CERTIFICATION Notice

An Urgent Bulletin from CSA Group

Gas Products No. 425
(Supersedes Informs Gas Products No. 095 – Ref No. I06-007; Gas Requirements – 2.90 U.S. dated May 22, 1990, Revised January 14, 2005)

Effective Date: July 31, 2019

Date: January 5, 2018

Apply Before February 22, 2019

Announcing: Publication of CSA / ANSI NGV 5.2-2017 Vehicle Fueling Appliances

Class No: 3315 94, NATURAL GAS VEHICLE (NGV) - Fueling Appliances - Certified to U.S. Standards
3315 05, NATURAL GAS VEHICLE (NGV) - Fueling Appliances

To purchase the Standard, visit us at www.shop.csa.ca

Who is affected?

Manufacturers of vehicle fueling appliances.

What do you do?

1. CSA Group Service Delivery staff will contact you to address compliance with each revision as applicable to the product designs covered in your affected Certification Reports. In addition to updates to your Certificate(s) of Compliance & Report(s), testing may be required to comply with these revisions.
2. Please respond within thirty (30) days of receiving CSA Group's "Application for CSA Certification Services" and "Quotation" communication. You must respond no later than February 22, 2019 in order to guarantee the update to your certification is completed by July 31, 2019. If testing is needed, we will inform you of the samples required.

Approvals:

American National Institute, Inc. approved on June 15, 2017

Interprovincial Gas Advisory Council: approved on May 6, 2017

Major Revisions:

The publication of this standard supersedes the requirements of CSA 12.6-04, CSA Requirement 2.90 U.S., and TIL R-20.

See attachment 1

For questions specific to your file or products contact your CSA Group technical staff associate.
Go to http://www.csagroup.org/services/testing-and-certification/product-listing/ and enter your Master Contract # and the class numbers associated with this Notice to determine which of your products are affected.

For technical questions on this Certification Notice

Contact Gregory Chirdon
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or e-mail Gregory.Chirdon@csagroup.org

The standard edition or amendments announced in this Notice may be used for certification as of the date of issue of this Notice. The "Effective date" in this Notice is the date on which the current requirements, applicable to Certified products listed in the affected class numbers, expire and the standard edition or amendments announced in this Notice become the only requirements that may be used for certification.

In the event that currently certified products do not comply with the latest requirements outlined in this Notice after the "effective date", the certification of such models may be discontinued.

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ATTACHMENT 1

Major Revisions

Clause(s)	Changes
1.1	Scope: The requirements of CSA/ANSI NGV 5.2-2017 standard pertain to newly manufactured non-residential appliances. Moreover, NGV 5.2-2017 includes two notes within its scope stating: 1) that residential fueling appliances (RFA) are addressed in CSA NGV 5.1., and 2) devices dedicated only to dispensing fuel into vehicles are addressed in CSA NGV 4.1. In contrast, CSA 12.6-04 and CSA 2.90 included requirements for residential and commercial applications.
1.2e	Application: The NGV 5.2-2017 standards shows a number of applications in clause 1.2. The standard now emphasizes that the vehicle fueling appliance is certified as a system with temperature compensated pressure limits for delivery of fuel for 1) direct fueling of vehicles, 2) fueling of vehicles from the systems internal storage, 3) filling of external natural gas storage systems; or 4) any combination of the above.
1.2f	Application: In clause 1.2f, the NGV 5.2-2017 standard now says that the maximum inlet flow rate shall not exceed 10 SCFM (17 SCMH). In contrast, CSA 2.90, clause 1.1f stated that the capacity (flow rate) shall not exceeding 15 SCFM (25.5 cubic meters per hour), except 5 SCFM (8.5 cubic meters per hour) for residential use.
1.2g	Application: In clause 1.2g, the standard reiterates that the standard applies to vehicle fueling appliances (VFA) for installation in non-residential occupancies. . In contrast, CSA 12.6-04 and CSA 2.90 included requirements for residential and commercial applications.
1.2j	Application: In clause 1.2j, the standard clarifies that the VFA is intended for connection to a single vehicle, multiple vehicles, or storage systems.
4.2	Ambient temperature: NGV 5.2-2017 states that the VFA shall be able to withstand an ambient temperature range between -40 to 55°C (-40 to 131°F). In contrast, CSA 12.6 stated that a compressor package under this standard for reliable and safe operation at ambient temperatures of -40°C (-40°F) and the manufacturer's declared maximum ambient temperature rating ; this declared rating is not less than 40°C (104°F). Additionally, CSA 12.6 stated that the manufacturer shall submit acceptable evidence from seal, diaphragm, O-ring, and other non-metallic part manufacturers that the particular material is suitable for use in the ambient temperature range -40 to 55°C (-40 to 131°F).
4.3	Operating temperature: NGV 5.2-2017 states that the VFA shall, at a minimum, have an operating temperature range between 0°C (32°F) and 40°C (104°F). The manufacturer may specify a lower minimum temperature and/or a higher maximum temperature. The unit shall be non-functional outside of the manufacturer's specified temperature range. It is this latter sentence—that the unit is to be nonfunctional outside of the manufacturer's specified temperature range—which is unique to NGV 5.2-2017. In contrast, CSA 12.6 doesn't explicitly state that the unit has to be nonfunctional outside of the manufacturer's specified temperature range. It states that a vehicle refueling appliance shall operate reliably without safety-related shutdown at all ambient temperatures between -40°C (-40°F) and the declared maximum ambient temperature rating.
4.7	Copper alloy parts: NGV 5.2-2017 states that fuel conveying copper alloy parts shall be resistant to stress corrosion cracking when tested in accordance with ASTM B858. In

