## Proposal for amendments to Regulation No. 110 - CNG/LNG vehicles

The text reproduced below was prepared by The Netherlands proposing to correct and introduce references within UN Regulation No. 110. Modifications to the original text are marked in bold for new characters and strikethrough for deleted characters.

## I. Proposal

Annex 4D, paragraph 2.2., insert a new reference to Annex 5Q to read:

"2.2. The materials constituting the regulator which are in contact with the heat exchange medium of the regulator when operating, shall be compatible with that fluid, **the procedure** in Annex 5Q shall be used."

Annex 4I, paragraph 2.2., insert a new reference to Annex 5Q to read:

"2.2. The material constituting the LNG heat exchanger - vaporizer which is in contact with the CNG when operating shall be compatible with the test CNG. In order to verify this compatibility, the procedure in Annex 5D shall be used.

The materials constituting the LNG heat exchanger - vaporizer which are in contact with the heat exchange medium of the regulator when operating, shall be compatible with that fluid, the procedure in Annex 5Q shall be used."

Annex 5, Table 5.1, insert a new reference to Annex 5Q to read:

"Table 5.1

Test	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Annex
Overpressure or strength	X	X	X	X	О	X	X	5A
External leakage	X	X	X	X	О	X	X	5B
Internal leakage	A	A	A	A	О	A	A	5C
Durability tests	A	A	A	A	О	A	A	5L
CNG/LNG compatibility	A	A	A	A	A	A	A	5D
Corrosion resistance	X	X	X	X	X	A	X	5E
Resistance to dry heat	A	A	A	A	A	A	A	5F
Ozone ageing	A	A	A	A	A	A	A	5G
Burst/destructive tests	X	О	O	О	О	A	X	5M
Temperature cycle	A	A	A	A	О	A	A	5H
Pressure cycle	X	О	О	О	О	A	X	5I
Vibration resistance	A	A	A	A	О	A	A	5N
Operating temperatures	X	X	X	X	X	X	X	5O
LNG low temperature	О	О	О	О	О	X	О	5P
Compatibility with heat exchange fluids of non-metallic parts	A	A	A	A	A	A	A	5Q

- X = Applicable
- O = Not applicable
- A = As applicable

## Remarks:

- (a) Internal leakage: Applicable if the Class of the component consists of internal valve seats that are normally closed during engine "OFF" condition;
- (b) Durability test: Applicable if the Class of the component consists of integral parts that will move repeatedly during engine operation;
- (c) CNG compatibility, resistance to dry heat, ozone ageing: Applicable if the class of the component consists of synthetic / non-metallic parts;
- (d) Temperature cyclic test: Applicable if the class of the component consists of synthetic / non-metallic parts;
- (e) Vibration resistance test: Applicable if the Class of the component consists of integral parts that will move repeatedly during engine operation.
- (f) Compatibility with heat exchange fluids of non-metallic parts: Applicable, if the Class of the components consists out of material in contact with the heat exchange fluid."

Annex 5Q, Figure 1-2, amend to read (also inserting a new row):

"Figure 1-2 Tests applicable to specific classes of components (excluding CNG cylinders and LNG tank)

Test	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Annex
Overpressure or strength	X	X	X	X	О	X	X	5A
External leakage	X	X	X	X	О	X	X	5B
Internal leakage	A	A	A	A	О	A	A	5C
Durability tests	A	A	A	A	О	A	A	5L
CNG/LNG compatibility	A	A	A	A	A	A	A	5D
Corrosion resistance	X	X	X	X	X	A	X	5E
Resistance to dry heat	A	A	A	A	A	A	A	5F
Ozone ageing	A	A	A	A	A	A	A	5G
Burst/destructive tests	X	О	О	О	О	A	X	5M
Temperature cycle	A	A	A	A	О	A	A	5H
Pressure cycle	X	О	О	О	О	A	X	5I
Vibration resistance	A	A	A	A	О	A	A	5N
Operating temperatures	X	X	X	X	X	X	X	5O
LNG low temperature	О	О	О	О	О	X	О	5P
Compatibility with heat exchange fluids of non-metallic parts	A	A	A	A	A	A	A	5Q
X = Applicable O = Not applicable A = As applicable								

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## II. Justifications

- 1. Currently, the test requirement "Compatibility with heat exchange fluids of non-metallic parts" Annex 5Q is part of UN Regulation No. 110. In Annex 4D, the wording "Compatibility with heat exchange fluids" is used but there is no reference to the applicable tests.
- 2. In Annex 4I, the component "LNG heat exchanger vaporizer" consist out of material in contact with the heat exchange fluid. Therefore, reference to this Annex 5Q should be made.
- 3. Also in the general overview Figure 1-2, with all tests from Annex 5, and Table 5.1 in Annex 5 does not have any reference to the mentioned test, already present in the current revision of UN Regulation No. 110.