 <p style="text-align: center;">Heavy Power Equipment Plant, Bharat Heavy Electricals Limited, Ramachandrapuram -502032, Andhra Pradesh, INDIA.</p>	Enquiry No. & Dt.:	
	Due Date :	
	Supplier's Ref.:	
	Date :	
Specification cum Compliance Certificate for STACK PIT (HYDRAULIC STACKING EQUIPMENT)		
Note:-		
1. The Column " VENDOR'S OFFER WITH TECHNICAL DETAILS & REMARKS" of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.		
2. The offer and all documents enclosed with offer should be in English language only.		
Name & Address of the supplier:		Name & Address of the Indian Agent:
Telephone No.		Telephone No.
Fax No.		Fax No.
e-mail :		e-mail :
Scope: Supply, Erection & Commissioning of STACK PIT (HYDRAULIC STACKING EQUIPMENT) complying with specification as below.		
SNO	BHEL TECHNICAL SPECIFICATION	VENDOR'S OFFER WITH TECHNICAL DETAILS & REMARKS
1.0	PURPOSE:	
1.1	The purpose of the equipment is to stack the compressor rotor (press fitting of one gas turbine compressor disc over the other) of a Gas turbine. The compressor rotor is built up of Seventeen individually machined discs each with a mating male & female spigot. The fit between the compressor discs is a force fit. The stack pit is used to force the male spigot of one disc onto the female spigot of the other. The maximum stacking force expected is around 15 to 20 Tons	Vendor to note
2.0	CONSTRUCTIONAL DETAILS	
2.1	Typical constructional details are given below. Please refer to attached ANNEXURE-I for conceptual sketch of the proposed stack pit.	Vendor to note

2.2	The major components of the Stacking System are: 1. Hydraulic lifting platform placed in pit. 2. Swing arm type hydraulic ram 3. Hydraulic power pack & Controls	Vendor to note	
2.3	Hydraulic platform: The hydraulic lifting platform is supported by 4 hydraulic rams each of 50T capacity. The platen of the hydraulic platform is 1250x1250mm with T-slots and is sufficiently strong to resist the stacking load as well as dead weight of the component. The Stroke of the hydraulic platform is around 5500mm. The Hydraulic platform is placed in a pit such that the compressor discs are positioned at a convenient working height of 700-800mm.	Vendor to note	
2.4	Swing arm type hydraulic ram : The swing type hydraulic ram is located along the axis of the Hydraulic platform. The swing ram consists of a Column & Arm (similar to a radial drill). The Arm swings about the Column to an angle of 45° or more to aid loading of the compressor discs. The hydraulic ram is fixed on the Arm such that the Ram axis is always aligned to the lifting platform center. Once the Ram is over the C/L of the platform the Arm is positively locked in position on the Arm support at the opposite end.	Vendor to note	
2.5	Hydraulic Power Pack: Hydraulic power pack with complete safety interlocks & Push button control Pendant is provided for the complete system.	Vendor to note	
3.0	TECHNICAL SPECIFICATION:		
3.1	STACK PIT DETAILS:		
3.1.1	Stack pit size : Length x Width x Depth (3000mmx3000mmx5000mm) pit will be provided by BHEL as per Vendor's layout. Stack	Vendor to note	
3.2	HYDRAULIC LIFTING PLATFORM		
3.2.1	Hydraulic plat form size (LxB)mm	1250mm x 1250mm	
3.2.2	Size & No of T-slots on the platform	4 each along length and width suitable for M36 studs	
3.2.3	Stroke of platform	5500 mm or more	
3.2.4	No. of lifting rams	4 or more	
3.2.5	Capacity of each lifting ram	50T or more	
3.2.6	Collapased height of hydraulic platform from pit bottom	600mm	

