Nipple Measuring Complex

DATASHEET

Geometric and Physical Parameters of Graphitized Nipples

Purpose

The complex determines geometric and physical parameters of graphitized nipples. It includes weight measurement, electrical resistivity, ultrasonic velocity and laser geometry control.

Principle of Operation

A robot places the nipple on the first station (Weight-ER). The upper and lower probe blocks clamp the nipple and measure weight, electrical and ultrasonic characteristics. The nipple is then transferred to a precision rotary table at the Laser station, where an Optimet ConoProbe sensor scans the geometry in sections or along a spiral path. The supporting frame is made of 32NKD Invar alloy with near-zero thermal expansion in the working temperature range.

Key Features

- Vertical orientation of the nipple during measurement.
- Cycle time 2–4 minutes depending on size.
- Invar frame for thermal stability.
- Conoscopic laser sensor (Optimet ConoProbe).
- PROFINET interface.

Measured Parameters and Accuracies

Parameter	Range / Value	Accuracy
Thread pitch diameter (D2)	200–432 mm	±0.016 mm
1/2 cone angle	9°26′–9°32′	±17″ (Ø500–800); ±20″ (Ø350–500)
Roundness (outer diameter)	up to 434.96 mm	±0.03 mm
Thread pitch	6.35–8.47 mm	±0.007 mm
Accumulated pitch deviation	—	±0.007 mm
Nipple length	up to 685.8 mm	±0.1 mm
Weight	4–200 kg	Class III (GOST R 53228)
Electrical resistivity	2.0–10 μΩ·m	±0.1 μΩ·m (target)
Ultrasonic velocity	0–4000 m/s	±1.5 %
Dynamic Young’s modulus	3–18 GPa	±2.0 %

Utilities

Electrical: 12 kW, 400 V, 50 Hz.

Compressed air: 0.5 m³ per cycle at 5 bar (20 % reserve). Average consumption at 4 min cycle ≈ 0.75 Nm³/min.

Air quality: ISO 8573-1 [7:5:4].

Scope of Supply (main items)

Input control station, Weight-ER station, laser geometry station, calibration gauges and standards, spare parts for commissioning, operating documentation, software.