

Inspection at Time of Fill
Transportable Pressure Receptacles
Welded Steel Pressure Drums

TF01 HSE

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Introduction

This document covers requirements which reflect current practice and experience.

Each pressure drum is inspected at time the of filling in order to establish that:

- it has no defects such that the pressure drum is unsafe for filling or for continued use;
- it can be identified and complies with the relevant requirements with regard to marking, labelling, colour coding and completeness of its accessories;
- its closure(s) functions satisfactorily;
- The filling process does not introduce potential defects.

The pressure drum filling inspection shall be carried out only by persons who are trained and competent in the subject, for the purpose of ensuring that a pressure drum is safe for continued use.

1 Scope

This document:

- specifies the inspection requirements at the time of filling and applies to welded steel transportable pressure drums for liquefied gases (excluding acetylene) of water capacity from 150 litre up to 1000 litres.

- does not apply to pressure drum bundles or manifolded trailer pressure drums.

2 Normative references

This document incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this document only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prENyyyy	Transportable gas cylinders – Periodic inspection and testing of welded steel pressure drums. CEN TC23 WI00023105
EN ISO 11114-1	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials
EN ISO 11114-2	Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2 : Non-metallic materials

3 Terms and definitions

For the purpose of this document the following terms and definitions apply:

3.1 filling ratio

Mass of contents per litre of water capacity

3.2 maximum permissible filling weight

product of the water capacity of the pressure drum and the filling ratio of the gas.

3.3 pressure relief device

device which is fitted to the pressure drum or its valve and designed to open to prevent a rise of pressure in excess of a specified value because of excess temperature and/or pressure.

3.4 tare weight

sum of the empty weight, the mass of the valve including dip tube where fitted, any fixed valve guard(s) and the mass of all other parts which are permanently attached (e.g. by clamping or bolted fixing) to the pressure drum when presented for filling, where the empty weight is the mass of the pressure drum including all integral parts (e.g. neck ring, foot ring, shroud, bowling hoops) but excluding the mass of valve, valve cap or valve guard and any coating.

3.5 total weight

tare weight of the pressure drum plus the maximum permissible filling weight.

3.6 filler

person or persons responsible for inspection prior to, during and immediately after filling and who has received an appropriate level of training and assessment for the work involved, and has access to all necessary data for the product, the pressure drum, valve and all other fittings used.

4 Inspection at time of filling

4.4 Verification of serviceable condition

It shall be established that each pressure drum and associated fittings are in a serviceable condition. Before a pressure drum is filled it shall be established that the pressure drum is sufficiently clean externally and free of foreign material, such that the pressure drum can be assessed for mechanical damage that would prevent it from being filled safely. Pressure drums and/or their fittings which have been found to be non-serviceable shall be clearly identified according to written procedures by the filling organisation. Where defects are found, the

pressure drum shall not be filled but shall go to a competent test house for further investigation.

4.5 Inspection of pressure drums for suitability for filling

4.2.1 Before filling a pressure drum, it shall be established that:

- the pressure drum has not passed its due date for retest, the last test date and the mark of the last inspection body shall be clearly visible;
- the pressure drum is compatible with the intended gas content and filling weight;
- the test pressure/filling ratio are as required in the country of filling and use;
- the pressure drum is permitted for filling in the country of the filling station;
- the proposed contents corresponds with any identification label.
- that no contamination has been introduced into the pressure drum that could impair the operation of the valve or cause the pressure drum to deteriorate internally
- the installed valve(s) are suitable for the intended gas service (see EN ISO 11114-1 and EN ISO 11114-2:1999) and is in a satisfactory condition.

If required, before filling, the identity of the pressure drum's owner shall be established and their authorization to fill the pressure drum obtained.

4.2.2 Prefill inspections

The outside (external) surface of each pressure drum should be visually inspected by the filler prior to fill and where the following defects are noted the pressure drum should be put aside for further assessment.

- Evidence of leakage
- Bulge
- Mechanical damage and corrosion that could impair the integrity of the pressure drum
- Arc burns
- Unauthorised modifications
- Cracks

It is particularly important that the ends of each pressure drum are inspected for corrosion or rusting and that areas prone to crevice corrosion (for example behind data plates, shroud to concave dished end, behind loosely fitted labels, behind rolling hoops without continuous welding attachments.) and attachment welds that are prone to cracking are closely examined. Pressure drums exhibiting such evidence shall not be filled until properly investigated by a competent person for example by evacuating, cleaning and inspecting in accordance with prENyyyy.

The valves and fittings shall be inspected and as a minimum it shall be established that:

- the valve operates correctly;
- the valve is free from contaminants;
- the safety device, if present, is undamaged;
- the outlet threads and body are undamaged;
- the valve attaches correctly to the filling connector;
- where fitted, the bolts attaching the valve to the pressure drum are not corroded

If the pressure drum fails to meet all of the above criteria it shall not be filled.

4.2.3 Verification of integrity of shroud, rolling hoops and handling points

Before filling a pressure drum, it shall be established that the shroud and welded attachments do not exhibit any crack like defects and that all drainage points are free of obstruction. Rolling hoops, if fitted, shall be continually welded on both sides to the pressure drum and the welds shall be free of any cracking. Lifting attachments shall be inspected for any damage or corrosion that could impair their integrity. Shrouds, rolling hoops and lifting attachments should be free of any defects that could impose stresses into the pressure drum itself. If there is a permanent valve guard it shall be checked to ensure that it is properly attached. Where defects are found, the pressure drum shall not be filled but shall be further investigated by a competent person.

