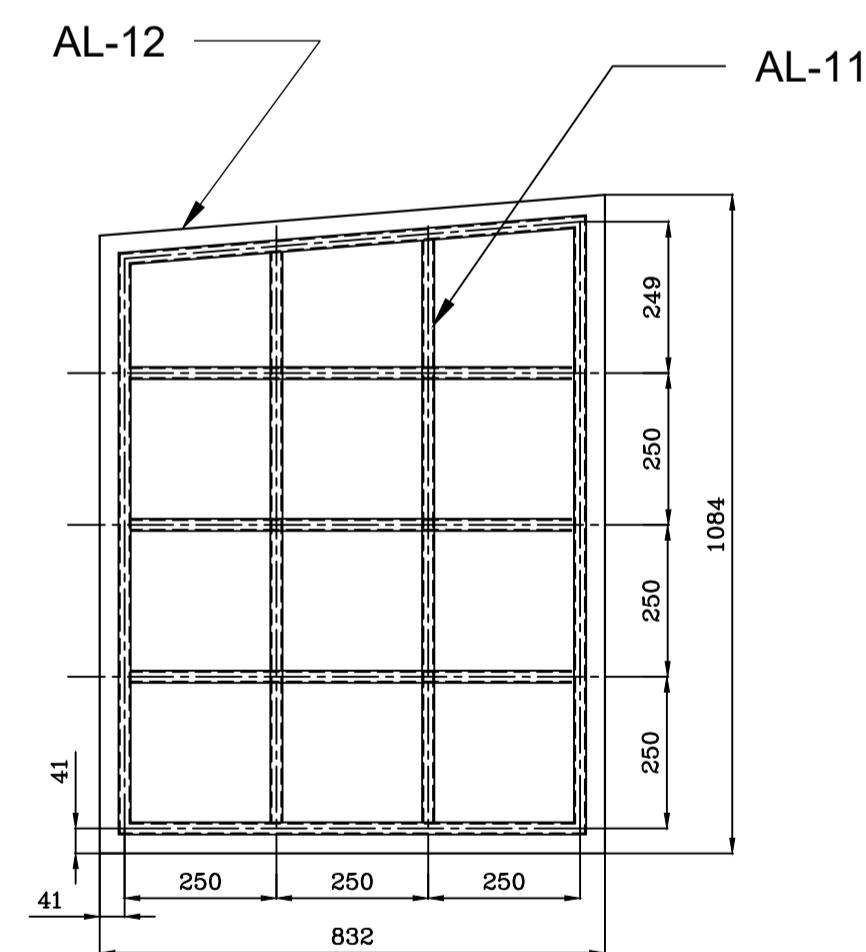
HOLDING FRAME TYPE 8
(24 nos.)



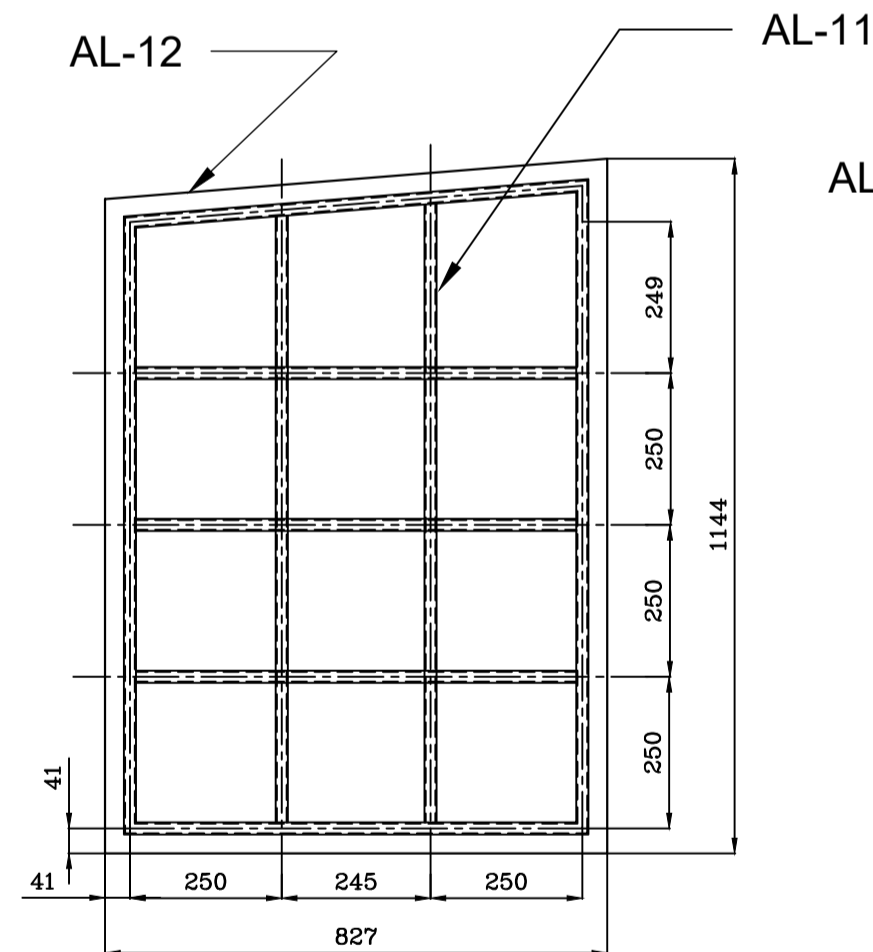
HOLDING FRAME TYPE 7
(24 nos.)



