

**Harmonization of
ECE R110 (Annex 3A)
&
ISO 11439: 2013 “High pressure
cylinders for the on-board storage of
natural gas as a fuel for automotive
vehicles”**

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ECE R110 Annex 3A was originally based on the 1998 Draft International Standard for ISO 11439 (ISO/DIS 11439: 1998)

- ISO/DIS 11439 underwent a number of changes before it was eventually published as ISO 11439: 2000

Since 2000, both documents have been diverging even further

- R110 allowed use of stainless steels and welded construction for CNG fuel cylinders
- ISO 11439 was revised in 2013 to address safety issues that had occurred with CNG fuel cylinders

Numerous technical differences exist between ECE R110 Annex 3A, and ISO 11439

First proposed harmonizing ECE R110 with ISO 11439 in 2015

Driving forces for harmonization:

- CNG cylinder manufacturers did not want to perform different tests to comply with both the R110 regulation, and the ISO 11439 standard
- Safety concerns, since ECE R110 specified an environmental test for cylinders that was inadequate in preventing in-service CNG cylinder failures due to stress corrosion cracking of composite reinforcement
- A need correct erroneous references in ECE R110 to other test standards – these were inadvertently introduced in the 1998 version of ISO/DIS 11439
- The ECE R110 Annex 3A test requirements for cylinders are due for updating considering that they are essentially unchanged from the original 1998 requirements of ISO/DIS 11439 - Note also that ISO 11439 was revised in 2013 due to in-service cylinder failures

Harmonization Proposal



In 2016, comprehensive changes were proposed to fully harmonize ECE R110 with the ISO 11439 standard

- Several national committees, particularly France and Germany, spent considerable time to review the proposal, and indicate where the requirements of the ISO 11439 standard were incompatible with the Regulation
- It is now recognized that it is not possible to achieve 100% harmonization between the ISO standard and the regulation
- In addition, even if the Regulation was harmonized with the standard, that harmonization would only last a very short time before one of the documents made unilateral changes

In 2017, the proposal has been revised to limit the harmonization changes to ECE R110 Annex 3A to the following:

- Items that affect cylinder safety
- Items that affect the ability of certain tests to be conducted

Summary of Proposed Changes to ECE R110 Annex 3A



Replace the acid environment test in A.14 with the Environmental test already provided in Appendix H as a non-mandatory test

- Update the Environmental test with the revised procedures in ISO 11439: 2013

Modify A.16 Penetration test to allow the gunfire testing all-metal cylinders to be conducted at 90 degree angle, instead of 45 degree angle (difficult for bullets to penetrate at an angle)

Update/correct various referenced standards used in the test procedures