

Technical Specification for HVOF Coating Powder WC10Co4Cr

Technical Specification No: FBM/WD&T/TS06 Rev 06

S. No	Description	Requirement		Vendor	Offered	Deviation (if any)	Remarks
1	Purpose	WC10Co4Cr HVOF Coating powder to be used with Sulzer Metco system with Woka Star 600/610 (Liquid Fuel Gun) and DJ-2600 (Hydrogen fuel Gun) for coating on Hydro Turbine components					
2	General:						
2.1	Make and Brand	Vendor Must quote the following brands only		Vendor to confirm and specify			
	Sr. No	Make	Brand				
	i	Praxair Surface Technologies USA	WC 760				
	ii		Nano Tuff 5000				
	iii		1350VM				
	iv	Oerlikon Metco Germany- formerly Sulzer Metco	Sume 9013				
	v		SXH70				
	vi		WOKA 3652 FC				
	vii		WOKA 3652				
	viii	Fujimi Incorporated Japan	DTS-IHI-45/15				
	ix	HC starck Germany	Amperit 558.074				
	x		Amperit 558.186				

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2.2	Country of Origin	Vendor to Specify country of origin	Original Powder Manufacturer to specify			
3	Properties					
3.1	Chemical Composition Nominal Range in percentage by weight	WC-10Co-4Cr Cobalt: 8.5 % - 11.5 % Chromium: 3 % - 5% Carbon: 4.8% - 6% Total All Others: 0.5 % (max) Tungsten: Balance	Vendor to confirm & provide details from (Detailed Technical catalogue/data sheet from with mention of properties to be submitted with offer.)			
3.2	Manufacturing	Agglomerated and Sintered				
3.3	Shape	Spheroidal				
3.4	Particle size:	- 45 to + 15 microns				
3.5	WC Particle Size	≤ 0.8 microns				
3.6	Apparent Density	> 4.5 g/cc				
3.7	Flowability	Free flow type	Original Powder Manufacturer to confirm			
3.8	Physical Properties of powder	Vendor may provide parameters for Wokastar 600 Gun of M/s Oerlikon Metco Make system (formerly known as Sulzer Metco) to achieve below properties.				
3.8.1	Hardness (0.3 Kg Load)	1250-1500 Hv 0.3	Vendor to confirm and provide details. (Data sheet from with mention of properties to be submitted with offer.)			
3.8.2	Porosity	< 1%				
3.8.3	Bond Strength:	10000 Psi or more (ASTM C 633)				
3.8.4	Roughness:	< 6 Ra				
3.8.5	Deposition Efficiency	> 45%				

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3.8.6	Service temperature	Vendor to Specify	Original Powder Manufacturer to Specify			
3.8.7	Wear Rate	Vendor to Specify	Original Powder Manufacturer to provide data on wear rate			
3.9	The above powder should be compatible with liquid fuel based and Gas fuel based HVOF system		Original Powder Manufacturer to confirm			
4.1	Essential Conditions for technical evaluation of bids	Free Sample (approximately 10 Kg) of quoted Make and Brand to be submitted as per time period mentioned in PQR. However,samples of : I) Oerlikon Metco, Germany make- Brand: 3652 FC, II) HC Starck, Germany make- Brand: Amperit 558.186 III) Praxair, USA Make-Brand: 1350VM have already been tested at BHEL Bhopal and need not to be submitted. Interested Vendors to send free samples on DDP, BHEL Bhopal basis INCOTERM 2020	Vendor to confirm			
4.2	Sample testing at BHEL for technical evaluation of bids	Submitted free samples (As per S No 4 of this spec) shall be tested as per S.No 4.3.1 to S.No 4.3.4 of this specification	Vendor to agree			

S. No	Description	Requirement	Vendor	Offered	Deviation (if any)	Remarks
4.3.1	Coating Properties of powder	Properties (As per S. No 4.3.2 to 4.3.4 of this specification) to be achieved at 500 micron-coating thickness. (Vendor may suggest the recommended parameters for BHEL equipment, however, BHEL will coat the powders at parameters suitable to the BHEL equipment and it will be at sole descretion of BHEL to disclose the parameters or not. BHEL Equipment details is mentioned at S.No 1).	Original Powder Manufacture to confirm			
4.3.2	Physical properties of powder	As per 3.8.1 to 3.8.5	Vendor to confirm			
4.3.3	Wear Rate:	< 4 mm ³ (ASTM G 65 B)	Vendor to confirm			
4.3.4	Silt Erosion	All the coated samples will be tested for silt erosion test as per BHEL standard test method for comparision.	Vendor to agree			
4.4	Testing of Samples:	BHEL will coat the samples and testing will be done at BHEL Lab. The test results of BHEL will be final.	Vendor to agree			
5	Authorisation Corrospondence & Documentation					
5.1	In case, an authorized vendor quotes for the tender, then it has to provide authorized dealer certificate valid for 1 year(from date of enquiry) , and the original powder manufacturer to take guarantee of the product quoted, otherwise the offer will be rejected.		Vendor to confirm & provide details			
5.2	All Technical correspondence shall be done with their principal supplier (original powder manufacturer). Contact details of Original powder manufacturer to be provided with the offer.		Original Powder Manufacturer to confirm			

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