

The application of the PED on the design codes for cryogenic equipment and future developments foreseen in this field

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Summary

- Background
- PED – Advantages for the Industry
- PED – Inconvenients for the Industry
- PED – Main changes compared to national regulations
- PED – Notified Body
- PED – Category and module
- PED – EN and ISO Standards published for pressure vessels
- PED – Recent modifications

Background

- ❑ PED: Pressure Equipment Directive
- ❑ First version published in 1997, came fully into force on May 2002
- ❑ First revision in 2014.

- PED covers **Static Pressure Equipment**
- Some cylinders are also covered by PED
- PED only covers **design, manufacturing** and **firstplacing** on the market
- PED is **mandatory** in European union since end of May 2002

PED – Advantages for the Industry

- ❑ Same design can be used in all European Union countries
 - ➔ Allows manufacturers to optimize design and to reduce manufacturing cost

- ❑ Approval from only one notified body is necessary
 - ➔ Allows to obtain better conditions from notified Bodies
 - ➔ Allows to “open” difficult markets/countries

- ❑ Should allow a company to harmonise PE fleet in European Union
 - Not always possible because of different practices in the different countries e.g. different service pressures or safety accessories*

- ❑ Also recognized in Eastern European countries

PED – Inconvenients for the Industry

- Sometimes more stringent than old national codes
 - For materials
 - For safety accessories
 - Vaporisers are considered as pressure vessels

- May lead to cost increase

PED – Main changes compared to national regulations

- All vessels > 0,5 bar are subjected
- Pressure test (coefficient: 1,43)
- Pipes > DN 25 to be PED compliant
- The entire control cabinet (with accessories > DN 25) to be PED compliant
- Risk analysis to be submitted to the Notified Body
- Choice of a Notified Body per product line

PED – Notified Body

- ❑ PED allows the cryogenic vessel manufacturer to choose a unique Notified Body as per the following criteria:
 - ✓ Qualification and capability
 - ✓ Wide recognition, even outside the European borders
 - ✓ Close collaboration
 - ✓ Competitiveness

PED – Category and module

□ For cryogenic vessel for LIN, LOX and LAR

- Risk category IV
- Module G (unit CE approval)
- Or Modules B + D
 - CE type approval
 - Production quality assurance

PED – EN and ISO standards published for pressure vessels

□ Vessels

ISO reference	EN reference	Title
EN ISO 21009-1*	EN 13458-1	Static vacuum insulated vessels Part 1(ISO and EN): Fundamental requirements
EN ISO 21009-1*	EN 13458-2	Static vacuum insulated vessels Part 1(ISO) Part 2(EN): Design, fabrication, inspection and tests
EN ISO 21009-2	EN 13458-3	Static vacuum insulated vessels Part 2(ISO) Part 3(EN): Operational requirements
	EN 14197-1	Static non-vacuum insulated vessels Part 1: Fundamental requirements
	EN 14197-2	Static non-vacuum insulated vessels Part 2: Design, fabrication, inspection and tests
	EN 14197-3	Static non-vacuum insulated vessels Part 3: Operational requirements

Static vacuum insulated vessels

Static non-vacuum insulated vessels

* Under revision

PED – EN and ISO standards published for pressure vessels

□ Accessories

ISO reference	EN reference	Title
ISO 21011*	EN 1626	Valves for cryogenic services
EN ISO 21012*	EN 12434	Hoses
ISO 21013-1*	EN 13648-1	Pressure relief devices Part 1: Reclosable pressure-relief devices
ISO 21013-2*	EN 13648-2	Pressure relief devices Part 2: Non-reclosable pressure-relief devices
ISO 21013-3*	EN 13648-3	Pressure relief devices Part 3: Sizing and capacity determination
ISO 21013-4*		Pressure relief devices Part 4: Pilot operated pressure-relief
EN ISO 24490*	EN 13275	Pumps for cryogenic vessels

* Under revision

PED – EN and ISO standards published for pressure vessels

Materials

ISO reference	EN reference	Title
ISO 21010*	EN 1797	Gas/materials compatibility
EN ISO 21028-1*	EN 1252-1	Toughness requirements for materials at cryogenic temperature Part 1: Temperature below -80°C
EN ISO 21028-2*	EN 1252-2	Toughness requirements for materials at cryogenic temperature Part 2: Temperature between -80°C and -20°C

Miscellaneous

ISO reference	EN reference	Title
ISO 21014*	EN 12213	Cryogenic insulation performance
ISO 23208*	EN 12300	Cleanliness for cryogenic service

* Under revision

PED – Recent modifications

To re-qualify cryogenic vessels, original documents of design and manufacturing must be presented to the Notified Body

Cryogenic vessels are generally built according to different national construction code:

- French code
- German code
- Belgian code
- Dutch code

□ Documents to be supplied:

- Drawing of approval
- Annex to the drawing of approval (device's description)
- Calculation of internal bowl
- Certificate of hydraulic test (event)
- Operating modes of soldering
- Qualifications of the welders
- Report of the radiographic examinations
- X-ray

End of presentation
Thank you for your attention

