INTERNATIONAL STANDARD

ISO 6803

Second edition
1994-10-01

Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing

Tuyaux et flexibles en caoutchouc ou en plastique — Essai d'impulsions de pression hydraulique sans flexions

Reference number
ISO 6803:1994(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6803 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This second edition cancels and replaces the first edition (ISO 6803:1984), which has been technically revised.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing

1 Scope

This International Standard describes a pressure impulse test without flexing for rubber or plastics hydraulic hoses and hose assemblies.

The test is applicable to high-pressure hydraulic hoses and hose assemblies which are subject to pulsating pressures in service.

NOTE 1 If it is required to carry out the test with flexing, the method described in ISO 6802:1991, *Rubber and plastics hose and hose assemblies with wire reinforcements — Hydraulic impulse test with flexing*, should be used.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3448:1992, *Industrial liquid lubricants — ISO viscosity classification.*

ISO/TR 11340:1994, *Rubber and rubber products — Hydraulic hose assemblies — External leakage classification for hydraulic systems.*

3 Apparatus

3.1 Pressure-application apparatus, capable of applying an internal pulsating pressure to the test piece at a rate of 1 Hz ± 0,25 Hz using a hydraulic fluid which circulates through the test piece, the fluid being maintained at the required test temperature. Each pressure cycle shall be within the tolerances shown in figure 1.

The nominal rate of pressure rise R shall be calculated from the equation

$$R = f(10p - 5)$$

where

f is the frequency, in hertz;

p is the nominal pulse pressure, in megapascals.

The actual rate of pressure rise shall be determined as shown in figure 1 and shall be within a tolerance of ± 10 % of the calculated nominal value.

3.2 Suitable graphical recorder, digital-storage facility or oscilloscope, to enable the pressure cycle to be checked against figure 1. The recorder shall have a natural frequency of more than 250 Hz, critically damped to give a response flat to within 5 % up to 0,6 times the natural frequency.

4 Test fluid

Unless otherwise specified, the test fluid shall comply with the requirements of ISO VG 46 at 40 °C, in accordance with ISO 3448.

5 Test temperature

The following temperatures are preferred for the test:

85 °C, 100 °C, 125 °C, 135 °C or 150 °C

The test fluid shall be circulated through the test pieces at the chosen temperature with a tolerance of ± 3 °C. The test fluid temperature shall be measured

at the inlet and the outlet of the test pieces and the test temperature is defined as the mean value of the two measured temperatures. No one of the measured values may deviate from the test temperature by more than 3 °C.

6 Test pieces

6.1 Test pieces shall consist of complete hose assemblies or lengths of hose with suitable end fittings attached.

Unless otherwise specified, four test pieces shall be tested.

6.2 Calculate the free (exposed) length of hose under test, shown in figure 2, as follows:

a) for hose sizes up to and including 22 mm nominal inside diameter:

$$180°\text{-bend free length} = \pi\left(r + \frac{d}{2}\right) + 2d$$

b) for hose sizes larger than 22 mm nominal inside diameter:

$$90°\text{-bend free length} = \frac{\pi}{2}\left(r + \frac{d}{2}\right) + 2d$$

where

r is the minimum bend radius;

d is the hose outside diameter.

A tolerance of $+1\ \%/-0$ or $+15$ mm$/-0$, whichever is greater, applies to the calculated free hose length.

7 Procedure

7.1 Connect the test pieces to the apparatus. The test pieces shall be installed in accordance with figure 2, where test pieces of nominal bore size up to and including 22 mm shall be bent through 180° and test pieces of nominal bore size above 22 mm shall be bent through 90°.

7.2 Bring the test fluid to the test temperature and then apply the pulse pressure in accordance with figure 1. Continue the test for the specified number of cycles or until the assembly fails.

If a pulse test is stopped before completion of the minimum number of cycles, slight leakage of the test fluid may occur at the hose/fitting junction upon re-starting the test until the test temperature is reached. Any leakage shall be reported in accordance with the classification in ISO/TR 11340.

8 Expression of results

8.1 Record the number of cycles to failure or, if failure did not occur, the number of cycles completed.

8.2 Leakage at the end fitting, blow-off or rupture of the hose within 25 mm of the fitting or within a distance equal to the external diameter of the hose, whichever is greater, shall be considered as failures in the performance of the assembly. Such failures do not necessarily demonstrate an inability of the hose to meet the specified requirements with an alternative fitting.

