Government of India
Bhabha Atomic Research Centre
Accelerator Control Division
Electromagnetic Applications Section

सत्यमेव जयते

Tender No. : ACnD/EMAS/JI/2018/477 **Date : 31.07.2018**

Sub: Manufacturing, Assembly, Inspection, and testing of permanent magnet based focusing solenoid as per technical specification sheet -TSP/06

Dear Sir/Madam,

1. Quotations are invited for the *execution of subject work.*
2. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.
3. The suppliers are shall submit the cost for Design, fabrication, assembly and testing. All necessary tools, instruments have to be arranged by the supplier.
4. The quotation must reach the undersigned on or before **23.08.2018** and must be sent in a sealed envelope super-scribed with the **reference number & the due date** given above.
5. The quotations must reach us on or before the aforesaid date by *India post (by speed post or ordinary post)* only.
6. The address on the envelop should read:

   The Head,
   Electromagnetic Applications Section,
   Accelerator Control Division,
   RCnD Bldg., North Site,
   B.A.R.C, Trombay,
   Mumbai - 400 085.
   (Attn: Shri. Janvin Itteera)
7. The Purchaser representative shall approve the design of the assembly sequence, and fabrication procedure, magnetic mapping scheme consequent to which the supplier shall commence the fabrication of the jigs and fixtures.
8. The testing of the magnet shall be conducted in the presence of the Purchaser representatives only, further details are laid down in the enclosed specification sheet.
9. The bidder is expected to deliver the finished components after the approval by our engineer within *03 months* from the date of receipt of Free issue material and firm work order.
10. All the raw materials used shall have the manufacturer's QC/QA certificates for ensuring the authenticity of the components. Further details are mentioned in the enclosed specification sheet.
11. The finished components with the test certificates as mentioned in the enclosures shall be delivered by the manufacturer after the award of the contract at Accelerator Control Division(ACnD), BARC, Trombay, Mumbai - 400 085.
12. Head, Electromagnetic Applications Section, ACnD reserves the right to accept / reject any or all quotations without assigning any reason.
13. Delivery, packing & forwarding charges, if any, must be clearly mentioned in the offer.
14. Drawings / Sketches (if any) must be returned along with the offer
15. Quotation must indicate the VAT no / PAN no of the vendor & validity of offer. Minimum validity of 60 days is preferred.
16. The quotation has to be duly signed by *authorized person with company seal*. *Unsigned offers shall be treated as invalid.*
17. The supplier has to submit insurance for the Free issue material offered by the purchaser as per para 3.0 of the enclosed technical specification sheet.
18. For any technical clarifications, Please contact us vide email: janvin@barc.gov.in; Tel: +912225591849

Encl.: TSP/06

(SD/-)
Head, Electromagnetic Applications Section
B.A.R.C
For & on Behalf of the President of India
(The Purchaser)

Specification no.	Revision no.	Date of Issue
TSP06	0	24th July, 2018

Manufacturing, Assembly, Inspection, and testing of permanent magnet based focusing solenoid as per technical specification sheet -TSP/06

1.0 Scope:

The tender is invited for the "Manufacturing, assembly, Inspection and testing of water cooled electromagnet" as per the following technical specification..This tender specification is arranged as follows:-

- Para 2.0 gives statement of purpose.
- Para 3.0 gives details of Free Issue material offered by the purchaser
- Para 4.0 mentions the deliverable under this tender.
- Para 5.0 highlights the technical requirement for winding the coils.
- Para 6.0 indicates the drawings associated with this specification sheet.
- Para 7.0 specifies the acceptance criteria for all the coils.
- Para 8.0 covers the performance of the contract.
- Para 9.0 describes the general instructions.

