



फैक्स नं : 91-22-2550 5151
Fax No : 91-22-2551 9613
Telephone: 91-22-2559 4534
E-mail: lalitk@barc.gov.in

भारत सरकार
GOVERNMENT OF INDIA
भाभा परमाणु अनुसंधान केंद्र
BHABHA ATOMIC RESEARCH CENTRE
INTEGRATED FUEL FABRICATION FACILITY

ट्रॉम्बे,
मुम्बई ४०० ०८५
Trombay
Mumbai 400 085

Ref: BARC/IF3/06/2018/193537

9th Oct 2018

Sub: Design, fabrication, supply, installation and commissioning of MFDC Inverter Resistance Spot welding Machine as per attached technical specification.

Dear Sir/ Madam,

For & on behalf of The President of India your sealed offer on printed letter head of your company is invited for "Design, fabrication, supply, installation and commissioning of MFDC Inverter Resistance Spot welding Machine as per attached technical specification". Technical specifications and general terms & conditions are enclosed with the enquiry in Annexure I.

Quotations should indicate GST registration number & PAN number of the firm without which the quotations are liable to be rejected. Your offer in sealed envelope should be addressed to:

Head, Integrated Fuel Fabrication Facility
Attn.: Shri Lalit Kumar
Scientific Officer (F)
Integrated Fuel Fabrication Facility
BARC, Mumbai. - 400 085.

Duly marked with above reference no. & due date 26-10-2018 on the envelope and reach us by 26-10-2018.

You are requested to send your quotation by Registered / Speed post only. Courier or Hand delivery of quotation is not acceptable.

Encl: 1. Technical Specifications as Annexure I.

Lalit Kumar
9-10-2018
(Lalit Kumar)
SO/F, IF3

For & on behalf of President of India

ललित कुमार / LALIT KUMAR
वैज्ञानिक अधिकारी / Scientific Officer (F)
एकीकृत ईंधन सविचरण सुविधा
Integrated Fuel Fabrication Facility
भारत सरकार / Government of India
भाभा परमाणु अनुसंधान केंद्र
Bhabha Atomic Research Centre
ट्रॉम्बे, मुम्बई / Trombay, Mumbai - 400 085

TECHNICAL SPECIFICATION FOR RESISTANCE SPOT WELDING MACHINE

1. Requirement:

Design, fabrication, supply, installation and commissioning of MFDC Inverter Resistance Spot welding Machine along with DC Inverter Power Supply, Toroidal coil, MFDC weld transformer, Pneumatic weld head, table for machine & weld head mounting, X/Y Manual indexing assemblies for job movement with Ball screw with Linear Motion guide.

Important parts of resistance spot welding machine:-

a. MFDC Inverter Spot Welding Machine detail of:-

MFDC Inverter Resistance Spot welding Machine Power Supply IS 800A-10-10 (Miyachi Make) or Equivalent

Sr. No.	Parameters	Rating		
1	Power requirement	Three phase, 380-480VAC \pm 10% (50/60Hz)		
	Maximum output current	800 A		
	No. of Schedule	More than 200		
2	Transformer cooling	Forced water cooling (Water chiller not in scope of this specification)		
5	Control Mode	Primary current RMS/ Secondary current RMS/ Secondary power RMS/ Primary current PEAK/ Secondary voltage RMS/ Constant phase		
6	Setting range for welding	mili second mode	cycle mode	
		Squeeze delay	0-9999	0-999 cycle
		Squeeze	0-9999 msec	0-999 cycle
		Up Slop	0-9999 msec	0-50 cycle
		weld	0-999 msec	0-50 cycle
		Down slop	0-999 msec	0-50 cycle
		Cool	0-999 msec	0-99 cycle
		Hold	0-20000 msec	0-999 cycle
		Off	0-9990 msec	0-99 cycle