9 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) a full description of the hose or hose assembly tested, including fitting identification and attachment details, such as skive length, crimp diameter, etc.;

c) the test temperature;

d) the test pressure;

e) the test fluid;

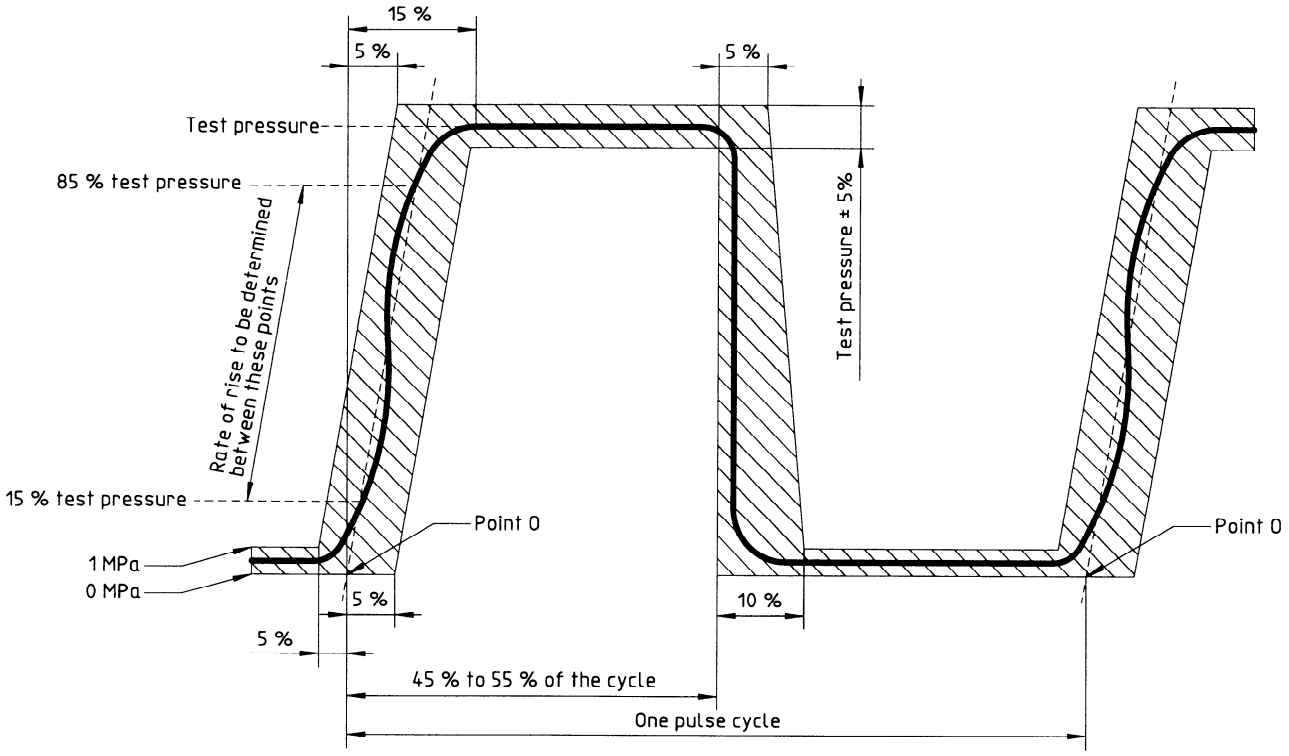
f) the rate of pressure rise;

g) the pulse cycle rate;

h) whether the test pieces were bent through 90° or through 180°;

i) the number of cycles to failure, or the number of cycles completed, for each test piece;

j) the position and mode of failure of each test piece, or the condition of each test piece on completion of the test.



NOTES

1 The secant pressure rise is the straight line drawn through two points on the pressure rise curve, one point at 15 % of the test pressure and the other at 85 % of the test pressure.