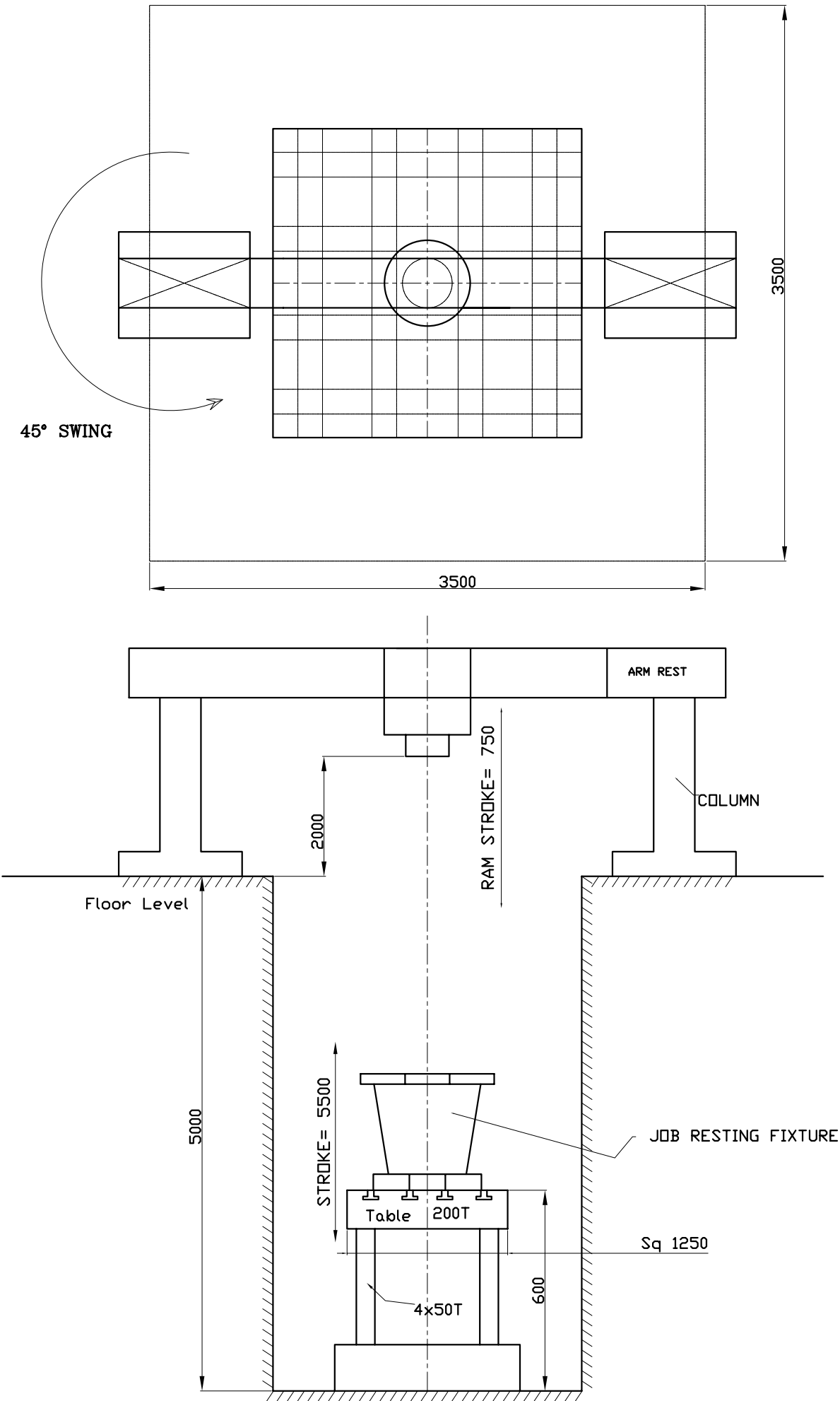
3.2.7	Hydraulic platform top surface shall be a T-slot table rigid enough to withstand the dead weight of the job & stacking force	Vendor to confirm	
3.2.8	Lifting ram cross section shall be rigid enough to prevent swaying of platform at the maximum extension with maximum job weight	Vendor to confirm	
3.2.9	Adjustable operator walk way with adjustment from 1500x1500 mm to 2500x2500mm shall be provided at the floor level around the lifting platform, for operators to stand and assemble the jobs	Vendor to confirm	
3.2.10	Constructional details with sketches of the Lifting platform to be furnished.	Vendor to submit	
3.3	SWING ARM WITH HYDRAULIC RAM:		
3.3.1	A Swinging Column & Arm assembly with hydraulic ram as shown in Annexure-1 shall be located along the axis of the pit such that when the Arm is swung to the stacking position (stacking position is defined as the position in which the Arm is aligned to the center of the lifting platform axis and supported on the Arm rest)	Vendor to confirm	
3.3.2	Constructional details with sketches of the Column, Arm and Hydraulic ram assembly to be furnished	Vendor to submit	
3.3.3	Swing of Arm about the Column for easy job loading & un-loading	45° or more	
3.3.4	Arm swing shall be manual with suitable locking arrangement in stacking position.	Vendor to confirm	
3.3.5	Capacity of Hydraulic ram on the Arm	100T or more	
3.3.6	Stroke of Hydraulic ram	750mm or more	
3.3.7	Height of the Hydraulic ram face in fully retracted condition, from the Floor level shall be 2000mm	Vendor to confirm	
3.4	HYDRAULIC POWER PACK & CONTROLS		
3.4.1	Suitable hydraulic power pack with necessary safety interlocks shall be designed & located on the operator pendant at a convenient location.	Vendor to confirm	
3.4.2	Operation of the lifting platform, stacking ram etc shall be through push buttons located on the operator pendant	Vendor to confirm	
3.4.3	Details of Hydraulic power pack (Make, Model & Rating etc) along with catalogues shall be submitted	Vendor to submit	
3.4.4	Hydraulic oil chiller if any required for equipment operation in the ambient conditions specified at clause 4.0 shall be provided.	Vendor to submit	
3.5	OTHER ESSENTIAL REQUIREMENTS:		
3.5.1	Light with sufficient illumination shall be provided at suitable location for better visibility during operation.	Vendor to Confirm	

