

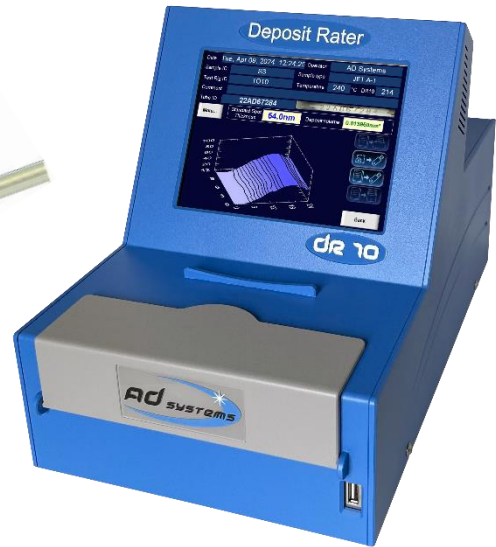


Thermal Oxidation Stability of Aviation Turbines Fuels
ASTM D3241 - Annex A2, IP 323 - Annex C

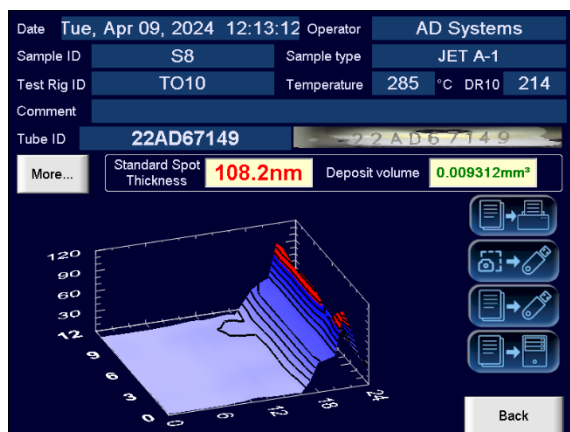
DR10 – ITR Heater Tube Deposit Rater

Methods:

ASTM D3241
IP 323, ISO 6249
ASTM D1655,
D7566, D4054
DEF STAN 91-091



- ▶ Referee instrument (D3241 Annex A2 ITR) for thermal oxidation deposit thickness measurement
- ▶ Quick and easy in operation, very compact design
- ▶ Rigid construction, no optical adjustment required
- ▶ Ideal tool for routine QC and research
- ▶ Automatic result transmission to TO10



To qualify jet fuel thermal oxidation stability by ASTM D3241 method a visual rating of heating tubes was historically used for specification purposes, but it is suffering from the drawback of operator subjectivity. Since 2014 ASTM moved toward objective metrological technique capable to accurately measure the thickness of the deposit instead of its color comparison. The automated tube rater DR10 from AD Systems was the first commercial instrument available on the market. With proven performance, it became referee method in jet fuels specifications.

The DR10 – ITR (Interferometric Tube Rater) measures deposit thickness in less than 5 minutes. It displays in SI units (nanometers) a 3D mapping of the deposit around the total surface of the tube, reports maximum and average thicknesses, and calculate total volume of the deposit.

Applications

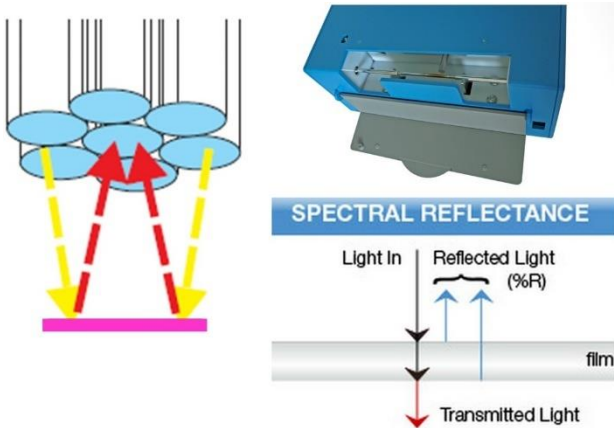
With its robust design and ease of use, the DR10 is well suited for testing labs, research, refining, pipeline, terminals, and mobile laboratories - every location where thermal oxidation stability of aviation fuel is evaluated.



