
Changes to legislation: There are outstanding changes not yet made to Regulation (EC) No 79/2009 of the European Parliament and of the Council. Any changes that have already been made to the legislation appear in the content and are referenced with annotations. (See end of Document for details) [View outstanding changes](#)

Regulation (EC) No 79/2009 of the European Parliament and of the Council of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC (Text with EEA relevance)

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ANNEX III

Applicable test procedures for hydrogen components,
other than containers, designed to use liquid hydrogen

HYDROGEN COMPONENT	TYPE OF TEST										
	Pressure test	External leakage test	Endurance test	Operational test	Porosity test	Resistance to dry-heat test	Ozone ageing test	Temperature cycle test	Pressure cycle test	Hydrogen compatibility test	Seat leakage test
Pressure relief devices	➤	➤		➤	➤			➤		➤	
Valves	➤	➤	➤		➤	➤	➤	➤		➤	➤
Heat exchangers	➤	➤			➤	➤	➤	➤		➤	
Refuelling connections or receptacles		➤	➤		➤	➤	➤	➤		➤	➤
Pressure regulators	➤	➤	➤		➤	➤	➤	➤		➤	➤
Sensors	➤	➤			➤	➤	➤	➤		➤	
Flexible fuel lines	➤	➤			➤	➤	➤	➤	➤	➤	

Subject to specific requirements in relation to any of the hydrogen components, the test procedures to be applied for the type-approval of hydrogen components, other than containers, designed to use liquid hydrogen must include:

- Pressure test: the purpose of the test is to provide evidence that the hydrogen components can withstand a level of pressure which is higher than the working pressure of the component. The hydrogen components must not show any visible evidence of leak, deformation, rupture or cracks when the pressure is increased to a certain level.
- External leakage test: the purpose of the test is to provide evidence that the hydrogen components are free from external leakage. The hydrogen components must not show evidence of porosity.
- Endurance test: the purpose of the test is to provide evidence that the hydrogen components are capable of continuous reliable operation. The test consists of carrying out a specific number of test cycles for the hydrogen component under specified temperature and pressure conditions. A test cycle means the normal operation (i.e. one opening and one closing) of the hydrogen component.
- Operational test: the purpose of the test is to provide evidence that the hydrogen components are capable of operating reliably.

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- (e) Corrosion resistance test: the purpose of the test is to provide evidence that the hydrogen components are capable of resisting corrosion. In order to prove this, the hydrogen components are submitted to contact with specified chemicals.
- (f) Resistance to dry-heat test: the purpose of the test is to provide evidence that the non-metallic hydrogen components are capable of resisting high temperature. In order to prove this, the components are exposed to air at the maximum operating temperature.
- (g) Ozone ageing test: the purpose of the test is to provide evidence that the non-metallic hydrogen components are capable of resisting ageing due to ozone. In order to prove this, the components are exposed to air with high ozone concentration.
- (h) Temperature cycle test: the purpose of the test is to provide evidence that the hydrogen components are capable of resisting high variations of temperature. In order to prove this, the hydrogen components are submitted to a temperature cycle of specified duration from the minimum operating temperature up to the maximum operating temperature.
- (i) Pressure cycle test: the purpose of the test is to provide evidence that the hydrogen components are capable of resisting high variations of pressure. In order to prove this, the hydrogen components are submitted to a pressure change from atmospheric pressure to the maximum allowable working pressure (MAWP) and then back to atmospheric pressure within a short period of time.
- (j) Hydrogen compatibility test: the purpose of the test is to provide evidence that metallic hydrogen components (i.e. cylinders and valves) are not susceptible to hydrogen embrittlement. In hydrogen components that are subjected to frequent load cycles, conditions that can lead to local fatigue and the initiation and propagation of fatigue cracks in the structure must be avoided.
- (k) Seat leakage test: the purpose of the test is to provide evidence that hydrogen components are free from leakage while installed in the hydrogen system.

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Changes and effects yet to be applied to the whole legislation item and associated provisions

- Signature words omitted by [S.I. 2022/1273 reg. 52\(8\)](#)
- Art. 2(1) words substituted by [S.I. 2022/1273 reg. 52\(2\)](#)
- Art. 11(1)(a) words omitted by [S.I. 2022/1273 reg. 52\(4\)\(a\)\(iv\)](#)
- Art. 11(3)(a) words omitted by [S.I. 2022/1273 reg. 52\(4\)\(c\)\(iv\)](#)
- Art. 12(e) word omitted by [S.I. 2022/1273 reg. 52\(5\)\(b\)](#)