ISO13938-1 Hydraulic Method for Determination of Bursting Strength and Bursting Distension-Testing Equipment

Description

Fabric Burst Tester

4 Principle
A test specimen is clamped over an expansive diaphragm by means of a circular clamping ring. Increasing fluid pressure is applied to the underside of the diaphragm, causing distension of the diaphragm and the fabric. The volume of fluid is increased at a constant rate per unit time until the test specimen bursts. The bursting strength and bursting distension are determined.

6 Apparatus
6.1 Bursting tester
Metrological confirmation of the bursting tester shall be carried out in accordance with EN 30012-1:1993. The bursting tester shall comply with the following requirements:
6.1.1 The apparatus shall be capable of producing various constant rates of increase in volume per unit time between 100 cm3/min and 500 cm3/min to within ±10 % of the indicated value. If the apparatus is not equipped to adjust fluid volume, a testing time to burst of (20 ±5) s may be applied. This shall be indicated in the test report.

6.1.2 Bursting pressure shall be indicated with an accuracy of ±2 % of full scale range above the first 20 % of range.
6.1.3 Height at burst up to 70 mm shall be indicated with an accuracy of ±1 mm. Zero position of the measuring gauge shall be adjustable to accommodate the thickness of the test specimen.
6.1.4 Means for indicating the volume at burst (if available) to within ±2 % of the indicated value.
6.1.5 A test area of 50 cm2
(79,8 mm diameter) shall be used.
Other test areas of 100 cm2
(112,8 mm diameter) or 10 cm2
(35,7 mm diameter) or 7,3 cm2
(30,5 mm diameter) may be used, if the preferred test area is not applicable in the existing testing equipment, or due to high or low expansion of the fabric or other fabric requirements, or by mutual agreement.
6.1.6 The clamping device shall provide for clamping of the test specimen securely without distortion or damage and prevent slippage during the test. The clamping ring shall allow undisturbed vaulting of highly expansive fabrics (e.g. fabric test specimens whose height at burst is greater than half of the test specimen diameter). All test specimen clamping ring inner diameters shall be accurate to ±0,2 mm. To avoid test specimen damage a small curvature at the inner edge of the clamping ring facing the test specimen is recommended. 6.1.7 A safety cover shall enclose the clamping device during the test when the expansion of the test specimen takes place. It shall allow clear observation of the expansion of the test specimen during the test.

6.1.8 The diaphragm shall meet the following requirements:

- thickness up to 2 mm;
- highly expansive;
- if the diaphragm is to be used several times, it shall be elastic within the range of height at burst observed during the test;
- resistant against pressurizing fluids used.

8 Procedure

8.1 Prior to testing the sample shall be conditioned in the relaxed state in accordance with clause 7. During conditioning and testing maintain the test specimens in the atmosphere for conditioning and testing in accordance with clause 7. 8.2 Set a test area of 50 cm2 (see 6.1.5).
NOTE 1 : For most fabrics, particularly knitted fabrics, the test area of 50 cm2 is applicable. For fabrics with low extensibility (known from previous experience or preliminary testing), e.g. for fabrics for technical application, a test area of 100 cm2 is recommended. In cases where these conditions cannot be met or are not appropriate alternative test areas in accordance with 6.1.5 may be used if mutually agreed. NOTE 2 : Comparison of results requires the test to be performed with the same test areas and rates of increase in volume.
8.3 Set a constant rate of increase in volume of between 100 cm3/min and 500 cm3/min depending on test area and fabric requirements. Or adjust a time to distend a test specimen to burst of (20 ±5) s using preliminary trials, if a constant rate of increase in volume is not applicable.

8.4 Place the test specimen over the diaphragm so that it lies in a flat tensionless condition, avoiding distortion in its own plane. Clamp it securely in the circular holder, avoiding jaw damage, to prevent slippage during the test. Place the distension recording device into the measuring position and adjust it to the zero position. Fasten the safety cover in position according to machine requirements. Apply pressure to the test specimen until the fabric bursts.
Immediately after burst, reverse the apparatus to starting position. Note bursting pressure and height at burst and/or bursting volume. If the test specimen bursts close to the edge of the clamping device, report this fact. Reject jaw breaks occurring within 2 mm of the clamping line. Repeat the test at least four more times at different places on the fabric. The number of test specimens may be increased if agreed mutually.

8.5 Diaphragm correction
With the same test area and rate of increase in volume or time to burst as that employed in the above tests, distend the diaphragm without the presence of a test specimen by an amount equal to the mean height at burst or the mean volume at burst of the test specimen. Note the pressure at this distension of the diaphragm as the “diaphragm pressure”.

9 Calculation and expression of results

9.1 Calculate the arithmetic mean of the bursting pressure values in kilopascals. From this subtract the diaphragm pressure in kilopascals as determined according to 8.5 to obtain the bursting strength. Round the result to three significant figures.

9.2 Calculate the arithmetic mean of the height at burst values in millimetres. Round the result to two significant figures.

9.3 If required, calculate the arithmetic mean of the volume at burst values in cubic centimetres. Round the result to three significant figures.

9.4 If required, calculate the coefficient of variation and the 95 % confidence limits for the bursting pressure and height at burst and, if required, volume at burst. Round the coefficient of variation to the nearest 0,1 % and the 95 % confidence limits in accordance with the mean values.

10 Test report

The test report shall include the following information

10.1 General

a) The number and year of publication of this part of this standard and date of test;
b) identification of test sample and sampling procedure, if required;
c) make and model of bursting tester used;
d) test area used, in square centimetres;
e) rate of increase in volume or time to burst;
f) number of test specimens tested and number of bursts close to clamping device and number of tests rejected;
g) observation of bursting behaviour (e.g. rupture of one or both thread directions);
h) state of test (conditioned or wet);
i) any deviation from the given procedure.

10.2 Test results

a) Mean bursting strength, in kilopascals;
b) mean height at burst, in millimetres;
c) mean volume at burst, in cubic centimetres, if required;
d) the coefficient of variation of the relevant values, in percent, if required;
e) the 95% confidence limits, in units of the relevant mean values, if required

Fabric Burst Tester

Hydraulic Fabric Burst Tester According to ISO 13938-1

- Test area 50 cm2 (other are as option)
- Hydraulic pressure increase control
- Elastic diaphragm
- Thermal printer
- Touch display showing pressure and height of sample at burst
- USB data output to MS Excel
- Manual valve for flow adjustment of hydraulic system
- Pneumatic grip of sample
- Height indication of sample at bursting using linear transducer

- Pressure indication of sample piece
- Maximum pressure is 1000KPa (other pressures available on customer request)
- Clamping pressure adjustment of sample piece
- Burst pressure indication
- Displacement measurement
- Burst displacement indication using liner transducer
- Training video included

Category

1. Equipment for Standards
2. Standards