

M2F - Fatigue machine -



Automated laboratory equipment, designed to carry out the strength test to fatigue on 2 or 4 trapezoidal specimens of bituminous materials (NF EN 12697-24 Appendix A).

This material also allows for the use of a specific enclosure, to measure the complex modulus (an isotherm) on 4 trapezoidal specimens of bituminous materials (2PB-TR) according to standard NF EN 12697-26 Appendix A.

Measurement principle

Fatigue strength test :

The trapezoidal specimens are subject to displacement imposed by bending in 2 points for a given frequency of sinusoidal displacement.

The test is repeated for 3 deformations in a controlled temperature ventilated atmosphere.

The result is the fatigue slope calculated from three deformations and the allowable deformation ϵ_6 to obtain a life expectancy of 10^6 cycles.

Complex test module :

Test specimens are subject to constant sinusoidal loads on the head at set frequencies and temperatures.

The result is the module averages of 4 specimens tested.

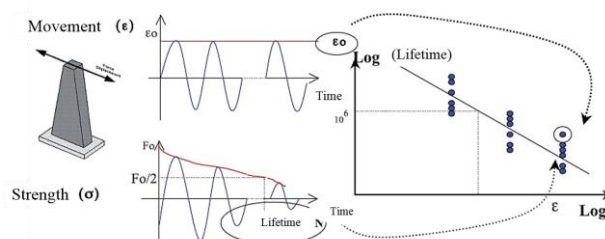
The value of module retained in the standards produced is the module at 15 °C and 10 Hz.

Terms of use

The test is practiced on trapezoidal specimens collected from roads or sawn on plates manufactured in the laboratory using the BBPAC plate compactor.

The test temperature is regulated and controlled.

Schematic diagram



Description

Fatigue strenght test :

Test specimens consoles embedded at their bases are subject to a constant amplitude sine wave moving in a controlled temperature environment. The reaction force decreases during the test and the arbitrary criterion of the test specimen corresponds to half of the initial force. This test is repeated for three levels of displacement.

Thus, by performing a linear regression on the individual results, we obtain the fatigue equation that allows to calculate the deformation to apply to the material for a lifetime of 10^6 cycles (ϵ_6).

The temperature remains constant for the duration of the test.

Complex test module :

The exciter imposes a sinusoidal effort at the top of the specimen resulting in a displacement. The displacement as well as the strength at the top of specimen are measured, allowing to calculate from the characteristics of the specimens, the values of constraints and necessary maximum deformation needed for the determination of the complex modulus.

These measurements are performed in the "Linear" material field, so that the module is independent of the deformation applied.

The temperature remains constant for the duration of the test.

Features

The system allows the calculation of the fatigue equation and the determination of allowable deformation. A test result sheet can be issued automatically.

The system is equipped with a control device during operation and a calibration mode facilitating the metrological interventions.

Solicitation Frequency: 40 to 3Hz;

Number of measurement stations: 2 or 4;

Displacement range: 0-1.4 m (4.6 ft) (peak - peak);

Dimensions of test specimens: according to standard NF EN 12697-24;

Frame dimensions: L = 770 mm; l = 440 mm; h = 960 mm,
L = 1.96 ft; l = 1.31 ft; h = 5.9 ft,

Frame weight: 200 kg (1,808 lbs)



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