

## **Economic Commission for Europe**

### **Inland Transport Committee**

**Working Party on the Transport of Dangerous Goods**

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Item 4 of the provisional agenda

**Reports of informal working groups**

### **Periodic inspections and test of some transportable refillable LPG steel cylinders - Comments on ECE/TRANS/WP.15/AC.1/2015/48**

**Transmitted by the Government of Spain**

#### **Introduction**

1. Work on the periodic inspection and test of some transportable refillable LPG steel cylinders has been a topic on which in the last Joint meetings much discussion has taken place.
2. Spain has already voiced its general concern on the inspection method proposed, based on carrying out part of the tests only on samples for each production group. Below Spain presents its comments on the present proposal prepared by AEGPL in ECE/TRANS/WP.15/AC.1/2015/48, as modified by INF 20.

#### **General comments**

Testing on samples taken out of batches is a useful testing method used for industrial processes in mass production. In serial manufacturing, the production process is carried out under constant parameters: same material, same manufacturing procedures, same conditions, same operator, same controls, etc. Once the homogenous manufacturing conditions disappear, and each pressure receptacle is subject to different environmental and use conditions and strains. Therefore, it is not possible to assume that the situation of the pressure receptacles which have to be controlled is homogenous. Samples are not representative any more of their production group. Testing only samples is not enough to detect those pressure receptacles that have been subject to the worst conditions; those will be further used, without having been specifically controlled...

Therefore, Spain opposes to the introduction of inspection methods where not all tests, and specifically quiet important tests, are carried out on each pressure receptacle.

## **Designing methods**

Engineering and design of any device has to take into account current legislation on the subject. This also means that new designs have to take into account current inspection methods, or possible future equivalent inspection methods with an equivalent level of safety, and adapt the designs to these methods.

Until this moment, the presented inspection method, even if it has been used for years in two countries, has not been proved to have an equivalent level of safety. It is difficult to really know the state of the receptacle without testing.

By introducing this inspection possibility, we would be opening the door to the possibility of designing pressure receptacles which do not fulfill the present legislation-and afterwards push to modify the legislation, and this procedure can hardly be thought as a technical advance.

## **Normal statistical distribution**

It has been stated by AEGPL that the distribution of bursting pressure and volumetric expansion are normal, and this allows a statistical analysis of the pressure receptacles.

The normal distribution does not assure that a very very high percentage of the samples are near the average of the normal distribution, nor allows it to detect those samples which are on the “left side of the curve” and have the worst properties. Only individual testing will allow to pick these out.

## **Grouping for statistical purposes**

Grouping for statistical purpose and to select the samples of one calendar year is a too extensive period. During manufacture, even without changing the material, the design and the production process, there are characteristic factors that make it necessary to adjust the manufacture process.

Each steel lot is different from each other, even if it is the same steel kind. Each steel batch that is used will make recalibration and adjustments of the press and welding parameters necessary.

A pressure receptacle is made out of two parts, manufactured separately out of high drawability material; the steel coil fulfil its own standards, which has some tolerances, and which make each material unique. So, each time a different coil arrives, a new lot begins.

Any quality assurance system will not accept that the lot is established for a yearly production. Each time the machinery starts and stops for a certain period of time (shift changes or weekends), is also considered to be a different lot.

Therefore, smaller periods of time should be considered.

## Representation of the samples

It has already been mentioned that once the pressure receptacles leave the factory, the equal, controlled production conditions disappear. Pressure receptacles will be subject to different environmental and use conditions, for example extreme temperature conditions, salty atmosphere, high refilling frequency, or inadequate treatment. Therefore, it is not possible to assume that the situation of the pressure receptacles which have to be controlled is homogenous. Each pressure receptacle, after several years of different use, is different and has to be considered individually.

Drawing a parallelism to the production of vehicles, a normal production of a small utilitarian car model is of approximately 1200 vehicles per day. This would suppose a yearly production of 264.000 cars (220 working days). After for example 10 years of use, and 150.000 km (by average), applying the proposed batch sampling method, it would be enough to pass the technical inspection for only 192 vehicles out of 264.000. The results would be valid for the other 263.808 cars, without taking into account the different conditions of use, maintenance and conservation. Even, of course, vehicles do not represent exactly the same case, the use of each pressure receptacles involves safety risks for individuals for the users and their surroundings.

## Test failure

If any test fails, no further possibility of sample testing should be allowed.

Sampling inspection is used in the production lines. But even if a vehicle has been manufactured serially, if a problems in the brakes is detected afterwards, you call back all of the production, and check them one by one. No defective product should be allowed to remain.

In a similar way, if any problem is detected during sample inspection, all products should be withdrawn and retested one by one. If no testing is possible, the whole lot of products has to be retired from the market, as any failure during pressure receptacle operation is a threat for the persons using it.

## Hydraulic test

The hydraulic test is considered to be fundamental in ADR; hydraulic test or an equivalent test, has to be done for 100% of the bottles.

If it is considered fundamental for other pressure receptacles, why not for these?

If we are now substituting these tests by testing one sample out of a years production, it seems that the hydraulic test is not fundamental.

The hydraulic test does not only tests the tightness of the bottle, but also subjects the material to a high stress, which indirectly proves the capacity of elongation of the material without producing cracks and the elastic recovery of the pressure receptacle without deformation, which are factors directly related to the materials aging and inner state.

The hydraulic tests gives much information, which would be lost. Therefore it is mandatory for each pressure receptacle, except when an equivalent test can be used.

An economical factor is clearly involved in pushing to change the inspection method, as sampling inspection involves less cost than 100% inspection. Therefore, if the testing of samples would be accepted, in spite of providing less security, we would be encouraging the manufacture of these bottles at the expense of the rest of the industry, because of a less expensive testing method.

By applying different testing requirements to pressure receptacles, different safety levels are established. It does not seem to be reasonable to have different safety levels for pressure receptacles that contain the same product, and that would be used in equal applications.

## **Conclusion**

9. Spain considers that the inspection method proposed does not guarantee the safety of the product, and therefore opposes the introduction of these pressure receptacles into ADR/RID, until a different inspection system carried out on the 100% of the pressure receptacles is established.

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