

A2L Refrigerants and the Pressure Equipment (Safety) Regulation SI 2015-1105 (PE(S)R)

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This guide covers the implications of using an A2L refrigerant on the PE(S)R category of a system. There is a short explanation at the end of this document of the PE(S)R terms used. See Cool Stuff 23 for more information about PE(S)R and the Pressure equipment Directive (PED).

A2L refrigerants have lower flammability so are classed as group 1 (dangerous) fluids. A1 refrigerants (non-flammable) are classed as non-dangerous (“other”) for the PE(S)R. This means that, compared to a system of the same size and with the same PS running on a non-flammable (A1) refrigerant, an A2L system could have a higher hazard category.

One of the implications of this is that condensing unit systems which are PE(S)R category I with an A1 refrigerant are now likely to be PE(S)R category II or higher with an A2L refrigerant. A category I system can be self-certified but a category II system (or above) must be assessed by an Approved Body.

Example of PE(S)R Hazard Classification

The example in the table below compares a condensing unit system operating on R448A, an A1 refrigerant, with the same system running on R454C, an A2L refrigerant. The system has a 3 litre liquid receiver.

Refrigerant	Safety class	PS, bar g (at 55°C)	PE(S)R category of 1 1/8" liquid line	PE(S)R category of a 7 litre receiver	PE(S)R category of whole system	Compliance with PE(S)R
R448A	A1	25.5	SEP	I	I	Self certification and UKCA marking is required
R454C	A2L	23.1	I	II	II	Approved body is required to check design and technical information and witness a proportion of strength pressure tests

In the example above for the A2L (R454C) system brazers would need an industry standard brazer qualification. However, it is possible on some larger A2L systems that pipe joints will fall into PE(S)R category II or higher, in which case brazers would need to be approved by an approved body.

Explanation of Terms

PE(S)R (hazard) category

The PE(S)R category of a system usually depends on:

- Receiver size or in some case the hermetic compressor free volume;
- PS;
- Fluid group (toxicity and / or flammability of the refrigerant).

There are five categories – SEP to cat IV. SEP and cat I systems are certificated by the manufacturer / installer, cat II, III and IV system must be assessed by an approved body. The requirements for compliance are similar for all categories although the involvement of the approved body increases with PE(S)R category. Note – SEP is sound engineering practice.

PS

System design pressure, also called the maximum allowable pressure – see CS22 for an explanation of PS.

Approved body

An approved body is a third party independent organisation that is accredited by the UK Accreditation Service, UKAS (in the UK) to carry out conformity assessments, in this case for the PE(S)R.

Further Information

For more information about the PE(S)R and the PED please contact us. We provide PE(S)R and PED compliance help to contractors:

- Training for personnel who are involved in the compliance procedure such as project managers and on site commissioning engineers;
- Templates for the design and technical file documents which are used to demonstrate compliance;
- Liaison with the approved body.

Email info@coolconcerns.co.uk for further information.

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