

## ANNEXURE - I

### **1. Specifications for Calcia stabilized Zirconium Oxide:**

<b>S.No</b>	<b>Property</b>	<b>Testing /Inspection Methodology</b>	<b>Nominal Specification for Acceptance</b>
1	Chemical composition analysis	XRF	ZrO <sub>2</sub> - 91.5% min. CaO - 4.5-5.5% Other oxides - Balance # No volatile content shall be present
2	Apparent Density	As per ASTM B212 (Hall cup)	2.3±0.25 g/cm <sup>3</sup>
3	Sieve analysis	As per ASTM B214	Nominal range : -53+11 μm
4	Crystal structure	XRD	99.5-100% by Weight Cubic or tetragonal Zr
5	Manufacturing method	-	Fused and crushed or latest
6	Morphology	SEM	Angular / blocky/better
7	Service temperature	-	Minimum 900°C
8	Coating process	-	Suitable for flame spray coating and atmospheric plasma spray coating processes
9	Application	-	Thermal barrier coating on metallic substrate

### **2. Coating qualification:**

The zirconium oxide coating shall be qualified through the plasma spray coating generated from the powders with IPRC process parameters at IPRC facilities. Coating specimens will be prepared with the powders at IPRC facilities and the following qualification tests will be carried out by IPRC for acceptance of the powder (Testing methodology mentioned in annexure-1)

<b>S.No</b>	<b>Test</b>	<b>Specification</b>	<b>Number of specimens</b>
1	3 point bend test	>100 kgf	5
2	% elongation measurement	0.9-3%	5
3	Coating Density measurement	4.5-5.5 g/cm <sup>3</sup>	5
4	Bond strength testing	>720 psi	5
5	Thermal exposure test	No coating disintegration after the test	3
6	Maximum thermal exposure test (Margin demonstration)	No coating disintegration after the test	3
7	3 point bend test after thermal	>94kgf	3

	exposure test		
8	Micro structure analysis	Shall be comparable with standard coating micrographs from IPRC	3
9	Porosity measurement	5-10%	3
10	Coating thermal conductivity measurement	0.9-1.4 W/mK	3

### **3. Pre Qualification Criteria for Vendors:**

1. Party shall be a manufacturer of thermal spray powders.
2. Party shall have the necessary manufacturing facilities to produce thermal spray powders as per mentioned manufacturing method and to meet the quantity requirements
3. Dealers, agents, stockists and traders are not eligible for the participating in tender.
4. Party shall bring out the detailed company profile including their personnel, equipment and manufacturing facilities
5. Party shall submit the details regarding their financial standing through latest I.T.C.C., annual report (balance sheet and Profit & Loss Account) of last 3 years. The same shall be commensurate with the level demanded for the execution of the tender requirement
6. Quality management system: The party shall be certified for ISO 9001:2015 quality management system , a copy of the certificate by the accreditation agency shall be submitted

### **4. Terms and conditions:**

1. The powder shall be indigenous powders manufactured in India
2. Quantity requirement: After successful completion of powder testing and coating qualification the following quantity of powders shall be supplied.
  - a. ZrO<sub>2</sub> coating powder: 250 kg
3. The test certificates such as XRD, PSD, chemical composition (EDS or spectrometry), density and SE micrographs of particle morphology shall be supplied along with the powder.
4. Detailed compliance statements addressing all the points of the technical specification shall be submitted by the party
5. Execution schedule:
  - a. Against purchase order, the party shall supply the powders for qualification tests within 3 months from the placement of order. The party shall supply the following quantity of powders for qualification tests
    - i. ZrO<sub>2</sub> coating powder: 20kg
  - b. With the supplied powder, specimen level coating and testing will be carried out by IPRC.
  - c. Upon satisfactory performance of the coating in the qualification tests, clearance will be provided by IPRC for bulk manufacturing
  - d. After acceptance and clearance from IPRC for bulk manufacturing and supply, the party shall supply the powders within 6 months from the date of clearance.