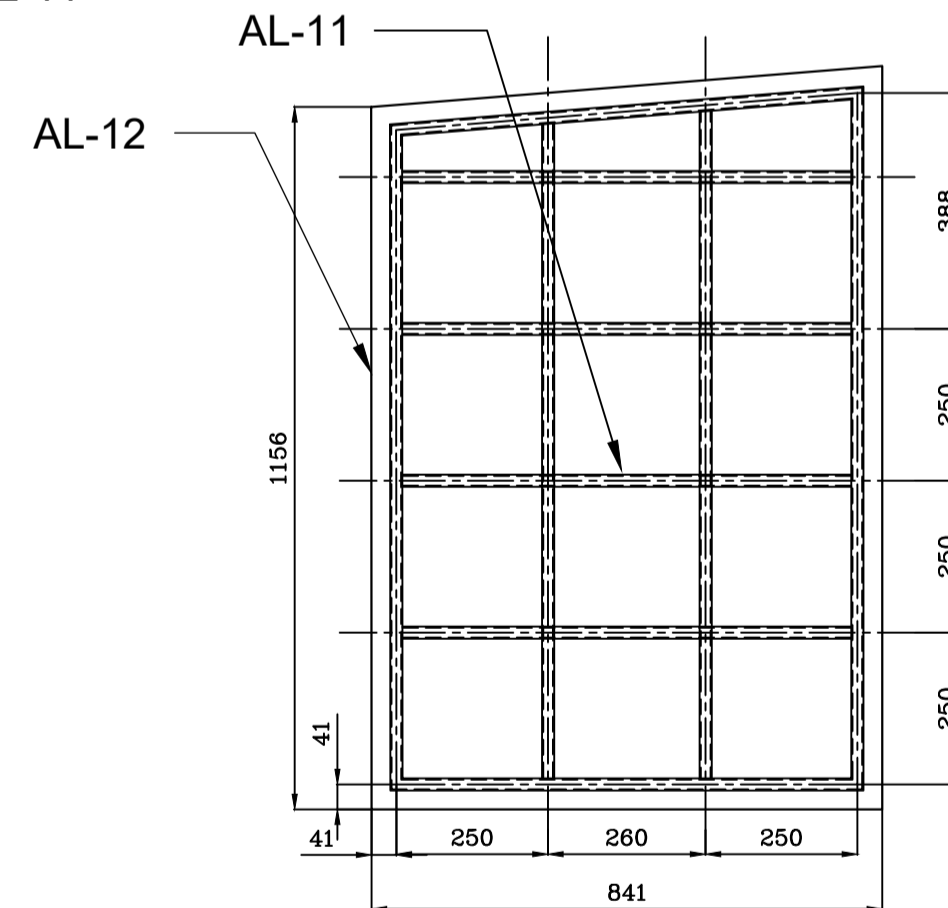
HOLDING FRAME TYPE 6
(24 nos.)



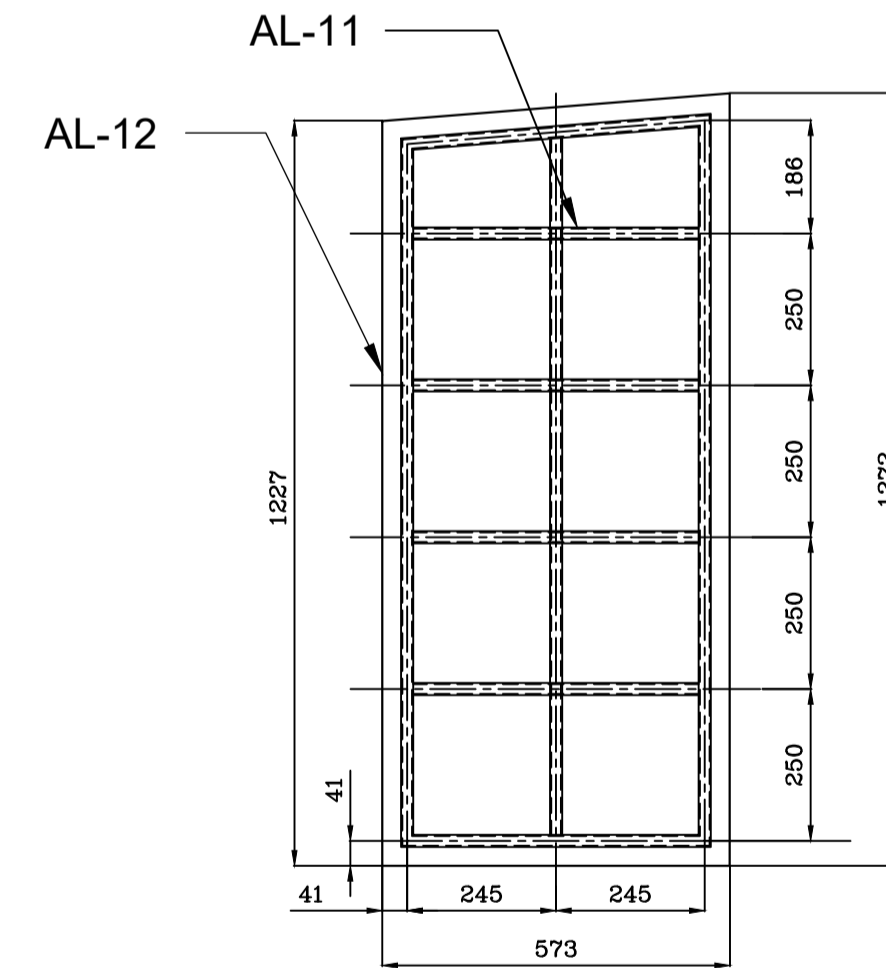
HOLDING FRAME TYPE 5
(24 nos.)