Clause(s)	Changes
	contrast, CSA 2.90 states that parts constructed of brass shall be resistant to season cracking after immersion in an aqueous mercurous-nitrate solution by demonstrating compliance to ASTM B154.
4.10.1	Hoses (2 psi or higher): NGV 5.2-2017 states that all hoses utilized in the VFA, including the fill hose, shall meet the requirements of ANSI/CSA NGV 4.2 ● CSA 12.52.
4.10.2	Hoses (under 2 psi): NGV 5.2-2017 states that all hoses utilized in the VFA, under 2 psi, shall meet the requirements of either CSA 8.1 or CSA 8.2 as applicable.
4.11	NGV 5.2-2017 adds gas retention limits for all VFAs.
5	Flow rate: NGV 5.2-2017 states the permissible appliance maximum flow rates. These appliance maximum flow rates are shown in categories, that is, for VFAs listed for: a) indoor installation and fueling, and b) VFAs listed for outdoor installation with vehicle indoor fueling. For VFAs listed for indoor installation and fueling, the inlet flow rate to the VFA shall not exceed 5.0 SCFM (8.5 SCMH). This flow rate is more stringent than the flow rate expressed in former CSA 12.6, clause 5.2.1, where this latter standard simply stated: A VRA shall have a flow rate not in excess of 0.3 m^3/min. (10 ft^3/min) when operated at any inlet condition.
6.2	Rating of components/parts: NGV 5.2-2017 clarifies that all components and parts subject to the fill pressure of the VFA shall be rated to the MAWP. The VFA manufacturer shall provide specifications and ratings as published or declared by the component manufacturer. CSA 12.6, clause 4.6.1 has a correlating requirement but it expresses that all pressure-bearing parts and components shall be designed for at least the maximum working pressure.
6.4	Isolation installation: NGV 5.2-2017 states a means of isolation (e.g., shutoff valve) shall not be installed between the monitored pressure source and the pressure-relieving means.
6.7.3	NGV 5.2-2017 has added a wall, floor, and ceiling temperature test.
6.8.1	Both the NGV 5.2-2017, clause 6.8.1 and CSA 2.90, clauses 3.1.4 and 3.1.5 states to conduct a risk analysis. But the NGV 5.2 standard, clause 6.8.1 now gives a note stating that guidance for risk analyses can be found in certain standards, where the title of these standards are detailed in the note.
6.8.6	Unauthorized access: NGV 5.2-2017 clarifies that a tamper-resistant means and associated markings shall be required to discourage unauthorized entry into the controls and compression portions of the VFA. In contrast, CSA 2.90 simply states any exposed access cover shall require the use of a tool, or equivalent means, to open.
6.8.8	Identical to CSA 2.90, NGV 5.2-2017 has a requirement that the outer casing (housing) of the appliance shall incorporate intake (inlet) and exhaust (outlet) openings that provide air circulation. But NGV 5.2-2017 has deleted the following construction requirement regarding such openings: The minimum dimension of each shall not be less than ¼ inch (6.35 mm).
6.8.12	The former CSA 12.6 standard applied to Canada. With regard to solid state devices used for safety, CSA 12.6 correctly referenced that such items comply with CSA C22.2 no. 0.8 for it is the appropriate Canadian requirement. But NGV 5.2-2017 is a bi-national standard. Therefore, the U.S. requirement for solid state devices used for safety had to be added. Therefore, NGV 5.2-2017 also references UL 991.