7	Setting range	Constant current	0.2-40.0KA
		Constant voltage	0.5-60 KW
		Constant phase	10 – 99.9
	Current monitor		High 0.00 – 9.99KA/ LOW 0 – 9.99 KA
	Power monitor		High 0.00 – 9.99KW/ LOW 0 – 9.99 KW
	External communication method		RS-232/RS – 485 (Cable shall be provided with system)
	Graphic display of welding waveform, pre-welding check function		
	There should be provision for logging welding parameters like voltage, current, pressure, force, displacement etc. The data should be recorded in the laptop and should be available for further analysis. Suitable laptop along with software is in the scope of supply.		
	Programme Box- It is used to feed required		
	5 meter (min) line cable should be provided for programme box power cable.		
	MB-800L or equivalent Toridal Coil for current and weld time monitoring.		
	Input & output Cable for main supply		
	5618 MFDC weld transformer (Miyachi make) or equivalent TDC - 500V, 1000Hz, 100KVA at 50% Duty cycle. Trial at supplier end will be taken by using supplier chiller unit.		

b. Table (platform) for machine and weld heads mounting - Pneumatic weld head with 2 cylinders.

- For resistance spot welding head 1, Tie plate will be welded with rod of diameter 6.3 mm and length 1000 mm (approx) as shown in drawing. **Proper support for pins & tie plate during welding and table shall be designed. This is part of technical specification and it is in the scope of supply. Details of different types of tie plate given in the drawing. Trial of different weld joint shall be taken at vendor factory as part of qualification.**
- For resistance spot welding head 2, For grid welding, electrode design is in the scope of supply, 5 set of electrode shall be provided along with system. Electrode and welding set up design should be such that all spot welding in

the drawing will be carried out properly. **Proper support for grid during welding and table shall be designed. This is part of technical specification and it is in the scope of supply. Detail of different types of grid is given in the drawing.**

- **Both welding head shall be mounted on one table. One welding power source shall be connected with two welding head.**
- **At a time only one welding head shall be used.**
- The welding head of machine is to be pneumatically operated type and is required to weld tie plate & grid assembly of different varieties and thickness. The electrode should be able to be fitted vertically and it should have capability to weld different joint as per attached drawing.
- The main frame of the machine should have heavy, rigid reinforced steel construction and should be able to resist mechanical deflection. Transformer should be fitted inside (below top surface) the body. The pneumatic/hydraulic control and electronic control cabinet should be mounted suitably.
- The welding set to be complete with pressure cylinder, foot switch, air regulator, air filter, pressure gauge, pressure switch, air pressure reducer if required & all other necessary accessories.
- The pneumatic valves and cylinders should be quick action and festo make or equivalent.
- Proper functioning of the following features and systems should be ensured.
 - Different set of fixture (ball screw/linear guide) for holding tieplate & grid assembly.
 - Different types of electrode.
 - Automatic movement of tie plate & grid assembly welding fixture for positioning of welding at venter end.
 - Digital pressure switch.
 - Recording of welding parameters in suitable laptop.

2. Performance:

- 2.1 The machine should be able to give the guaranteed performance as specified in this specification.
- 2.2 Welding parameters viz. **voltage, current, pressure, displacement and force** should be consistence for one set of parameters though out the

welding process from start to finish. **These parameters should be recorded in computer (Laptop).**

- 2.3 There should not be any gap between the sheets after welding. In peel off test parent material shall fail, weld shall not fail. Trial shall be successful if 100 nos. such weld is qualified. Trial shall be taken on two sheet and three sheet of 0.50 mm thick of SS 321.

3.1 **Frame:**

- a. The main frame of the machine should be heavy and rigid. Material of construction shall be mild steel.
- b. Basic plate should be MS 15 mm thick (minimum). Base plate shall have fixing arrangement for mounting table. Length of table is such that welding of components along with rod shall be properly supported on table. Proper support shall be provided for rod as per attached detail. Width of table is such that welding head, weld checker, lap top is properly mounted on top. Provision shall be given for two additional welding head for future development.
- c. The whole weld head shall be mounted on a table of size 1500 x 800 mm (approx). Drawer with compartment must be provided to keep the welding accessories.
- d. Separate weld button and RAM down switches shall be provided on the table on which whole assembly is mounted.

3.2 **Electrode Assembly**

- a. Electrode shall have an adjustable mounting.
- b. Vertical arm shall be provided with LM guide for accurate movement of electrode.
- c. The LM guide to be attached to a separate plate which in turn shall be attached to the vertical arm, ensuring the adjustable positioning of LM guide for + 100 mm.
- d. Facility to locate the electrode before welding shall be provided by way of Laser positioning.
- e. **Proper fixture of acrylic shall be provided for holding of different types tie plate during welding of different shape. Design & fabrication of these fixtures in the scope of supply.**
- f. Electrode shall be pneumatically operated. Digital pressure regulator is required. The capacity of regulation shall be from 1 bar to 15 bar.