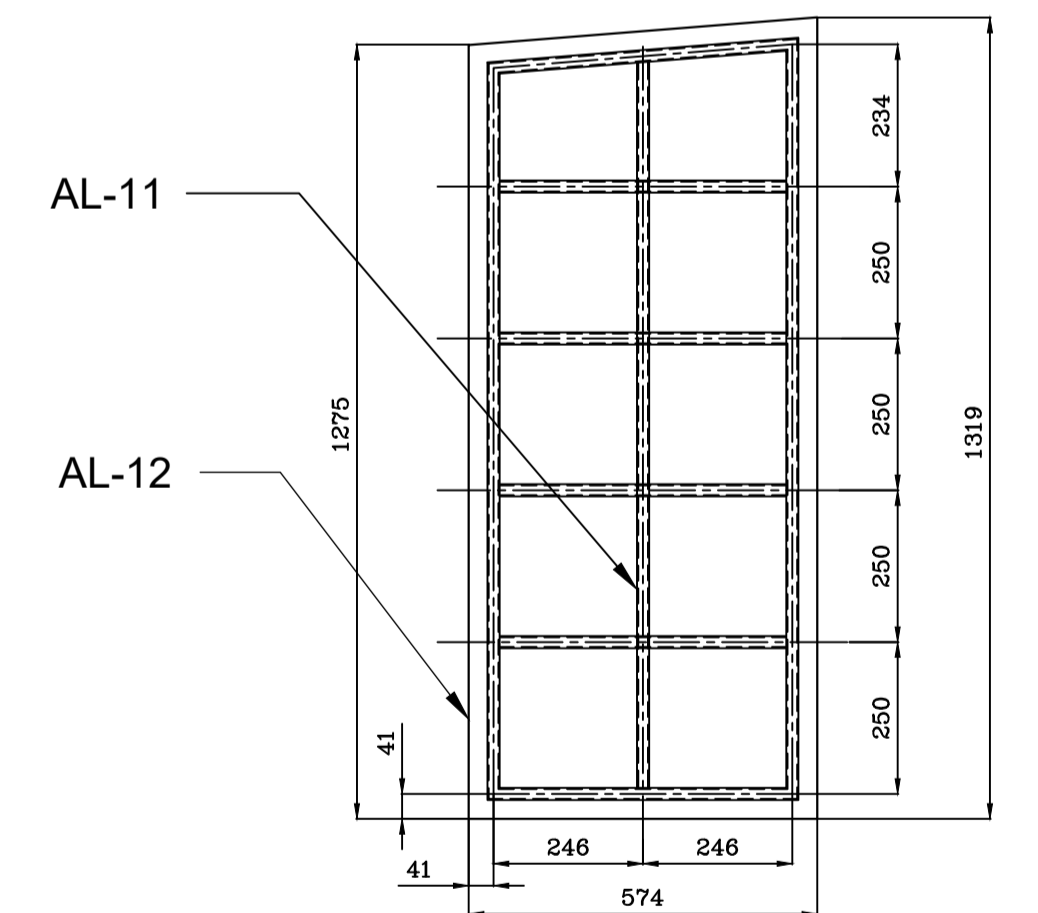
HOLDING FRAME TYPE 4
(24 nos.)



HOLDING FRAME TYPE 3
(24 nos.)



HOLDING FRAME TYPE 2
(24 nos.)



HOLDING FRAME TYPE 1
(24 nos.)

NOTE (1) THERE ARE TOTAL 348 NOS. OF HOLDING FRAMES OF 17 DIFFERENT TYPES. HOLDING FRAME TYPE (1) TO (12) ARE 24 IN NOS. EACH (TOTAL 288) WHILE HOLDING FRAME TYPE (13) TO (17) ARE 12 IN NOS. EACH (TOTAL 60).

NOTE (2) LOCATION OF HOLDING FRAME TYPE 01 TO 17 IS SHOWN BY NUMBERED BOX XX

All dimensions are in "mm"
DRAWING NO. SOLAR/GG/04
TITLE: PARTS NO. AL-11 AND AL-12 OF
HOLDING FRAME TYPES 1 TO 17

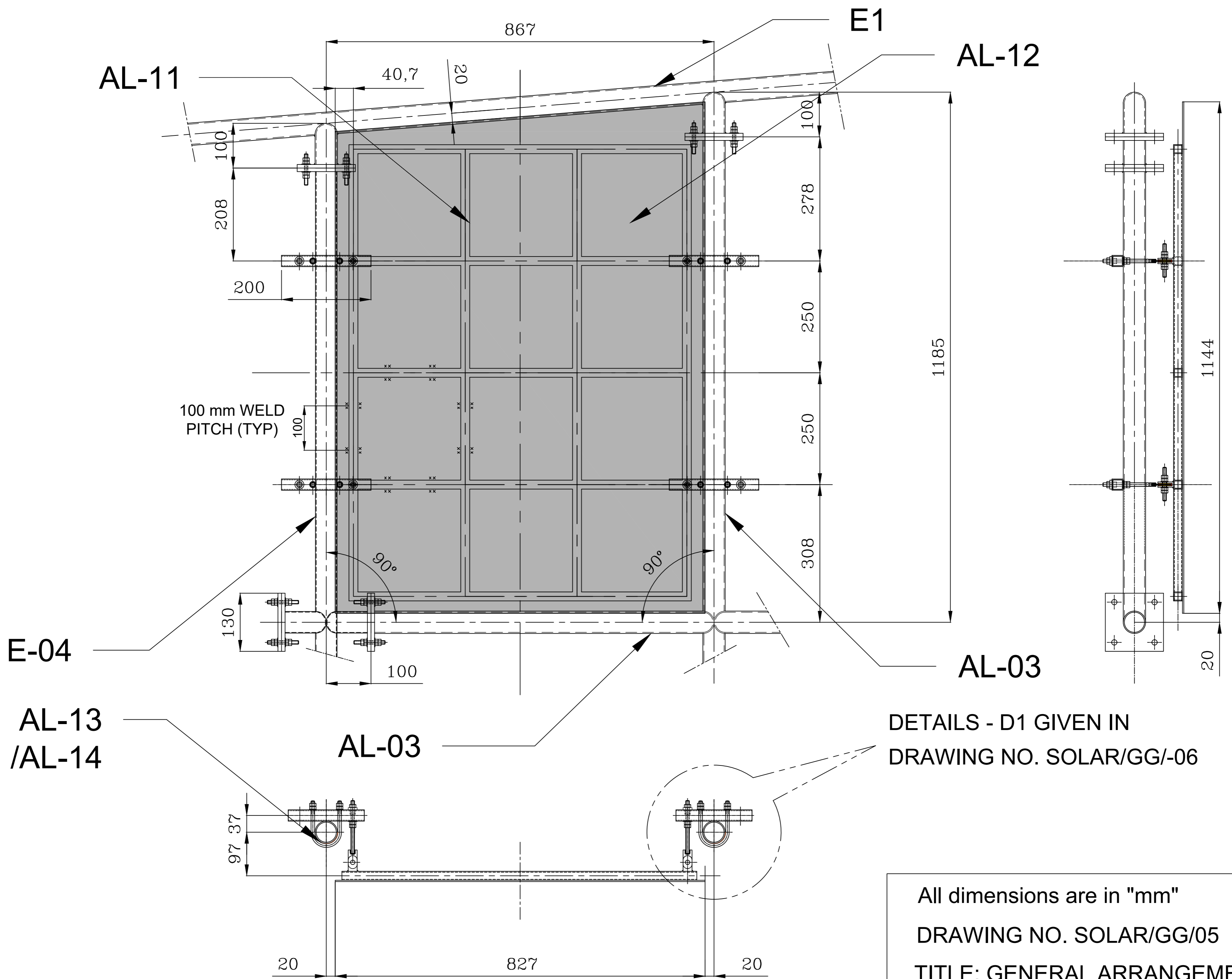
NOTE (1) DESIGN OF BACKUP STRUCTURE (AL-11) AND BACKUP PLATE (AL-12) IS DIFFERENT IN SHAPE AND SIZE FOR DIFFERENT HOLDING FRAME TYPES. HOWEVER THE BASIC ARRANGEMENT IS THE SAME.

