Bid Number/बोली क्रमांक (बिड संख्या):
GEM/2023/B/3265048
Dated/दिनांक : 14-03-2023

Bid Document/ बिड दस्तावेज़

Bid Details/बिड विवरण	
Bid End Date/Time/बिड बंद होने की तारीख/समय	04-04-2023 16:00:00
Bid Opening Date/Time/बिड खुलने की तारीख/समय	04-04-2023 16:30:00
Bid Offer Validity (From End Date)/बिड पेशकश वैधता (बंद होने की तारीख से)	180 (Days)
Ministry/State Name/मंत्रालय/राज्य का नाम	Ministry Of Power
Department Name/विभाग का नाम	Na
Organisation Name/संगठन का नाम	Ntpc Limited
Office Name/कार्यालय का नाम	Cg
Total Quantity/कुल मात्रा	50
Item Category/मद केटेगरी	M5276066596
BOQ Title/बीओक्यू शीर्षक	Procurement of Gas Turbine Stage 3 Stator Vanes for DGPS
MSE Exemption for Years of Experience/अनुभव के वर्षों से एमएसई छूट/ and Turnover	No
Startup Exemption for Years of Experience/अनुभव के वर्षों से स्टार्टअप छूट/ and Turnover	No
Document required from seller/विक्रेता से मांगे गए दस्तावेज़	Experience Criteria,Bidder Turnover,Certificate (Requested in ATC),OEM Authorization Certificate,Additional Doc 1 (Requested in ATC),Additional Doc 2 (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled/बिड से रिवर्स नीलामी सक्रिय किया	No
Type of Bid/बिड का प्रकार	Two Packet Bid
Time allowed for Technical Clarifications during technical evaluation/तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय	3 Days
Evaluation Method/मूल्यांकन पद्धति	Total value wise evaluation

EMD Detail/ईएमडी विवरण

Advisory Bank/एडवाईजरी बैंक	ICICI
EMD Amount/ईएमडी राशि	2000000

ePBG Detail/ईपीबीजी विवरण

Advisory Bank	ICICI
ePBG Percentage(%)/ईपीबीजी प्रतिशत (%)	3.00
Duration of ePBG required (Months)/ईपीबीजी की अपेक्षित अवधि (महीने).	62

(a). EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy./जेम की शर्तों के अनुसार ईएमडी छूट के इच्छुक बिडर को संबंधित केटेगरी के लिए बिड के साथ वैध समर्थित दस्तावेज़ प्रस्तुत करने है। एमएसई केटेगरी के अंतर्गत केवल वस्तुओं के लिए विनिर्माता तथा सेवाओं के लिए सेवा प्रदाता ईएमडी से छूट के पात्र हैं। व्यापारियों को इस नीति के दायरे से बाहर रखा गया है।

(b). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable./ईएमडी और संपादन जमानत राशि, जहां यह लागू होती है, लाभार्थी के पक्ष में होनी चाहिए।

Beneficiary/लाभार्थी :
GM(C&M)
NTPC Limited, Western Region II Headquarters, Plot No-87, Sector-24, Atal Nagar, Naya Raipur, Raipur Chhatisgarh-492018
(Uma Shankar Gupta)

Splitting/विभाजन

Bid splitting not applied.

MII Purchase Preference/एमआईआई खरीद वरीयता

MII Purchase Preference/एमआईआई खरीद वरीयता	Yes

MSE Purchase Preference/एमएसई खरीद वरीयता

MSE Purchase Preference/एमएसई खरीद वरीयता	Yes

1. Preference to Make In India products (For bids > 200 Crore) (can also be used in Bids < 200 Crore but only after exemption by competent authority as defined in Deptt of Expenditure OM dated 28.5.2020): Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India), Order

2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a Class 1 local supplier is denoted in the bid document. If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020. In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.
2. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer)of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25%(selected by Buyer) percentage of total QUANTITY.
3. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

M5276066596

(Minimum 50% and 20% Local Content required for qualifying as Class 1 and Class 2 Local Supplier respectively/क्रमशः श्रेणी 1 और श्रेणी 2 के स्थानीय आपूर्तिकर्ता के रूप में अर्हता प्राप्त करने के लिए आवश्यक)

Brand Type/ब्रांड का प्रकार	Unbranded

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Uma Shanker Yadav	201008,National Capital Power Project P.O. VIDYUT NAGAR GAUTAM BUDH NAGAR(U.P.)	50	365

Buyer Added Bid Specific Terms and Conditions/क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें

1. **Scope of Supply**

   Scope of supply (Bid price to include all cost components) : Only supply of Goods

2. **Certificates**

   Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.

3. **Buyer Added Bid Specific ATC**

   Buyer uploaded ATC document Click here to view the file.

Disclaimer/अस्वीकरण

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. Any clause(s) incorporated by the Buyer regarding following shall be treated as null and void and would not be considered as part of bid:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process.
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

This Bid is also governed by the General Terms and Conditions/ यह बिड सामान्य शर्तों के अंतर्गत भी शासित है

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws./जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो।बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।

---Thank You/धन्यवाद---

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900254868

Bill of Materials

Delivery Address:

Dadri Gas Power Project
Post Vidyut Nagar, Dist GB Nag
Dadri
Uttar Pradesh
201008
India

Item	Material Code	Description	UoM*	Total Quantity	Delivery Date
00010	M5276066596	V94.2:ST-3 TURB STATOR BLADE, H11H70D47	NO	50.000	31.03.2024

(UOM Legends :- NO - Number **)**

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900254868

TECHNICAL DATA SHEET

00010 - M5276066596

Specification

SIEMENS-V94.2 (PRE-RATIO) STAGE-3 TURBINE STATOR BLADE

MATERIAL - INCONEL 939/ G-NICR16CO8TIALWMO
PB NO. - PB0000007745/ PB0000278739
A2A NO. - A2A50011624
TIN - H11H70D47
DG - 12643/001

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900254868

ITEM DATA SHEET

Material Code	Item Text
M5276066596	1.Letter of undertaking from the Foreign Bidder clearly mentioning the NTPC Tender Number need to be submitted in which Foreign Bidder will have to compulsorily take all the unconditional responsibilities associated with the supplied material, including the coverage of the Guarantee/ Warranty Period Etc. 2.The supplied material needs to be Door Delivered at NTPC Dadri and Bidder need to take care of the transportation, insurance, custom clearance, and all other formalities. NTPC will not extend any help in this process. 3.The material should be inspected at the works of the manufacturer by Third Party Inspection Agency in line with approved Quality Plan. The material shall only be dispatched only after written clearance (Material Dispatch Certificate) from NTPC. 4.Tentative QP attached ."Quality Plan shall be submitted for NTPC's approval considering clauses 4,5,6,7,8,& 9 and Annexure VI of "TECHNICAL SPECIFICATIONS WITH BOQ FOR VANE ROW#3.pdf.

