

### Oxidation Stability of Mineral Insulating Oil

#### ASTM D2440



**Stainless steel bath**  
**Bath drain, overflow outlet**  
**Easy to operate**  
**Wide temperature range**  
**Small footprint**  
**Robust, complete for six tests**

#### General

The oxidation stability test of mineral transformer oils is a method for assessing the amount of sludge and acid formed in a transformer oil when the oil is tested under prescribed conditions. Good oxidation stability is necessary to improve the service life of the oil. Oils that meet the requirements tend to minimize electrical conduction, ensure acceptable heat transfer, and preserve system life.

For this test, a test specimen of mineral insulating oil is placed in an oil receptacle together with a copper catalyst coil to simulate the ageing of the sample. The sample is in the bath at 110°C for 72 or 164 hours. During this time, oxygen is constantly bubbled through the sample. After this procedure, the oil is evaluated by measuring the amount of sludge and acids formed.

#### Construction

The apparatus consists of one liquid bath equipped with six sets of calibrated flowmeters and six sets of glassware. The flowmeters have a fine adjustable needle valve, to ensure the correct amount of oxygen is supplied. A dryer tower is also supplied and can be mounted on the side of the bath. The liquid bath is well insulated and all wetted parts are made from stainless steel to withstand high working temperatures. The stainless steel parts can easily be cleaned. Grommets around the openings protect the glassware from scratches.

Item	Unit	TC16 D2440
P/N apparatus ASTM D2440 230V/50-60Hz		00T2060
P/N apparatus ASTM D2440 115V/60Hz		00T2061
Power	[kW]	1.5
Range	°C °F	Ambient .. 250 Ambient ..482
Reading	[°C/°F]	°F on request
Setting	[°]	0.1
Stability	[°C]	0.02
Heating	[kW]	1.4
Bath volume	[L]	16
Bath openings	[mm]	6
Bath depth	[mm]	220
TC16 dimensions (L x W x H)	[mm]	480 x 550 x 480
Materials	Used inside bath: stainless steel 304, brass	
CE	Conforms to CE regulation	

The apparatus should be placed in a fume hood. In case this is not possible, six additional pieces of glassware can be used together with the standard supplied side brackets to prevent smell spreading into the laboratory.

#### Accuracy

The insulation of the bath and electronic controller with PID regulation result in a very stable working temperature of  $\pm 0.02^\circ\text{C}$ . The set point can be set in steps of  $0.1^\circ\text{C}$  in the range of  $0^\circ\text{C}$  up to  $250^\circ\text{C}$  ( $148..482^\circ\text{F}$ ). The readout is displayed in  $0.1^\circ\text{C}$ . The controller has an internal accuracy of  $0.01^\circ\text{C}$ .

#### Temperature readout

Standard available in  $^\circ\text{C}$ , on request in  $^\circ\text{F}$ .

#### Pump

When not used for oxidation tests, the pump can be used to circulate the bath content to an external application.











#### Safety

The bath conforms to CE regulation. It is further equipped with a mechanical resettable safety thermostat. A low liquid float is standard included and will switch-off the apparatus when the bath fluid is too low.

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**Table 1: Apparatus ASTM D2440 P/N 00T2060 or P/N 00T2061 consists of the following parts:**

P/N	Picture	Quantity	Description
00T0671		1	TC16 circulator bath, 230V/50-60Hz.
00T0861			TC16 circulator bath, 115V/60Hz
03T0033		1	Levelling platform with cover and lids for ASTM D2440 tests. Side brackets to hold glassware and drying tower are also included.
31T2110		6	Oil receptacle and head
31T2074		6	Flowmeter, with fine adjustable needle valve
24T0056		1	Tubing silicon, 5 meter, 4 mm inside diameter.
34T0000		1	Blue PU tubing 6 mm
34T003X		6	Hose barb fitting G1/4" to I.D. 5 mm
34T0011		6	O-ring G1/4"
34T0048		1	Hose adapter 6mm O.D. to G1/4" quick fit
34T0061		5	Hose adapter T-shaped 6mm O.D. to G1/4" quick fit
31T2044		1	Gas drying tower, 75 mm x 289 mm, with 1/8" stainless steel NPT fittings and connectors to mount on TC16.

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Table 2: Accessories for ASTM D2440

Item	Picture	Suggested quantity	Description
08T0001		1	Bath fluid silicon oil 20..150°C 20 L
25T0934B		1	Thermometer, solid stem, similar to ASTM 41C, white backed, 98+152:0,2°C, capillary tube specially coated inside, with non-wetting blue special liquid, immersion 100mm, max.400x6-8mm, durable pigment, with Works Certificate at +100°C
31T2111		1	Catalyst copper coil ext Ø 16 mm, 50 mm height, pack of 10 pcs.
31T2041		1	Refilling for dryer (P/N 31T2044), 5 lbs, 8 mesh
31T2110		6	ASTM D2440 glassware (Oil receptacle and head). Six additional pieces are recommended to filter smelly oxygen if apparatus is not placed in fume hood.

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