- g. The double acting pneumatic cylinder of bore diameter 50 mm and stroke length of 50 mm is to be mounted. Size of cylinder shall be finalized after trial. It should have stroke speed regulation valve.
- h. Operating load capacity shall be upto 400 Kg (approx). (load values will be finalized after trial of different weld joint at your end.
- i. Load cell shall be mounted along with the cylinder. The load cell shall have a capacity of min. 1 Kg to a max of 400 kg.
- j. Solenoid valve of activation pressure of min 0.5 bar is required for inert gas purging during welding. The solenoid valve shall activate only on weld command.

3. Safety:

- a. Suitable electrical mechanical interlock, limit switches, personnel safety guards, overload protection should be provided to prevent the machine from damage and for safety of the operator in case of malfunctioning of the machine.

4. Testing at vendor's works and Erection & Commissioning at BARC works:

- a. The machine has to be completely tested and inspected at vendor's works and four copies of test and inspection certificates are to be furnished. BARC Engineers may witness the test and inspection of the machine before supply of the machine.
- b. The equipment is to be erected and commissioned by the supplier. The quotation for the same must be furnished in the offer.
- c. All the Tools & Tackles required for erection & commissioning of the machine shall be arranged by vendor.
- d. The equipment should meet all our general clauses as enclosed. and commissioning. Proving of equipment will have to be arranged by supplier.

5. Guarantee Period: The machine is to be guaranteed in respect of Accuracy, Design, Materials, Construction, Performance and against any Manufacturing Defects for a period of eighteen months from the date of supply or twelve months from the date of commissioning whichever is later and four copies of guarantee certificate should be supplied. Free after sales service should be provided during guarantee period.

6. Scope of Supply: The equipment should consist of the following:

- a. One MFDC Inverter resistance spot welding machine along with one transformer as per this technical specification.

- b. Two resistance spot welding head along with table and welding fixture as given in this specification.
- c. Installation, Commissioning and Testing.

7. Testing at BARC Works:

- a. BARC representative shall test the machine performance as per the specifications mentioned in this specification. Vendor shall prove machine capability and machine shall render properties of all clauses as per technical specification.
- b. Other Facilities / Services required for equipment like civil works, water etc. shall be provided by BARC. Vender shall inform his requirement well in advance prior to start of erection of machines.
- c. Supplier must quote all materials / facilities / services required for satisfactory installation.

8. Maintenance:

- a. All the parts of the equipment should have easy accessibility for maintenance work, inspection and repair work.
- b. Any special tools required for maintenance and repairs for the machine should be indicated and the same shall be offered along with the equipment.
- c. Service manual should be supplied, with flow diagram of mechanical items.
- d. The electrical / electronic circuit diagrams including PCB details must be provided.

9. Important terms and condition.

A. Material Delivery: -

- a. Material shall be delivered to IF3, South Site Zonal Stores, BARC, Trombay, Mumbai – 400 085 under advance intimation to Shri Lalit Kumar, Ph: 2559 4534/4526.
- b. For entering inside BARC premises vendor shall arrange Police Verification Certificate (PVC) for their personnel and obtain required BARC security clearance in advance for entire duration of contract

B. Payment Clause: 100% payment including taxes & duties applicable will be paid only after satisfactory completion of work and submission of the following documents:

Advance Stamped Receipt, Original Bill in Triplicate and Guarantee/Warranty Certificate, installation & commissioning report etc. Payment will be made through ECS/RTGS after filling option form. Option form will be provided along with work order.

(Payment will not be made on prorata basis. Part payment & advance payment is not possible)

C. Income Tax:- Surcharge on IT as applicable will be deducted from vendor's bill.

D. Delivery Period:- Work completion time for total work is six months from date of issue of Work Order.

E. GSTN Invoice: GSTN invoice should have details of a) GSTN b) PAN & c) Location of supply d) tax component to be separately indicated.

F. GST @ 5% shall be paid Since these goods are to be supplied against the work order meant for research purpose of a research organization under DAE, the necessary GST will be exempted to the party.

