SHORT-TERM AGEING

EN 12607-2: Bitumen and bituminous binders – Determination of the resistance to hardening under influence of heat and air - Part 2: TFOT method

Overview

The test is not a classical test providing results, but an ageing/conditioning procedure for bituminous binders.

TFOT is a method to simulate the short-term ageing behaviour of bituminous binders used for hot mix asphalt. It is described in EN 12607-2 as one of three methods to address short-term ageing behaviour of bitumens. For materials other than hot mix asphalt mixtures, these standard conditions may not necessarily apply.

Definition and Terminology

Short-term ageing/conditioning: The conditioning that the binder goes through during the methods described in EN 12607 (Part 1, 2 and 3). Short-term ageing is deemed to represent the ageing a bituminous binder undergoes during handling, storage, mixing, and laying of asphalt mixtures.

Long-term ageing/conditioning: The conditioning that the binder goes through during the accelerated pressure ageing procedure. In the case of hot mix asphalt binders, the long-term ageing is carried out on binders that have already been conditioned through short-term ageing/conditioning. Long-term ageing is deemed to represent the ageing a bituminous binder undergoes during the service life of an asphalt pavement.

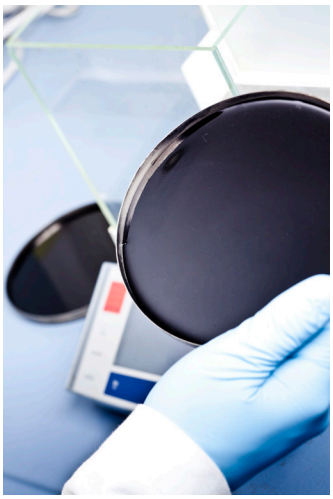
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At the time of publication of this document, EN 12607-2:2014 Bitumen and bituminous binders – Determination of the resistance to hardening under influence of heat and air - Part 2: TFOT method` was the reference for testing. This document does not overrule the test standard EN 12607-2, but is intended to help users of the standard to be aware of the important factors. However, the reference for testing remains EN 12607-2. Temperatures, times, and dimensions and their tolerances must be strictly observed, that is checked for accuracy and for maintaining the tolerance during application.

Practical Information:

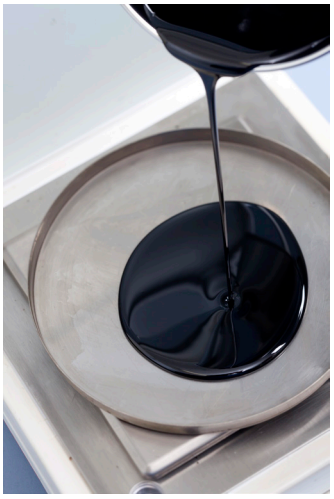
The test temperature must be selected carefully.

- Usually, the TFOT procedure is carried out at 120 °C.
- Some bituminous binders may need different conditioning temperatures, see Note of section 6.1 of EN 12607-2. For example, for harder paving bitumen grades the temperature is recommende at 163 °C.
- For bituminous binders used in warm-mix applications, the standard conditioning temperature may not necessarily reflect the ageing occurring during asphalt production and laying.



The procedures of conditioning need to be respected carefully.

- Once the oven has reached the conditioning temperature ± 1 °C the containers shall be rapidly placed on the circular shelf.
- The sample should remain in the oven for 5 h from the moment the temperature is 1 °C below the defined conditioning temperature.
- The sample should not be kept in the oven for more than 5 h 15 min.
- The requirements of the TFOT oven are given in table 1 of EN 12607-2.
- The assessment of change in mass is described in section 6 of EN 12607-2.
- Only similar samples should be conditioned in the oven at the same time.



After conditioning, the sample needs to be prepared for testing.

- If testing after TFOT-conditioning does not take place immediately, pour all the hardened binder into the same collecting vessel straight away.
- For PMBs, heating the containers to 180 °C for a short time may be necessary to remove all hardened binder from the containers.
- The sample shall be allowed to cool, then sealed and stored at ambient temperature, see EN 12594.
- Reheating of the hardened binder should be in accordance with EN 12594, except that higher sample preparation temperatures may be needed to reflect the hardening of the binder. Stir to homogenize the mixture but avoid incorporating air bubbles.
- Measure the characteristics of the hardened binder within 72 h in accordance with the respective method.



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