3.5.2	Complete circuit diagram (Electrical & Hydraulic) as implemented in the equipment is to be submitted.	Vendor to submit	
3.5.3	All wiring and plumbing should be as per relevant IS / DIN standard.	Vendor to Confirm	
3.5.4	All wires and pipes to be marked clearly and distinctly.	Vendor to Confirm	
3.5.5	There should no oil / coolant leakages during operation and idle period of the equipment.	Vendor to Confirm	
3.5.6	Complete details for all above points and detailed dimensional drawings must be provided by the supplier along with quotation.	Vendor to Confirm	
4.0	AMBIENT CONDITIONS		
4.1	Power: Equipment should be suitable to operate on 3 phase A.C supply of 415 volts +10% / -15 %, 50 Hz + /- 3 %.	Vendor to Confirm	
4.2	Environment: Tropical environment consist of dust laden atmosphere during some part of the year. Temperature - Min. 05° C and Max. 45° C. Relative Humidity - 95 % Max. Max. available air pressure - 5 kg / cm ² , other conditions similar to tropical country.	Vendor to Confirm	
4.3	Tropicalisation: Electricals and paint of complete machine shall be suitably tropicalised.	Vendor to Confirm	
4.4	All control cabinets & panels should be dust and vermin proof	Vendor to Confirm	
4.5	Motors if any shall conform to IEC or Indian Standards	Vendor to Confirm	
4.6	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to Confirm	
5.0	SPARES		
5.1	Recommended spares to be indicated separately alongwith itemwise prices. Spares shall include electrical, mechanical, and bought - out items.	Vendor to Specify	
5.2	Vendor should also supply the addresses from where these spares could be procured in case of future requirement.	Vendor to give details	
5.3	Spares are to be quoted for 2 years of trouble free operation.	Vendor to quote	
6.0	DOCUMENTATION:		
6.1	3 sets of operation & maintenance manuals of machine and it's controls, attachments etc are to be supplied along with the machine in English language.	Vendor to Confirm	
6.2	Complete catalogue of all major bought out items shall be provided along with the machine in english language.	Vendor to Confirm	
7.0	TRAINING:		

7.1	Vendor shall impart training to BHEL Personnel for operation and maintenance of the equipment during Erection & Commissioning.	Vendor to Confirm	
8.0	WARRANTY:		
8.1	Supplier shall provide warranty for 24 months from the date of commissioning.	Vendor to Confirm	
9	PROVE-OUT OF BHEL COMPONENT		
9.1	Supplier shall demonstrate the suitability of the above equipment for stacking of rotor parts by stacking four nos of compressor wheels at BHEL works during Erection & Commissioning. Prove-out details shall be mutually discussed & agreed during technical discussions. Job holding fixture for the stacking of wheels will be provided by BHEL	Vendor to accept & offer	
10	FOUNDATION:		
10.1	Vendor shall submit the preliminary General Arrangement Drawing and Layout Drawing for getting BHEL's approval within two months from the date of Letter of Intent (LOI) / P.O. Complete Foundation details viz. static / dynamic load details etc. and final Layout drawings shall be submitted by the supplier within two months after getting BHEL's approval. BHEL shall design & construct complete foundation for the system as per layout & details provided by vendor. The vendor shall also indicate detailed specifications of grouting compound and grouting procedure etc. if any specifically desired for foundation bolts of the machine.	Vendor to submit	
11.0	ERECTION & COMMISSIONING		
11.1	Erection and commissioning : Supplier to take full responsibility for carrying out the erection, start up, testing of equipment, it's control & all types of other supplied equipment etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL subject to availability. Details of these requirements should be informed by vendor in advance.	Vendor to Confirm	
12.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :		

12.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc.for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to quote	
13.0	MACHINE ACCEPTANCE:	Vendor to Confirm	
13.1	Pre-dispatch clearance will be given by BHEL Engineers after verification of all items at vendor's works for compliance with scope of supply		
13.1	Final acceptance shall be made by BHEL at it's plant following successful erection & commissioning and component prove-out.	Vendor to Confirm	
14.0	PACKING		
14.1	Rigid packing for all items of complete machine, all Accessories and other supplied items to avoid any damage/loss in transit.	Vendor to Confirm	
15.0	GENERAL :	Vendor to Confirm	
15.1	Painting of Equipment/ Electrical Panels :	Vendor to Specify	
15.2	Total weight of the machine	Vendor to Confirm	
15.3	Weight of heaviest part of machine	Vendor to Confirm	
15.4	Weight of the heaviest assembly / sub-assembly of the Equipment	Vendor to Confirm	
15.5	Dimensions of largest part/ sub-assembly/ assembly of the Equipment	Vendor to Confirm	
15.6	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential.All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to note	

ANNEXURE 1



CONCEPTUAL SKETCH OF STACK PIT FOR GAS TURBINE ROTOR