2.0 Scope of work:

2.1) Supplier shall procure the raw material mentioned in the enclosed drawings except those indicated as FIM in para 3.0.
2.2) Supplier shall fabricate the requisite jigs and fixtures as per the drawings enclosed herewith and also design and develop additional jigs as deemed necessary to safely insert the magnets in the pockets.
2.3) Supplier shall take adequate safety measures during the assembly of high energy NdFeB magnets supplied as FIM by the purchaser.
2.4) Prior to the assembly of magnets, Supplier shall perform CMM measurements on the machined components and submit a geometrical inspection report of the same.
2.5) Supplier shall do electro-less nickel coating(thickness ~ 8 microns) on the soft iron parts for protection against corrosion.
2.6) All aluminum components shall be anodized to matte finish

3.0 FREE ISSUE MATERIAL

3.1) The list of free issue material offered by the purchaser for the satisfactory of the proposed work is as under:

S No.	Description	Qty	Cost in Rupees
1	NdFeB magnets 90 x 90 x 40	300Nos	Rs. 45,00,000/-
2	NdFeB magnets 180 x 180 x 40	20 Nos	Rs. 20,00,000/-
3	Soft magnetic Steel - 1.5m x 1.5m x 0.11m	01 No	Rs.6,00,000/-

Table-1.0

The supplier has to submit insurance for the aforesaid FIM on the behalf of President of India acting Head, ACnD

4.0 DELIVERABLES

The deliverables included in this tender are as follows:-
For the FIM supplied by the purchaser, the items highlighted under table-1.0 are to be delivered:

Sr. no	Description	Quantity	Reference
1.	Assembled and tested Permanent magnet focusing assembly	01 Set	As per Drawing No.-A3/A09SMCA08

Table-2.0

5.0 LIST OF DOCUMENTS

Following documents (under table 2.0) are to be furnished under this contract

Sr. no	Description	Quantity
1	Geometrical inspection report	01 Set

2	Material test reports	01 Set
3	The Quality Control Records	01 Set

Table-3.0

5.0 RECOMMENDED FABRICATION AND ASSEMBLY TECHNIQUES

5.1) Supplier shall cut the pockets in the aluminum frame with EDM/wire cut techniques only. This is to ensure minimal corner radius. The milling with corner relief is not acceptable .
5.2) The supplier to verify the fitment of magnets with the pocket dimensions and proceed with further cutting.
5.3) The stacking of aluminum block to meet the desired thickness is not preferred, single piece machining is recommended.
5.4) The supplier to ensure desired flatness and parallelity is maintained after the pocket are cut.
5.5) Regarding the polarity of the magnet, it may be noted that all magnets with same direction of magnetization are assembled in the pockets. The direction of magnetization supplied by purchaser are through the 40mm thickness.
5.6) These magnets are of high energy in nature and, hence, sufficient care has to be taken while handling these magnets.

5.7) The grade of aluminium is T6-6061(extruded/rolled)

6.0 PERFORMANCE OF THE CONTRACT

6.1 Fabrication and Delivery Schedule

The bidder shall complete the job within preferably within 03 months starting from the date of Receipt of Free issue material to the successful bidder. The supplier is expected to maintain and preserve the integrity of the coil This may involve the revision in the practices governing the assembly, testing and requisite jigs fixtures after consulting with the purchaser. All the changes called for, shall be intimated vide Engineering/Design change notice(ECN/DCN) duly approved. A copy of the DCN/ECN may be forwarded to the purchaser for information and records. The purchaser shall incorporate the remarks of the aforesaid notices at applicable test documents and release the revisions of the same to the contractor. This is essential to ensure the quality of the delivered goods.

6.2 Document to be furnished prior to the start of winding

After the successful award of the contract, supplier shall first deliver the manufacturing file(MF) containing the factory drawing of the magnet
The manufacturing file shall contain the following information:
a) Engineering Details of jigs and fixtures to be used
b) The schematic representation of the assembly procedures
c) Details of insulating material proposed to be indicating the make and class
d) The fabrication drawing of the winding indicating the adjustment allowed in para 3.0
A review meeting will be scheduled within two weeks after its receipt. This document shall be approved by the purchaser, although the review and the approval process shall not relieve the contractor from his responsibility to produce the magnet according to the requirements as set out in this technical specification.

