ThermOmegaTech®

# EFFECT OF EXTREME COLD ON THE GURU®

## LOW TEMPERATURE TEST RESULTS OF THE GURU® DL 2.1 IN -60°F CONDITIONS

## THE STUDY

On January 6, 2020, ThermOmegaTech® conducted an environmental exposure test to determine if extremely cold air temperatures could cause the GURU® Plug to nuisance dump when engine coolant water temperature is above the valve's release set-point.

The test was performed at ThermOmegaTech®'s Warminster, Pennsylvania headquarters in an on-site lab and was supervised by a qualified design engineer.

## THE CONDITIONS

A GURU® DL 2.1 Type-T valve was installed in a Tenny Environmental Chamber® and exposed to 3 MPH winds at -60°F (-51.1°C) in an attempt to trigger a nuisance dump.

To simulate engine coolant, the test was conducted with 55°F (12.7°C) water flowing through the valve at 1 GPM. Coolant temperature was monitored at the inlet and outlet of the environmental chamber and flow was adjusted to keep the inlet and outlet temperatures relatively consistent at 55°F (12.7°C).

To ensure environmental conditions were constant throughout the test, the temperature chamber door remained closed. To accurately determine if a valve release occurred, a leakSMART® sensor was placed inside of the chamber underneath the GURU® Plug.




***Figure 1.*** *GURU® DL 2.1 Low Temp Test Set Up*




***Figure 2.*** *Environmental Chamber Settings*

## THE CONCLUSION

After two hours of exposure, the GURU® remained closed. There were no instances of nuisance dumping above the GURU® Plug's set-point due to the extreme cold air temperature or wind exposure.

This test confirmed that 55°F (12.7°C) engine coolant flowing at 1 GPM will provide sufficient heat/energy for the GURU® DL 2.1 to remain closed despite environmental conditions. The test also confirmed the benefits of sensing the coolant fluid's temperature, compared to sensing the ambient air temperature. Due to the GURU®'s fluid-sensing design, it is able to operate in environments where ambient sensing products cannot.

The test results were verified by removing the 55°F (12.7°C) coolant flow, leading the GURU® to release.

| Coolant Inlet Temp (°F) | Coolant Outlet Temp (°F) | Tenney Chamber Temp (°F) | Chamber Wind Velocity (MPH) | Coolant Flow Rate (GPM) | Result |
|---|---|---|---|---|---|
| 55 | 55 | -60 | 3 | 3 | Closed |
| 55 | 55 | -60 | 3 | 0 | Open |

***Table 1.*** *GURU® DL 2.1 Low Temp Test Results*