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900254868

VENDORS LIST

S.No.	Collective No. / RFQ No.	Vendor Details

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900254868

List of Documents

Please note that below documents are needed to be provided along with Invoice.

S.No.	Document Description

TECHNICAL SPECIFICATION OF TURBINE BLADES/ VANES FOR V94.2 SIEMENS DESIGN GAS TURBINES OF DADRI CCPP

1. OPERATING CONDITIONS :-

1.1 The turbine **Blades/Vanes** along with fixing materials shall be used in V94.2 PRE RATIO Gas Turbines (Siemens AG make) installed at Dadri Gas Power Project of NTPC Ltd. (India). Brief operating details for these machines is as follows :

S. No.	PARAMETER	DESCRIPTION
A	Design Site Conditions	27 ^{0}C ambient temperature, barometric pressure 0.9870 bar, 60% RH, and 50 Hz frequency.
B	Gas Turbine Output: At ISO conditions At Design Site Conditions	 142.42 MW (Base Load) 131.31 MW (Base Load)
C	Gas Turbine Compression Ratio	10.24
D	Gas Turbine Exhaust Flow at Design Site conditions	471. 6 Kg/S (Base Load)
E	Turbine Inlet Temperature as per ISO 2314	1060 ^{0}C at base load & 1100 ^{0}C peak load
F	Fuel	Natural Gas and High Speed Diesel (HSD) oil.
G	Type of duty	Base load and cyclic
H	Operating frequency range	47.5 – 51.5 HZ
I	Air Quality	Gas turbines are provided with high efficiency filtration system that meets air quality requirement as specified by OEM.
J	Year of manufacturing	1990

1.2 Detailed analysis of Natural Gas and HSD being fired at Dadri is enclosed at **Annexure – I** and **Annexure – II** respectively.

1.3 It is bidder's responsibility to ensure that the components proposed to be supplied meet the duty requirement as mentioned above and are suitable for firing gaseous and liquid fuels. Any lowering of Turbine Inlet Temperature (**TIT**) due to limitations from material and / or coating of Blades/ Vanes shall not be allowed.

2. SERVICE LIFE / REPAIRABILITY :-

2.1 Service Life :-

a. The minimum Design life of the turbine **Blades/Vanes** is as per **Annexure-IV. Blades/ Vanes** offered by the Bidder shall be suitable for trouble free service for **at least 33,000 EOHs (i.e. Mac 33 Design)** without any refurbishment. Design life of offered material shall not be less than that for the components supplied by OEM for V94.2 Siemens Design Gas Turbines. This is important to ensure that maintenance cycle of Gas Turbine is not disturbed.

b. Service life of the components shall be expressed in terms of Equivalent Operating Hours (EOH) as defined by OEM i.e. Siemens AG. The formula for EOH is given at **Annexure-III**. The material proposed to be used shall meet the requirement of equivalent operating hours as mentioned in **Annexure-IV** of this specification.

2.2 Refurbishment and Reparability :-

- Bidder shall clearly indicate the weld reparability of the components supplied.

- The type and extent of damage that can be weld repaired shall be furnished with the components. Supplier shall also indicate the rejection criterion that has to be adopted for deciding further use of blades/vanes after refurbishment.

- A brief procedure for repair / refurbishment (recoating) of used blades / vanes shall be furnished along with the components. The procedure shall contain the description of rejuvenation heat treatments and heat treatments that need to be carried out before and after weld repair to achieve the tasks of improved weld-ability, stress relieving of weld repaired area and to restore alloy microstructure.

- Bidder shall clearly indicate whether it shall be possible to fully restore the mechanical properties through rejuvenation heat treatment of the components.

- In case the design life, refurbishment interval, and number of allowable refurbishment are better than for OEM supplied components, bidder shall furnish the proof of the same.

3. DRAWINGS :-

a. The bidder, **other than OEM** of V94.2 model Gas Turbine, shall submit dimensional assembly drawing, which shall include all sub components and bear all necessary dimensional details. Deviations (if any) with respect to actual OEM supplied part or OEM drawing for that part shall be clearly brought out in the bid. The **Blades/ Vanes** should have same airfoil profile as for the blades/vanes currently installed in gas turbines of Dadri Gas Project.

b. The drawings submitted by the Bidders should establish dimensional compatibility with installed parts. However, the bidder shall own complete and unconditional responsibility for supply of Blades/Vanes and associated assembly material that fit the machines as per OEM recommended fits/tolerance values.

4. MATERIAL OF BLADES/VANES:-

4.1 Blades/ vanes shall be made by the conventional equiaxed invacuo precision investment casting process except for Moving Blades Stage- 3 & 4, which shall be made by precision Forging. The material shall be super-alloys capable of meeting the strength and life requirement at elevated temperatures. The mechanical and oxidation/corrosion resistance properties of the material shall be better or equivalent than the material used by OEM for current V94.2 machines. Bidder shall indicate $T_{SOLIDUS}$ of the offered material and the maximum surface temperature that is likely to be experienced by vane/blade during service.

4.2 The material that are acceptable are as follows :

Moving Blades Stage- 1 & 2	- Inconel 738 LC
Moving Blades Stage- 3	- NICR18CO15MOTIALW
Moving Blades Stage- 4	- NICR20CO18TI
Stationary Blades (Vanes) Stage- 1 & 2	- Inconel 738 LC
Stationary Blades (Vanes) Stage-3 & 4	**- Inconel 939**

4.3 The material must be sourced from a reputed supplier with proven references for supply of super-alloys used for manufacturing of gas turbine blades / vanes. Bidder should indicate the name of proposed supplier for the blade / vane material to be used for manufacturing of blades / vanes. The material specification that the bidder specifies to its supplier shall be included in the bid documents.