Clause(s)	Changes
6.8.13	NGV 5.2-2017 adds a requirement for software. It references that software used to control the VFA's emergency shutdown system shall be evaluated in accordance with UL 1998 or CSA C22.2 No. 0.8, as applicable.
6.9.1	NGV 5.2-2017 has added a requirement stating that a VFA shall be equipped with a nozzle and at least one fueling hose. Each individual hose shall have a maximum length of 7.6 m (25 ft.).
6.9.3	Both NGV 5.2-2017 and CSA 12.6 (clause 5.5.9) make reference that the breakaway device shall conform with ANSI NGV 4.4/CSA 12.54. But NGV 5.2-2017, clause 6.9.3 adds the following statement: "Where hoses are attached to a hose retrieving mechanism, the breakaway quick closing device shall be installed between the point of attachment of the hose retrieving mechanism to the hose and the nozzle, unless the retrieving mechanism separates from the hose at a force less than that of the breakaway quick closing device, does not affect operation of the hose breakaway feature, and does not result in damage to the VFA frame.
6.9.5	NGV 5.2-2017 states that the pressure in the fueling hose equipped with a Type 3 nozzle (see ANSI/CSA NGV 1) shall be limited to the maximum blowdown pressure of 517 kPa (75 psi) while the VFA is not delivering fuel. NGV 5.2-2017 clarifies that this requirement pertains to a hose equipped with a Type 3 nozzle. CSA 12.6 has the same maximum blowdown pressure limit, but it doesn't correlate this pressure limit threshold specifically to a hose equipped with a Type 3 nozzle. The latter document is silent on the matter.
6.9.6	NGV 5.2-2017 added the requirement that for VFAs with auxiliary storage, a one-way check valve shall be placed downstream of the VFA as close as practicable to the outlet of the VFA, prior to the auxiliary storage.
6.10.1b	Both the NGV 5.2-2017 and former CSA 12.6 standards require that a VFA be provided with a low-pressure-sensing system that shuts down the VFA if the supply pressure at the inlet to the VFA drops below 0.90 kPa (3.6 in.w.c.) but NGV 5.2 now requires that this action be done within the time limit of five seconds. In other words, if the supply pressure at the inlet to the VFA drops below 0.90 kPa (3.6 in.w.c.) for greater than five seconds the low-pressure sensing means shall shut down the VFA.
6.10.5	NGV 5.2-2017 adds the following requirement: The sensing means specified in clauses 6.10.1 and 8.8.8 shall comply with the applicable sections of ANSI/UL 353, CSA C22.2 no. 24, and/or UL 873, or other equivalent nationally recognized standards. In contrast, CSA 2.90 made reference to UL 353 and UL 873. But CSA 12.6 neglected to mention CSA C22.2 no. 24.
6.10.6	Both the NGV 5.2-2017 and former CSA 12.6 standards state that components downstream of compression shall be protected from overpressure by pressure-relieving means. But NGV 5.2 now states the pressure-relieving means shall not allow the pressure to build in excess of 1.25 times the service pressure.
6.10.6	The NGV 5.2-2017 standard clarifies that the pressure-relieving means shall be sized to accommodate at least the rated outlet flow rate of the VFA, as specified by the VFA manufacturer. In contrast, CSA 12.6 addresses this issue but the wording is expressed differently.
6.10.7	The NGV 5.2-2017 standard states that a pressure-relieving means shall have provision to relieve gas in a controlled manner, if an unsafe condition exists. Acceptable means include:

