Equipment for Standard Tests for the Determination of Cooling Characteristics of Quenchants by Cooling Curve Analysis (ASTM D6200-01)
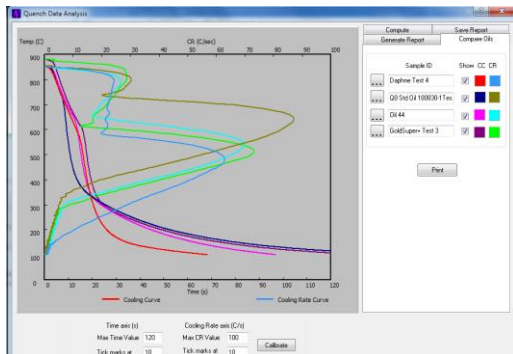
Features

- Heating Furnace:
  - Vertical electrical resistance tube-type furnace; 2.5 to 3 kW power at 230 / 208 /110 V 50/60 Hz AC supply
  - PID temperature controller for heating the probe to 850-900°C,
  - Probe placed centrally in the heating chamber;
  - Probe's temperature maintained within ± 2.5°C over the specimen length
  - Ease of maintenance; replaceable cartridge heater
- Quench Probe (as per ASTM D 6200):
  - 60 mm long 12.5 mm diameter inconel 600 probe
  - 1.5 mm external diameter inconel sheathed 'K' type thermocouple
  - Thermally insulated handle
  - Manual transfer form furnace to quench vessel
- *Data acquisition system:*
  - Single channel temperature recorder with time stamp
  - Battery operated with capacity to store up to 52000 data
  - Compact with no lose wires
  - Manual data transfer to PC/Laptop through USB interface
- *Cooling curve data evaluation software*:
  - Test records with date / time stamp
  - Analysis of cooling curve and cooling rate curve parameters (as per ASTM D6200 – 01)
  - Heat flux or heat transfer coefficient transients
  - User's own data base of quenchant characteristics
- *Calibration*:
  - Against *a* reference oil with certificate traceable to IVF Standard Oil
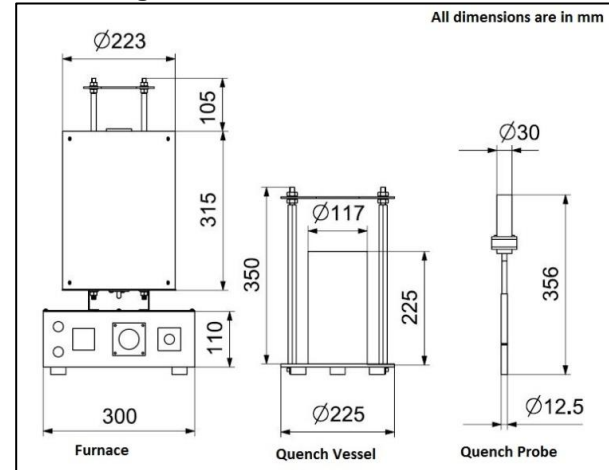- *OS*: Windows XP, Vista, 7 and later.

Applications

- Measurement of cooling characteristics as per ASTM D6200-01; quenched at 850 C
  - Time to 600 C
  - Time to 400 C
  - Time to 200 C
  - Maximum cooling rate
  - Temperature at maximum cooling rate
  - Cooling rate at 300 C
  - Segerberg Hardening power
- Selection of proper quenchant based on comparison of different quenchants
- Check the 'health' of quenchants with continued use
- Check the effect of agitation on cooling rates
- Check the effect of contamination in quenchants (water in oil; polymer in oil etc.)
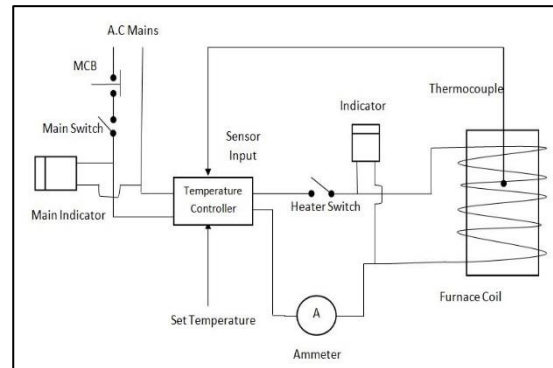- Inspection of quenchants in as-received condition

Comparison of different oils

Block Diagrams

All dimensions are in mm

Furnace — Quench Vessel — Quench Probe

Control Circuit

Test Report

Quench Test Report (ASTM 6200)

Company:	TherMetSolutions
Sample ID:	Q8 Std Oil Benchmark Test
Test Temperature:	70.0 C
Sample Quantity:	1800 ml
Test Date:	8th Sept 2018
Transfer Time:	3.0 s
Probe ID:	180830-2
Quench Temperature:	850.5 C
Cooling Time to 600 C:	6.8 s
Cooling Time to 400 C:	11.2 s
Cooling Time to 200 C:	51.8 s
Maximum Cooling Rate:	89.9 C/s
Temperature at Maximum cooling Rate:	621.9 C
Cooling rate at 300 C:	5.0 C/s
Average Cooling rate from 600-100 C:	24.8 C/s
Boiling Begin Temperature:	741.8 C
Convection Begin Temperature :	342.9 C
Segerberg Hardening Power :	557.7

Place:
Date :