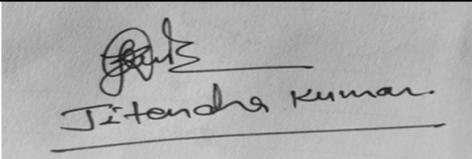
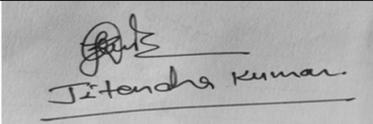
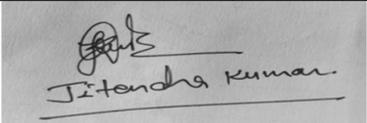
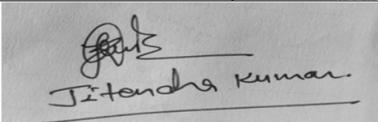


**TECHNICAL SPECIFICATIONS OF SINGLE PHASE GAS TUNGSTEN ARC WELDING (GTAW) MACHINE**  
**For Expression of Interest (EOI)**

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	<b>APPLICATION</b>				
1.0	<b>APPLICATION</b>				
	The TIG Welding Machine will be used for defect free welding of thin Tube/ Pipe, Sheet metal and root runs for carbon steel, alloy steel, stainless steel etc. material with digital weld process control	Vendor to offer			
2.0	<b>TECHNICAL SPECIFICATION</b>				
2.1	Type- Digital micro processor controlled Inverter Power Source	Vendor to offer			
2.2	Input Supply- 220V $\pm$ 10% variation	Vendor to note			
2.3	Output Current range- 3-220 A DC	Vendor to confirm			
2.4	Welding Current (10 minute duty cycle)-	Vendor to confirm			
2.4.1	Maximum current at 35% duty cycle- 220A DC	Vendor to confirm			
2.4.2	Maximum current at 60 % duty cycle- 160A DC	Vendor to confirm			
2.4.3	Maximum current at 100 % duty cycle- 130A DC	Vendor to confirm			
2.5	Power factor- 0.99	Vendor to confirm			
2.6	Type of cooling- AF (Forced air cooled)	Vendor to confirm			
2.7	Degree of protection- IP 23	Vendor to confirm			
2.8	Weight & Dimension	Vendor to specify			
					

<b>3.0</b>	<b>TECHNICAL FEATURES</b>				
<b>3.1</b>	Construction- Portable, light weight, handy and sturdy to work at shop floor working condition	Vendor to confirm			
<b>3.2</b>	It should have following in-built features-	Vendor to confirm			
<b>3.2.1</b>	HF Ignition facility	Vendor to confirm			
<b>3.2.2</b>	Pulsed welding functions, slope up, slope down etc.	Vendor to confirm			
<b>3.2.3</b>	Automatic Gas preflow and postflow facility	Vendor to confirm			
<b>3.2.4</b>	Gas test function	Vendor to confirm			
<b>3.2.5</b>	2 steps/ 4 steps operation	Vendor to confirm			
<b>3.2.6</b>	Over temperature protection	Vendor to confirm			
<b>3.2.7</b>	Crater fill current function	Vendor to confirm			
<b>3.2.8</b>	Earth leakage monitoring	Vendor to confirm			
<b>3.2.9</b>	Arc force control	Vendor to confirm			
<b>3.2.10</b>	Continuously adjustable welding power	Vendor to confirm			
<b>3.2.11</b>	Stepless control of current settings	Vendor to confirm			
<b>3.2.12</b>	Inbuilt safety measures against open circuit, short circuit or phase fault etc.	Vendor to confirm			
<b>3.2.13</b>	Facilities for storing welding parameters once established and activate these stored data during repeatative type welding	Vendor to confirm			
					