NOTE (2) A TYPICAL DRAWING OF HOLDING FRAME TYPE (4) IS SHOWN IN THIS DRAWING. LOCATION OF HOLDING FRAME TYPE (4) IS SHOWN IN DRAWING NO. SOLAR/GG - 02

NOTE (3) ACCEPTABLE TOLERANCE ON LENGTH FOR OF EVERY 1000 mm LENGTH IS +/- 5 mm

NOTE (4) ACCEPTABLE TOLERANCE FOR OUT OF STRAIGHTNESS FOR EVERY 1000 mm LENGTH IS +/- 3 mm

NOTE (5) WELD (SIZE 2mm & LENGTH 5 mm) BETWEEN AL-11 AND AL-12 AT PITCH OF 100 mm OVER FULL LENGTH OF AL-11 IS TO BE DONE



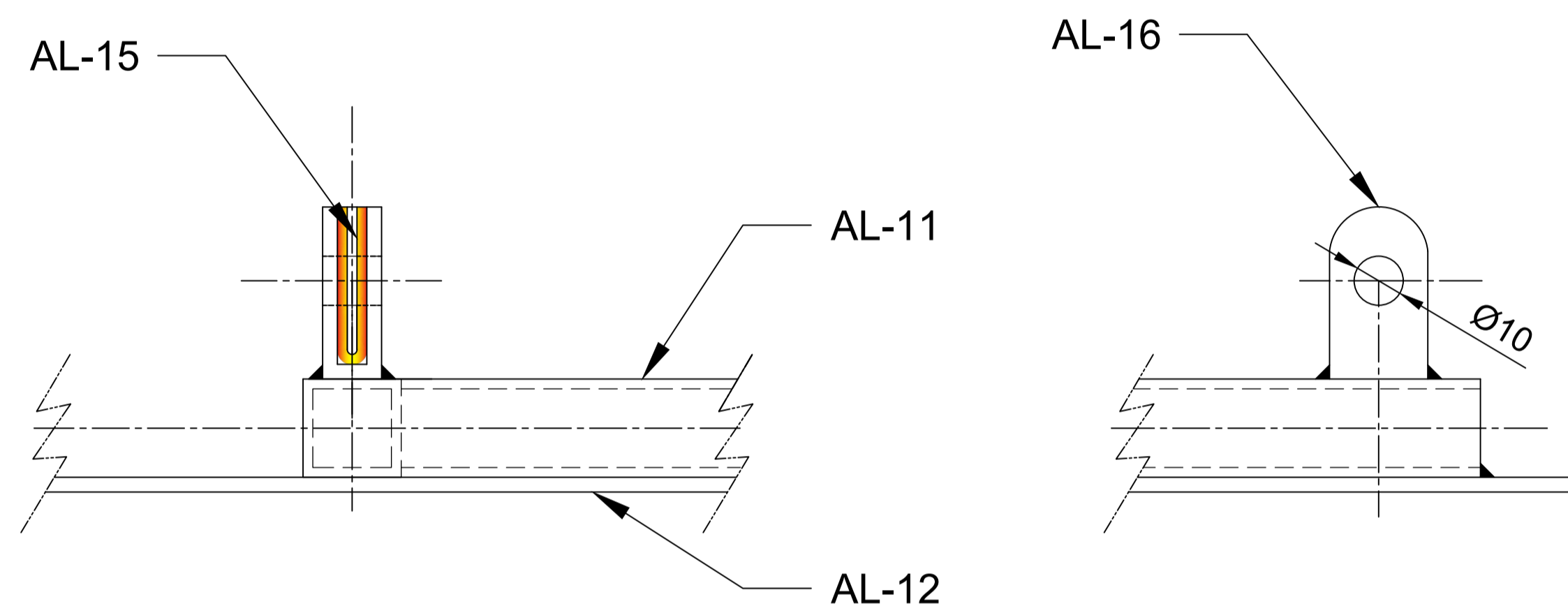
All dimensions are in "mm"
 DRAWING NO. SOLAR/GG/05
 TITLE: GENERAL ARRANGEMENT-
 HOLDING FRAME TYPE 4

