

STANDARD INFORMATION

Standard: UL 674 / CSA C22.2 No. 145

Standard ID:

Electric Motors and Generators for Use in Hazardous (Classified) Locations [UL 674:2022 Ed.6]

Electric Motors and Generators for Use in Hazardous (Classified) Locations [CSA C22.2#145:2022 Ed.4]

Previous Standard ID:

Electric Motors and Generators for Use in Hazardous (Classified) Locations [UL 674:2011 Ed.5+R:28Dec2020]

Electric motors and generators for use in hazardous (classified) locations (R2020) [CSA C22.2#145:2011 Ed.3+U1;U2;U3]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **July 29, 2024**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

Overview of Changes:

- New requirements for through-bolts
- New locked-rotor endurance test
- Revised requirements for the explosion pressure test
- New low-ambient explosion pressure tests
- New installation instructions

Specific details of new/revise requirements are found in table below

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown lined-out below.</i>
11	Info	Joints in Enclosure
11.4	Info	Class II Locations
11.4.4		<i>New section added;</i>
		Through-bolts
11.4.4.1		(II) – For a through-bolt that secures the end shields and passes through the enclosure, the diametrical clearance between the unthreaded shank of the bolt and the clearance hole in the enclosure (or end shields) shall not be more than 0.25 mm (0.010 inch) for a length of not less than 12.7 mm (1/2 inch).
11.4.4.2		(II) – For a joint between a specially-machined nut and a machined surface on the end shield surrounding the bolt hole, the width of joint shall not be less than 4.8 mm (3/16 inch). The clearance at the joint shall not be over 0.05 mm (0.002 inch) for a 4.8 mm (3/16 inch) wide joint and not over 0.08 mm (0.003 inch) for a 6.4 mm (1/4 inch) wide joint. The width of joint shall be measured from the bolt clearance hole to the nearest outside edge of the nut. In addition, the nut shall fully engage not less than five threads of the through-bolt and a washer shall not be provided.
32	Info	Temperature Tests on Sinewave Power for Single Speed or Multi-Speed Motors
32.7		<i>New section added;</i>
		Locked-rotor endurance test
32.7.1		(I, II) – A motor that is provided with a temperature-limiting device in the motor circuit shall be connected to a power-supply circuit of 100 – 110 % of the voltage specified in Table 29. The enclosure of the motor shall be connected to ground through a 30-ampere cartridge fuse. The rotor of the motor shall be locked, and the motor operated as described in 32.7.2 or 32.7.3 depending on whether the temperature-limiting device is automatic or manually operated.
32.7.2		(I, II) – A motor with an automatically reset temperature-limiting device shall be operated for 15 days. There shall be no permanent damage to the motor, including excessive deterioration of the insulation.
32.7.3		(I, II) – An automatically reset temperature-limiting device may permanently open the circuit before 15 days of operation if: a) It is specifically intended to do so; and b) Testing of three samples show that it will do so consistently and without grounding to the motor frame, damage to the motor, or evidence of any risk of fire.