7.2.3 Quality Control Records

The QCR shall contain:

- The material certificates, in particular varnish, epoxy any other material intended to be used.
- All the documentation requested in the para 6.0. All these documents shall be endorsed by the purchaser for approval during successive stages of the production, or for provisional acceptance before authorization for shipment can be granted. The baseline format of the QCR shall be specified in the MF. If any format is changed during the period of this contract, it shall through mutual agreement between purchaser and the contractor, the related templates in the MF shall be revised as well.

6.3) Warranty:

6.3.1) All items covered under this contract shall have a warranty of 12 Months

7.0 GENERAL DESCRIPTION:

7.1 Supplier shall submit the offer for the winding of coil using hollow conductor that shall be supplied as free issue material from the purchaser.

7.2 Overall cost will be compared and include packaging, forwarding and safe delivery to purchaser site.

7.3 Suppliers shall give complete details of their product, facilities, winding machine details, list of users and compliance certificates from users for technical evaluation. Quotations submitted with incomplete details are viable for rejection.

7.4 Vendors with test facilities for qualification of geometrical inspection, EDM/spark erosion, CNC machining, and basic metrology equipment's for dimensional checks will be given preference.

In case vendor plans of sub-contracting the job, same shall be clearly brought out in quotations. The sub-contracting can only be carried out only after prior permission of the purchaser. Under any circumstances, the responsibility for the satisfactory completion of job lies solely the supplier. Vendors shall document the details of qualification checks performed on the fabricated parts by self or in collaboration with other laboratories.

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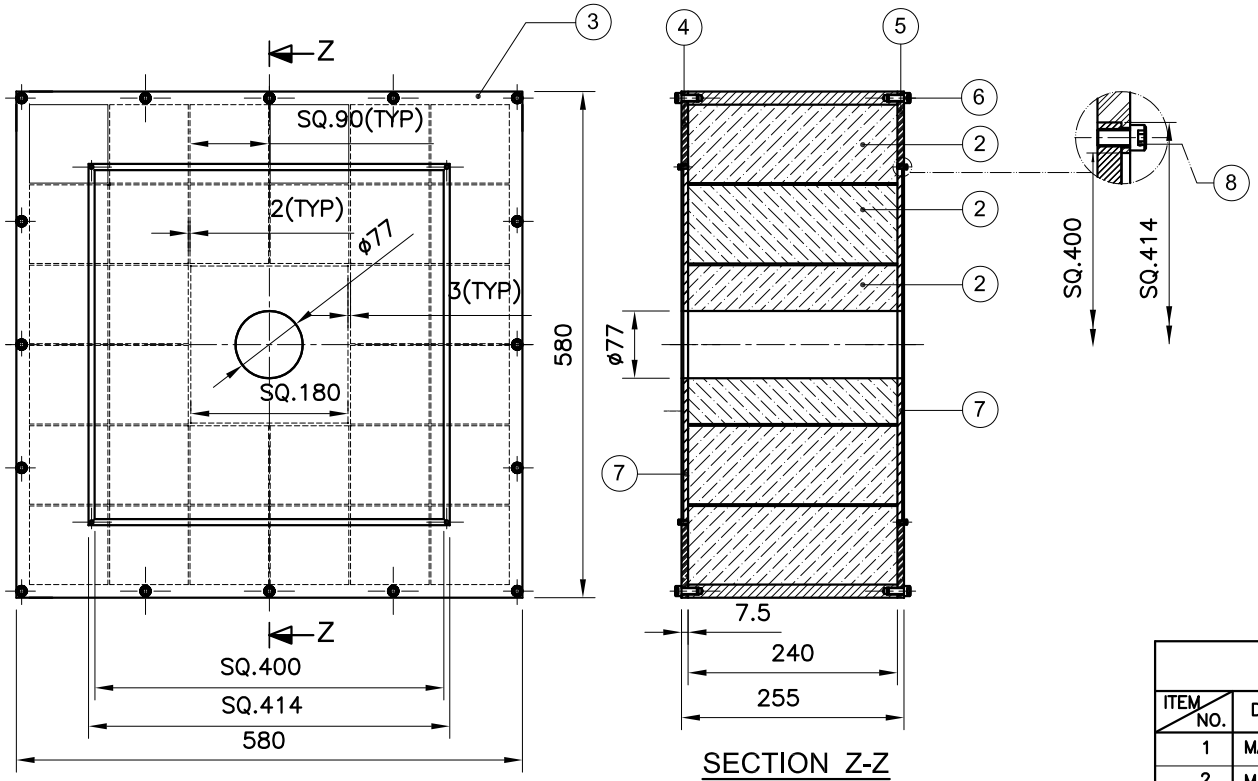