NOTE (1) 2 mm OF WELD OF ELENGTH 5 mm WITH A PITCH OF 100 mm SHALL BE USED TO WELD PART AL-11 TO PART AL-12

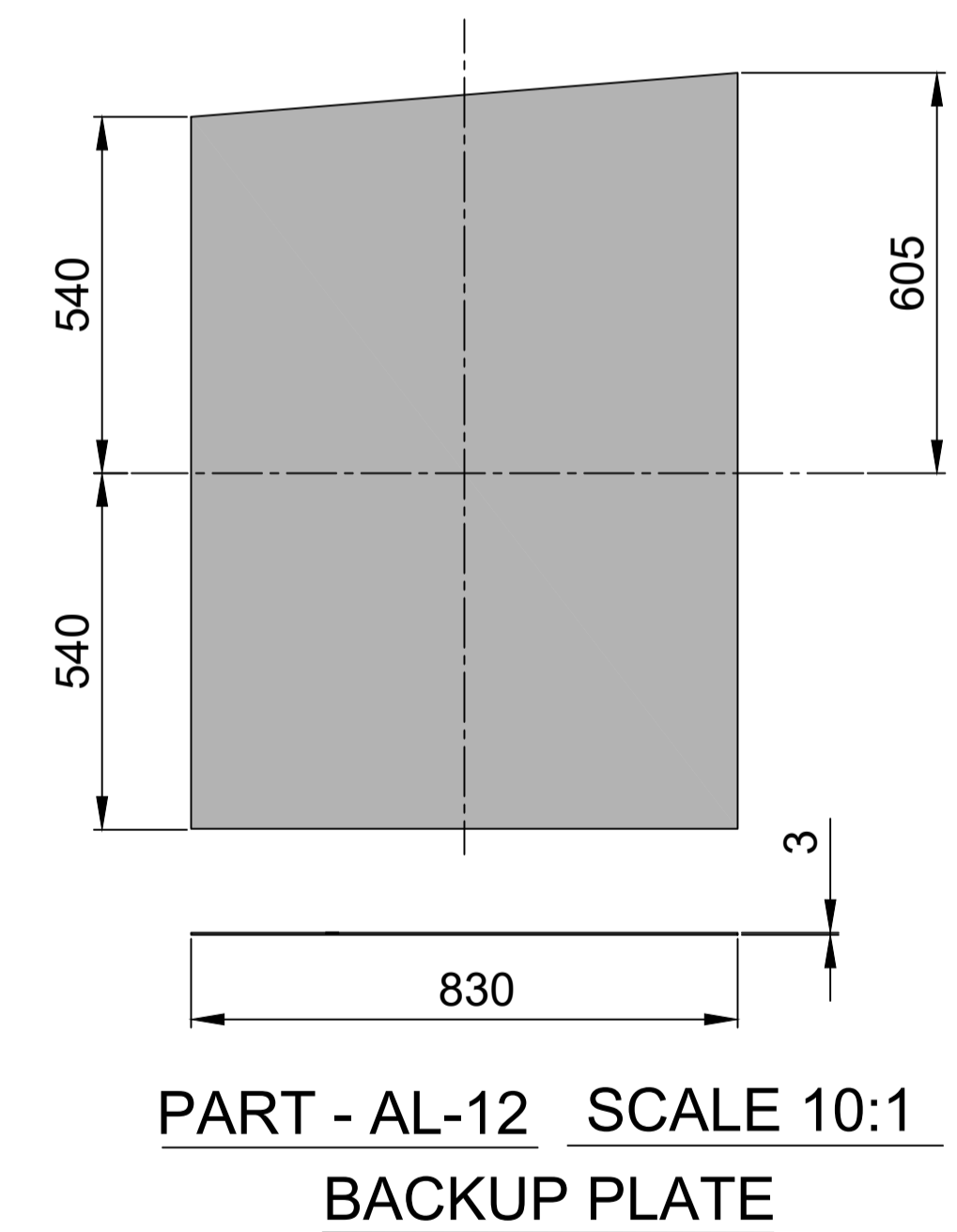
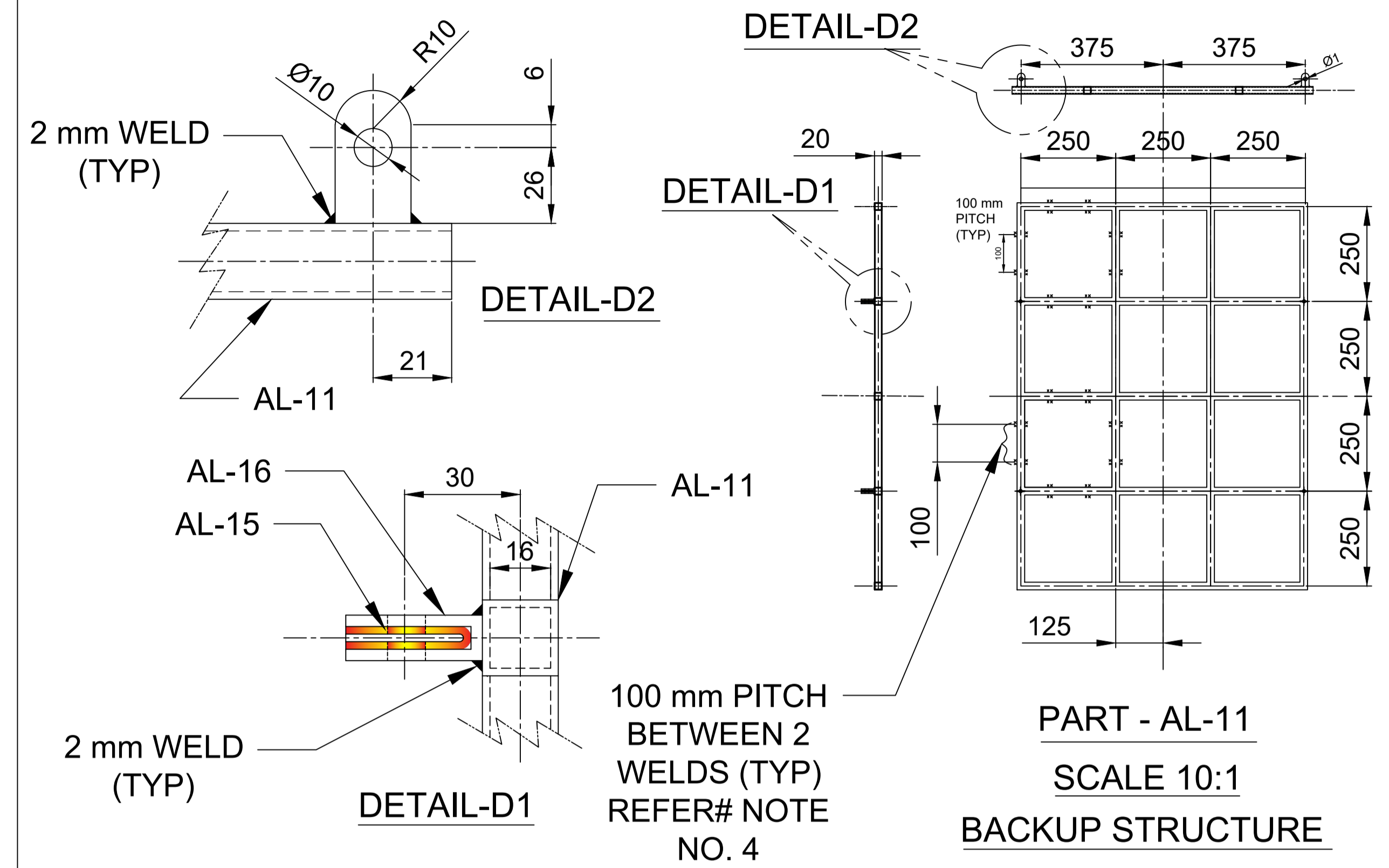
NOTE (2) ACCEPTABLE TOLERANCE ON LENGTH FOR EVERY 1000 mm LENGTH IS +/- 5 mm

