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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 15605-2008

**Guide for pressure venting of dust explosions
(English Translation)**

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Foreword

This standard replaces GB/T 15605-1995 "Guide for pressure venting of dust explosions".

This standard is revised from GB/T 15605-1995.

The consistency between this standard and VDI 3673 "Pressure venting of dust explosions" (English version 2002, hereinafter referred to as the original text) not equivalent, the main differences are as follows.

- DELETE the theoretical knowledge introduction and the interpretational descriptions of relevant provisions from the original text;
- DELETE the references and the attached drawings which are not highly associated with the main contents of the standard from the original text;
- MODIFY the expression methods into the form applicable to Chinese standard;

- ADD the normative references (SEE chapter 2);
- COMBINE the chapters 3, 4, 5, 11, and 12 of VDI 3673 into chapter 4 of this standard;
- ADJUST the chapters 7, 8, 9, 10 of the original text into the chapters 5, 6, 7, 8 of this standard; ADJUST the chapter 13 of the original text into chapter 9 of this standard; ADJUST the chapter 6 of the original text into chapter 10 of this standard;
- The main contents of chapter 11 of this standard are revised mainly with reference to GB/T 15605-1995, which contains the contents of chapter 14 of the original text;
- CHANGE the pressure unit to the international system of units.

As compared with GB/T 15605-1995, the main changes of this standard are as follows.

- MODIFY the terms and definitions, DELETE some of the terms and definitions which have been given in the basic terminology standards, ADD the terms and definitions related to flame and pressure hazards (chapter 3 of 1995 version; chapter 3 of this version);
- Explosion pressure venting application. this version uses the contents of chapters 3, 4, 5, 11, and 12 of VDI 3673, to respectively specify the applications in different place pressure venting such as containers, buildings, pipelines, systems connected to pipeline, and so on. DELETE the chapter 6 and chapter 7 of the 1995 version, and COMBINE the contents with chapter 4 of 1995 version into chapter 4 of this version (chapter 4, 6 and 7 of the 1995 version; chapter 4 of this version);
- Venting area calculation method. the 1995 version mainly uses the calculation method of NFPA 68.1988, whilst this version uses the calculation method of VDI 3673.2002 (chapter 5 and chapter 8 of 1995 version, chapter 5 of this version);
- This version no longer uses the venting area Nomogram, but uses the fitting formula (chapter 5 and chapter 8 of 1995 version, chapter 5 of this version);
- ADD the hazards of flame and pressure as well as the recoil force calculation in the venting process (SEE chapters 6 and 8);
- Independently LIST the relevant design of the pressure venting tube (clause 5.3 of 1995 version, chapter 7 of this version);
- MODIFY the combustible mixture pressure venting design (chapter 9 of 1995 version, chapter 9 of this version);
- MODIFY the chapter 10 Pressure venting device, DELETE the technical provisions on the pressure venting device, ADD the anti-vacuum suction valve area calculation Nomogram (chapter 10 of 1995 version; chapter 10 of this version);
- DELETE the chapter 11 Determination of activation pressure;
- DELETE Appendix A "Explosion pressure venting of pipeline, channel, and long

container", Appendix B "Basic principles of dust explosion pressure venting", and Appendix C "Explosion of combustible dust";

- ADD the normative Appendix "Venting area calculation for special delivery system" (SEE Appendix A), informative Appendix "Design example" (SEE Appendix B), and informative Appendix "Length diameter ratio of protected container/bin as determined during venting area calculation" (SEE Appendix C).

Appendix A of this standard is normative, Appendix B and Appendix C are informative.

This standard was proposed by the State Administration of Work Safety.

Guide for pressure venting of dust explosions

1 Scope

This standard gives the basic method for explosion pressure venting design in the places in presence of combustible dust and mixture.

This standard applies to general industrial dust.

This standard does not apply to toxic and corrosive dust, explosives or energetic materials.

This standard does not apply to the equipment that subject to detonation disaster.

The explosion pressure venting technology of this standard is permitted only if it does not seriously endanger the environment and does not cause injury to personal safety and health.

If the actual test proved that it can ensure the same level of safety obtained with this standard, then the method used and the calculated pressure venting area are allowed to deviate from this standard.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard;

however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable.

For undated references, the latest edition of the referenced document applies.

GB/T 15604 Terminology for dust explosion prevention GB/T 16426 Determination for maximum explosion pressure and maximum rate of pressure rise of dust cloud (GB/T 16426-1996, eqv ISO/DIS 6181-1)

3 Terms and definitions

The following terms and definitions apply to this standard.

Explosion pressure venting A method of restraining the pressure of explosion by opening a pre-designed venting port to release the unburned mixture and the products of combustion, so as to prevent the pressure from rising beyond the design strength, and to protect the container, which is referred to as explosion venting or pressure venting.

Activation overpressure 3.2.1 Static activation overpressure, p_{stat} , MPa the pressure at which the pressure venting device opens by slowly rising pressure.

Note: The pressure shall be pressure-strength, which is used to be called pressure. The unit is MPa (Megapascal).

3.2.2

Dynamic activation overpressure, p_{dyn} , MPa the pressure which opens the pressure venting device during explosion. It may be higher than the static activation overpressure.

Reduced explosion overpressure, p_{red} , MPa the maximum pressure produced at the time of explosion pressure venting of the mixture of a certain concentration dust and air in the pressure venting protected container.

Reduced rate of pressure rise, $(dp/dt)_{red}$, MPa - S-1 the rising rate of the maximum pressure as produced at the time of explosion pressure venting of a certain concentration of dust-and-air mixture, in the pressure venting protected container.

Maximum reduced explosion overpressure, $p_{red,max}$, MPa

4.1 Explosion pressure venting for containers, silos and equipment

4.1.1

The maximum reduced explosion overpressure shall not exceed the design pressure of the equipment. All components of the equipment subjected to explosion pressure, such as valves, sight glasses, access holes, cleaning ports and pipelines, shall have this design strength.

4.1.2

Pressure venting devices shall be installed to avoid the personnel from risk of explosion hazards, and shall not affect the equipment operation with safety significance.

4.1.3 If the equipment to be protected is located in a building, a vent duct shall

be used to lead the pressure venting port outside the building, or otherwise the pressure venting device that does not produce flame or spark shall be used.