



HOTSTART HAZARDOUS LOCATION ENGINE HEATING

Evaluation of Performance on a Gas Compression Reciprocating Engine

Optimized Performance is Everything

Hotstart heating systems keep natural gas compressor packages and engines ready by maintaining optimal engine temperature during downtime. Industry requirements for these applications demand even heat distribution throughout the entire engine water jacket and oil sump.

In February 2020, Hotstart worked with engine manufacturer Caterpillar to perform compression

skid field testing at their Miami Lakes Learning Center. Testing was intended to assess Hotstart's installation practices for a dual fluid heating application on a Cat® G3606 A4 engine.

By collaborating directly with engine manufacturers to test and validate installations, Hotstart can provide critical application-specific expertise that package designers and end users can rely on to ensure performance in the field.

Equipment Specifications:

Model:
OCLE3180-0604-3220
Fluids Heated:
Coolant / Oil
Wattage:
Coolant up to 36 kW
Oil up to 12 kW
Hazardous Location:
UL-C/US
Circulation Method:
Forced Circulation
Set Temperature:
Coolant 50 °C / Oil 40 °C



Photograph of the experimental setup at the Miami Lakes Learning Center (MLLC). This setup is intended for experimental purposes and is not to be used as a recommended design practice.

Testing

Scope:

Evaluate effectiveness of a coolant heating system in various flow path configurations commonly seen in gas compression field installations.

Equipment:

Hotstart OCLE3180-0604-3220
Cat G3606 A4 engine

Primary Test:

Four flow paths were tested with different return port locations. A single supply port used for each flow path test.

Additional testing:

Oil heating was evaluated with a single flow path for each coolant test. The oil connections used in testing were not typical of a field installation; the oil drains were not accessible during testing.



Thermal image of heated coolant circulating through the engine.



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Method

Temperature, pressure and flow measurements were recorded to measure the performance of the OCLE. Thermocouples were installed throughout the jacket water system to map engine heating and temperature uniformity.

Testing specifically focused on the coolant

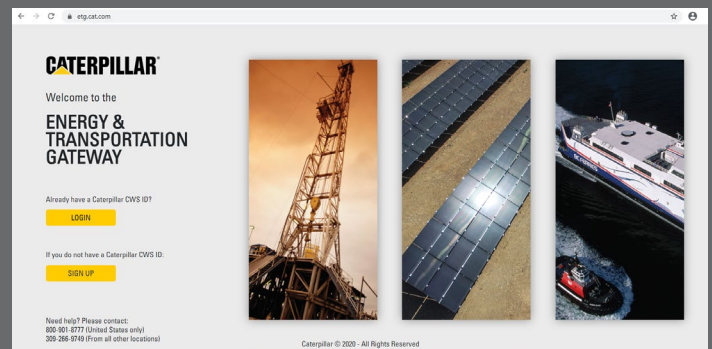
temperature around the cylinders in the engine core as these temperatures are the most crucial for engine startability and longevity. Thermal imagery was also recorded to qualitatively compare heat distribution across the engine during each test.

Results

The results of the complete test are detailed in [Jacket Water and Oil Heater Performance Evaluation on a Reciprocating Engine Used for Gas Compression](#) which is available on the My White Papers widget.



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Improved Performance Starts Here

Engine and compressor package manufacturers can partner with Hotstart for similar testing and analysis of installation best practices for their skid design.

Testing can be performed in the field or at Hotstart's headquarters in Spokane, WA. The 6,000 sq ft Research and Development facility includes two large cold rooms (15' x 30' x 16'; 15' x 15' x 16') capable of -40 °C temperatures, environmental chambers for recreating a wide variety of ambient conditions, and a dedicated testing team. Contact Pat Norwood or Kohner Thames to discuss testing protocols and schedules.

To learn more from Hotstart on installation best practices for your Oil & Gas hazardous location heaters, visit <https://www.hotstart.com/resources-and-tools/support/installation-operation-manuals/> to download operation and maintenance manuals.

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