NOTE (3) ACCEPTABLE TOLERANCE FOR OUT OF STRAIGHTNESS FOR EVERY 1000 mm LENGTH IS +/- 3 mm

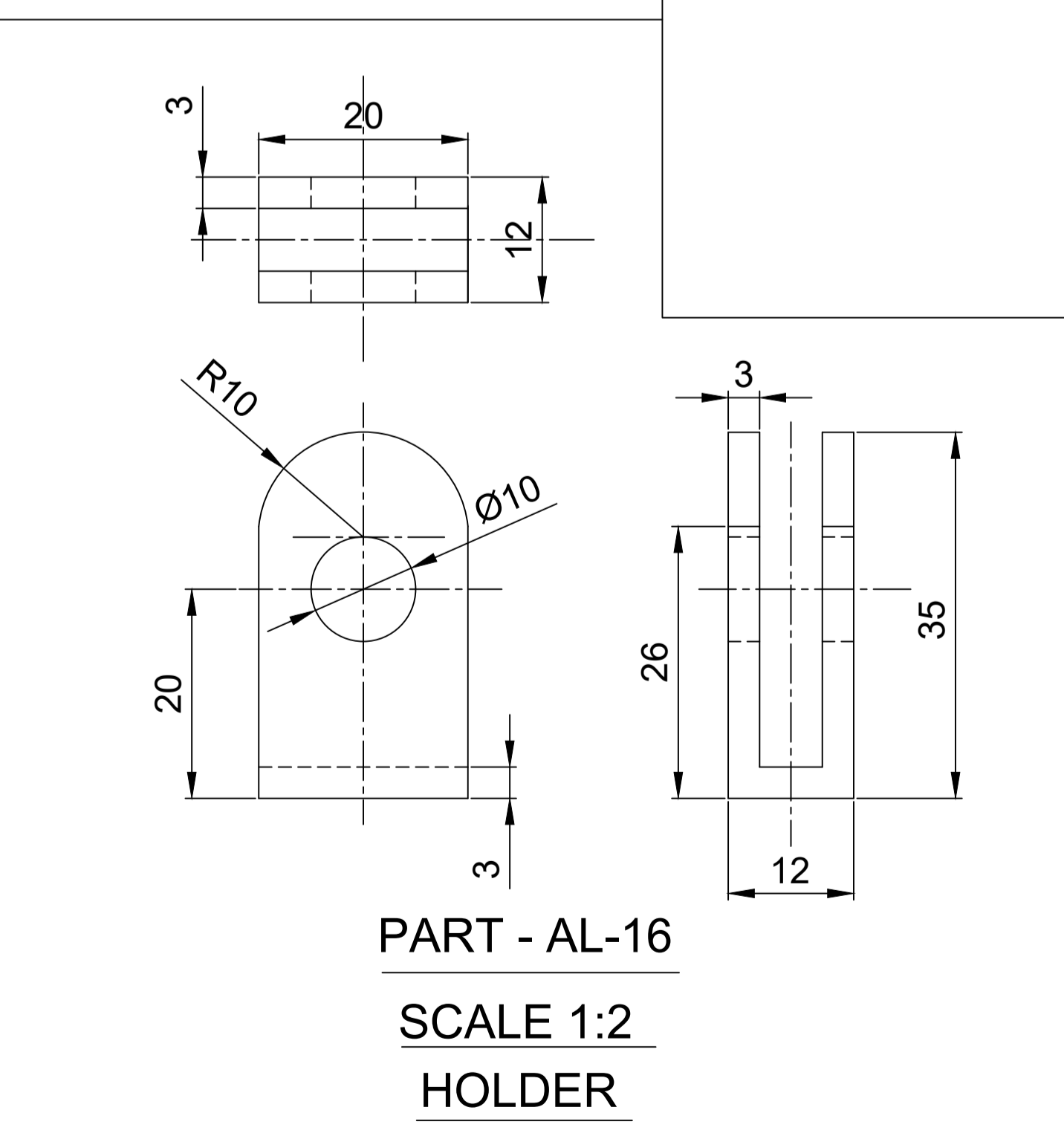
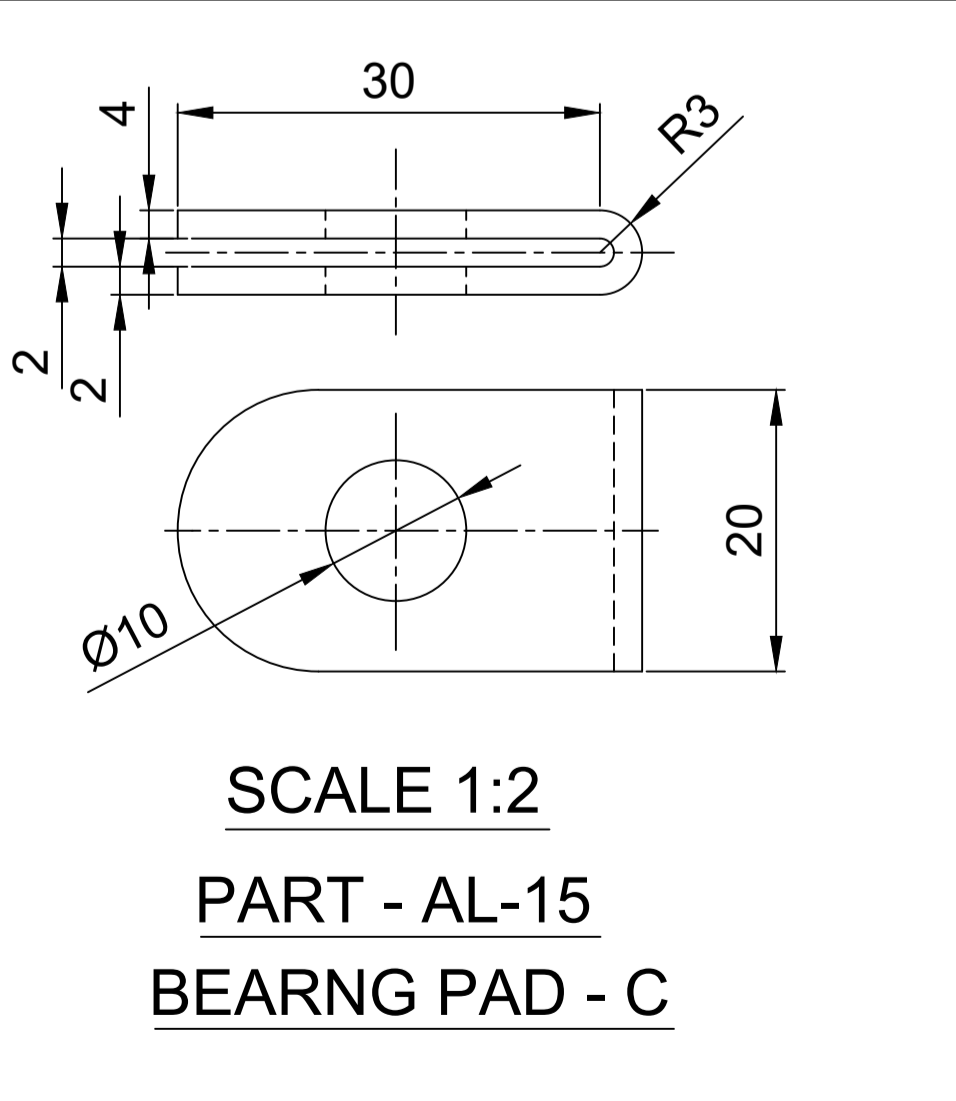