4.4 Chemical Composition :-

Bidder shall furnish the reference composition range in a format that is similar to the format given at **Annexure-V**. Chemical composition for both Bar Stock analysis and Cast Sample analysis for material of cast components shall be furnished. Similarly Chemical Composition for material of forged components shall also be furnished. Composition as per actual chemical analysis carried out during manufacturing should be necessarily within the range-furnished along with the bid.

Chemical analysis report shall contain details like cast no., mould no., alloy code, supplier specification no. etc. Supplier's specification for cast vanes / blades shall be included in the bid.

4.5 Metallography :-

- Bidder shall furnish micro-structural details like size and volume fraction of gamma prime particles.

4.6 Mechanical Properties :-

- Bidder shall include in his bid procedure and acceptance norms for following mechanical property tests for material of blades / vanes to be supplied :

(i) Short time creep test at 760 ^{0}C – Acceptable norms for Fracture time, Fracture Elongation and Fracture Contraction for a load of 500 N/mm^2 shall be furnished.
(ii) Heat Tensile strength test at 600 ^{0}C – Acceptance norms for 0.2% proof stress limit, tensile strength, elongation, and contraction.
(iii) Brinell Hardness test – Acceptance norms.
(iv) Impact Strength test – Acceptance norms.

- In addition to above other characterization parameters that are normally used for super-alloys like – 10^5 hours rupture strength of the material at 850 ^{0}C, Temperature capability in terms of rupture temperature for 10^5 hours at 140 Mpa stress, Low cycle Fatigue strength, High cycle fatigue strength etc. shall also be mentioned in the bid.

5. HEAT TREATMENT OF COMPONENTS :-

5.1 Cast/Forged components shall be subjected to required heat treatment processes for getting desired physical and mechanical properties as required for the service intended.

5.2 Bidder shall furnish the procedure details of all heat treatment activities (solution annealing, precipitation hardening, age hardening, etc.) to be performed on blades/ vanes.

6. HOT ISOSTATIC PRESSING (HIP) :-

6.1 OEM supplied cast/forged components are also normally submitted to Hipping prior to coating to ensure that the pores formed in the process of casting are effectively closed. Therefore, the components that require HIP treatment shall be subjected to this process in line with the practices generally adopted by manufacturers of blades/vanes for Gas turbines.

Bidder should indicate applicability of HIP process for the offered components. Following details for the supplied blades/ vanes shall be included in the acceptance test certificate that accompanies the blade delivery.

a) Heating up process and temperature level to which the component shall be heated up.

b) Holding time (hours) at above-mentioned temperature.

c) Inert Gas to be used – Gas purity to be indicated (total impurity in ppm should not be more than 50 ppm).

d) Furnace pressure (in Mpa) and duration of HIPPING.

e) Cooling rate (^{0}C per minute).

f) Type of furnace heating elements.

g) Details of crack test to be performed after the HIP treatment.

7. MACHINING:-

Cast/Forged Vanes/Blades shall be machined to get the same root profile as that for currently Installed components in Dadri machines. Suitable machining process shall be employed to Drill cooling holes. All machined blades / vanes shall be subjected to NDT inspection like Fluorescent liquid penetrate test. Further, cooling holes of vanes / blades shall be visually examined. Cooling holes of blades shall also be subjected to flow measurement tests.

8. COATING :-

8.1 The blades / vanes supplied by OEM for V94.2 Siemens Design Gas turbine are coated as follows :

~~**Moving & Stationary Blades Stage 1 & 2**~~	~~- **MCrAlY** (CoNiCrAlYSi) coating deposited by Vacuum Plasma Spray (VPS) method. Trade name of coating used for 1st/ 2nd Stage vanes/ blades supplied by OEM for V94.2 Siemens Design Gas turbine is SICOAT 2231.~~
Stationary/Moving Blades Stage-3	- Originally supplied without coating. However, subsequently Chromised Coating was applied for units fired with HSD. Trade name of coating supplied by OEM for V94.2 Siemens Design Gas turbine is SICOAT 1110.

~~**8.2** Coating offered by the bidder for Moving & Stationary Blades Stage 1 & 2 should be either **SICOAT 2231 or an equivalent MCrAlY** coating that exhibits equal or better corrosion/ oxidation resistance, longevity, and mechanical properties.~~

~~**8.3**~~ The coating material and application method must be compatible with the substrate material. ~~The method of coating application for Vanes/Blades Stage-1 & 2 shall be **Vacuum Plasma Spray (VPS)/ Low Pressure Plasma Spray (LPPS).**~~

8.4 Alternate coating application methods like **High Velocity Oxygen Fuel (HVOF)** can be considered only if it is established by the bidder that the quality of coating deposited by any of these methods is not inferior to OEM's standard **VPS/ LPPS** coating and have actually performed at least as well as OEM coating. Necessary independent literature/ studies that support supplier's contention shall be furnished along with the bid.

8.5 Bidder should indicate the applicability of coating on Moving and Stationary Blades of Stage-3 in order to protect the parent material from attack by HSD fuel fired at Dadri. Analysis of HSD being fired at Dadri is furnished at **Annexure-II**. The coating material, if applicable shall have the composition suitable to combat hot corrosion problem faced by Vanes/Blades Stage-3 during HSD firing.

Application method shall be compatible for the substrate as well as coating material. Design life of the Stage#3 Blades & Vanes in either case (coated or uncoated) shall not be less than 1,00,000 EOH. Bidder shall furnish the details of coating material and process in the bid in case it is applicable. Moving & stationary Blades Stage-4 are to be uncoated type.

~~8.5~~8.6 As Gas turbines of Dadri operate in cyclic duty operation and require frequent starts/ stops, coating material, deposition techniques, and thickness shall be selected such as to ensure that Thermo mechanical fatigue (TMF) life of coating is not less than 33,000 EOH i.e. one Hot Gas Path Inspection (HGPI) Interval.

