

## **Multilateral Agreement M301**

### **under section 1.5.1 of ADR concerning the periodic inspection of some steel cylinders intended for the carriage of liquefied petroleum gas (UN 1965)**

1. By derogation from the provisions of 6.2.1.6.1 (a), (b) and (d) of ADR, the periodic inspection of over-moulded welded steel liquefied petroleum gas (LPG) cylinders, provided the conditions in point 2 below are met, can be done by an inspection body authorised by the competent authority in accordance with the points described in the appendix.
2. This agreement only applies to liquefied petroleum gas cylinders with a capacity lower than or equal to 12,8 litres and complying with the following requirements:
  - 2.1. The cylinders are manufactured in accordance with Directive 84/527/EEC, Directive 1999/36/EC or Directive 2010/35/EU. They are over-moulded with a polyurethane material whose mechanical and adhesion properties insure an integrity which guarantees the metallic cylinder one, in accordance with EN 1442 and EN 14140.
  - 2.2. All the cylinders for which this agreement is applicable are accurately identified and recorded in a detailed information technology database.

The record allows:

    - To trace the specific technical characteristics of the cylinders;
    - To accurately operate each cylinder;
    - To ensure the mandatory monitoring of the cylinders;
    - To automatically withdraw a batch of cylinders to perform tests and/or to manage the periodic inspection test date;
    - To carry out the marking which indicates the successful completion of the periodic inspection;
    - To look for the history of all the events of a cylinder life.
  - 2.3. Each step related to the follow-up of these cylinders is recorded in an information technology database.

The database system shall record:

    - The identification of each cylinder;
    - The manufacturing information of each cylinder;
    - The status of each cylinder regarding periodic inspection;
    - The tare weight of each cylinder;
    - The segregation before filling of any identified cylinder or batches of cylinders for any reason (e.g. periodic inspection, sampling).
  - 2.4. The quality of LPG shall comply with the corrosion contaminants level specified in ISO 9162:1989.
3. The date of the last periodic inspection will be marked on each cylinder (of the same series) during the next filling process, provided the successful completion of the valve control or the valve replacement.
4. This agreement shall be valid from 1 January 2017 to 31 December 2021 for the carriage on the territories of those ADR Contracting Parties signatory to this Agreement. If it is revoked before that date by one of the signatories, it shall remain valid until the above mentioned date only for carriage on the territories of those ADR Contracting Parties signatory to this Agreement which have not revoked it.

The competent authority for ADR  
in

## Appendix to Multilateral Agreement M3xx

### a) Testing procedure

Testing shall occur:

- After 3 years of service and
- Every 5 years after the first tests.

The tests shall at least include:

- Burst test whose procedure (modus operandi) is in accordance with EN 1442:2006 + A1:2008, and
- Peeling and corrosion tests in accordance with ISO 4628-3:2003, and
- Adhesion tests of the polyurethane material. The number of cylinders to be tested is set by ISO 2859-1:1999 (single sampling for normal inspection, inspection level 1) applied to one thousandth of the annual production. The minimum adhesion value is set to 0,5 N/mm<sup>2</sup>. If the result does not comply with this criteria for at least one cylinder, a second sampling, whose quantity is fixed by the tightened sampling plan of the same standard applied to one thousandth of the production, is made. If at least one cylinder of the second sampling does not comply with the minimum value of the adhesion criteria, the periodic inspection of the batch depends on the results of the peeling and burst tests described in Table 1.

### b) Rejection criteria and batch sampling

The rejection criteria and sampling levels shall be in accordance with Table 1.

### c) Periodic inspection tests reports and records

Periodic inspection reports shall be made available to the competent authority upon request. At the end of the tests, the database (see point 2.3) is updated for the cylinders of the batch or sub-batch. When the cylinders return to a filling plant, the cylinders from the relevant batch are:

- Marked in accordance with 6.2.3.9 of ADR (see point 3), provided the successful completion of the valve control or the valve replacement;
- Or, if the batch or sub-batch fails, withdrawn.

**Table 1. – Batch sampling**

| Test interval (years)    | Test type             | Standard   | Rejection criteria   | Batch sampling level   | Test results   |
|--------------------------|-----------------------|------------|--|--|--|
| After 3 years of service | Burst test            | EN 1442    | Burst pressure (*) < 70 bar in propane service or 50 bar in butane service | 3 x $\sqrt[3]{Q}$ or Q/200 whichever is lower and with a minimum of 20 per batch (Q) | If any test fails, repeat tests replacing Q with monthly production q of representative sub-batches. |
|                          |                       |            | Volumetric expansion (*) < 15% or 9% (**)                                  |  |  |
|                          | Peeling and corrosion | ISO 4628-3 | Maximum corrosion grade: Ri2   | Q/1000   |  |
| Every 5 years            | Burst test            | EN 1442    | Burst pressure (*) < 70 bar in propane service or 50 bar in butane service | 6 x $\sqrt[3]{Q}$ or Q/100 whichever is lower and with a minimum of 40 per batch (Q) |  |
|                          |                       |            | Volumetric expansion (*) < 13, 12 or 9% (**)                               |  |  |
|                          | Peeling and corrosion | ISO 4628-3 | Maximum corrosion grade: Ri2   | Q/1000   |  |

Q represents the total number of cylinder made by a manufacturer in the same year  
q represents a continuous monthly production batch

(\*)

For each of the two groups of figures (burst pressure and volumetric expansion), the "right" unilateral statistical tolerance interval is calculated for a confidence level of 95% and a fraction of population equal to 99%. The calculation is made in accordance with the standard ISO 16269-6:2005 (Statistical interpretation of data – Part 6: Determination of statistical tolerance intervals) admitting, for each of the groups of figures, the normality of the population and considering that the variance is unknown.

(\*\*)

For the cylinders manufactured according to Directive 84/527/EEC, the volumetric expansion cannot be lower than:

- 15% for the tests done 3 years after manufacturing,
- 13% for the tests done 8 years after manufacturing,
- 12% for the following tests.

For the cylinders manufactured according to Directive 1999/36/EC or Directive 2010/35/EU, the volumetric expansion cannot be lower than 9%.