Clause(s)	Changes
	1) vent gas outdoors to a safe point of discharge, or (2) contained vented gas within the VFA blowdown chamber.
6.11.1	Release of gas: The NGV 5.2-2017 standard has added the following requirement: “There shall be no release of gas when the nozzle/hose assembly is stored and not connected to a vehicle receptacle.”
6.12.1	Both NGV 5.2-2017 and CSA 12.6 require that all components be suitable for the expected range of usage temperatures and pressures. But NGV 5.2 clarifies that the components shall be rated for the operating temperatures as stated in clause 4.3. This clause (4.3) gives the requirement for the product’s operating temperature. This clause states that the VFA shall, at a minimum, have an operating temperature range between 0°C (32°F) and 40°C (104°F). The manufacturer may specify a lower minimum temperature and/or a higher maximum temperature. The unit shall be non-functional outside of the manufacture’s specified temperature range. In contrast, CSA 12.6, clause 5.1.2 (performance) stated that performance tests on the VRA and on components thereof shall be performed at 55°C, 20 ± 5°C, and -40°C (-40°F) and other temperatures as specified in the CSA 12.6 standard. CSA 2.90 states that all parts and components, whether pressure-bearing or not, shall be rated at not less than the specified range of operating ambient temperatures. In CSA 2.90, clause 1.16.22 the manufacturer needs to declare the range of operating ambient temperatures.
6.12.2	NGV 5.2-2017 adds the following requirement: “Any gas contained with the VFA (e.g., blowdown gas) shall not be vented in the natural gas supply line.
6.12.2	NGV 5.2-2017 adds the following requirement: Hanging hardware (e.g., nozzle, hose) shall be capable of depressurizing to facilitate disconnection from the vehicle.
6.12.5	NGV 5.2-2017 is a binational standard. To cover the Canadian requirement, NGV 5.2 adds a requirement stating that steel piping used as gas conduit shall comply with CSA B51 Part 3. The CSA 2.90 standard, clause 6.12.5 already showed the U.S. requirements.
6.12.6	NGV 5.2-2017 has added the following requirements: a) The VFA manufacturer shall state if an appliance pressure regulator is required to protect the VFA from damage or for normal operation, b) If an appliance pressure regulator is required, information shall be provided in the manufacturer’s instructions explaining the specification of the required pressure regulator, and c) The gas pressure regulator stated above may be supplied separately from the appliance. The installation instructions shall state how the regulator is to be installed.
6.12.8.1	NGV 5.2-2017 has added the following requirement: A normally closed automatic valve shall be provided at the VFA inlet connection. This valve shall operate to turn on and shutoff the gas supply to the compressor.
6.12.9	NGV 5.2-2017 updates the coverage for electric motors by: 1) referencing the current U.S. standards, and 2) adding the Canadian requirements, namely, CSA C22.2 No. 77, CSA C22.2 No. 209, and CSA C22.2 No. 140.2.
6.13	NGV 5.2-2017 adds requirements pertaining to energized components like guarding of such components so as to minimize accidental contact by service personnel performing service functions with respect to uninsulated high voltage circuits.
6.14.3	The former CSA 12.6 standard (clause 4.5.3) shows that a VFA needs to comply with certain clauses of CSA C22.2 No. 236. Therefore, NGV 5.2-2017 has now added reference to UL

