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UL 1247A

OUTLINE OF INVESTIGATION FOR VARIABLE SPEED LIMITING
CONTROLS INSTALLED WITH DIESEL ENGINES FOR DRIVING
STATIONARY FIRE PUMPS

Issue No. 3

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Summary of Topics

This third issue of Subject 1247A, Outline of Investigation for Variable Speed Limiting Controls Installed With Diesel Engines for Driving Stationary Fire Pumps covers the construction and performance requirements for a variable speed pressure limiting control (VSPLC) and variable speed suction limiting control (VSSLC) intended to be installed on a diesel engine for driving a stationary fire pump at the engine manufacturing location. The minimum set pressure for a VSPLC referenced in 6.17 has been reduced to 90 psig from 100 psig to provide for slightly lower pressures to be discharged into underground piping which can have a pressure rating as low as 100 psig.

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1 Scope

1.1 These requirements cover the construction and performance requirements for a variable speed pressure limiting control (VSPLC) and variable speed suction limiting control (VSSLC) intended to be installed on a diesel engine for driving a stationary fire pump at the engine manufacturing location. In addition to complying with the requirements described herein, the engine with VSPLC or VSSLC shall comply with the applicable requirements of the Standard for Diesel Engines for Driving Stationary Fire Pumps, UL 1247.

1.2 The engines covered by these requirements are intended for installation and use in accordance with the Standard for the Installation of Stationary Fire Pumps for Fire Protection, NFPA 20.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this Outline of Investigation shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this Outline of Investigation, or
- b) Is superseded by a requirement in this Outline of Investigation.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this Outline of Investigation shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of this outline of investigation, the following definitions apply.

5.2 CORROSION-RESISTANT MATERIAL – A material having resistance to corrosion equivalent to or exceeding that of a brass, bronze, monel, or series 300 stainless steel alloy.

5.3 RATED PRESSURE – The maximum working pressure intended for the device.

5.4 SET PRESSURE – The internal pressure at which a variable speed limiting control device is intended to begin to decrease engine speed.

5.5 SYSTEM PRESSURE – The pressure that is measured on the discharge side of the fire pump (the result of the suction supply pressure, pump curve and engine speed droop) at any flow condition.

5.6 VARIABLE SPEED PRESSURE LIMITING CONTROL (VSPLC) – A factory installed engine attachment intended to limit system pressure by reducing the pump driver speed from rated speed. Where referenced in this standard, the VSPLC device is the primary variable speed control device that is connected to the engine throttle or electronically controls the engine throttle.

5.7 VARIABLE SPEED SUCTION LIMITING CONTROL (VSSLC) – A factory installed engine attachment intended to maintain a minimum positive suction pressure by reducing the pump driver speed from rated speed. Where referenced in this standard, the VSSLC device is the primary variable speed control device that is connected to the engine throttle or electronically controls the engine throttle.

6 Variable Speed Limiting Controls

6.1 A VSPLC shall not decrease engine speed unless system pressure exceeds the set pressure.

6.2 A VSSLC shall not decrease engine speed unless the suction pressure drops below the set pressure.

6.3 A VSPLC shall not increase engine speed above the rated speed for the purpose of increasing system pressure.

6.4 A mechanical VSPLC or VSSLC shall be factory preset, and provided with a means such as a fastening nut to secure the intended setting and a tamper indicator such as a seal.

6.5 An electronic VSPLC or VSSLC shall be factory preset and shall not be field programmable.

6.6 A VSPLC or VSSLC shall be provided with a stop having a tamper indicator or other feature that will not permit the engine to be operated at a speed below the lowest operating speed permitted by the engine manufacturer.

6.7 A VSPLC or VSSLC device shall be constructed for use at a rated pressure of at least 175 psig (1.21 Mpa).

6.8 A part that bears against, rotates within, or slides on stationary parts, and that must be free to move during operation, shall be made of compatible corrosion-resistant material, or shall be fitted with bushings, inserts, or other parts made of these corrosion-resistant materials at those points where freedom of motion is required.

6.9 An interior bolt or screw shall be made of bronze or other corrosion-resistant material.

6.10 An internal spring used in a VSPLC or VSSLC device shall be made of material having corrosion resistance equivalent to that of phosphor bronze and shall not be susceptible to stress corrosion.

6.11 Clearance shall be provided between working parts and between working and stationary parts so that corrosion or deposits of foreign matter will not result in sluggish action or otherwise impaired operation of the VSPLC or VSSLC device.

6.12 If an orifice with a diameter less than 3/16 inch (4.8 mm) is used in operation of the device, a screen or strainer with corrosion resistance equivalent to brass shall be provided. The total area of the openings in the screen or strainer shall be not less than 20 times the cross-section area of the opening that the screen or strainer is intended to protect. The largest dimension of the screen or strainer openings shall not exceed 1/32 inch (0.8 mm) less than the diameter of the protected orifice.

6.13 A VSPLC or VSSLC shall be provided with means to accept a 1/2 inch (12.7 mm) pipe for sensing pressure.

6.14 A mechanical VSPLC or VSSLC device shall be constructed with a return spring or similar feature such that in the event of a failure of the pressure limiting control, the engine shall return to rated speed.

6.15 An electronic VSPLC or VSSLC device shall be constructed such that in the event of a failure of the pressure limiting control, the engine shall return to rated speed.

6.16 A pressure sensing line connected to a VSPLC or VSSLC device shall not incorporate a manual shutoff unless the shutoff valve has provisions to be locked in the open position.

6.17 A VSPLC shall not have a set pressure less than 90 psig (0.62 Mpa).

6.18 A VSSLC shall not have a set pressure less than 5 psig (34.5 kPa).

6.19 A pressure-sensing device shall have a minimum orifice diameter of 1/8 inch (3.2 mm).

6.20 A pressure transducer (sensor, transmitter) shall be field replaceable.

6.21 An engine provided with a VSSLC shall be provided with a switch or means to activate a low-pressure signal when the suction pressure falls between 80 to 100 percent of the set pressure. The signal to the terminal and switch shall comply with the applicable requirements of the Standard for Diesel Engines for Driving Stationary Fire Pumps, UL 1247.