DIN EN ISO 21809-1 External Coatings for Buried or Submerged Pipelines/ Polyolefin coatings (3-layer PE and 3-layer PP) / UV Ageing Test and Thermal Ageing Test / Testing Equipment

Description

G.1 UV ageing
G.1.1 General
The test shall consist of subjecting PE/PP material test samples to the continuous irradiation of a xenon lamp under given temperature and humidity conditions.
Evaluation shall be performed by assessing the change in the material through the variation in its melt flow rate.
G.1.2 Equipment
G.1.2.1 Irradiation chamber, equipped with a xenon lamp (see ISO 4892-2).
G.1.2.2 Melt flow tester (see ISO 1133).
G.1.3 Sampling
The test shall be carried out on a sample of PE/PP in accordance with ISO 1872-2 for PE and ISO 527-2
for PP.
G.1.4 Procedure
G.1.4.1 The size of the sample shall be large enough to make ten test specimens of type 1B, 5A or 5B (see Figures 1 and A.2 in ISO 527-2).
G.1.4.2 The test sample shall be exposed under the following conditions:
âŽ¯ artificial weathering (see ISO 4892-2:2006, Table 1, Method A);
âŽ¯ black standard temperature (65 Â°C Â± 3 Â°C);
âŽ¯ relative humidity (65 % Â± 5 %);
âŽ¯ spray cycle: 18 min Â± 0,5 min spray, 102 min Â± 0,5 min dry;
âŽ¯ total radiant energy: 7 GJ/m2 for Classes A and B; 5 GJ/m2 for Class C;
âŽ¯ continuous exposure.
G.1.4.3 Three melt-flow-rate measurements shall be undertaken on the test sample in accordance with ISO 1133.
G.1.4.4 The melt flow rate, RMF1, for the exposed samples shall be calculated as the arithmetic mean of
the three results.
G.1.4.5 The melt flow rate, RMF0, for an unexposed test sample of identical shape shall be calculated in
accordance with ISO 1133.

G.1.5 Results and test report
The variation of the melt flow rate, âˆ†RMF, expressed as the percentage variation after exposure, shall be
calculated using Equation (G.1):

$$\Delta R_{MF} = \frac{R_{MF_1} - R_{MF_0}}{R_{MF_0}} \times 100 \qquad (G.1)$$

where

R_{MF_0} is the melt flow rate measured before exposure;

R_{MF_1} is the melt flow rate measured after exposure.

The test reports shall include at least the following:
âŽ¯ identification of test specimens;
âŽ¯ procedure used;
âŽ¯ instruments used;
âŽ¯ reference to this part of ISO 21809;
âŽ¯ date of test;
âŽ¯ test results.

G.2 Thermal ageing

G.2.1 General

The test shall consist of subjecting PE/PP material test samples to the effect of dry heat from a thermostatically controlled oven.

Evaluation shall assess the change in the material by the variation in its melt flow rate.

G.2.2 Equipment

G.2.2.1 Oven, thermostatically controlled, with air circulation maintaining a test temperature within Â±3 Â°C.

G.2.2.2 Melt-flow tester (see ISO 1133).

G.2.3 Sampling

The test shall be carried out on a sample of PE/PP material in accordance with ISO 1872-2 for PE and ISO 527-2 for PP.

G.2.4 Procedure

G.2.4.1 The test temperature and duration shall be in accordance with Table G.1.

Table G.1 — Temperature and duration of test

Coating class	Test duration h	Test temperature °C
A	2 400	100 °C ± 3 °C
B	4 800	100 °C ± 3 °C
C Design temperature, $T \leq 80$ °C	240	150 °C ± 3 °C
C Design temperature, $T > 80$ °C	$(T–70) \times 24$	150 °C ± 3 °C

G.2.4.2 Three melt-flow-rate measurements shall be undertaken on the test sample in accordance with ISO 1133.