3.2.14	Function selection switch for DC TIG & pulsed TIG welding	Vendor to confirm			
3.2.15	Machine should have built-in protection/ tripping device to avoid any damage to machine at higher current range than specified	Vendor to confirm			
3.2.16	Hold function to know actual value of welding current and voltage after welding	Vendor to confirm			
3.3	Front Panel should have LED display of following functions-				
3.3.1	Welding voltage and current	Vendor to confirm			
3.3.2	Operating mode	Vendor to confirm			
3.3.3.	Welding parameter values like Gas pre-flow and post flow time, down slope and up slope time, pulse time, pulse pause time, ignition current, main current etc.	Vendor to confirm			
3.3.4	Crater fill current	Vendor to confirm			
3.3.5	Hold function	Vendor to confirm			
3.3.6	Main voltage	Vendor to confirm			
3.3.7	Over temperature indication	Vendor to confirm			
3.3.8	Error display	Vendor to confirm			
3.4	Highly flexible, ergonomically designed, light weight welding Gas Cooled Torch with swivel mounted handle, flexible and light hose. It should be fitted with press and release type switch suitable for 2/4 step operation and push/ pull connector with locking system	Vendor to offer			
					

4.0	<b>SCOPE OF SUPPLY</b> The TIG welding machines should be complete with following items in ready-to-work condition-	Vendor to confirm & offer			
4.1	Power source with built-in HF system as per terchnical specification and features mentioned above	Vendor to confirm & offer			
4.2	Gas cooled welding torch with 4.0 m cable/ hose assembly and 8.0 m cable/ hose assembly separately	Vendor to confirm & offer			
4.3	Input cable with plug -10.0 m	Vendor to confirm & offer			
4.4	Interconnecting hose between Gas Cylinder & Machine- 5.0 m	Vendor to confirm & offer			
4.5	Earthing cable with clamp- 5.0 m	Vendor to confirm & offer			
					

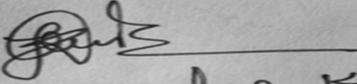
**PQR for SINGLE PHASE GAS TUNGSTEN ARC WELDING (GTAW) MACHINE**

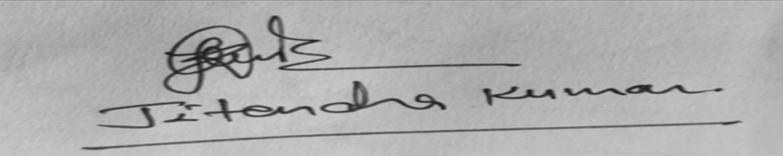
S No.	Description of BHEL Requirement	To be supplied/ confirmed/ submitted by
1	Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate	Vendor to Note
2	Only those OEMs/ OEM authorized vendors will be qualified who have manufactured supplied SINGLE PHASE GAS TUNGSTEN ARC WELDING (GTAW) MACHINE of same (Output Current range : 3-220 A) or higher capacity in last 5 years of Capacity.	Vendor to accept & comment
2.1	Vendor to submit copy of Purchase Order in compliance of above	Vendor to submit
2.2	Technical parameters of Machine (current rating) and application for which welding machine was supplied	Vendor to submit
2.3	Month & Year of supply	Vendor to inform
2.4	Name of company/ customer where welding machine supplied	Vendor to inform
2.5	Postal Address of Customer	Vendor to inform
2.6	Name & designation of contact person of customer	Vendor to inform
2.7	Phone & Email of contact person of customer	Vendor to inform
2.8	BHEL reserves right to verify the information submitted by the vendor	Vendor to note

  
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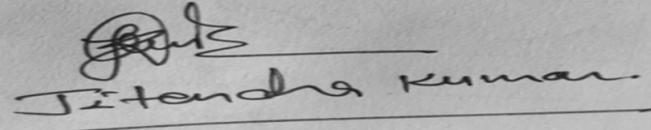
**TECHNICAL SPECIFICATIONS OF GAS TUNGSTEN ARC WELDING (GTAW) MACHINE  
For Expression of Interest (EOI)**

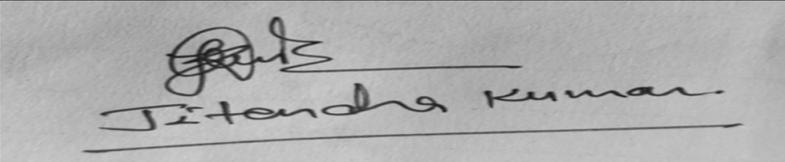
SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	<b>APPLICATION</b>				
1.1	The GTAW machine will be used for defect free welding of various Turbine components having stringent quality requirement of carbon steel, alloy steel, stainless steel etc.	Vendor to offer			
2.0	<b>SCOPE OF SUPPLY</b> The TIG welding machine should be complete with following items in ready-to-work condition	Vendor to offer			
2.1	a. Power source with built-in HF system b. Welding Torch c. Input cable with plug, Interconnecting hose between Gas Cylinder & Machine & Earthing cable d. Accessories e.g. pressure regulator with flow meter, Trolley with handle, Tool kit & consumables	Vendor to offer			