G. Supplier will have to submit undertaking stating that GST has been promptly deposited with the authority (copy of blank undertaking attached).

H. Guarantee for material quality & workmanship shall be provided for period of one year from date of supply of material to BARC.

I. You will have to submit an undertaking saying that GST has been promptly deposited with authorities. (copy of undertaking attached).

J. If required, party required to send request letter for extension of delivery period before expiry of work order.

K. Penalty:- Any delay in supplying the finished components, which is attributable to the contractor, is liable for penalty @1/2 % per week (max 5 %) to be imposed on the contractor.

10. Confidentiality Clause:- [Reference: (2/Misc-9/Lg1/2001/92 dated April 30, 2001, BARC)]

1. 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 shall not be disclosed to any third party without the prior written consent of the original disclosing party.

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

2. "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 contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.

3. Prohibition against use of BARC's name without permission for publicity purposes:

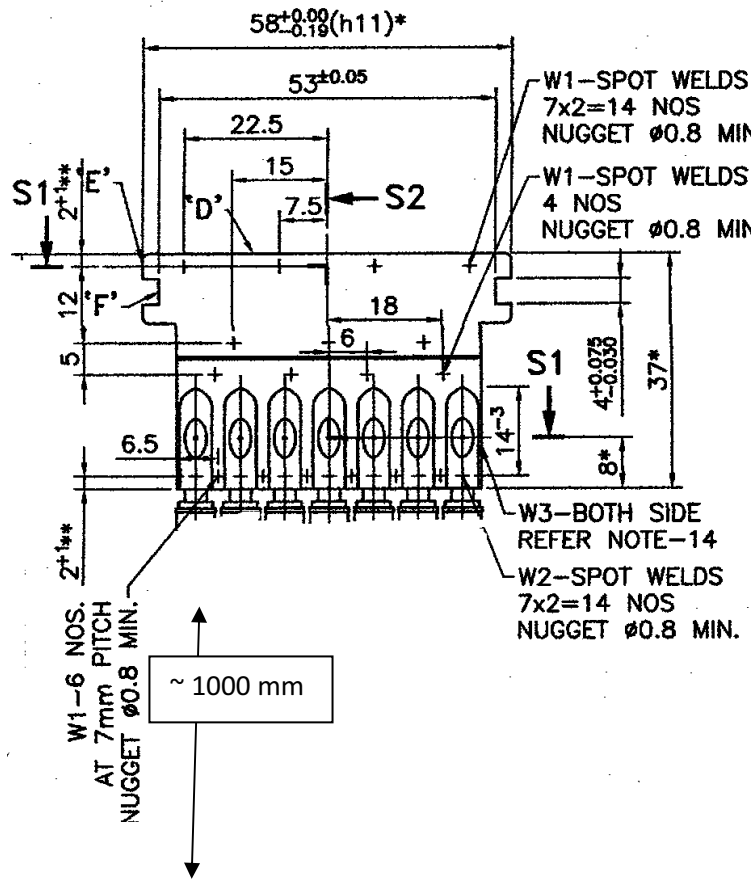
The contractor or sub-contractor, consultant, advisor or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

(Lalit Kumar)