SECTION Z-Z

BILL OF MATERIAL

ITEM NO.	DESCRIPTION	MATERIAL	QTY.	REF. DRG NO.
1	MAGNET–I	NdFeB–N48H	1	A4–A09SMCA12
2	MAGNET –II	NdFeB–N48H	24	A4–A09SMCA12
3	FRONT HOUSING COVER	AL T–6061	1	A4–A09SMCA10
4	REAR HOUSING COVER	AL T–6061	1	A4–A09SMCA10
5	HOUSING FOR MAGNET	AL T–6061	1	A4–A09SMCA09
6	HEX SKT HD CAP SCREW M8x20	IS:2269 Gr–304	16	
7	SOFT IRON POLE	AISI 1010	2	A4–A09SMCA11
8	HEX SKT HD CAP SCREW M4x7	IS:2269 Gr–304	8	

REV	ZONE	CHANGE MADE	DATE	INITIAL

DEVIATIONS FOR LINEAR DIMENSIONS AS PER IS:2102

RANGE OF NOMINAL DIMENSIONS							
CLASS OF DEVIATION	ABOVE	0.5	3	6	30	120	
	UPTO AND INCLUDING	3	6	30	120	315	
FINE		±0.02	±0.05	±0.1	±0.15	±0.2	

TITLE:–

G.A. OF MAGNET ASSEMBLY

APP'D.

SCALE 1:1

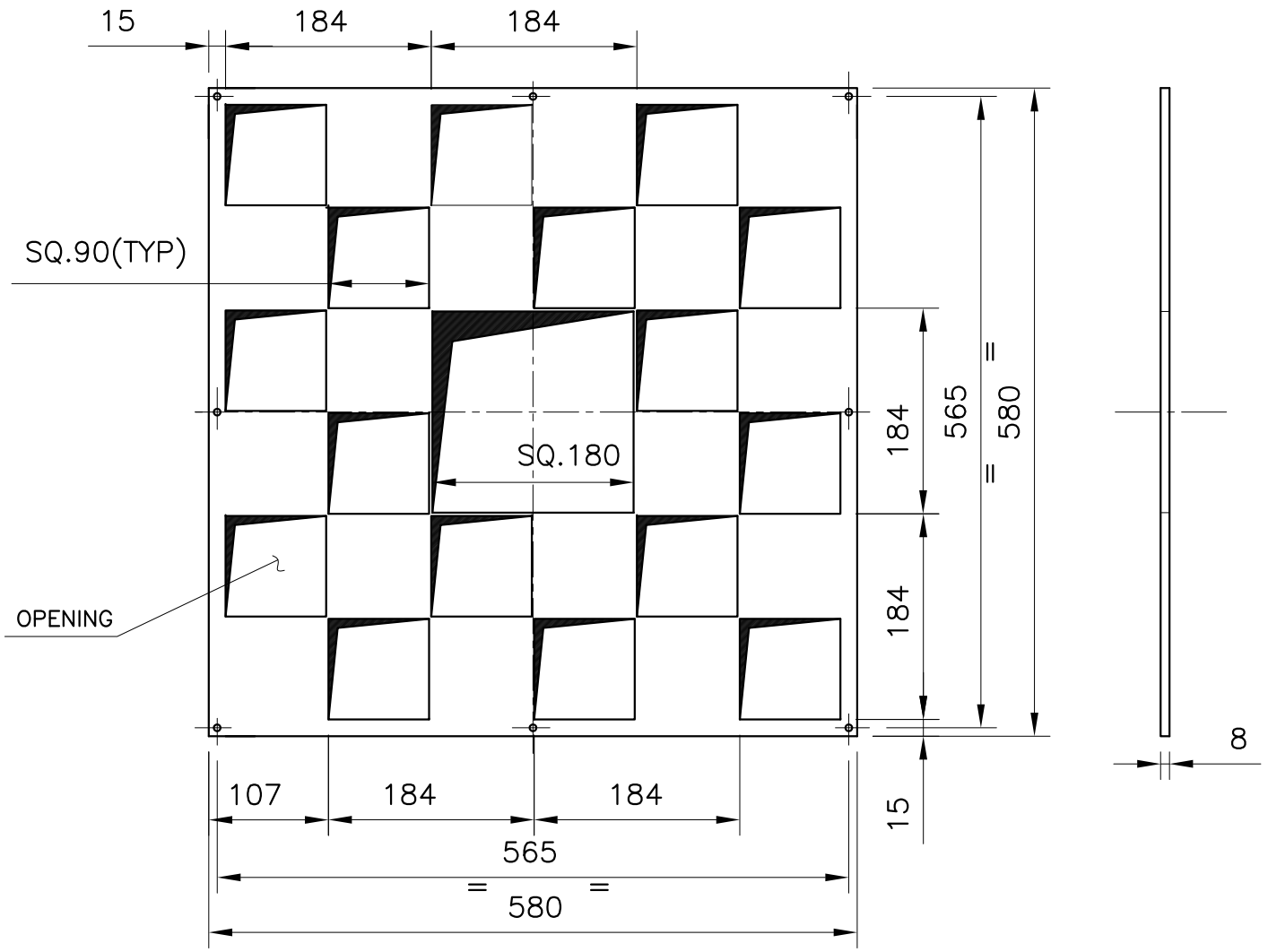
DR'N	RBC 11.07.18	PROJECT: P M MAGNET
DRG. CHK'D.		
STD.		FOR TENDER PURPOSE ONLY
DES'D.		
DES'N CHKD.		

