

## IEC61508 SIL compatibility – clear as mud!

Mike Amphlett, sales & marketing manager with RGS Electro-Pneumatics Ltd addresses some of the issues around the declaration of ‘SIL Ratings’ for components or sub-systems to IEC 61508

IEC 61508 is concerned with functional safety which is part of the overall safety that depends on a system or equipment operating correctly in response to its inputs. It is achieved by safety-related systems that are primarily implemented in electrical and/or electronic and/or programmable electronic (E/E/PE) technologies, ie, E/E/PE safety related systems.

IEC 61508 recognises that there are different levels of safety performance for a safety system depending on its application. These are called Safety Integrity Levels. Safety integrity level 1 (SIL1) is the lowest level of safety integrity and safety integrity level 4 (SIL4) is the highest level.

In the above very condensed summary of IEC61508 the word ‘system’ appears four times – and that’s the rub! The whole framework of IEC61508 necessarily relates to a complete system and its ability to perform a given task to the necessary level. A system is, of course, made up of components and sub-systems, but it is the complete system that

achieves a given SILn (n = 1 to 4) rating, not its constituent parts.

A given system will, of course, achieve higher levels of safety integrity if it is assembled from components that have low failure rates, but the performance level of the component is only part of the story. It is at best of limited value for individual components to be described as being ‘SILn’ compatible. The full description of the suitability of a component or sub-system is provided by good quality, extensive test and performance data, fault analysis and the resultant assessment of failure rates, based on this data.

RGS is advised by the UK Health and Safety Executive that a component’s SIL rating should be taken simply as a guide to its potential; as the probability of failure, the Safe Failure Fraction (SFF), and more particularly the data supporting those figures is the real substance from which the SILn of a safety related system can be known.

IEC 61508-2:2000, clause 7.4.7.3

details what can be claimed for a device such as a solenoid valve, and what information is required to back the claims. These are summarised as:

- failure rates (or probability of failure) for specific failure modes;
- hardware fault tolerance (the number of internal faults tolerated before device failure);
- limit on the safety function SIL that is imposed by techniques used to avoid and control systemic faults. (Only relevant for complex devices, for example those containing software, so it will not usually be a factor for a low complexity device such as a solenoid valve.)

Working closely with Dr David J Smith BSc, PhD, CEng, RGS has taken a great deal of care to ensure that the SIL2 and SIL3 ratings (depending on solenoid valve function) claimed for its full range of pilot operated spool valves are demonstrably valid. These claims are made based on a rigorous FMEDA and test data on over 750,000,000 valve operations. ●



## Solenoid Valves

- RGS** has 45 years of experience in the design and manufacture of electro-pneumatic devices for power and process industry applications.
- RGS** solenoid valves are well trusted and widely specified for use in Oil, Gas and Energy Process Applications.
- RGS** is number one for;

- **Approvals** – Hazardous area EExd, EExm, EExme, EExnA, EExia and safe area, variously with ATEX, FM, CSA, and SAA approvals
- **Choice** – over 200,000 possible variants of interchangeable valve bodies, operators and other options
- **Range** - ‘Namur’, remote, banjo, gang mount and manifold mount options, In Stainless Steel, Brass or Aluminium construction
- **Control** – All product design and manufacturing is RGS ‘end-to-end’
- **Support** – Distributors and agents across the world



**RGS Electro-Pneumatics Ltd**  
West End Business Park  
Blackburn Road  
Oswaldtwistle  
Lancashire  
BB5 4WZ  
England

Tel: 00 44 (0)1254 872277  
Fax: 00 44(0)1254 390133  
Email: sales@rgs-e-p.co.uk  
Web: www.rgs-e-p.co.uk