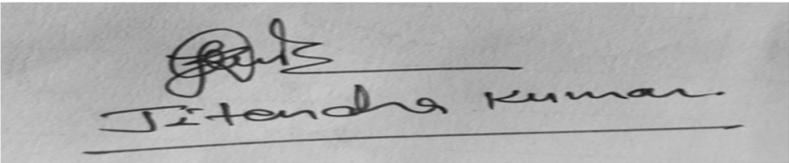
  
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3.0	<b>TECHNICAL SPECIFICATION</b>				
3.1	Type- Digital micro processor controlled Inverter Power Source	Vendor to offer			
3.2	Input Supply- AC 415V $\pm$ 15% variation ; 3 Phase, 50Hz	Vendor to note			
3.3	Output Current range- 5-300 A	Vendor to confirm			
3.4	Welding Current (10 minute duty cycle)-	Vendor to confirm			
3.4.1	Maximum current at 50 % duty cycle- 300A				
3.4.2	Maximum current at 100 % duty cycle- 250A				
3.6	Power factor- 0.99	Vendor to confirm			
3.7	Type of cooling- AF (Forced air cooled)	Vendor to confirm			
3.8	Degree of protection- IP 23	Vendor to confirm			
3.9	Weight & Dimension	Vendor to specify			
4.0	<b>TECHNICAL FEATURES</b>				
4.1	Construction- Portable, light weight, handy and sturdy to work at shop floor working condition	Vendor to confirm			
4.2	It should have following in-built features-				
4.2.1	Digital welding process control	Vendor to confirm			
4.2.2	HF Ignition facility & touch-down ignition both	Vendor to confirm			
4.2.3	Pulsed welding functions, slope up, slope down etc.	Vendor to confirm			
4.2.4	Automatic Gas preflow and postflow facility	Vendor to confirm			
4.2.5	Gas test function	Vendor to confirm			
4.2.6	2 steps/ 4 steps operation	Vendor to confirm			
					

4.2.7	Synchronized wire pulse mode	Vendor to confirm			
4.2.8	Hot start	Vendor to confirm			
4.2.9	Thermostat controlled fan	Vendor to confirm			
4.2.10	Crater fill current function	Vendor to confirm			
4.2.11	Updown control from torch	Vendor to confirm			
4.2.12	Continuous welding current adjustment through welding torch	Vendor to confirm			
4.2.13	Facilities for storing welding parameters once established and activate these stored data during repeatative type welding	Vendor to confirm			
4.2.14	Machine should have built-in protection/ tripping device to avoid any damage to machine at higher current range than specified	Vendor to confirm			
4.2.15	Inbuilt safety measures against open circuit, short circuit or phase fault etc.	Vendor to confirm			
4.2.16	Overtemperature protection	Vendor to confirm			
4.2.17	Earth fault monitor	Vendor to confirm			
4.2.18	Inter lock must be provided for water flow in the torch. In case water stops flowing due to any reason, alarm/error should be displayed and machine should stop working.	Vendor to confirm			

