

SIL



Functional Safety Certificate

No. 11180418.NATUU92

Technical Construction File no. TCF-AR-NJAY-SIL

Certificate's Holder: Nanjing AIYI Technologies Co., Ltd.
 Building 13, No. 1318 Qingshuiting East Road, Jiangning District,
 Nanjing City 210000, Jiangsu, China.

Product: Gas Detection System

Model(s): Gas Detector AG210, AG200, Anr, Anr-N, Anr-S
 Gas Detector AG310, AG311, AF110, AF111
 Control Panel AGS1000, AGS1000F, AGS1600F, AGS2000F, JUDD

Standard: Standard:
 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 2 (SIL 2 Capable)
 Random Capability: Type A Element
 SIL 2 @ HFT= 0;
 PFD_{AVG} and Architecture Constraints must be verified each application.
 * Safety Function:
 Gas detection and alarm function when the detected gas exceeds the standard within
 specified safety time.
 * Application Restrictions:
 The unit must be properly designed into a Safety Instrumented Function per the Safety
 Manual requirements
 * Is suitable to be safety function according to the description and the configuration
 defined in Annex I.

Related to:
 SIL Functional Safety Verification

Verification Mark:



The Verification Mark can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way

Remark: This SIL Verification of Compliance has been issued on a voluntary basis. ECM confirms that a Test Report is existent for the above listed product(s) and found to meet the requirements of above standards for application in safety related system up to Safety Level of SIL 2.
 The unit must be properly designed into a Safety Instrumented Function as per the requirements in the Safety Manual. The Verification Mark shown above can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way. In addition the Verification's Holder is NOT allowed to transfer the Verification to third parties. This certificate can be checked for validity at www.entecerma.it

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Expiry date 17 April 2023

**Chief Manager
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Annex I

No. 11180418.NATUU92

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- The use of the product [Series Gas Detection System] must obey the required rules to conservation of SIL 2 properties. These rules are recalled in the §6 of the Assessment Report reference: [SIL Capability assessment report]
- The product version of hardware components used for validation and type tests are the following:

Component	Model
Gas Detector	AG210, AG200, Anr, Anr-N, Anr-S
Gas Detector	AG310, AG311, AF110, AF111
Control Panel	AGS1000, AGS1000F, AGS1600F, AGS2000F, JUDD

- Acceptable environmental constraints for the system are recalled in the safety Manual (Ref:[SIL-NJAY-01]). These elements must be checked for each integration operation of the product
- The SIL 2 capable certified Safety Instrumented of [series Gas Detection System] is the following:
SF1: Gas detection and alarm function when the detected gas exceeds the standard within specified safety time
- Hypothesis used for calculations are presented herer under: The mode of operation is Low demand, which means less than 1 trip demand each year

Component Architecture	SIL Capability	Demand frequency	PFD
Tool Configuration	SIL 2	Low	1.05E-03

Safety function	Failure rate	Undetected dangerous failure rate	Tests intervals	MTTR
SF1	2.51E-07	2.32E-07	12months	24h

- The Safety Integrated Level of the safety function using the series Gas Detection System shall be calculated taking into account the characteristics of the whole system