



METRIC AEROSPACE STANDARD

MA2002**REV. B**

Issued	1981-10
Revised	1988-07
Reaffirmed	2007-08
Cancelled	2013-11

Superseded by AS603

Impulse Testing of Hydraulic Hose, Tubing and Fitting Assemblies

RATIONALE

The MA2002 is being cancelled since it is no longer in compliance with latest impulse wave shape requirements in AS603, which the ISO 6772 is based on.

CANCELLATION NOTICE

This document has been declared "CANCELLED" as of November 2013 and has been superseded by AS603. By this action, this document will remain listed in the Numerical Section of the Aerospace Standards Index noting that it is superseded by AS603.

Cancelled specifications are available from SAE.

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Equivalent to ISO/TC 20/SC 10 DIS 6772

1. SCOPE:

This standard establishes the requirements and the procedures for impulse testing of hose assemblies, tubing, and fittings for use in aerospace metric hydraulic systems.

2. REQUIREMENTS:

2.1 Shape of Impulse Trace:

When observed on an oscilloscope, the impulse traces show as approximate pressure-time cycles. It is mandatory that these pressure-time curves be confined to the shaded area indicated in Fig. 1, and that the dynamic impulse trace produced by the test machine shall be in conformance with the trace illustrated in Fig. 1.

2.2 Calculations:

The rate of rise will be calculated as follows:

$$\text{"Rate of pressure rise"} = \frac{0.9 p - 0.1 p}{t \text{ at } 0.9 p - t \text{ at } 0.1 p}$$

Where:

p = peak pressure in kPa
t = time in seconds

2.2 (Continued):

NOTES:

- (1) The peak pressure is defined as the maximum pressure reached during the test pressure surge to 125 or 150% of the specified operating pressure, as appropriate.
- (2) Sweep rate on the oscilloscope shall be adjusted so that the slope of the pressure rise shall take advantage of the full size of the screen. The trace or photograph of the impulse cycle shall be an accurate record of the impulse cycle and shall show a grid or other means to permit accurate checking.

2.3 Preparation of Specimens:

The preparation of test specimens shall be defined in the applicable specification of the component. Specimens shall be subjected to the applicable treatments and production test requirements of the component specification.

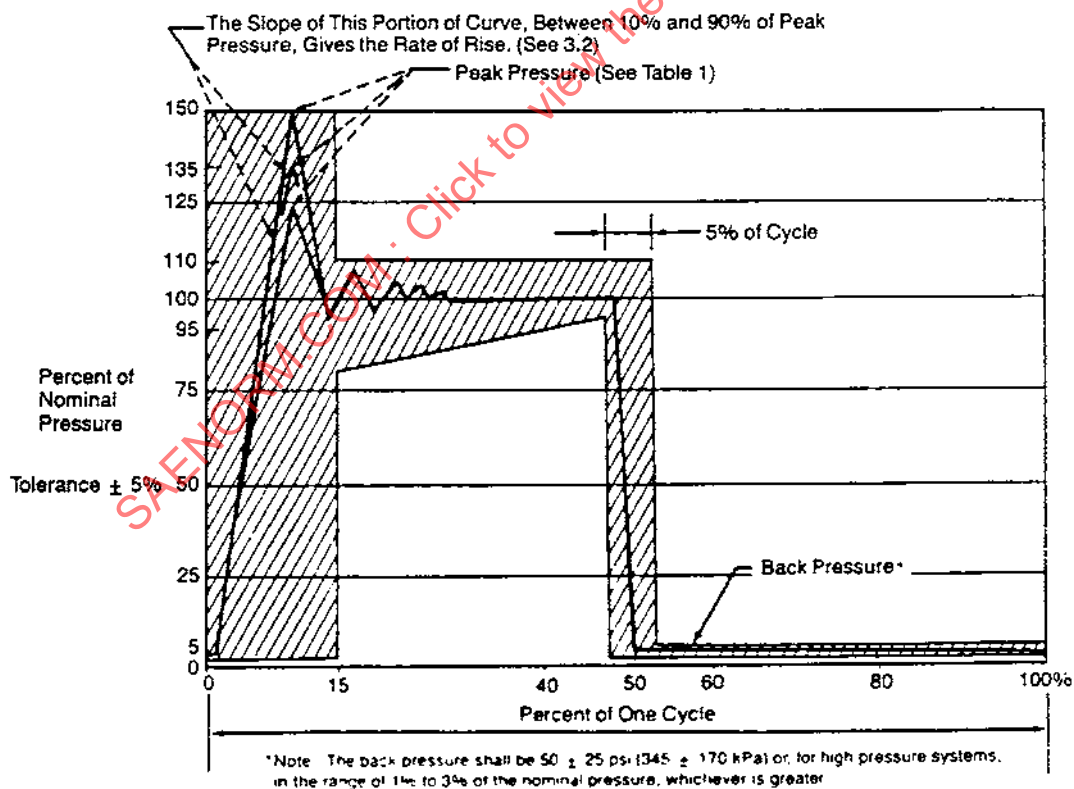


FIGURE 1 - Impulse Trace

2.4 Test Fluid:

The test fluid shall be the specified aircraft system fluid or other hydraulic fluid which is compatible with the item being tested.

3. METHOD OF TEST:

3.1 Hose Assemblies:

For testing of hose assemblies, the cycle rate shall be 70 ± 5 cpm, and the rate of pressure rise shall be per Table I, unless otherwise specified. The sequence of testing for hose assemblies shall be defined in the applicable detail specification for the hose assembly.

3.2 Tubing and Fittings:

For testing of tubing and fittings, including boss or port fittings, the cycle rate shall be 70 ± 5 cpm, peak pressure and the rate of pressure rise shall be per Table I of this specification. The assembly shall be tested in the sequence shown in Table II unless otherwise specified.

Unless otherwise specified, the total number of cycles shall be 200 000. The balance of the cycles not shown in Table II (40 000) may be added to any sequence or divided among the sequences.

After the temperature is stabilized at the maximum or minimum per Table II, a minimum soak time of one hour is required before beginning that portion of the test sequence. The temperature shall be measured within 13 mm of the test manifold and shall be maintained within the tolerance limitations defined during the testing.

4. INTENDED USE:

4.1 Standard:

This test is intended to promote standardization of impulse test requirements, procedures and equipment for the standard qualification and evaluation impulse testing of hydraulic hose assemblies, tubing and fittings.

4.2 Reference:

When this standard is referenced in a specification as part of the requirements, the following additional requirements must be specified:

- a. Operating pressure
- b. Peak pressure (when applicable)
- c. Operating temperature
- d. Design of specimens
- e. Sequence and duration (hose only)

TABLE I - Rate of Pressure Rise

Type	Pressure Classes psi kPa	Nominal Diameter Dash Size DN	Peak %	Minimum psi/s kPa/s	Maximum psi/s kPa/s
Hose, Tubing and Fitting Assemblies	1500 10 500	-8 (DN14) and smaller -10 thru -12 (DN16-DN25) -20 (DN32) -24 (DN40) and over	125	18 000	100 000
				126 000	700 000
				18 000	75 000
				126 000	520 000
	3000 21 000	All sizes	150	18 000	50 000
				126 000	340 000
	4000 28 000	All sizes	150	40 000	280 000
				126 000	280 000
	5000 35 000	All sizes	150	45 000	300 000
				315 000	2 100 000
	8000 56 000	All sizes	135	60 000	420 000
				420 000	300 000
				75 000	525 000
				525 000	300 000
				75 000	650 000
				525 000	4 590 000

Note: psi = lbf/in²