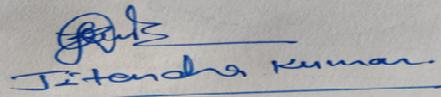
  
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<b>4.3</b>	<b>Front Panel should have LED display of following functions-</b>				
4.3.1	Welding voltage and current	Vendor to confirm			
4.3.2	Operating mode	Vendor to confirm			
4.3.3.	Welding parameter values like Gas pre-flow and post flow time, down slope and up slope time, ignition current, main current etc. These functions should be such that it can be set as per requirement.	Vendor to confirm			
4.3.4	Hold function to know actual value of welding current and voltage after welding	Vendor to confirm			
4.3.5	Crater fill current	Vendor to confirm			
4.3.6	Main voltage	Vendor to confirm			
4.3.7	Over temperature indication	Vendor to confirm			
4.3.8	Error display	Vendor to confirm			
<b>4.4</b>	<b>Welding Torch</b>				
4.4.1	Water cooled welding torch with 4.0 m cable/ hose assembly	Vendor to offer & confirm			
4.4.2	Torch will be fitted with 2/4 step on-off switch and up/down switch for finer adjustment of current during welding	Vendor to offer & confirm			
4.4.3	Welding Torch adaptor should be Euro Connection type	Vendor to offer & confirm			
					

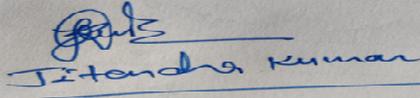
4.6	<b>Cables &amp; Hoses</b>				
4.6.1	Input cable with plug -10.0 m	Vendor to offer & confirm			
4.6.2	Interconnecting hose between Gas Cylinder & Machine- 5.0 m	Vendor to offer & confirm			
4.6.3	Earthing cable with clamp- 5.0 m	Vendor to offer & confirm			
5.0	<b>Special Instructions</b>				
5.1	Vendor should provide pointwise confirmations and clarifications of all above mentioned specification clauses with technical back-up documents/ technical literature	Vendor to note			
					

**TECHNICAL SPECIFICATIONS OF SYNERGIC MIG/MAG WELDING MACHINE**  
**For Expression of Interest (EOI)**

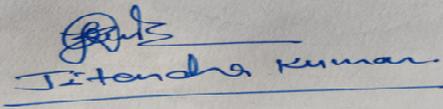
SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	<b>APPLICATION</b>				
	Synergic MIG/MAG welding machine will be used for spatter free and heavy duty welding of Carbon Steel, Alloy Steel, Stainless Steel, Aluminum, Inconel etc on continuous duty cycle	Vendor to offer			
2.0	<b>TECHNICAL SPECIFICATION</b>				
2.1	<b>Type:</b> Digital Microprocessor controlled software based inverter type power source.	Vendor to offer			
2.2	Shielding medium : Argon/ Argon + Co2 gas mixture	Vendor to offer/ confirm			
2.3	Output Current range : 10 to 500 A	Vendor to specify			
2.4	Welding Current rating at 100% duty cycle (10 minutes) at 40 °C : 340 A (minimum)	Vendor to specify			
2.5	Welding Current rating at 60% duty cycle (10 minutes) at 40 °C : 450 A (minimum)	Vendor to specify			
2.6	Duty cycle (10 minutes, at 40°C) at which 500A will be available	Vendor to specify			
2.7	<b>Variation of set current : &lt; ± 1%</b>	Vendor to confirm/ specify			
2.8	<b>Open circuit Voltage : 65 v (minimum)</b>	Vendor to confirm/ specify			
2.9	<b>Wire feed speed : Up to 25m/min</b>	Vendor to confirm/ specify			
2.10	<b>No load Power Consumption : &lt; 75 W</b>	Vendor to confirm/ specify			
2.11	Type of Cooling : Forced air cooled	Vendor to confirm			
2.12	Degree of Protection : IP 23	Vendor to confirm			
2.13	<b>Input Supply : 415 ± 10 % Variation, 3 Phase 50 H ± 3% Variation</b>	Vendor to confirm			
2.14	<b>Working Condition :</b> a) Ambient Temp. Variation 3°C to 50° C b) Relative Humidity - 95% (maximum) during rainy season. c) Continuous heavy duty welding in dusty Fabrication Shop	Vendor to note/ confirm			