CLAUSE	VERDICT	COMMENT
32.7.4		(I, II) – A manually reset temperature-limiting device shall open the motor circuit for 50 operations without damage to the motor or itself. The temperature-limiting device shall reclose as quickly as it can be made to do so after each opening of the circuit. There shall be no permanent damage to the motor, including excessive deterioration of the insulation.
36	Info	Explosion Test
36.2	Info	Explosion pressure test
36.2.1		(I) The explosive mixture shall be allowed to flow into the motor enclosure until all of the original air has been displaced. The flow shall be stopped and the valves at the inlets and outlets to the motor shall be closed. The mixture shall then be ignited inside the motor. <u>Products intended and marked for an ambient of lower than minus 25 °C shall be tested at 5 °C ±5 °C below the marked lower temperature.</u> <u>In Canada, products intended and marked for an ambient of lower than minus 50 °C shall be tested at 5 °C ±5 °C below the marked lower temperature.</u>
36.3	Info	Low-ambient explosion pressure tests <i>New clause added;</i>
36.3.1		(I) For explosion-proof equipment specified and marked for use at ambient temperatures lower than minus 25 °C (minus 50 °C in Canada), the explosion tests shall be determined by one of the following methods: a) For explosion-proof equipment specified and marked for use at ambient temperatures lower than minus 25 °C (minus 50 °C in Canada), the explosion tests shall be performed at 5° lower than the rated minimum ambient temperature, ±5 °C (±9 °F). When the ambient specified is such that common materials within the Group are not flammable, a test temperature shall be specified that represents the minimum temperature at which the test gasses shown in Table 31 remain gasses, or b) The reference pressure shall be determined at room ambient temperature using the defined test mixture(s), but at increased pressure. The absolute pressure of the test mixture (P) shall be calculated by the following formula, using Ta in °C: $P = 100 \left[\frac{293}{(T_a, \text{ min} + 273)} \right] \text{ (kPa)}$ <p style="text-align: center;">or</p> $P = 14.6959 \left[\frac{293}{(T_a, \text{ min} + 273)} \right] \text{ (psi)}$



CLAUSE	VERDICT	COMMENT
		<i>New section added;</i>
36.5		Elevated ambient flame propagation tests
		For explosion-proof equipment specified and marked for use at ambient temperatures greater than 60 °C (65 °C in Canada), flame propagation tests shall be conducted under one of the following conditions:
36.5.1		a) At a temperature not less than the specified maximum ambient temperature; or b) At normal ambient temperature using the defined test mixture at increased pressure according to the factors in Table 36; or c) At normal atmospheric pressure and temperature, but with the test gap increased by the factors noted in Table 36.
		These tests are in addition to the explosion tests required to determine compliance with 36.2 and 36.4.
36.5.2		All test sample joints shall be based upon the manufacturers maximum specified gap and tested with the minimum specified joint length. Specially prepared test samples having modified joint lengths, gaps and engagements shall be employed. For Group B test factors per 36.4.2, 36.4.3 or 36.4.4, as applicable, shall be introduced into the test pressure or test gap in addition to the test factors above.
		<i>New section added;</i>
38		Dynamic Pressure Test
		For explosionproof enclosures not subject to pressure piling and intended for routine testing during production, the Dynamic Pressure Test shall be permitted as an alternative to the Hydrostatic Pressure Test. The dynamic tests shall be carried out in such a way that the maximum pressure to which the enclosure is subjected is 1.5 times the reference pressure.
		The test shall be made once except for Group B, in which case the test shall be made three times with each gas mixture as follows:
38.2		– Group D: 4.6 ±0.3 % propane – Group C: 8 ±0.5 % ethylene – Group B: 31 ±1 % hydrogen
38.3		Following the test, there shall be no permanent deformation or damage and joints shall not be permanently enlarged.
38.4		(I, II) The fluid handling section of a canned motor pump shall withstand a pressure equal to 1.5 times the operating pressure for 10 minutes without evidence of leakage into any electrical compartment.



CLAUSE	VERDICT	COMMENT
42	Info	Accelerated-Aging Test on Bushings
42.1		<u>A molded-rubber or -neoprene bushing provided at the cord entrance to the terminal enclosure of portable equipment shall be exposed in an air oven for 70 hours at 100 °C ±2 °C (212 °F ±3.6 °F). See the Standard for Gaskets and Seals, UL 157, for oven aging conditions for service temperatures exceeding 60 °C (140 °F). The bushing shall not have a change in hardness of more than ten numbers.</u>
42.3		Either the complete molded-rubber or -neoprene bushing or representative material specimen shall be tested. The hardness of the rubber or neoprene shall be determined as the average of five readings with a gauge such as a Rex hardness gauge or Shore durometer. <u>The bushing shall then be exposed in an air oven for 70 hours at 100 °C ±2 °C (212 °F ±3.6 °F).</u>
		<i>New section added;</i>
53		Installation Instructions Motors shall be provided with documentation that includes all the instructional material required by this standard. See standard for details.