~~8.6~~8.7 Ductile to brittle transition temperature (DBTT) for the offered coating system shall be as low as possible to avoid cracking in the coating during service. The bidder shall indicate the DBTT for the offered coating system.

~~8.7~~8.8 The coated part shall be subjected to required heat treatment cycles to impart greater ductility to coating matrix.

~~8.8~~8.9 **Internal cooling hole** surfaces of the cast Blades/Vanes shall be coated with aluminide coating using preferably chemical vapor deposition (CVD) techniques as applicable. Bidder shall indicate whether it shall be possible to recoat the internal cooling surfaces during refurbishment of used blades. If the same is not possible, bidder shall guarantee that the internal coating shall last complete life cycle of the component.

~~8.9~~8.10 The Supplier shall furnish the following information along with the components during delivery. This shall necessarily consist of but not limited to following:

a. Chemical analysis of spray powder

b. Nominal particle size distribution of coating powder (wt. %).

c. Detailed Procedure of Coating application

- Pretreatment (Solution and Precipitation heat treatment)
- Coating matrix deposition on substrate
- Post treatment of coated part (removal of spray material from the transition between airfoil and root, grinding etc.).
- Final heat treatment operations to attain the desired coating and base material structures.

d. Detailed procedure for applying coating on internal cooling hole surfaces of vanes and blades.

e. Coating material and method of application of coating on internal surfaces of blades/ vanes. Internal cooling holes shall be provided with oxidant resistant coating applied through chemical vapor deposition (CVD) or an equivalent suitable process.

f. Acceptance Tests

Bidder shall furnish detailed procedure for following:

- Definition of acceptance lot
- Visual inspection and defect acceptability criterion
- Fluorescent Liquid penetrant inspection and defect acceptability criterion for surface cracks.
- Coating thickness by metallographic test and defect acceptability criterion.
- Surface roughness inspection and acceptance criterion-detailed method and equipment details to determine surface roughness (on suction and pressure side of airfoil) shall be furnished in the bid.

- Surface roughness shall be examined at minimum five locations on both sides of airfoil. The locations at which surface thickness shall be measured shall be indicated for each type of vane/ blade.
- Measure of oxide/ nitride inclusions in coating and acceptance norm for the same.
- Test for establishing adequate bonding between the coating matrix and substrate.
- Brinell hardness of the coated part

8.11 The Bidder shall furnish the operating experience with the proposed coating system in the bid. In case the part/ coating system developed by Bidder has not completed one HGPI cycle, Bidder shall furnish the technical details to establish that expected life of offered coating system (Same Substrate, coating material and application method) shall not be less than one HGPI interval. Details of accelerated laboratory tests (Burner rig test etc.), if carried out may be furnished with bid.

9. INSPECTION REPORT FORMATS FOR BLADES/VANES :-

9.1 Supplier shall furnish inspection Report and Certificate from manufacturer /supplier of Blade/ Vanes for each stage of manufacturing viz. Casting, heat treatment, HIPPing, machining, and Coating. These reports shall be furnished during the supply of blades/ vanes.

9.2 The inspection report/ certificate from supplier of blades/ vanes shall generally include following:

a. Material Certificate for chemical composition (**Annexure-V**)
b. Grain Size Inspection report
c. Heat Treatment reports
d. HIP Treatment reports.
e. Hardness Inspection report
f. Penetrant Inspection report
g. Visual Inspection report
h. X – ray Inspection report
i. Dimensional Inspection report (after machining)
j. LPI test for root area (after machining) – for 100 % of vanes/ blades

~~j.~~k. Eddy current test for root flanks of components – for 100 % of vanes/ blades.

~~k.~~l. Check of shot peening of root flanks – for 100 % of vanes/ blades

~~l.~~m. Report for check of cooling holes/ slots for blockage (Airflow check, wire insertion test etc.).

~~m.~~n. Final check for cleanliness and ID marking.

Other inspection and testing requirements shall be as per **Annexure-VI**.

9.3 Bidder shall include the detailed **Manufacturing Quality Plan** as per reference NTPC Quality Plan in the bid. .

9.4 Bidder shall arrange for **Third party Inspection** as per approved Manufacturing QP at its own cost. Bidders shall furnish the name of the Third party Inspection agency in its bid**.**

9.5 Full set of approved **QA documentation** comprising of various documents specified in the Tech specification shall be submitted and Material Despatch Clearance Certificate (**MDCC**) from NTPC will be obtained by supplier prior to despatch of material.

10. SUPPLY AND ASSEMBLY:-

10.1 Moment weighed and computer balanced blades (complete set) shall be supplied to NTPC Ltd. Along with computerized Blading chart including Blade Moment. Each component shall be marked distinctly.

10.2 **Sequence Chart** shall be supplied for Vanes.

10.3 The vanes/ blades to be supplied by bidder shall be replacement part for blades/ vanes for Dadri machines. Therefore, **bidder shall certify the same in bid** and also in the '**Interchangeability and Fitment Certificate'** to be sent along with supply QA Documents.

10.4 The offered assembly material for Blades/ Vanes should be compatible with offered Blades/Vanes for Dadri machines. **Bidder shall certify the same in bid.**

10.5 Request/ proposal for modification of gas turbine parts to facilitate assembly of Blades/ Vanes supplied by bidder shall not be entertained. Assembly of bidder supplied material shall not alter the machine in any way; that creates problem for use of Blades/ Vanes supplied by OEM/ other Non OEM supplier in future.

10.6 NTPC Ltd. may divert the **Blades/ Vanes** to its other Stations (if required) provided the fitment is found possible.

11.0 GUARANTEE:-

11.1 The Guarantee period for Blades/Vanes including coating (if provided) shall be minimum **16000 EOH operations OR 02 years from date of installation, whichever is earlier**.

11.2 Guaranteed **Shelf life** shall be up to the date of installation OR Max. 02 years from the date of delivery at NTPC's site, whichever is earlier.

11.3 **Total** duration of Guarantee period shall be limited to maximum 04 years from the date of delivery at NTPC site in case the first HGPI is delayed due to any operational constraints of NTPC Ltd.

11.4 All other provisions of General Purchase Conditions (GPC) shall apply in respect of Guarantee except for Guarantee period, which shall be applicable as specified above.