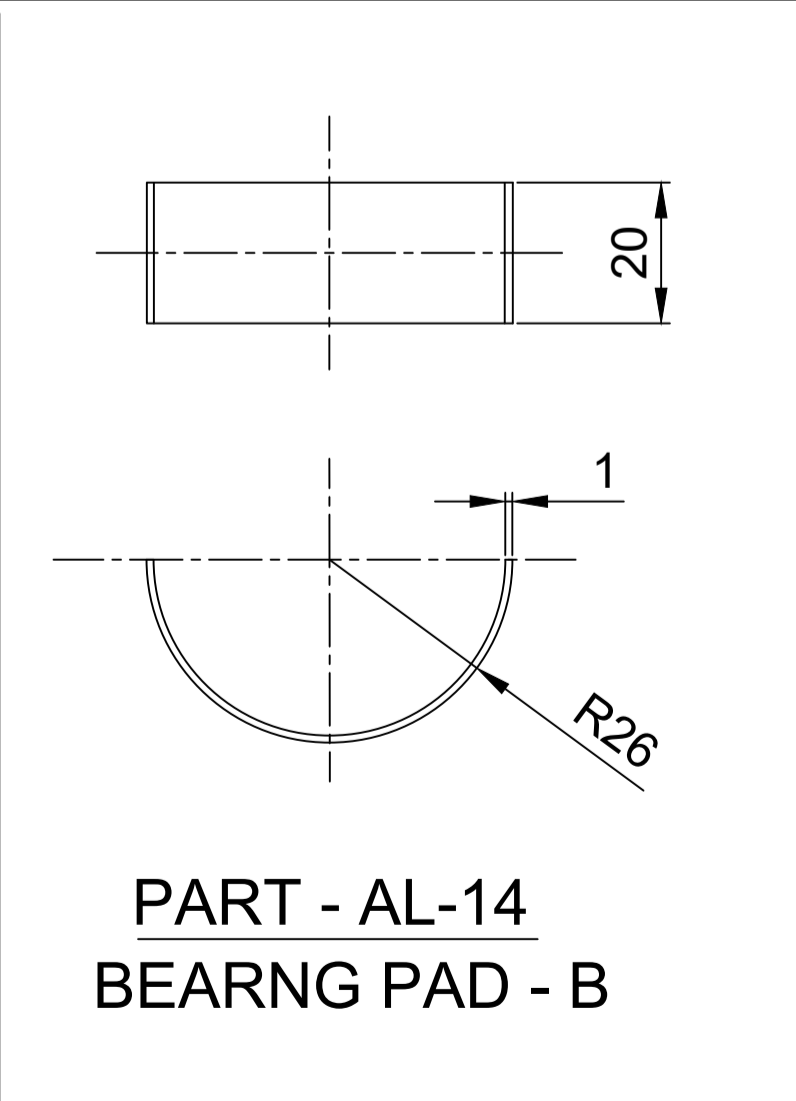
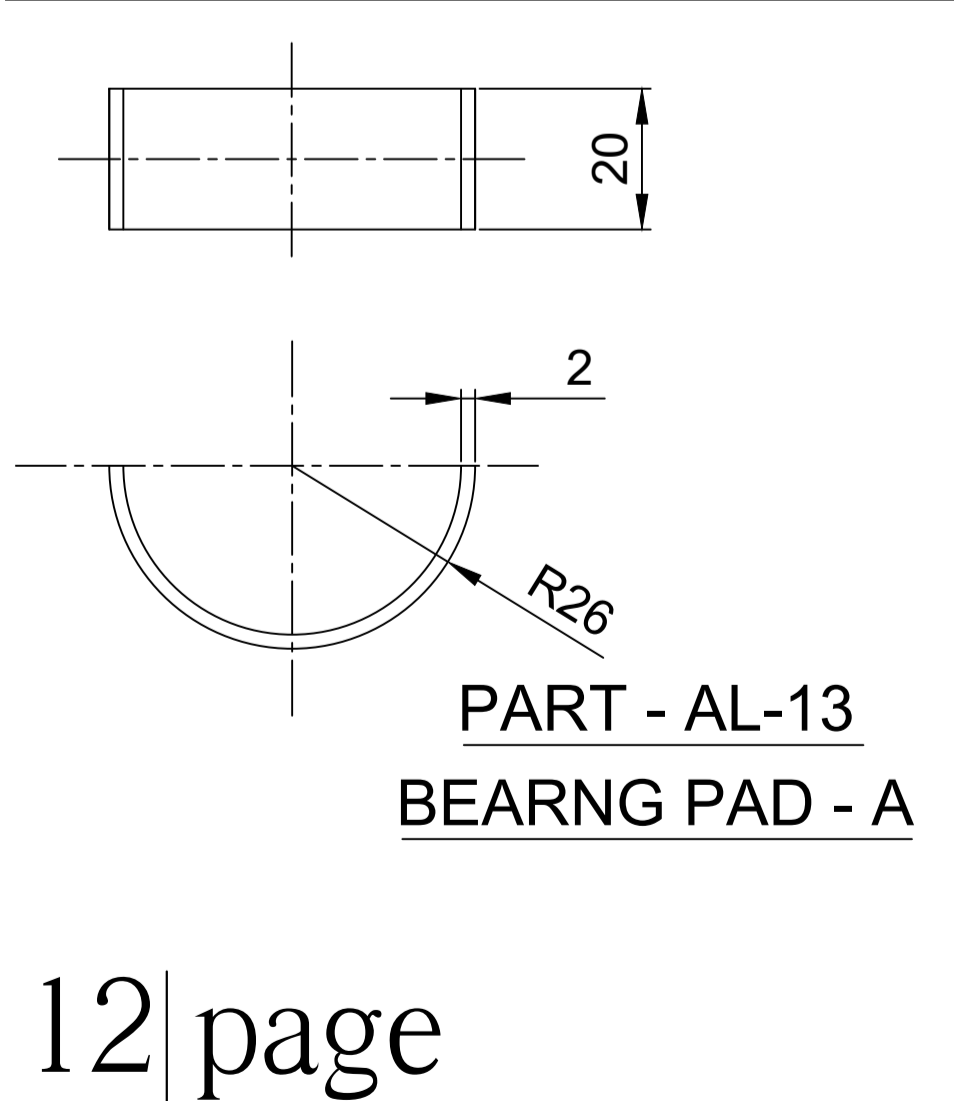
NOTE (4) WELD (SIZE 2mm & LENGTH 5 mm) BETWEEN AL-11 AND AL-12 AT PITCH OF 100 mm OVER FULL LENGTH OF AL-11 IS TO BE DONE