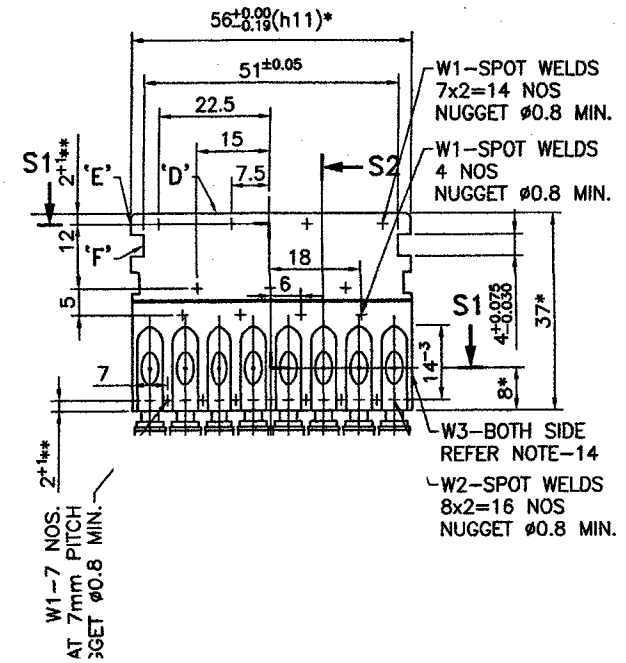
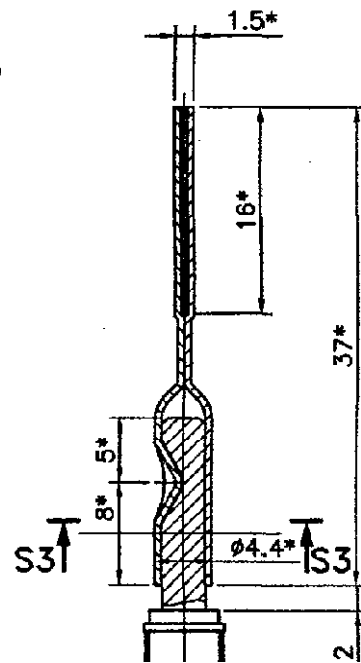
ललित कुमार/LALIT KUMAR
 सहायक आधिकारी/Sci SO/T, QPS (F)
 एकीकृत ईंधन सविचारन सुविधा
 Integrated Fuel Fabrication Facility
 भारत सरकार/Government of India
 भाभा परमाणु अनुसंधान केंद्र
 Bhabha Atomic Research Centre
 टॉंबे, मुंबई/Trombay, Mumbai-400 001