ALL DIMENSIONS ARE IN mm

REV. 0 DATE 09.06.17

DRG. No. A3–A09SMCA08

SH 1 OF 1



MATERIAL : AL T-6061
QTY. : 1 NO.

TITLE:–

DETAIL OF JIG PLATE

APP'D.

SCALE 1:1

REV	ZONE	CHANGE MADE	DATE	INITIAL

DEVIATIONS FOR LINEAR DIMENSIONS AS PER IS:2102

RANGE OF NOMINAL DIMENSIONS						
CLASS OF DEVIATION	ABOVE	0.5	3	6	30	120
	UPTO AND INCLUDING	3	6	30	120	315
FINE		±0.02	±0.05	±0.1	±0.15	±0.2

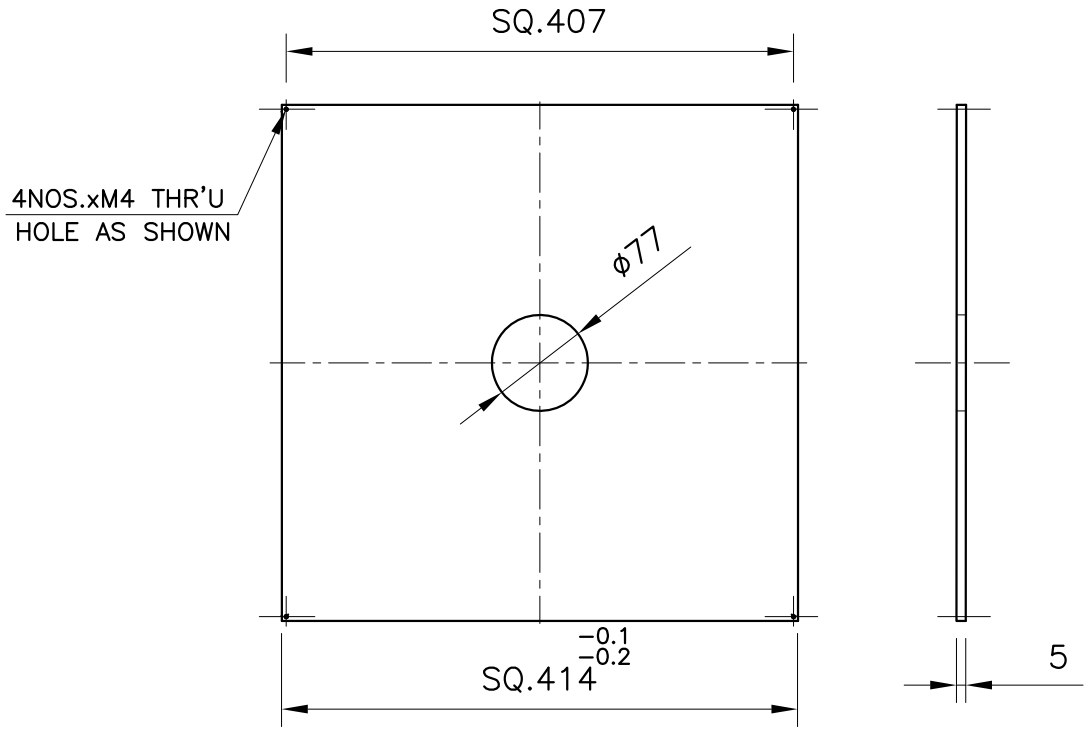
DR'N	RBC 11.07.18	PROJECT: P M MAGNET
DRG. CHK'D.		
STD.		
DES'D.		FOR TENDER PURPOSE ONLY
DES'N CHKD.		

ALL DIMENSIONS ARE IN mm

REV. 0 DATE 09.06.17

DRG. No.
A3–A09SMCA12

SH 1 OF 1



MATERIAL : AISI 1010
QTY. : 1+1 NO.

TITLE:–

DETAIL OF SOFT IRON POLE

APP'D.

SCALE 1:1

REV	ZONE	CHANGE MADE	DATE	INITIAL

DEVIATIONS FOR LINEAR DIMENSIONS AS PER IS:2102

CLASS OF DEVIATION	RANGE OF NOMINAL DIMENSIONS					
	ABOVE	0.5	3	6	30	120
	UPTO AND INCLUDING	3	6	30	120	315
FINE		±0.02	±0.05	±0.1	±0.15	±0.2

DR'N	RBC 11.07.18	PROJECT P M MAGNET
DRG. CHK'D.		
STD.		FOR TENDER PURPOSE ONLY
DES'D.		
DES'N CHKD.		

