SPECIFICATION FOR MICROSCOPIC RESDIUAL STRESS/STRAIN ANALYZER ALONGWITH RETAINED AUSTENITE ANALYZER

(Origin: Japan, Korea, West European, Germany, U.S)

- The equipment should be robotic type stress analyzer (Qty: 01)
- Both cabin version and trolley version are required
- Should be capable of analyzing residual stress in materials (metals and non-metals)
- Should be capable of analyzing retained austenitic in iron and its alloys
- Should be capable of measuring residual stress on varying geometries e.g gears, shafts, turbine blades etc

1. PRINCIPLE:

The equipment should be based on X-ray Diffraction (XRD) for measuring residual stress and retained austenite

2. ROBOT:

- 6-axis anthropomorphic robot
- Accuracy and a repeatability in positioning better than 10-20 microns

3. X-RAY GENERATOR:

- Power input: 220V ± 10% / 50Hz ± 5%
- Power: 300 Watt
- Voltage: 30 KV
- Current: 10 mA
- Stability: < 25 ppm/hr after 2 hours warm up

4. X-RAY OPTICS:

- The equipment should be equipped with a Psi goniometer with different radius available (e.g 120, 140, 160 mm)
- The 2Theta value may be manually changed from 120° to 170° in order to analyse Fe (ferrite, austenite) Al, Ni, Cu, Ti, Mg alloys and non-metals as well.

5. X-RAY TUBE:

- Anode: Ti, Cr, Mn, Fe, Co, Ni, Cu (Any of these elements)
- Power: 300W
- Voltage: 30 kV
- Current: 10 mA

6. LASER SPECIFICATION:

- The laser accuracy should be better than 1 microns with measuring range of 100-200 mm
- The alignment procedure should be done with a distance X-Ray collimator/sample
- It should also be performed automatically without requiring any calibration

- Pump capacity: 3L/min @ 10 psi

11. STANDARDS:

- The quoted equipment should be compliant to ASTM E915 and UNI EN 15305 procedure

12. CALIBRATION SAMPLE:

- Two shot-peened calibration samples of compressive residual stress of -300 and -1000 MPa may be provided
- Sample with a value of zero residual stress may also be provided

13. PROFESSIONAL USB CAMERA:

- A professional USB video camera with a resolution of 6 megapixels should be mounted on the robotic goniometer head and it may also allow the laser to see the measurements area on the sample surface

14. LAPTOP:

- Laptop must be provided with the main equipment having following specifications:

➢ Screen Minimum 19'', Inter Core i9, 12GB Ram, 1TB hard drive, SDD, Windows 7 / Windows 10 Professional, DVD

➢ Printer must also be included for report generation

15. SOFTWARE:

- Robotic residual stress analyzer should support several types of analysis, from data acquisition, having the full control of all the process and hardware settings (robot, generator and tube, detector, measurement set up) to data analysis.
- Software for Residual stress analysis for both metals and non-metals
- Software for Retained austenitic values
- Software for Uni-axial and Tri-axial residual stress state analysis compliance with ASTM E915 practice and UNI EN 15305
- Integrated robot control and acquisition software
- Software for X-Ray generator and shutter complete control
- Software for acquisition of a single diffractogram
- Software for Automatic stress measurement up to 15 psi position
- Software for Automatic residual stress mapping, Storage of data, Operating hours X-Ray tubes counter and Display and printout of the collected spectra
- Software for stress analysis according to UNI EN 15305