Clause(s)	Changes
	1995, which is the US equivalent standard to CSA C22.2 No. 236 since NGV 5.2 is a bi-national standard.
6.14.6	NGV 5.2-2017 clarifies that panels *not* contained within the VFA enclosures shall have a minimum NEMA 3 or IP54 rating or comply with the weatherproof requirements in CAN/CSA C22.2 No 94 or ANSI/NEMA/IEC 60529.
6.15	NGV 5.2-2017 adds a set of requirements pertaining to the subject of preventing fire or explosion hazards within a VFA system. In contrast, TIL R-20 has certain coverage for gas detection (clause 6.4) but its coverage relates to requirements for garage installation.
6.17.2	NGV 5.2-2017 adds a requirement that if it is intended that supply connections be made to the motor of an appliance, the terminal compartment on the motor shall comply with the requirements for terminal compartments in CAN/CSA C22.2 no. 100 and UL 1004.
6.17.3	NGV 5.2-2017 adds a requirement that conduit connection shall not be made to covers giving access to supply terminals. Component parts shall not be mounted on removable covers giving access to supply connections.
6.17.4	NGV 5.2-2017 has added a requirement pertaining to an opening in a wiring compartment for the connection to the power supply in the field.
6.17.5	NGV 5.2-2017 has added a marking requirement pertaining to disconnecting all power before opening an access cover.
6.18	NGV 5.2-2017 has added a set of requirements (clauses 6.18.1 thru 6.18.4) pertaining to “cord-connected appliances.”
6.19	Many of the electrical requirements in NGV 5.2-2017, clause 6.19 (which is titled power input and current) are identical to the correlating requirements shown in CSA 2.90, clause 1.13 (electrical equipment and wiring). Still, NGV 5.2-2017 includes additional requirements. See clauses 6.19.1, 6.19.2, 6.19.7, 6.19.13, 6.19.23, 6.19.24, 6.19.25, 6.19.26 and 6.19.27.
6.19.10	NGV 5.2-2017, clause 6.19.10 pertains to the subject of strain relief. This clause has the same requirement as given in CSA 2.90, clause 1.13.14 except NGV 5.2 goes onto add a pull test if the VFA is supplied with an external power supply cord handling greater than 50 Volts. The pull test is presented in NGV 5.2-2017, clause 8.11.
6.19.20	NGV 5.2-2017, clause 6.19.20 pertains to the subject of a low-voltage circuit needing to be supplied by a transformer suitable for a Class 2 circuit. This clause has the identical requirement as CSA 2.90. But NGV 5.2-2017 now gives the equivalent Canadian requirement as well. Clause 6.19.20 now additionally states the Canadian reference standard CSA C22.2 no. 66.3.
6.20	NGV 5.2-2017, clause 6.20 has added a new section titled “Gas containment.” This clause has many new requirements, which are briefly described below: • 6.20.1 – blowdown system requirements • 6.20.2 – total (volume) limit of gas contained by a VFA for indoor installation • 6.20.3 – total (volume) limit of gas stored by the VFA package for outdoor installation • 6.20.4 – VFAs that have gas storage shall have no single container with capacity more than 21.3 SCM (750 SCF), approximately 6 GGE. • 6.20.5 – Total volume limit of gas for auxiliary storage

Clause(s)	Changes
	• 6.20.10 – Valve and overpressure protection device requirements for a VFA with gas storage either onboard or as auxiliary storage containers for outdoor use only. • 6.20.11 – Means being needed to dilute an abnormal internal release of gas to a value below 50% of the LFL. • 6.20.12 – Means to detect the potential for abrupt severing of the vehicle supply hose. • 6.20.13 – this clause gives mitigation strategy requirements against gas leakage. • 6.20.14 - Fire detection methodology needed to be employed for outdoor mounted VFA with contained gas. • 6.20.15.1 thru .3 – additional requirements for outdoor mounted VFAs, whose subjects related to storage limits, use of isolation valves, use of a thermal pressure release device on containers to release gas if an external fire source were to heat the container. With regard to NGV 5.2-2017, clauses 6.20.6 (pressure vessels requirement), 6.20.7 (container design requirement), 6.20.8 (containers shall not be subjected to pressure in excess of 1.25 x marked service pressure) and 6.20.9 (settled pressure of a fuel container), these requirements are the same as the correlating requirements in CSA 12.6 and/or CSA 2.90.
7.2	Rating plate information: NGV 5.2-2017, clause 7.2.1 requires the following additional information to be shown on the rating plate: • In addition to the manufacturer's name, the rating plate needs to show the manufacturer's location (city and province or state) • The manufacturer's specified maximum fill pressure at 21°C • The maximum temperature compensated pressure at a specified maximum temperature • The ambient temperature range needs to be shown with the following expressed verbiage: "Use this product only between ambient temperatures of _____ °C (__ °F) and ____ °C (____ °F)" • The statement: "Do Not Tamper with Product" • Identification of the standard, including the edition: CSA/ANSI NGV 5.2 – edition/addenda. • Minimum clearances to combustible walls. See the exact verbiage in clause 7.2.1, r. • Maximum gas supply moisture content in mg/m^3 (lb/MMSCF). The rating plate no longer has to show the following information: minimum flow rate, the "manufacturer's specified maximum delivery pressure," and the "manufacturer's specified maximum design pressure".
7.2.2	Markings: NGV 5.2-2017 states that each appliance shall bear a label of Class IIIA marking material that reflects whether the unit is intended to be installed indoors only, outdoors only, for either indoor or outdoor installation. Please note that the indicated markings has exact wording required. See clause 7.2.2.
7.2.4	Label: NGV 5.2-2017 has revised the wording of a caution label. The new wording is given: CAUTION: No Smoking Keep open flame(s) away from the appliance The former CSA 2.90 document, clause 1.16.5 has a no smoking cautionary statement but it differs in wording.
7.2.8	NGV 5.2-2017 has added a requirement that an appliance shall be provided with a schematic circuit diagram, attached or secured to the appliance in a location that is easily accessible for

