ISO 11933-5:2026-05 (E)

Components for containment enclosures - Part 5: Penetrations for electrical and fluid circuits

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Selecting a component **3**
4.1 General requirements 3
4.2 Risk assessment and safety analysis 3
4.2.1 Principle and parameters 3
4.2.2 Atmosphere 3
4.2.3 Heat radiation 4
4.2.4 Corrosion 4
4.2.5 Leaktightness 4
4.2.6 Fire 4
4.2.7 Mechanical risk 5
4.2.8 Electrical risk 5
4.2.9 Contamination and irradiation 5
4.2.10 Chemical risk 5
4.2.11 Other risks 5
4.3 Shielded penetration requirements 6
4.3.1 General 6
4.3.2 Radiation protection (external exposure) 6
4.3.3 Seismic safety 6
4.3.4 Remote-handling 6
4.4 Other requirements 6

5 Electrical components **6**
5.1 Design and installation 6
5.1.1 General 6
5.1.2 Materials used in fabrication 6
5.1.3 Work stations 7
5.1.4 Equipment location and operation 8
5.1.5 Operator safety 9
5.1.6 Maintenance and intervention 9
5.1.7 Decontamination and dismantling 9
5.1.8 Installation 10
5.2 Specific component requirements and recommendations 11
5.2.1 Plug boards 11
5.2.2 High-voltage distribution cabinets 11
5.2.3 Low-voltage distribution cabinets (large and small distribution boxes) 11
5.2.4 Control consoles 11
5.2.5 Electrical (Optical) cables 12
5.2.6 Connector assemblies 13
5.2.7 Wall penetrations 15
5.2.8 Lighting components or systems 30
5.2.9 Transmission penetration 31
5.2.10 Detection, alarm and process apparatuses 33

6 Fluid components **33**

6.1 Design and installation 33
6.1.1 General 33
6.1.2 Uniformity 34
6.1.3 Installation 36
6.2 Special requirements and recommendations 36
6.2.1 Separation of functions inside the enclosure 36
6.2.2 Pipework junctions inside and outside enclosures 36
6.2.3 Sealing rings 37
6.2.4 Precautions for effluent circuit pipes 37
6.2.5 Fastening of pipes inside enclosures 38
6.2.6 Grouping of fluid pipes on ejectable plugs 38
6.3 Specific component requirements and recommendations 39
6.3.1 Pipe fittings 39
6.3.2 Wall penetrations 40
6.3.3 Valves 52
6.3.4 Measuring and inspection appliances 58
6.3.5 Functional equipment 59
6.3.6 Safety equipment 59

Bibliography **62**