4.3 Verification of tare weight and calculation of weight of gas to be charged

The validity of the tare weight is not required to be checked if valves are used which prevent ingress of contamination, e.g. non-return/positive pressure valves, or if it can be guaranteed by appropriate checks at time of filling that no liquid or other detrimental contamination exists in the pressure drum.

If the above conditions cannot be met, then the validity of the tare weight shall be verified at the start of the filling process when the pressure drum is placed on the filling scale. The tare weight stamped on the pressure drum shall be verified by the actual scale weight readings within the tolerance of + or – 2%..

If the tare weight is not stamped on the pressure drum, or there are doubts about the validity of the tare weight, it shall not be filled until the correct tare weight has been established and marked onto the pressure drum. Examples of such doubts are illegible stampmarkings, suspected change (or absence) of guard, suspected change of valve, additional lifting points. See annex A for an example of a tare weight procedure.

When a tare weight has to be altered, a diagonal line or 'X' shall be stamped through the obsolete tare weight, if present, so that it is still legible for future reference. If more than one obsolete tare weight exists only the original tare weight (with diagonal line or 'X') shall be retained together with the new tare weight. The other obsolete tare weight(s) shall be removed taking care not to affect the integrity of the pressure drum.

The amount of liquefied gas charged into a pressure drum shall be determined by weight, or, if charged at a pressure lower than the vapour pressure, by pressure shown on a vapour pressure/temperature chart for the specific gas.

5 Inspection during fill

During the filling cycle of a pressure drum, the filler shall determine:

- that the valve is not blocked (see annex B) and that the operation is progressing satisfactorily (e.g. by checking the weight increase);
- that the valve does not leak in the open position for example from the gland nut (e.g. by the use of a compatible leak test fluid or an electronic leak detector).
- That the pressure drum does not leak (for example through a pin hole in a weld)

If any of the above criteria are not met then the filling shall be stopped immediately and the pressure drum emptied in a safe manner and the fault rectified.

6 Inspection after fill

After filling a pressure drum the filler shall ensure that the valve or pressure relief device does not leak when the valve is closed and disconnected from the fill connection. If leakage is suspected a check shall be carried out for seat leakage at the valve outlet. Also it shall be checked that the interface between the valve and the pressure drum is leaktight. All welds shall be inspected by an appropriate leak detection method to ensure that the pressure drum is free from leaks.

If leakage is found, the pressure drum shall be emptied of all contents immediately and made safe.

6.1 Check for correct filling

Once filling is complete the total weight shall be checked by use of a calibrated scale capable of determining the gas content of that pressure drum. The weight of the full pressure drum shall not exceed the total weight allowed for that pressure drum and gas combination. The accuracy of the scale shall be checked every shift.

If the pressure drum has been overfilled the excess gas shall be removed immediately without the need to move the pressure drum. If the overfill could result in the pressure within the

pressure drum exceeding the pressure drum hydraulic test pressure then the pressure drum shall be depressurised and examined by a competent person.

On completion of filling it shall be confirmed that the pressure drum is correctly identified and labelled in accordance with the correct transportation and use legislation.

If a valve guard is fitted prior to dispatch a check shall be made of the guard fitting attachment.

Annex A

Example of a procedure to establish a correct tare weight

A correct tare weight may be determined as follows:

- a) Perform all necessary purges and evacuation steps in order to open the pressure drum;
- b) Valve removal (see annex B); or inspection port cover opening;
- c) Visually inspect the pressure drum internally and externally for corrosion, excess paint on exterior, contamination or build-up on interior. Clean if necessary, e.g. shotblast. Requalify to prENyyyy, if necessary, e.g. evidence of excess corrosion requires retesting;
- d) Weigh pressure drum on a calibrated scale:
 - Place the empty pressure drum, together with a valve of type to be used, or inspection port cover, on the scale and weigh;
 - From this reading establish the correct tare weight for the pressure drum with the valve;
- e) Stamp the tare weight onto the pressure drum in kilograms to the nearest kilogram.

Annex B

Procedure to be adopted when a pressure drum valve is suspected to be obstructed

B.1 If there is any doubt when the valve of a pressure drum is opened, that gas is not being released and that the pressure drum may still contain gas under pressure, a check shall be made to establish that the free passage through the valve is not obstructed.

The method adopted shall be a recognised procedure such as one of the following or one that provides equivalent safeguards:

- a) For pressure drums of liquefied gases, first check to establish that the weight of the pressure drum is the same as the tare weight stamped on the pressure drum. If there is a positive difference, the pressure drum may contain either liquefied gas under pressure or contaminants;
- b) Introduce inert gas at a pressure of up to 5 bar and check it the discharge of gas from the pressure drum;
- c) Use the device, or similar to pump an inert gas into the pressure drum.

B.2 When it is established that there is no obstruction to gas flow in the pressure drum valve, the valve may be removed.

B.3 When a pressure drum is found to have an obstructed gas passage in the valve, the pressure drum shall be set aside for special attention:

The preferred method is to unscrew partially the valve within a glanded cap, secured and joined to the pressure drum and vented to a safe discharge.

These procedures shall be carried out only by trained personnel. When the gas, if any, has been released and the pressure within the pressure drum reduced to atmospheric pressure, and when there is no frost or condensation on the outside of the pressure drum the valve may be removed.