2 Point O is the intersection of the secant pressure rise with 0 pressure.

3 The pressure rise rate is the slope of the secant pressure rise, expressed in megapascals per second.

4 The cycle rate shall be uniform at 1 Hz $\pm$ 0,25 Hz.

5 The nominal rate of pressure rise R shall be given by

$$R = f(10p - 5)$$

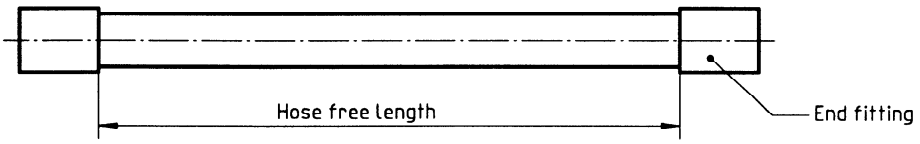
where

f is the frequency, in hertz;

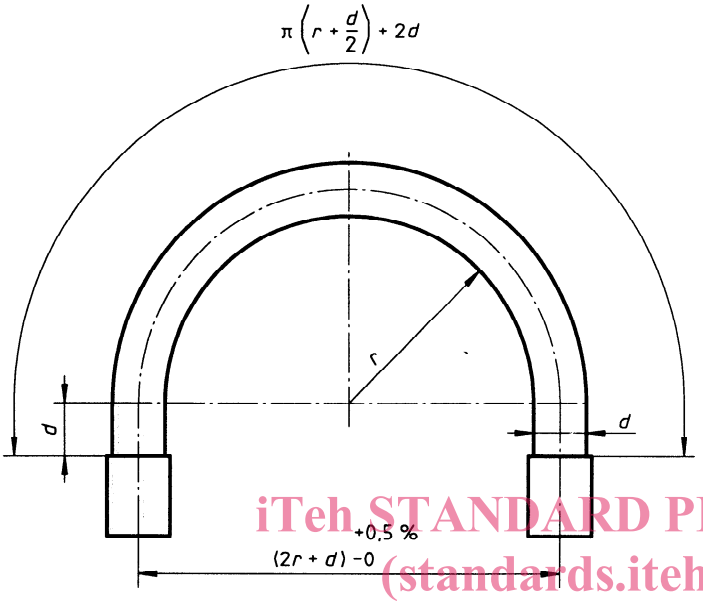
p is the nominal pulse pressure, in megapascals.

The actual rate of pressure rise shall be within a tolerance of $\pm$ 10 % of the calculated nominal value.

Figure 1 — Pressure pulse cycle



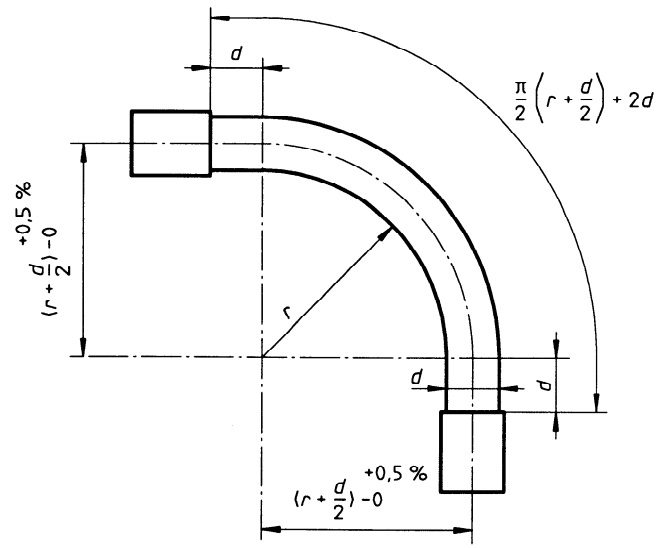
Hose sizes up to and including 22 mm nominal inside diameter



NOTES
r = Minimum bend radius
d = Hose outside diameter

Hose free length = $\pi\left(r + \frac{d}{2}\right) + 2d$

Hose sizes larger than 22 mm nominal inside diameter



NOTES
r = Minimum bend radius
d = Hose outside diameter

Hose free length = $\frac{\pi}{2}\left(r + \frac{d}{2}\right) + 2d$

Figure 2 — Test pieces for pressure pulse test

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ICS 23.040.70

Descriptors: rubber products, plastics products, hoses, rubber hoses, plastics hoses, tests, pressure tests, hydraulic tests, pulsating flow.

Price based on 4 pages