11.5 The above Guarantee shall be secured by performance Bank Guarantee (**PBG**) valid up to a period of three months after expiry of aforesaid mentioned Guarantee period to cover guarantee period and processing time for release of PBG.PBG will be @3% of PO Value.

11.6 Guarantee shall also continue to remain applicable even if NTPC diverts and utilizes the Blades/Vanes at any other Stations of NTPC as mentioned at Clause 10.6.

12.0 Bidder shall clearly mention/certify following details in its bid:-

a) **Duly signed and stamped copy of Tech Spec, Ref QP.**
b) **Duly filled up, signed and stamped Data Sheet**, **Certificate of Compliance and (Nil Deviation), Statement of Deviation (If Any)**
c) Suitability of Offered components for firing specified gaseous and liquid fuels.
d) No need to lower TIT due to limitations from material and/ or coating of Blades/ Vanes.

e) Design life of the offered components in terms of EOH.
f) Weld reparability of the Blades/ Vanes supplied along with Type and extent of damage that can be weld repaired.
g) Acceptance/rejection criterion for used Blades/Vanes that require refurbishment.
h) Details of proposed material for the Blades/ Vanes as per **Cl. 4.2/4.3.**
i) Name of proposed supplier for raw material for Blades/ Vanes as per **Cl. 4.3.**
j) Applicability of HIP process for the offered Blades/ Vanes as per **Cl. 6.1.**
k) Type of coating & Method of application as per **Cl. 8.1~8.4.**
l) Applicability of coating on Stage#3 Blades & Vanes. Design life of offered coating and Refurbishment/ Recoating interval for offered Blades/Vanes Stage-3 & 4 as per **Cl. 8.5.**
m) Ductile to brittle transition temperature (DBTT) for the offered coating system as per **Cl. 8.7.**
~~n) Design life of offered coating and Refurbishment/ Recoating interval for offered Blades/Vanes Stage-1 & 2 in terms of EOH, which should not be less than that of OEM supplied components (Refer **Annexure-IV**).~~
o) Coating of internal cooling hole surfaces of cast vanes/ blades with Aluminide coating using CVD techniques as per **Cl. 8.9.**
p) Possibility of recoating of internal cooling holes during refurbishment of used blades as per **Cl. 8.9.**
q) Maximum number of refurbishment that can be allowed on a particular part.
r) Compatibility of the offered assembly materials for Blades/ Vanes for Dadri machines.
s) Confirmation reg. furnishing of inspection report/certificate as per **Cl. 9.1 & 9.2.**
t) Third party inspection at bidders cost as per **Cl. 9.4.**
u) Name & details of **Third Party** inspection agency as per **Cl. 9.4.**
~~v) Furnishing of Computerized Blading chart including Blade Moment as per **Cl. 10.1.**~~
w) Sequence Chart for Vanes as per **Cl. 10.2**
x) Certification of Interchangeability and Furnishing of "**Interchangeability & Fitment Certificate**" as per **Cl. 10.3.**
y) **Guarantee period** as per **Cl. 11.1, 11.2, 11.3 & 11.4.**
z) Furnishing of PBG as per **Clause 11.5**.

Note:- The above documentations **except** at **a, b, s, t, u, v, w, x, y & z above** shall not be applicable for the OEM of V94.2 Gas Turbines i.e. M/s Siemens AG, Germany & its licensees M/s Ansaldo Energia, Italy & M/s BHEL, India.

13.0 DOCUMENTS TO BE FURNISHED WITH THE BID:-

a) Documentary proof in case the design life, refurbishment interval, and number of allowable refurbishment is better than for OEM supplied components, bidder shall furnish the proof of the same.

b) Brief procedure for repair/refurbishment of Blades & Vanes, if applicable. The procedure shall contain the description of rejuvenation heat treatments and heat treatments that need to be carried out before and after weld repair to achieve the tasks of improved weld ability, stress relieving of weld repaired area and to restore alloy microstructure, coating etc.

c) Dimensional assembly drawing showing all the sub components as per **Cl. 3** (Mandatory for Non OEM).

d) The material specification that the bidder specifies to its supplier as per **Cl. 4.3.**

e) Reference composition range in a format that is similar to the format given at **Annexure-V as per Cl. 4.4**.

f) Microstructural details like size and volume fraction of gamma prime particles as per **Cl. 4.5.**

g) Procedure and acceptance norms for mechanical property tests for material of blades / vanes to be supplied as per **Cl. 4.6.**

h) Procedure details of all heat treatment activities (solution annealing, precipitation hardening, age hardening, etc.) to be performed on Blades / Vanes as per **Cl. 5.2.**

i) Documents in support of coating method other than VPS as per **Cl. 8.4.**

j) Operating experience with the proposed coating system as per **Cl. 8.11.**

k) Manufacturing Quality Plan as per NTPC's reference QP (**Annexure-VII**) as per **Cl. 9.3**.

Note:- The above documentations except at **'k' above** shall not be applicable for the OEM of V94.2 Gas Turbines i.e. M/s Siemens AG, Germany & its licensees M/s Ansaldo Energia, Italy & M/s BHEL, India.

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Annexure – I

Natural Gas Analysis for Dadri CCPP

I.	COMPOSITION	Unit	Specified Values	TYPICAL Values
a.	Methane (C1)	% by Volume	> 75%	90.20
b.	Ethane (C2)	% by Volume	<20%	4.36
c.	Propane (C3)	% by Volume		1.00
d.	Butane (C4)	% by Volume		0.03
e.	Higher hydrocarbons (C5+C6+C7)	% by Volume		-
f.	Non combustible gases including Nitrogen & Carbon-dioxide	% by Volume	<8%	4.4
g.	Total sulfur Content as H_2S	PPM by Volume	<10	-
II.	**Calorific Value (NCV)**	kcal/scm	7700 min.	8180
III.	**Natural Gas Filtration Efficiency**	-	98% at 5 micron	