  
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<b>3.0</b>	<b>TECHNICAL FEATURES</b>				
<b>3.1</b>	Light weight, Trolley Mounted, Sturdy, Compact, rigid and dust proof construction.	Vendor to confirm			
<b>3.2</b>	Single knob Synergic Control through in built programs. Only base metal, wire diameter and shielding gas composition will be selected by Welder and rest all parameters will be automatically selected by the Synergic control system.	Vendor to confirm			
<b>3.3</b>	Digital display of all parameters	Vendor to confirm			
<b>3.4</b>	In-built programmes for welding various combinations of base metals like carbon steels, alloy steels, stainless steels, Aluminum, Inconel etc. & from thin to heavy joint thickness.	Vendor to confirm			
<b>3.5</b>	Warning and operational LED indications for over/under voltage, over temperature and no water/water flow.	Vendor to confirm			
<b>3.6</b>	Hold function to check pre-set and actual major welding parameters after welding is over.	Vendor to confirm			
<b>3.7</b>	Gas test button to check gas flow rate before welding.	Vendor to confirm			
<b>3.8</b>	Error code display for maintenance purpose (Error diagnostic function).	Vendor to confirm			
<b>3.9</b>	Automatic Arc length correction control to compensate welder's hand movements.	Vendor to confirm			
<b>3.10</b>	Built - in protective system to sense the water flow in the torch and prevent burning of Torch incase of insufficient /stoppage of water flow.	Vendor to confirm			
<b>3.11</b>	Short circuit and Single phase protection.	Vendor to confirm			
<b>3.12</b>	Auto-Cut off device built -in the power source to prevent use of higher current than rated capacity at 100% duty cycle in order to avoid burring of Torch / Components.	Vendor to confirm			
<b>3.13</b>	Auto-Cut off built-in the power source in case of over heating.	Vendor to confirm			
<b>3.14</b>	Fitted with built in cooling unit as single unit. The capacity should be such that the pump will be able to maintain coolant flow rate at a height of 6-7 m welding height, so that the torch does not get heated beyond specified limit	Vendor to confirm			

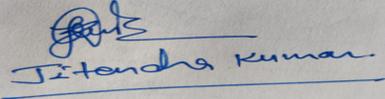
  
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4.0	<b>SCOPE:-</b>				
	Standard Synergic MIG/ MAG welding machine will consist of following items with Individual price and Identification No.				
4.1	Power Source with controls as per technical specification and technical features (refer clause 2.0 and 3.0)	Vendor to offer			
4.2	<b>Cooling Unit :-</b>	Vendor to offer			
4.2.1	Integral Water Cooling unit suitable to keep the Torch cool during continuous welding at rated capacity.	Vendor to confirm			
4.2.2	The cooling unit should be interfaced with the Power Source so that in case of interruption in the flow of coolant through cable hose/Torch, no welding can be done as a precautionary measure. Accordingly error message should be indicated on control panel.	Vendor to confirm			
4.3	<b>Wire Feed Unit:-</b>	Vendor to offer			
4.3.1	Light weight, compact and rigid wire feeder with 4 all powered and grooved Roller drive and suitable for continuous smooth wire feeding with wire dia 1.2 mm and 1.6 mm Solid/Flux Cored Wire.	Vendor to confirm			
4.3.2	Wire spool mounting arrangement with braking device for national/ international standard wire spools properly covered or housed inside the wire feed unit to prevent direct contact from moisture and dirt.	Vendor to confirm			
4.3.3	Welding Torch Adaptor should be Euro Connection type.	Vendor to confirm			
4.3.4	Display of major weld parameters like current, voltage, wire, speed, programme no w.r.t. material / thickness etc.	Vendor to confirm			
4.4	<b>Welding Torch :-</b>	Vendor to offer			
4.4.1	Ergonomically designed Water Cooled Torch fitted with 4 m (approx) flexible & light to handle cable hose and Euro connector.	Vendor to confirm			
4.4.2	Torch will be fitted with 2/4 step on-off switch and Up/Down switch for finer adjustment of current, if required, during welding.	Vendor to confirm			
4.4.3	Provision for Torch neck swiveling and locking to suit positional welding & welding in difficult areas.	Vendor to confirm			
4.5	<b>Cables and Hoses :-</b>				
4.5.1	Interconnecting cable/hose assembly (15.0 m long) between Power Source and Wire Feeder Unit.	Vendor to confirm			
4.5.2	Earthing cable (5.0 m long) with Plug/Connector.	Vendor to confirm			
4.5.3	Input cable (10.0 m long) with Plug.	Vendor to confirm			
4.5.4	All Cables will be made of Copper	Vendor to confirm			