Clause(s)	Changes
	servicing, such as the back panel, the top panel, the location of the wiring terminals, the console, or the control housing.
7.2.9	NGV 5.2-2017 has added a requirement that each appliance shall bear the following caution label of Class IIIA marking material. The label needs to say: CAUTION: This appliance contains high pressure natural gas storage. Verify compliance with all local codes.
7.2.10	Marking on the carton/package: NGV 5.2-2017 has a requirement that the packaging in which the product is shipped bear the following marking: CAUTION: This appliance contains high pressure natural gas storage. Verify compliance with all local codes.
7.2.12	NGV 5.2-2017 has added a requirement that each appliance intended for indoor installation shall bear a label of Class IIIA material which states the following: “This unit shall have additional gas detection installed in proximity to the unit in accordance with NFPA 52.” Or, “This unit shall have additional gas detection installed in proximity to the unit in accordance with CSAB108.”
8.1.4	NGV 5.2-2017, clause 8.1.4 also requires that the normal operation/flow rate test (clause 8.5.1) and the fill pressure test (clause 8.9) be conducted with the supply voltage adjusted and maintained at 85 and 110 percent of that specified by the manufacturer.
8.1.5d	NGV 5.2-2017 states to conduct the components temperature testing at both the manufacturer’s specified <u>minimum</u> and maximum temperature. In contrast, CSA 2.90, clause 2.7 (surface and component temperatures) and CSA 12.6, clause 5.7 (temperature limitations) indicates to conduct the testing at continuous operation with maximum temperature.
8.3	Leakage test: For safety reasons so as to protect lab personnel conducting the test, NGV 5.2-2017 states that compressed air shall not be used as a test fluid for the conducting of the leakage test.
8.3	Leakage test: NGV 5.2-2017 now has two different test methods to assess potential leakage of the VFA, both of which are required to be conducted in a program: 1) a “Static test method” and 2) a “Dynamic test method.” The NGV 5.2 static test method correlates to CSA 12.6, clause 5.4.9’s leakage test. Both standards show that the permissible leakage as being no greater than 1,000 cc/hr. However, the test pressure used in NGV 5.2 is 1.5 times the manufacturer’s specified MAWP for the system. In contrast, CSA 12.6 stated to use normal operating pressure, and design pressure. In other words, CSA 12.6 does not reflect the use of a safety factor to magnify the test pressure threshold. The NGV 5.2 static test method correlates to CSA 2.90, clause 2.2’s leakage test. As stated above, NGV 5.2 states that the permissible leakage as being no greater than 1,000 cc/hr. However, CSA 2.90 states the permissible leakage as being 200 cc/hr of air corrected to standard conditions. Both standards show the test as using a safety factor of 1.5. NGV 5.2 states the test pressure threshold as being 1.5 times MAWP. CSA 2.90 shows the test pressure as being 1.5 times the maximum pressure to which the product is exposed during intended use.
8.4	NGV 5.2-2017 includes a hose permeation test. For this test, NGV 5.2 states that the permissible permeation through the wall of the hose shall not exceed 20 Ncc of natural gas per meter of hose per hour. In contrast, CSA 12.6 allowed the manufacturer of the VFA to submit acceptable evidence from the delivery hose manufacturer that permeation form a hose does not exceed 1,000 cm^3 air/m^2/day/kPa at rated normal operating temperatures (corrected to standard conditions of 101.3 kPa at 15°C (30 in. Hg and 60°F)

