



Certificate / Certificat Zertifikat / 合格証

AME 1705133 C001

exida hereby confirms that the:

Thermox WDG-V¹ Combustion Analyzer

¹The WDG-V family of analyzers includes the following models:
WDG-V (oxygen only), WDG-VC, WDG-VCM, WDG-VM

AMETEK Process Instruments Pittsburgh, PA - USA

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-3

and meets requirements providing a level of integrity to:

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type B Element

SIL 2 @ HFT = 0; Route 2_H

**PFH/PFD_{avg} and Architecture Constraints
must be verified for each application**

Safety Functions:

The Thermox WDG-V¹ Combustion Analyzer measures the excess oxygen and/or combustibles content of the process gas and outputs 4-20 mA output signals within the safety accuracy. ²

² The Methane measurement function and the combustibles measurement function using hot wire are not certified.

Application Restrictions:

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

The manufacturer may use the mark:



Revision 2.1 March 31, 2023

Surveillance Audit Due
September 1, 2024



David Lybath

Evaluating Assessor

J.P. Moore

Certifying Assessor

AME 1705133 C001

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type B Element

SIL 2 @ HFT = 0; Route 2_H

PFH/PFD_{avg} and Architecture Constraints must be verified for each application

Systematic Capability:

The Product has met manufacturer design process requirements of Safety Integrity Level (SIL) 2. 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 Element meets *exida* criteria for Route 2_H.

IEC 61508 Failure Rates in FIT*

Configurations ²	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
WDG-V ³	141	683	4,480	847
WDG-VC (RTD) ⁴	187	711	4,595	1,204
WDG-VC (HW) ³	744	1,306	5,152	5,400
WDG-VM ⁴	740	1,319	5,145	5,401
WDG-VCM (RTD) ⁴	784	1,345	5,226	5,481
WDG-VCM (HW) ³	1,341	1,941	5,783	9,677

* FIT = 1 failure / 10⁹ hours

² The Methane measurement function and the combustibles measurement function using hot wire are not certified.

³ Only Oxygen measurement function is certified.

⁴ Only Oxygen and Combustibles measurement functions are certified.

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/PFD_{avg} 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: AME 17-05-133 R002 V3R0 IEC 61508 - WDG-V

Safety Manual: WDG-V_SIL SafetyManual_9000-263-VE_RevE



80 N Main St
Sellersville, PA 18960

**Thermox WDG-V¹
Combustion Analyzer**
¹ The WDG-V family of analyzers includes the following models: WDG-V (oxygen only), WDG-VC, WDG-VCM, WDG-VM