

Client

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Auf dem Stützelberg

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Summary:
Technical Statement / Expert Report
Safety Assessment of Enclosure Cooling Units
Using the Refrigerant R1234yf (A2L)
Rittal: Blue e+ S wall-mounted cooling unit 0.3 kW – 1 kW
Blue e+ S wall-mounted cooling unit 1,6 kW - 5,5 kW

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Purpose of the Statement / Expert Report: Assessment of residual risks, completeness of documentation, operator obligations, and the necessity of safety-related control functions

Statement / Expert Report for the Following Equipment Types: Rittal: Blue e+ S wall-mounted cooling unit 0.3 kW – 1 kW
Rittal: Blue e+ wall-mounted cooling unit 1,6 kW - 5,5 kW

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1. Key Statement

The enclosure cooling units under consideration are to be assessed as safe when used as intended. The remaining residual risks are negligible and acceptable. Additional safety-related control functions are not required.^{1 2 3 4 5}

For customers and operators, the following is essential: When used as intended, the equipment does not present any fire or explosion risks. An explosive atmosphere does not occur. Therefore, the operator is not required to implement any additional technical, organizational, or structural measures.^{2 3 4 13 14 15 16 17 18}

2. Technical Justification (Summary)

The units are tested and certified in accordance with IEC 60335-2-40 / IEC 60335-1.^{2 5 6 7 8 9 10 11 12}

The refrigerant circuit is hermetically sealed and safeguarded by multi-stage pressure, vacuum, and helium leak testing. Leak detection capability is approximately 3 g/year.^{3 4}

The refrigerant-carrying lines are designed to be permanently technically leak-tight. This is ensured by the hermetic design of the refrigerant circuit, qualified brazing and joining processes under inert gas atmosphere, the use of approved and tested components, as well as multi-stage leak-tightness testing during the manufacturing process. Therefore, any safety-relevant release of refrigerant during intended operation is to be considered extremely unlikely.

R1234yf is classified as an A2L refrigerant but has high ignition energy, low flame propagation, and no realistic ignition from electrical cabinet components.^{13 14 15 16 18 19}

BAM large-scale tests confirm no ignition even with high-energy electrical sources under realistic conditions.^{17 18}

3. Operator-Relevant Statement

The system is classified as work equipment under the German Industrial Safety Regulation (BetrSichV). The obligation for risk assessment remains, but no additional measures are required. No intervention in the refrigerant circuit is intended during normal operation. No explosion protection document is required.

^{2 13 14 16 17 18}

4. Conclusion

Residual risks: negligible / acceptable; Documentation: complete.

EN 62061: no safety-related control functions required; Additional technical measures: not necessary.

Operator measures: not required.^{1 2 3 4 17 18}

Place, Date



Mustafa Oymak

Expert / TÜV Rheinland

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