Clause(s)	Changes
	NGV 5.2-2017, clause 8.4 also states that if the hoses are certified to ANSI/CSA NGV 4.2/CSA 12.52 then such hoses are exempt from the permeation test as shown in NGV 5.2.
8.5.3	NGV 5.2-2017 has added a test whereby a filter shall not negatively alter the odorant from the natural gas supply for safety detection.
8.5.4	NGV 5.2-2017 has added a test to assess the dispensed natural gas dew point with respect to the lowest VFA manufacturer's vehicle operating temperature (at maximum service pressure and at the maximum supply pressure gas moisture content for which the VFA is designed).
8.6	NGV 5.2-2017 has revised the test method for the Durability testing.
8.8	NGV 5.2-2017 has added a shutdown parameters test, which requires that the VFA to automatically shut down should the unit experience any of the critical anomalies resulting from the manufacturer's risk analysis. NGV 5.2, clause 8.8 gives, at a minimum, a specific list of features of the VFA to test. In contrast, CSA 12.6, clause 6.1.4 and CSA 2.90, clauses 3.1.4 and 3.1.5 requires that a failure modes and effects analysis be conducted, but the requirement limits itself to the VFA's temperature compensation device.
8.8.4	NGV 5.2-2017 has revised a requirement. It states that the VFA shall be interlocked with a control that prevents starting or operating at ambient temperatures <u>outside of the manufacturer's specified ambient temperature range</u>. In contrast, CSA 12.6 stated that the VRA shall be interlocked with a control that prevents starting or operating at ambient temperatures less than -45°C (-49°F).
8.8.5	NGV 5.2-2017 has revised a requirement. It states that the VRA shall not release gas to the atmosphere both at the time and after a sudden and complete interruption of flow (e.g., hose breakaway). The tests shall be conducted at both the minimum and maximum operating temperatures as specified by the manufacturer. In contrast, CSA 12.6, clause 5.5.9 stated that the VRA shall shut down and not deliver gas to atmosphere both at the time of and after breakaway device activation. The breakaway device shall conform to ANSI NGV 5.4/CSA 12.54. The tests shall be conducted at both -40°C (-40°F) and 55°C (131°F).
8.8.8	The pressure sensing means test of NGV 5.2-2017, clause 8.8.8 is the same as CSA 2.90, clause 2.4.3. But NGV 5.2-2017 adds a second condition in which to test for: It states that the VFA shall be provided with a low-pressure sensing system that shuts down the VFA if the supply pressure at the inlet to the VFA drops below 0.90 kPa (3.6" in.w.c.) for greater than 5 seconds. A test needs to be conducted to verify that the low-pressure sensing system can shut down the VFA in the event of a low supply pressure condition.
8.9	The "delivery pressure" test (clause 5.8) in the former CSA 12.6-04 standard is now renamed the "fill pressure" test in NGV 5.2-2017, clause 8.9. The test criteria and test methodology are the same, with one exception: the minimum ambient temperature test condition has changed. The former CSA 12.6 standard stated that—for the minimum ambient temperature condition—the fill pressure test was to be conducted at -40°C. In contrast, NGV 5.2-2017 now states that the minimum ambient temperature condition is whatever the manufacturer specifies as being the minimum ambient temperature condition.
8.10	NGV 5.2-2017 has added a relief valve blowdown chamber test.

