



# Certificate / Certificat Zertifikat / 合格証

ROS 1204020 C001

exida hereby confirms that the:

## Rosemount 644 4-20mA HART Temperature Transmitter

Device Label SW 1.1.X

**Rosemount Inc.**

(an Emerson Process Management company)

**Shakopee, MN - USA**

Has been assessed per the relevant requirements of:

**IEC 61508 : 2010 Parts 1-7**

and meets requirements providing a level of integrity to:

**Systematic Capability: SC 3 (SIL 3 Capable)**

**Random Capability: Type B Element**

**SIL 1 @ HFT = 0; SIL 2 @ HFT = 1; Route 1<sub>H</sub>**

**SIL 2 @ HFT = 0; SIL 3 @ HFT = 1, Route 2<sub>H</sub>**

**PFD<sub>AVG</sub> and Architecture Constraints  
must be verified for each application**

### Safety Function:

Emerson's Rosemount 644 Temperature Transmitter will measure temperature within stated performance specifications when operated within the environmental limits found in the product manual. Extended ambient operating temperature range options<sup>1</sup> (down to -60C) must be specified in the model code along with option code QT for this certificate to remain valid across the extended ambient temperature limits.

The manufacturer  
may use the mark:



Revision 1.9 February 7, 2019  
Surveillance Audit Due  
December 1, 2020

### Application Restrictions:

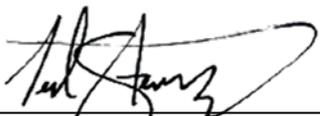
The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



ISO/IEC 17065  
PRODUCT CERTIFICATION BODY  
#1004



  
Evaluating Assessor

  
Certifying Assessor

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**Systematic Capability: SC 3 (SIL 3 Capable)****Random Capability: Type B Element****SIL 1 @ HFT = 0; SIL 2 @ HFT = 1; Route 1<sub>H</sub>****SIL 2 @ HFT = 0; SIL 3 @ HFT = 1, Route 2<sub>H</sub>****PFD<sub>AVG</sub> and Architecture Constraints  
must be verified for each application****Systematic Capability:**

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

**Random Capability:**

The SIL limit imposed by the Architectural Constraints must be met for each element. This device meets *exida* criteria for Route 2<sub>H</sub>.

**IEC 61508 Failure Rates in FIT<sup>2,3</sup>**

Application/Device/Configuration	$\lambda_{SD}$	$\lambda_{SU}^4$	$\lambda_{DD}$	$\lambda_{DU}$	#	SFF
644 Single T/C mode	0	0	362	39	136	90.3%
644 Dual T/C mode	0	0	371	39	140	90.5%
644 Single RTD mode	0	0	317	30	133	91.4%
644 Dual RTD mode (3-wire RTD)	0	0	330	31	135	91.4%

**SIL Verification:**

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD<sub>avg</sub> considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

**Assessment Report:** ROS 12/04-020 R002 V2 R4

**Safety Manual:** 00809-0200-4728 Section 7

- BR6 must be ordered with option code QT for this certificate to be valid below -40C.
- FIT = 1 failure / 10<sup>9</sup> hours
- 644 can be configured with single or dual RTD or Thermocouple sensors. The failure rates of the device vary with sensor configuration as well as other device configuration parameters. See FMEDA for details on how to calculate the failure rates based on the configuration.
- It is important to realize that the No Effect failures are no longer included in the Safe Undetected failure category according to IEC 61508, ed2, 2010.



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