



# Certificate / Certificat Zertifikat / 合格証

AVC 2105173 C003

exida hereby confirms that the:

## Solenoid Valves

**Series R370, R470, R431, R432, & R472**

**Avcon Controls Pvt. Ltd.  
Maharashtra - India**

Has been assessed per the relevant requirements of:

**IEC 61508 : 2010 Parts 1-2**

and meets requirements providing a level of integrity to:

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

**Random Capability: Type A, Route 2<sub>H</sub> Device**

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

### Safety Function:

The solenoid valve will move to the designed safe position when de-energized / energized within the specified safety time.

### 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 1.0 December 12, 2023  
Surveillance Audit Due  
December 15, 2026



Evaluating Assessor

Certifying Assessor

AVC 2105173 C003

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

**Random Capability: Type A, Route 2<sub>H</sub> Device**

**PFH/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>.

**Versions:**

Valve Group	Valve Type Series	Coil Rating
R370E	R370E06	AC: 14VA; DC: 8 Watts
R470E	R440E06	AC: 14VA; DC: 8 Watts
R472E	R472E06	AC: 14VA; DC: 8 Watts
R431E	R431E06, R431E10, R431E15	AC: 14VA; DC: 10.5 Watts
R432E	R432E06, R432E10, R432E15	AC: 14VA; DC: 10.5 Watts

**IEC 61508 Failure Rates in FIT\***

Valve	Trip Configuration - Static Application	$\lambda_{SD}$	$\lambda_{SU}$	$\lambda_{DD}$	$\lambda_{DU}$
R370 R470 (5-way)	Input to Cyl 1 & Cyl 2 to Exhaust	0	278	0	397
	Input to Cyl 2 & Cyl 1 to Exhaust	0	48	0	463
R370 R470 (3-way)	Input to Cyl 1	0	259	0	368
	Cyl 1 to Exhaust	0	19	0	443
R472	Input to Cyl 1 & Cyl 2 to Exhaust	0	592	0	429
	Input to Cyl 2 & Cyl 1 to Exhaust	0	126	0	565
R431	Input to Cyl 1 & Cyl 2 to Exhaust	0	130	0	400
	Input to Cyl 2 & Cyl 1 to Exhaust	0	48	0	433
R432	Input to Cyl 1 & Cyl 2 to Exhaust	0	296	0	407
	Input to Cyl 2 & Cyl 1 to Exhaust	0	126	0	479

\* FIT = 1 failure / 10<sup>9</sup> hours

**SIL Verification:**

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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:** AVC 21/05-173 R006 V1R1 (or later)

**Safety Manual:** SM-SVRS-DRG-001 R0

Solenoid Valves –  
Series R370, R470,  
R431, R432, & R472



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