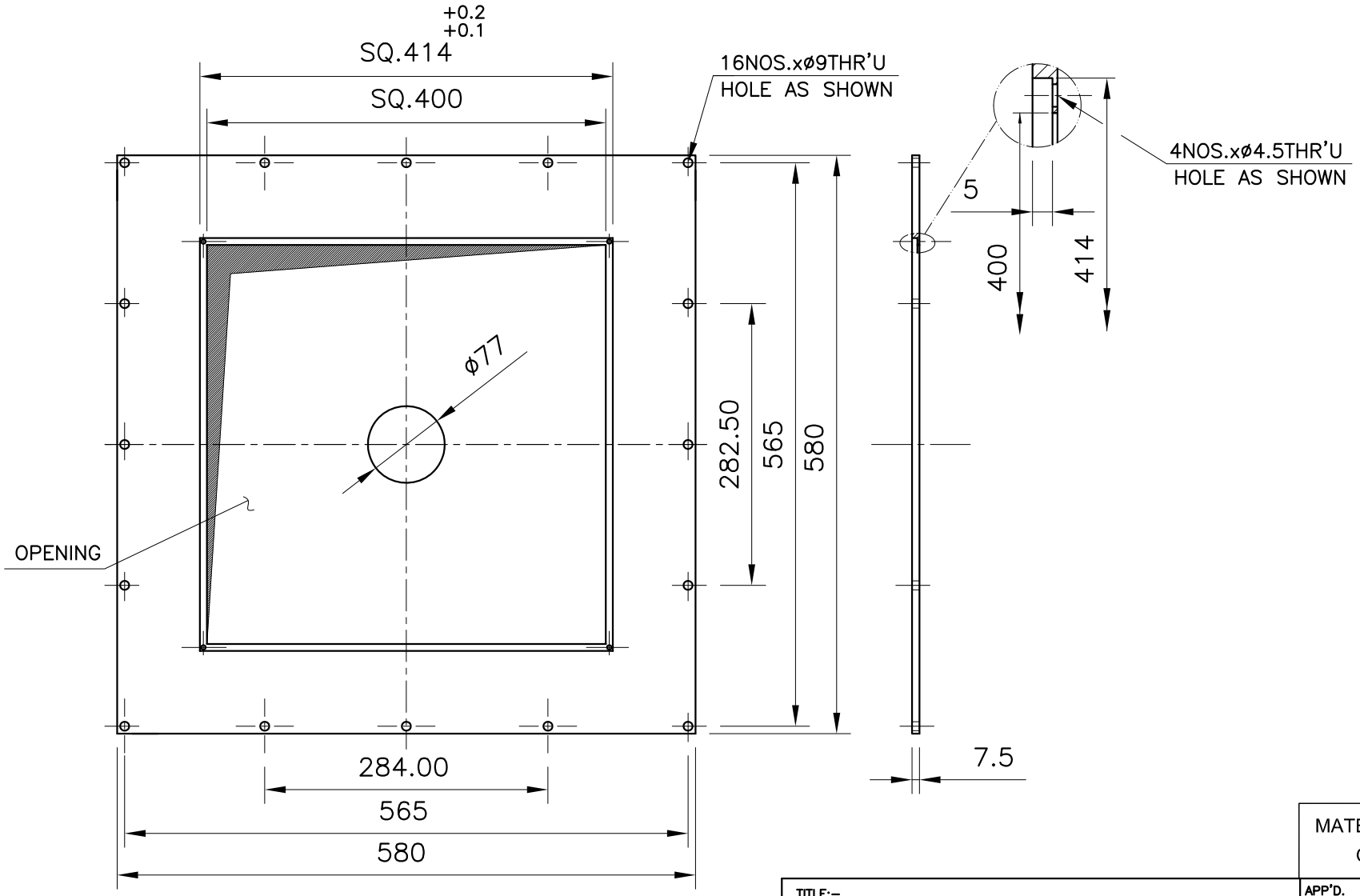
ALL DIMENSIONS ARE IN mm

REV. 0 DATE 09.06.17

DRG. No.

A3–A09SMCA11

SH 1 OF 1



MATERIAL : AL T-6061
QTY. : 1+1 NO.

TITLE:–

DETAIL OF FRONT & REAR HOUSING COVER

APP'D.