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Principle

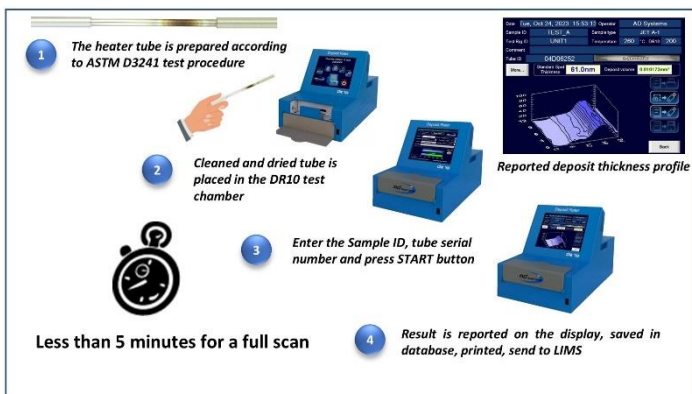
The DR10 uses an interferometry technique (Spectral Reflectance) based on a powerful light source, a fiber optic probe, and a spectrometer. Incident light of a specific spectra is emitted on the surface of the tube.



The reflected light is collected and transmitted by fiber optics to the spectrometer which processes spectrum data in real time. The software analyzes the interference fringes created by the deposit and calculates the deposit thickness.

Operation

The heater tube is prepared according to ASTM D3241 procedure and is placed in the test chamber of the DR 10.



The DR10 is equipped with a color touch screen. A virtual alphanumeric keypad is used to enter the sample ID and the tube serial number is captured by a built-in camera and stamped on the report. For complete traceability the sample type, operator name and test temperature are added to the report.

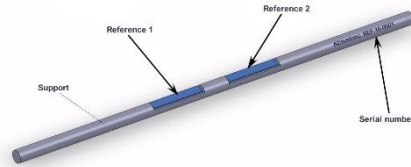
The standard tube scan at 1,200 measurement points is completed **in 5 minutes**.

In conformity with fuel specification, the DR10 reports the thickest deposit average over area of 2.5mm² (**Standard Spot Thickness**).

When measured Standard Spot Thickness value exceeds **85 nm limit** specified in ASTM D1655 / D7566 and DEF STAN 91-091, the result is displayed in red color to warn the laboratory technician.

The test report can be stored on USB, printed, or sent to LIMS. Then DR10 is linked to **TO10 oxidation rig**, the complete D3241 test report can be compiled including oxidation test parameters and the resulted tube rating.

AD Systems thickness reference tubes are available for the verification of the DR10 Deposit Rater accuracy. Each tube contains 2 thickness references certified by a national metrology laboratory.



These tubes are therefore traceable and meet the requirements for calibration and testing laboratories as defined in the EN ISO/IEC 17025.

Reported results

Reported results	Measurement limits
Average thickness	0 to 1200 nm
Maximum thickness	0 to 1200 nm
Max mean thickness of 2,5mm ² area (SST)	0 to 1200 nm
Deposit volume	0 to 0.5 mm ³

Technical specifications

Technical specifications	Description
Test duration	5 minutes for 1 200 pts scan 3 minutes in fast mode
Number of measurement points	Configurable By default: 1,200 points
Results storage	Locally over 110 000 results With external device limited only to its storage capacity
LAN connectivity	Ethernet port RJ45
Printer output	USB (printer is optional)
Data output	USB (2), Ethernet
Dimensions (mm)	250 x 410 x 290 (10" x 16" x 12")
Weight	10 kg (22 lb)
Electrical	100 to 240V - 2 A - 50/60 Hz

We reserve the right to alter specifications without notification.

Your local distributor:

For additional information:

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