Annexure-II

Analysis of High Speed Diesel Oil (HSD) for Dadri CCPP

DESCRIPTION	Unit	Range/Limit IS:1460-2000	TYPICAL Values
Kin. Viscosity at 40 °C -min./max.	cSt	2.0-5.0	2.8
Density at 15º C (max.)	Kg/m^3	820-860	831
Pour point max.	º C	3 º C for Winter 6 ºC for Summer	-6
Flash Point, min. (Abel)	º C	35	52
Carbon residue, max.	%	0.3	0.18
Ash, max.	%, (Wt.)	0.01	0.008
Water, max.	%, vv	0.05	< 0.05
Sediment, max.	%(wt.)	0.05	< 0.01
Sulfur, max.	%(wt.)	0.25	0.06
GCV, max. /min. (At 15 º C)	Kcal/kg	10,990-10,850	10900(Apx.)
Acidity, Inorganic max.	mg KOH/g	Nil	Nil
Acidity, Total, Max.	mg KOH/g	0.2	0.03
Copper Strip Corrosion @100^0C for 3 Hours, Max.,	---	ASTM1	<ASTM1
Distillation - A) 85% Vol Recovery @^{0}C, Max. B) 95% Vol. Recovery @^{0}C, Max.	^{0}C	350 370	345 357
Vanadium	ppm (wt.)	-	0.3
Sodium	ppm (wt.)		0.4
Potassium	ppm(wt.)		0.3
Lead	ppm(wt.)		<0.1
Zinc	ppm (wt.)		< 0.1
Calcium	ppm (wt.)		2.5

Annexure-III

CALCULATION OF EQUIVALENT OPERATING HOURS (EOH) FOR v94.2 SIEMENS DESIGN GAS TURBINE

$$t_{equ} = a_1 n_1 + a_2 n_2 + \sum_{t=1}^{n} t_i + f * w * (b_1 t_1 + b_2 t_2)$$

t_{equ} = equivalent operating hours (EOH)

n_1 = number of starts

a_1 = 10 (Start factor)

n_2 = number of trips

a_2 = 10 (rapid loading factor)

t_i = equivalent hours due to rapid temperature changes

n = number of rapid temperature changes

t_1 = Operating hours at up to base load

b_1 = 1 (base load factor)

t_2 = Operating hours from base load to peak load

b_2 = 4 (peak load factor)

f = fuel weighting factor

f = 1.0 for fuel gas and distillate fuels provided Siemens Specification is complied with

f = 1.5 for distillate fuel which slightly exceeds limits Stipulated for the pollutants Na + K Or V per Siemens Specification

f = 1.5 to 4 for heavy fuels used in VX4.2 machines (dependent on fuel analysis and turbine inlet temperature)

w = weighting factor for injection of water/steam

$$W = 1 + 0.45 \frac{mw}{mf}$$

mw = injected water/steam mass flow

mf = fuel mass flow

Annexure-IV

DESIGN LIFE OF COMPONENTS SUPPLIED BY OEM FOR CURRENT V94.2 SIEMENS DESIGN GAS TURBINE

S. No.	COMPONENT DESCRIPTION	DESIGN LIFE OF COMPONENT (EOH)	DESIGN LIFE OF COATING (EOH)	REFURBISHMENT/ RE-COATING INTERVAL (EOH)	Min. No. of Refurbishment / Re-coating (No/ EOH)
1	**Moving Blade Stage1 & 2 (Cooled)**	66000	33000	33000	**01**
2	**Stationary Blade (Vane) Stage 1 & 2 (Cooled)**	100000	33000	33000	**02**
3	**Moving Blade Stage 3 (Cooled/Un-cooled)**	100000	33000*	33000*	02*
4	**Stationary Blade Stage 3 (Cooled/Un-cooled)**	100000	33000*	33000*	02*
5	**Moving Blade Stage 4 (Un-cooled)**	100000	Uncoated	-	100000
6	**Stationary Blade Stage 4 (Un-cooled)**	100000	Uncoated	-	100000

* In case coating is required to protect blades from hot corrosion in the units being run with HSD firing.

HGPI INTERVAL

Hot Gas Path Inspection (HGPI) interval specified by OEM for current V94.2 Siemens Design Gas turbine is 33000 EOH.

Annexure-V

Chemical Analysis Report

Element	Unit	Reference Range		By Stock Analysis	Cast Sample Analysis
		Minimum	Maximum		
C	**%**				
Si	**%**				
Mn	**%**				
P	**%**				
S	**%**				
Ag	**%**				
Al	**%**				
B	**%**				
Bi	**%**				
Co	**%**				
Cr	**%**				
Cu	**%**				
Fe	**%**				
Hf	**%**				
Mg	**%**				
Mo	**%**				
N	**ppm**				
Nb	**%**				
Ni	**%**				
O	**ppm**				
Pb	**%**				
Pt	**%**				
Se	**%**				
Sn	**%**				
Ta	**%**				
Ti	**ppm**				
TI	**ppm**				
V	**%**				
W	**%**				
Y	**%**				
Zn	**ppm**				
Zr	**%**				
(A1 + Ti)	%				

ANNEXURE-VI

GENERAL GUIDE LINES FOR SUBMISSION OF MANUFACTURING QUALITY PLAN

1. It is expected that bidder has developed detailed specifications, drawings, manufacturing process and Quality Plan for above blades & vanes based on validated internal procedures, product standards. The testing procedures are expected to be in line with or better than appropriate international codes and standard.

2. **Reference Quality plan for the Blades/ Vanes form the part of the Specification. In the event of different QP being followed by the bidder, it shall submit its own Quality Plan to NTPC along with the bid for review. Any deviation w.r.t. reference QP should must be clearly brought out in the Deviation statement failing which Reference Quality plan shall be considered accepted by the bidder. In case of deviations the Quality Plan will be finalized after discussions with the bidder**. All tests mentioned in technical specification shall be included in the Quality Plan.

3. The chemical analysis should be per heat. The mechanical properties like impact, tensile, proof stress, elongation, contraction etc. at appropriate and elevated temperature should be done before and after heat treatment per heat / heat treatment batch.

4. Microstructure, grain size & porosity should be done before and after heat treatment.

5. 100% Radiography examination, ultrasonic examination, MPI / DPT after final machining of blades / vanes.

6. Casting and forging supplier / manufacturer should have established practices to ensure requirements of creep and rupture, in order to establish the adequacy of material to meet the duty requirements for long exposure to high temperature. The established data will be furnished to NTPC.