Spot welding components detail

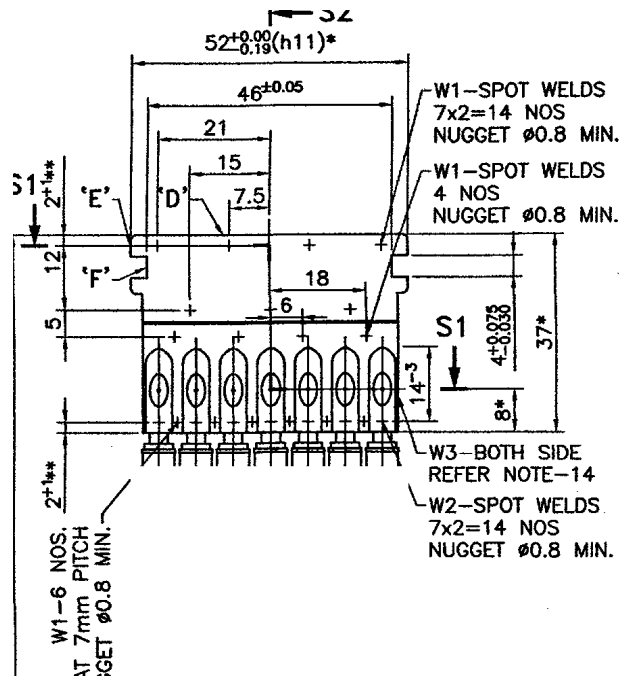
1. Type – 1 Tie plate



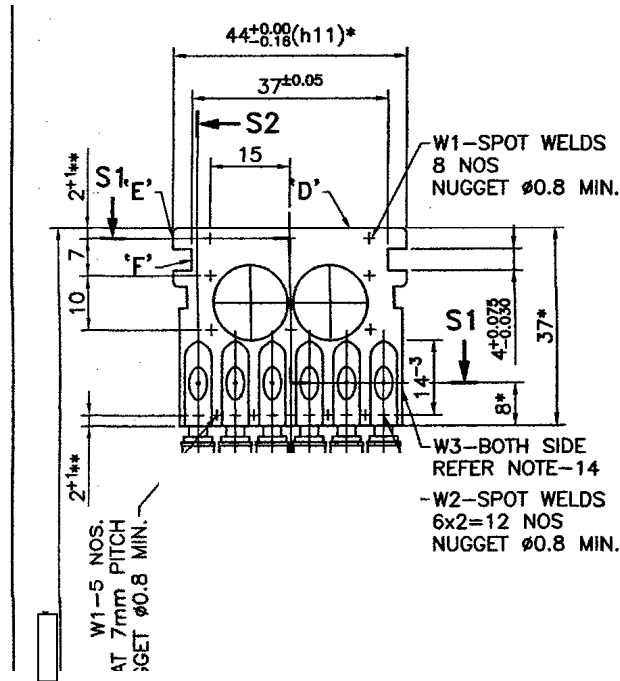
2. Type – 2 Tie plate



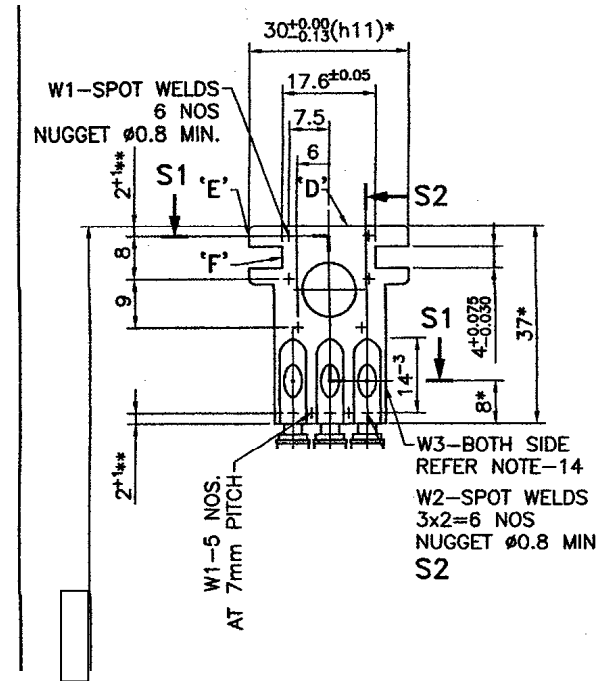
3. Type - 3 Tie plate



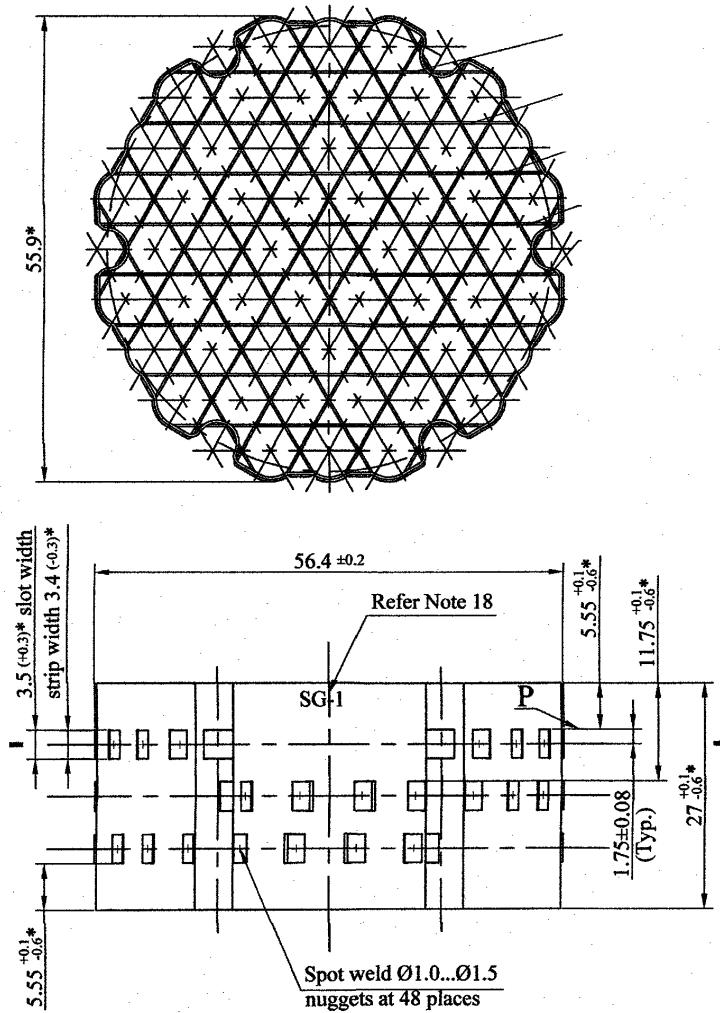
4. Type - 4 Tie plate



5. Type - 5 Tie plate



Grid Assembly type 1



Grid Assembly type 2