SCALE 1:1

ALL DIMENSIONS ARE IN mm

REV. 0 DATE 09.06.17

DRG. No. A3–A09SMCA10

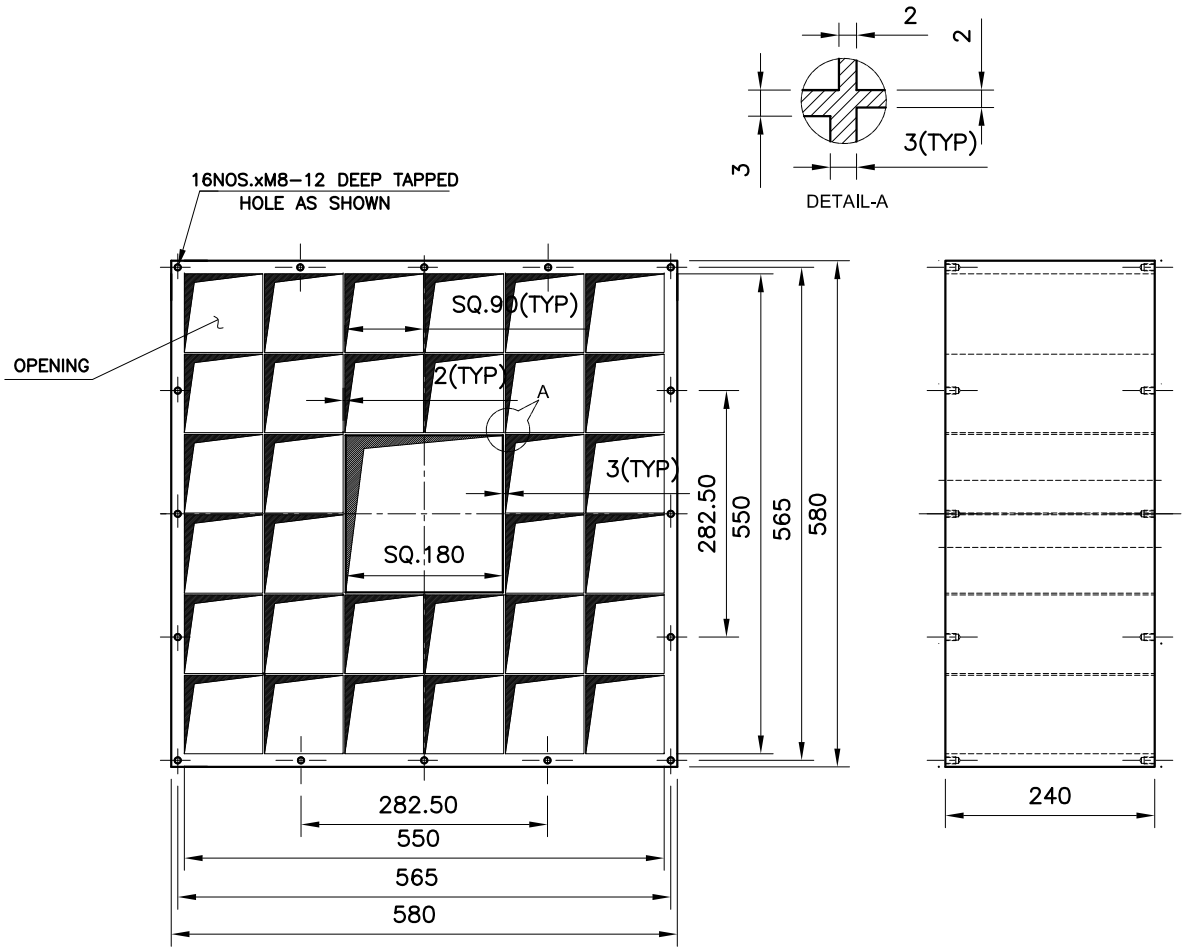
SH 1 OF 1

REV	ZONE	CHANGE MADE	DATE	INITIAL

DEVIATIONS FOR LINEAR DIMENSIONS AS PER IS:2102

RANGE OF NOMINAL DIMENSIONS						
CLASS OF DEVIATION	ABOVE	0.5	3	6	30	120
	UPTO AND INCLUDING	3	6	30	120	315
FINE		±0.02	±0.05	±0.1	±0.15	±0.2

DR'N	RBC 11.07.18	PROJECT	P M MAGNET
DRG. CHK'D.			
STD.		FOR TENDER PURPOSE ONLY	
DES'D.			
DES'N CHKD.			



MATERIAL : AL T-6061
QTY. : 1 NO.

REV	ZONE	CHANGE MADE	DATE	INITIAL

DEVIATIONS FOR LINEAR DIMENSIONS AS PER IS:2102

RANGE OF NOMINAL DIMENSIONS						
CLASS OF DEVIATION	ABOVE	0.5	3	6	30	120
	UPTO AND INCLUDING	3	6	30	120	315
FINE		±0.02	±0.05	±0.1	±0.15	±0.2

TITLE:–

DETAIL OF HOUSING

APP'D.

SCALE 1:1

DR'N	RBC 11.07.18	PROJECT: P M MAGNET
DRG. CHK'D.		
STD.		FOR TENDER PURPOSE ONLY
DES'D.		
DES'N CHKD.		

ALL DIMENSIONS ARE IN mm

REV. 0 DATE

DRG. No.
A3–A09SMCA09

SH 1 OF 1