Contd…

7. Short time creep rupture test shall be carried out per melt and heat treatment batch.

8. The bidder shall furnish the detailed proposal regarding type of coating and inspection carried out during process of surface treatment / coating including surface preparation, surface finish, thickness of coating etc.

9. Blades / vanes with provision of air cooling shall be examined by suitable and established test methods i.e. air flow check, Eddy current, wire insertion etc. to ensure unobstructed, through passage and designed wall thickness.

10. Final check for balancing dimensions, surface roughness, identification marking, accuracy of slots and holes will be defined.

11. If Blades / vanes are subjected to heat treatment after surface coating / treatment, then the representative samples will be subjected to full range of mechanical tests. The representative sample (s) will be subjected to the same full heat treatment along with respective batches of blades / vanes.

12. Completion of all tests and compilation of documentation including verification of test certificate, review of reference documents acceptance norms etc. will be defined.

13. **Inspection by third party is envisaged**. The inspection shall be carried strictly as per Quality plan duly approved and stamped by NTPC. The supplier will make the payment to the third party. Bidder has to consider the cost of third party inspection in his offer. The third party will be approved in consultation with NTPC.

14. The Bidders shall prepare and furnish inspection Schedule for Hold points as identified in Quality Plan.

15. Besides, Third party, NTPC may also depute its Engineer for carrying out inspection.

16. Inspection call with confirmed dates shall be given by Bidder to NTPC minimum 30 days before the Scheduled Inspection date.

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BOQ AS MENTIONED IN PURCHASE REQUISITION

1. M5276066596 - V94.2:ST-3 TURB STATOR BLADE, H11H70D47

SIEMENS-V94.2 (PRE-RATIO) STAGE-3 TURBINE STATOR BLADE

MATERIAL - INCONEL 939/ G-NICR16CO8TIALWMO
PB NO. - PB0000007745/ PB0000278739
A2A NO. - A2A50011624
TIN - H11H70D47
DG - 12643/001

DATA SHEET CUM CHECK LIST FOR SUPPLY OF BLADES FOR SIEMENS V94.2 GTs AT DGPS

DATA SHEET CUM CHECK LIST FOR SUPPLY OF BLADES/ VANES FOR SIEMENS V94.2 GTs AT DGPS			
Tech. Spec. Clause ref.	**Subject**	**Specified requirement**	**REMARKS**
12.0	**GENERAL**		
a	Return of NTPC Spec.	To be returned duly signed & Stamped. **Mandatory.**	YES/ NO
a	Return of NTPC Reference QP	To be returned duly signed & Stamped. **Mandatory.**	YES/ NO
b	Return of NTPC Data Sheet	To be returned duly signed & Stamped. **Mandatory.**	YES/ NO
b	Certificate of Conformance/compliance (nil deviation)	To be returned duly signed & Stamped. **Mandatory.**	YES/ NO
b	Statement of Deviation	To be furnished listing out all deviations sought & cost of withdrawal of such deviations.	YES/ NO
12.00	**CERTIFICATION REQUIRED AS PER CLAUSE 12.00**		
c	Suitability of Offered components for firing specified Gaseous and Liquid fuels.		YES/ NO
d	No need to lower TIT due to limitations from material and/ or coating of Blades/		YES/ NO
j	HIP process for the offered Blades/ Vanes. If applicable (Cl.6.1)		YES/ NO
o	Coating of internal cooling hole surfaces of cast Blades/ Vanes with Aluminide coating using CVD techniques. (Cl.8.9)	To be Confirmed.	YES/ NO
s	Confirmation reg. furnishing of inspection report/ certificate. (Cl. 9.1/9.2).	To be Confirmed.	YES/ NO
t	Third party inspection at bidders cost. (Cl. 9.4)	To be Confirmed.	YES/ NO
v	Furnishing of Computerized Blading Chart including Blade moment for Set of Blades (Cl.10.1).	To be Confirmed.	NOT APPLICABLE
w	Furnishing of Sequence Chart for Set of Vanes (Cl.10.2).	To be Confirmed.	YES/ NO
x	Interchangeability as per Clause 10.3.	To be Confirmed.	YES/ NO
x	Furnishing of "Interchangeability & Fitment Certificate" as per Clause 10.3.	To be Confirmed.	YES/ NO
z	Furnishing of PBG as per Clause 11.5		YES/ NO
na	Delivery Period	As per Tender Conditions	
12.00	**DETAILS TO BE FURNISHED AS PER CLAUSE 12.00**		
e	Design life of the offered components in terms of EOH.	Vanes# 3 - 100,000 EOH	To be furnished
f	Type and extent of damages on Blades/ Vanes that can be weld repaired.	To be furnished.	
g	Acceptance/rejection criterion for used Blades/ Vanes that require refurbishment.	To be furnished.	
h	Details of proposed material for the Blades/ Vanes. (Cl.4.2).	Vanes# 3- INC 939	To be furnished
i	Name of proposed supplier for raw material for Blades/ Vanes. (Cl. 4.3)	To be furnished.	