G.2.4.3 The melt flow rate, RMF1, for the exposed samples shall be calculated as the arithmetic mean of

the three results.
G.2.4.4 The melt flow rate, RMF0, for a test sample of identical shape that has not been placed in the oven
shall be calculated in accordance with ISO 1133.
G.2.5 Results and test report
The results shall be expressed as the percentage variation of the melt flow rate, âˆ†RMF, after exposure using Equation (G.1).
The test reports shall include at least the following:
âŽ¯ identification of test specimens;
âŽ¯ procedure used;
âŽ¯ instruments used;
âŽ¯ reference to this part of ISO 21809;
âŽ¯ date of test;
âŽ¯ test results.

UV Tester According to ISO 21809-1 Annex G

- According to below standard:
- **ASTM D4329**
  Standard Practice for Fluorescent UV Exposure of Plastics
- **ASTM D4587**
  Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings
- **ASTM D4799**
  Standard Test Method for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Fluorescent UV and Condensation Method)
- **ASTM D5208**
  Standard Practice for Operating Fluorescent Ultraviolet (UV) and Condensation Apparatus for Exposure of Photodegradable Plastics
- **ASTM G151**
  Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
- **ASTM G154**
  Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

- **DIN EN 12224**
  Geotextiles and geotextile-related products â€“ Determination of the resistance to weathering
- **DIN EN 1297**
  Flexible sheets for waterproofing â€“ Bitumen, plastic, and rubber sheets for roofing â€“ Method of artificial ageing by long term exposure to the combination of UV-radiation, elevated temperature and water
- **DIN EN 13523-10**
  Coil coated metals â€“ Test methods â€“ Part 10: Resistance to fluorescent UV light and water condensation
- **DIN EN ISO 4892-1**
  Plastics â€“ Methods of exposure to laboratory light sources â€“ Part 1: General guidance
- **EN 927-6**
  Paints and varnishes â€“ Coating materials and coating systems for exterior wood â€“ Part 6: Exposure of wood coatings to artificial weathering using fluorescent UV and water
- **ISO 11997-2**
  Paints and varnishes â€“ Determination of resistance to cyclic corrosion conditions â€“ Part 2: Wet (salt fog)/dry/humidity/UV light
- **ISO 16474-3**
  Paints and varnishes â€“ Methods of exposure to laboratory light sources â€“ Part 3: Fluorescent UV lamps
- **ISO 4892-3**
  Plastics â€“ Methods of exposure to laboratory light sources â€“ Part 3: Fluorescent UV-lamps
- **EN 1062-4**
  Paints and varnishes â€“ Coating materials and coating systems for exterior masonry â€“ Part 4: Preconditioning of exterior coatings to UV radiation and water in apparatus
- **SAE J2020**
  Accelerated Exposure of Automotive Exterior Materials Using a Fluorescent UV and Condensation Apparatus
- Proven performance matches or exceeds other brands
- Digital timer, UV and temp controller on the panel and fully programmed control using Windows based software
- USB data connection to PC including software
- Unsurpassed safety compliance
- Recirculating spray water option
- Plus many other exclusive user-friendly features
- Fluorescent UV lamps (8) â€“ 40 W (UVA-340, UVB-313, UVA-351) all are based on customer request
- Black Panel Temperature (BPT) calibration sensor
- Over-temperature shutoff
- Specimen easy holder
- Irradiance calibration ports
- Ergonomically designed specimen retaining rings
- It has functions of UV, Spray, Temperature control and Humidity control

MFI / MFR Melt Flow Rate Tester

- According to ISO 1133, ASTM D1238
- The MFR Tester used to determine the material output from 2.095mm diameter hole in specified loading and temperature condition
- temperature up to 500C
- 7 inch touch display
- USB data out to EXCEL file
- Thermal printer included
- Including standard 2.16 and 5kg weights
- Compression rod
- Piston as per standard
- Die 2.095mm
- Die cleaning tool
- Cylinder cleaning rod
- Polished cylinder
- Includes 2 heating element
- Two temperature sensors
- Steel tray
- Safety gloves

Hot Air Oven

- Digital PID temperature control
- Digital timer
- SS304 inside chamber
- Circulation fan inside
- Capacity 55 L

Category

1. Equipment for Standards
2. Standards