  
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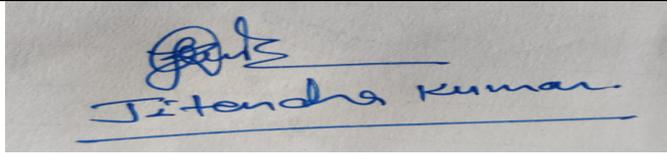
**PQR for THREE PHASE GAS TUNGSTEN ARC WELDING (GTAW) MACHINE**

S No.	Description of BHEL Requirement	To be supplied/ confirmed/ submitted by
1	Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate	Vendor to Note
2	Only those OEMs/ OEM authorized vendors will be qualified who have manufactured supplied three phase GTAW machine of same (Output Current range : 5 to 300 A) or higher capacity in last 5 years of Capacity and it has been working satisfactorily for more than one year after commisioning, should quote.	Vendor to accept & comment
2.1	Vendor to submit copy of Purchase Order in compliance of above	Vendor to submit
2.2	Technical parameters of Machine (current rating) and application for which welding machine was supplied	Vendor to submit
2.3	Month & Year of supply	Vendor to inform
2.4	Name of company/ customer where welding machine supplied	Vendor to inform
2.5	Postal Address of Customer	Vendor to inform
2.6	Name & designation of contact person of customer	Vendor to inform
2.7	Phone & Email of conatct person of customer	Vendor to inform
2.8	BHEL reservs right to verify the information submitted by the vendor	Vendor to note

  
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**PQR FOR SYNERGIC MIG/MAG WELDING MACHINE**

S No.	Description of BHEL Requirement	To be supplied/ confirmed/ submitted by
1	Only Class-I and Class-II Local suppliers as per MII order dated 4.6.2020 will be eligible to bid. Non - Local suppliers as per MII order dated 04.06.2020 are not eligible to participate	Vendor to comply
2	Only those OEMs/ OEM authorized vendors will be qualified who have manufactured supplied Synergic MIG/MAG welding machine of same (Output Current range : 10 to 500 A) or higher capacity in last 5 years of Capacity.	Vendor to comply
2.1	Vendor to submit copy of Purchase Order in compliance of above	Vendor to submit
2.2	Technical parameters of Machine (current rating) and application for which welding machine was supplied	Vendor to submit
2.3	Month & Year of supply	Vendor to inform
2.4	Name of company/ customer where welding machine supplied	Vendor to inform
2.5	Postal Address of Customer	Vendor to inform
2.6	Name & designation of contact person of customer	Vendor to inform
2.7	Phone & Email of contact person of customer	Vendor to inform
2.8	BHEL reserves right to verify the information submitted by the vendor	Vendor to note



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## PERFORMANCE FEEDBACK OF GMAW WELDING MACHINE

**MAKE :** \_\_\_\_\_

**MODEL:** \_\_\_\_\_

Sl	Description	Shop Feedback
1	Arc stability	
2	Weld bead appearance (e.g. free of ripples)	
3	Spatter Level	
4	Positional welding performance	
5	Rigidity & Stability	
6	Performance on partial duty cycle	
7	Performance on continuous duty cycle	
8	Provision of necessary protections	
9	Provision of necessary indicators on control panel	
10	Ease of maintenance	
11	Weight and Size	
12	Overheating observed- Yes / No	
13	Tripping of set observed- Yes / No	
14	Control of welding parameter through welding torch	
15	Any other observation	
Recommendation- Acceptable/ Not Acceptable		



## PERFORMANCE FEEDBACK OF GTAW WELDING MACHINE

**MAKE :** \_\_\_\_\_

**MODEL:** \_\_\_\_\_

Sl	Description	Shop Feedback
1	Arc stability	
2	Weld bead appearance (e.g. free of ripples)	
3	Positional welding performance	
4	Rigidity & Stability	
5	Performance on partial duty cycle	
6	Performance on continuous duty cycle	
7	Provision of necessary protections	
8	Provision of necessary indicators on control panel	
9	Ease of maintenance	
10	Weight and Size	
11	Overheating observed- Yes / No	
12	Tripping of set observed- Yes / No	
13	Any other observation	
Recommendation- Acceptable/ Not Acceptable		