DATA SHEET CUM CHECK LIST FOR SUPPLY OF BLADES FOR SIEMENS V94.2 GTs AT DGPS

Tech. Spec. Clause ref.	Subject	Specified requirement	REMARKS
k	Type of coating & Method of application. (Cl. 8.1~8.4).	SICOAT 1110 or equiv. MCrAlY by VPS /LPPS. HVOF can be considered *(**refer clause 8.4 for details**)	To be furnished
l	Applicability of coating on stage#3 Vanes (Cl. 8.5).	YES/NO	To be furnished
	Design life of offered coating and Refurbishment/ Recoating interval for offered Vane Row#3 (Cl. 8.5).	EOH	To be furnished
m	Ductile to brittle transition temperature (DBTT) for the offered coating system. (Cl.8.7)	To be furnished.	
n	Design life of offered coating and Refurbishment/ Recoating interval for offered	To be mentioned. (Vanes# 3 - 1,00,000 EOH)	
p	Possibility of recoating of internal cooling holes during refurbishment of used blades as per Cl. 8.9	YES/NO	
q	Maximum number of refurbishment that can be allowed on a particular part.	Not less than that of OEM components	
r	Compatibility of the offered assembly materials for Blades/ Vanes for Dadri machines	YES/NO	
u	Name & details of **Third Party inspection agency**. (Cl. 9.4**)**.		
y	**GUARANTEE : (Cl. 11.00)**		
y. (i)	Operating life	Min 16000 EOH Operation OR 2 years from date of installation, whichever is earlier.	
y. (ii)	Shelf life	Upto the date of installation OR Max. 02 years, whichever is earlier.	
y.(iii)	Total Guarantee	Max 4 years from date of delivery at site.	
y.(iv)	11.6 Guarantee shall also continue to remain applicable even if NTPC diverts and utilizes the Blades/Vanes at any other Stations of NTPC as mentioned at Clause 10.6.	YES/ NO	
13.00	**DOCUMENTS TO BE FURNISHED AS PER CLAUSE 13.00**		
a	Documentary proof in case the design life, refurbishment interval, and number of allowable refurbishment is better than for OEM supplied components.		YES/ NO
b	Brief procedure for repair/refurbishment of Blades/ Vanes, if applicable. The procedure shall contain the description of rejuvenation heat treatments and heat treatments that need to be carried out before and after weld repair to achieve the tasks of improved weld ability, stress relieving of weld repaired area and to restore alloy microstructure, coating etc.		YES/ NO
c	Dimensional assembly drawing showing all the sub components as per Clause 3		YES/ NO
d	The material specification that the bidder specifies to its supplier. (Cl. 4.3)		YES/ NO

DATA SHEET CUM CHECK LIST FOR SUPPLY OF BLADES FOR SIEMENS V94.2 GTs AT DGPS

Tech. Spec. Clause ref.	Subject	Specified requirement	REMARKS
e	Reference composition range in a format that is similar to the format given at Annexure-V. (Cl. 4.4)		YES/ NO
f	Microstructural details like size and volume fraction of gamma prime particles. (Cl. 4.5)		YES/ NO
g	Procedure and acceptance norms for following mechanical property tests for material of Blades/ Vanes to be supplied. (Cl.4.6)		YES/ NO
h	Procedure details of all heat treatment activities (solution annealing, precipitation hardening, age hardening, etc.) to be performed on Blades/ Vanes. (Cl.5.2)		YES/ NO
i	Documents in support of coating method other than VPS/ LPPS. (Cl. 8.4).		YES/ NO
j	Operating experience with the proposed coating system. (Cl.8.11)		YES/ NO
k	Manufacturing Quality Plan as per NTPC's reference QP (Annexure-VII) (**Cl.9.3**)		YES/ NO

MANUFACTURING QUALITY PLAN

ITEM:- TURBINE GUIDE BLADES STAGE 3-4

	MANUFACTURER'S NAME AND ADDRESS: SIEMENS	ITEM / EQUIPMENT: TURBINE GUIDE BLADES STAGE 3-4							TO BE FILLED UP BY N.T.P.C.				
									Rev. 00				
		SUB-SYSTEM: Gas Plant							REVIEWED BY:				WITNESSED BY:

Sl. #	Components and Operations.	Characteristics	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of records		AGENCY			Remarks
					M					M	C	N	
1	2	3	4	5	6	7	8	9	*	** 10			11
1	Material (castings)												
1.1	At Supplier's end												
1.1.1		Verification of dimensions & visual Inspection	Major	Measurement	100%	Manufactur Document	Drg.	Internal record		P	--	--	
1.1.2		Chemical composition	Major	Ladle analysis	One of master melt and remelt	Manufactur Document	-DO-	MTC		P	--	--	
1.1.3		Heat treatment check of data	Major	Time / Temp. control	100%	Manufactur Document	-DO-	MTC		P	--	--	
1.1.4		Mech. Properties 1) Short time creep Test at 870C A) Load 310N/mm² B) Fracture elongation C) Fracture Contraction	Major	Mech. Test	Sample test per master melt & HT charge	-DO-	-DO-	MTC		P	--	--	
1.1.5		Surface quality	Major	Visual & NDT LPI	100%	Manufactur Document	Manufactur Standard	MTC		P	--	--	
1.1.6		Soundness of material	Major	NDT RT	100%	-DO-	DIN54111 P2 Class B	MTC		P	--	--	
2	Receiving inspection												
2.1		A) Verification of test certificate B) Satisfactory completion all tests & compliation of doccumentation C) Identification marking	Major	TC review & visual inspection	100%	Acc. Specificabove.	-DO-	Receiving Record		-- P		V	
3	Inprocess inspection												
3.1		LPI after final m/cing	Major	NDT	10%	Manufactur Document	-DO-	Route chart		P		W	

MANUFACTURING QUALITY PLAN

ITEM:- TURBINE GUIDE BLADES STAGE 3-4

	MANUFACTURER'S NAME AND ADDRESS: SIEMENS		ITEM / EQUIPMENT: TURBINE GUIDE BLADES STAGE 3-4										
			SUB-SYSTEM: Gas Plant		Page 1 of:2			Valid upto:		REVIEWED BY:			WITNESSED BY:
Sl. #	Components and Operations.	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Format of records		AGENCY			Remarks
					M						M	C	N	
1	2	3	4	5	6		7	8	9	*	** 10			11
		Check of dimension	Major	Measurement	Random		Drg.	Drg.	-DO-		--	P	-- W	
		Check of cleanliness and ID marking	Major	Visual	100%		--	--	--		--	P	-- W	

LEGEND : * RECORDS IDENTIFIED WITH " TICK " (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION * * M: MANUFACTURE , N:- NTPC P:- PERFORM , W:- WITNESS AND V:- VERIFICATION, AS APPROPRIATE, CHP:- NTPC SHALL IDENTIFIED IN COLUMN "N" AS 'W'.

NOTE 1. Reference and acceptance norms shall be derived from following in the same sequence: a) NTPC Approved drawing / data sheet, b) NTPC tech specs, c) Purchase Order , d) Relevant national standard e) Relevant International standard, f) Manufacturer's standard, g) Good Engineering practices.

NOTE2- Witness by NTPC only in case of indigenous value addition, otherwise TC/IR/COC shall be reviewed.