DETAIL - D1 OF DRAWING NO. SOLAR/GG/-05)



All dimensions are in "mm"
 DRAWING NO. SOLAR/GG/06
 (DETAIL - D1 OF DRAWING NO. SOLAR/GG/-05)
 TITLE: ALUMINIUM HOLDING FRAME TYPE 4



BILL OF MATERIALS - ALUMINIUM Parts

PART NO.	PART NAME	PART QTY.	MATERIAL GRADE	MATERIAL QUANTITY	WEIGHT	
AL-01	CONNECTOR - AL	180	6061 T6	PIPE O.D 50 mm THK 2.5 mm PLATE THK 8 mm	50 kg	
AL-02	CROSS-AL - A	12	6061 T6	PIPE O.D 50 mm THK 2.5 mm PIPE LENGTH 256 m PLATE THK 8 mm PLATE AREA 6.7 sqm.	PIPE 270 kg PLATE 125 kg	
AL-03	CROSS-AL - B	12	6061 T6			
AL-04	CROSS-AL - C	12	6061 T6			
AL-05	CROSS-AL -D	12	6061 T6			
AL-06	CROSS-AL -E	12	6061 T6			
AL-07	CROSS-AL - F	12	6061 T6			
AL-08	TEE-AL	12	6061 T6			
AL-09	PIPE - AL - A	12	6061 T6			
AL-10	PIPE - AL - B	12	6061 T6			TOTAL 395 kg
AL-11	BACKUP STRUCTURES	348	5251/6061 (ANNEALED)			BOX 20 mm X20 mm X 2 mm LENGTH 2600 m
AL-12	BACKUP PLATE	348	5251/6061 (ANNEALED)	PLATE 3 mm THK. AREA 244 sqm.	1974 kg	
AL-13	BEARING PAD - A	354	5251/6061 (ANNEALED)	PLATE 2 mm THK. AREA 0.57 sqm.	3.11 kg	
AL-14	BEARING PAD - B	324	5251/6061 (ANNEALED)	PLATE 1 mm THK. AREA 0.53 sqm.	1.4 kg	
AL-15	BEARING PAD - C	1380	5251/6061 (ANNEALED)	PLATE 2 mm THK. AREA 1.93 sqm.	10.4 kg	
AL-16	HOLDER	1380	5251/6061 (ANNEALED)	PLATE 12 mm THK. AREA 1.0 sqm.	31.3 kg	
TOTAL WEIGHT					3600 kg	

NOTE (1) THE WEIGHT CONSIDERED IS PART WEIGHT ONLY. NECESSARY CUTTING/WASTAGE ALLOWANCE TO BE CONSIDERED

NOTE (2) THIS BOM GIVES ALL THE MATERIAL IN THE SCOPE OF SUPPLY