Clause(s)	Changes
8.11	NGV 5.2-2017 has added a pull test as applied to a VFA equipped with an external power supply cord.
8.12.2	NGV 5.2-2017 has added a wall, floor and ceiling temperature test.
8.13	NGV 5.2-2017 has added a fuel quality test.
8.15	NGV 5.2-2017 has added a VFA shut-down test, which is a test that verifies that a VFA will disable the flow of gas when an emergency shut-off device (ESD) is activated.
9.1.8	NGV 5.2-2017 has revised the following requirement: The temperature compensation device shall function throughout the ambient temperature range of the manufacturer's specified minimum to the declared maximum ambient temperature rating. In contrast, the former CSA 2.90 standard (clause 3.1.8) stated that the temperature compensation device had to function throughout the ambient temperature range of -40°C (-40°F) to the declared maximum ambient temperature rating.
9.2.1	NGV 5.2-2017 requires that the manufacturer's manuals include coverage related to "communication safety," which includes topics such as instructions for starting and shutting down the VFA, a statement to not use the VFA if any part has been under water, specifications for the frequency of filter changes, etc.
9.2.2	NGV 5.2-2017 has added coverage related to VFAs that can be operated remotely.
9.2.3	Both the NGV 5.2-2017 and former CSA 12.6 standards permit automatic restarts of the VFA following electrical power failures of less than 1 minute duration. Moreover, both standards state to conduct tests of this feature at temperature extremes. The former CSA 12.6 standard stated to conduct the tests at both -40°C (-40°F) and the declared maximum ambient temperature rating. In contrast, NGV 5.2-2017 states to conduct the tests at both the manufacturer's minimum and maximum operating temperatures.
10.1e	The Quality Assurance Plan in both NGV 5.2-2017 and former CSA 2.90 requires that the dielectric withstand test be conducted on all production units that have high-voltage electrical circuits. CSA 2.90 shows a test voltage of: 1,000 V for 1 minute, or 120% of 1,000V for 1 second. But the test voltage for NGV 5.2-2017 may differ depending on the electrical rating of the unit under test. For units rated 250V or less, and which include a motor rated at less than ½ hp, the test voltage is 1000V ac or 1414 dc. But if the unit is rated more than 250V or which includes a motor rated ½ hp or larger, the test voltage is 1000V ac plus twice rated voltage or 1414V dc plus 2.818 times rated voltage. Or alternatively, 120% of the indicated values for 1 second.
11.2.1	NGV 5.2-2017 has significantly expanded the amount of information to be conveyed in the manufacturer's installation instructions. See clause 11.2.1. Whereas, former CSA 12.6, Annex A, Clause A.1 installation instructions showed items (a) thru (k), NGV 5.2-2017 now shows items a) thru z). Plus, NGV 5.2-2017 show a boxed warning pertaining to electrical grounding instructions.
11.2.2	NGV 5.2-2017 includes coverage related to removal instructions, which requires that the manufacturer give instruction on how to remove a unit from service. See clause 11.2.2.
11.3	NGV 5.2-2017 has significantly expanded the amount of information to be conveyed in the User's information manual. See clause 11.3. Whereas, former CSA 12.6, Annex A, Clause A.2 User instructions showed items (a) thru (g), NGV 5.2-2017 now shows: a) *boxed* warnings dealing with the subject of smoking being prohibited near the vehicle during

Clause(s)	Changes
	refueling, the vehicle shall have its engine turned off during refueling, and a warning pertaining to “what to do if you smell gas.” Also, clause 11.3b has a “safety section,” items i) thru xxiii) showing much safety information.
11.4	NGV 5.2-2017 has added coverage pertaining to the installation of emergency shutdown equipment. See clause 11.4
Annex A, Clause A.2	• Both NGV 5.2-2017, Annex A, clause A.2 and former CSA 12.6-04, clause A.3 have certain information that needs to be conveyed in English and French. But NGV 5.2-2017, clause A.2 shows unique items that are not mentioned in CSA 12.6. NGV 5.2 show the following subjects to also be shown in the French language: • Using the product only between certain ambient temperatures. • Reference to the standard: “CSA/ANSI NGV 5.2” • Minimum clearances from sides and back of the appliance with respect to adjacent combustible surfaces. • Whether the product is intended for indoor installation only, or outdoor installation only, or for either indoor or outdoor installation. • A caution statement that this appliance contains high pressure natural gas storage, and that there is need to verify compliance with all local codes. • A statement that the unit shall have additional gas detection installed in proximity to the unit in accordance with CSA B108.
Annex B	NGV 5.2-2017 has added Annex B, which shows compressibility factors. Annex B is an ‘informative’ section.