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

GB 5135.9-2018

Replacing GB 5135.9-2006

**Automatic sprinkler systems - Part 9: Early suppression fast
response (ESFR) sprinklers**

自动喷水灭火系统 第9部分：早期抑制快速响应（ESFR）喷头

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Quarantine;
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Foreword

Chapters 6 and 8 of this section are mandatory and the rest are recommended. GB 5135 "Fire Sprinkler System" has been released and plans to release the following sections.

- Part 1. Sprinklers;
- Part 2. Wet alarm valve, delay device, hydraulic alarm bell;
- Part 3. Water spray nozzles;
- Part 4. Dry alarm valve;
- Part 5. Rain alarm valve;
- Part 6. General purpose valves;
- Part 7. Water flow indicator;
- Part 8. Accelerator;
- Part 9. Early suppression fast response (ESFR) nozzles;
- Part 10. Pressure switch;
- Part 11. Grooved pipe joints;
- Part 13. Water curtain nozzles;
- Part 14. Preaction devices;

1 Scope

Part 9 of China's mandatory series on automatic sprinkler systems, covering the ESFR sprinkler - the head designed not to control a warehouse fire but to put it out, and the component that made it possible to protect high-piled storage from the ceiling alone, without the in-rack sprinklers that used to be unavoidable. This part specifies the classification, the nominal operating temperature, the colour marking, the model designation and specifications, the requirements, the test methods, the inspection rules, and the packaging, transport and storage of early suppression fast response sprinklers. The principle is in the name and both halves of it are necessary. Fast response: the thermal element has a low response time index, so the head opens while the fire is still small enough to be beaten. Early suppression: the head delivers a very high flow of large, fast droplets that carry down through the fire plume and wet the burning surface, rather than the fine spray of a standard head, which the plume simply lifts away. Together they change the outcome from control to suppression. The price is that an ESFR system is unforgiving in a way a standard system is not: it depends on a high water supply pressure being genuinely available, on the ceiling clearances and the storage arrangement being what the design assumed, and on obstructions being absent - and if any of those is wrong the head does not underperform gracefully, it fails to suppress. That is why the requirements on the delivered density, the droplet momentum, the distribution and the operating characteristics are as tightly drawn as they are, and why the marking and specification of the head matter as much as its performance. Issued on 17 September 2018 and in force since 1 April 2019, it replaces GB 5135.9-2006.

This part of GB 5135 specifies the classification, nominal operating temperature, color marking, and model specifications for early suppression fast response (ESFR) nozzles. Grid, requirements, test methods, inspection rules and packaging, transportation, storage, etc. This section applies to the nominal flow coefficient K202 (sagging type and upright type), K242 (sagging type and upright type), K323 (sagging type), K363 (sag type) early suppression fast response (ESFR) nozzles, other types of early suppression fast response (ESFR) nozzles can be referenced This section. This section does not apply to special application nozzles.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB 5135.1 Automatic sprinkler systems - Part 1. Sprinklers

GB/T 7306.2 55° sealed pipe threads Part 2. Conical internal and conical external threads

GB/T 9969.1 General instructions for the use of industrial products

GB/T 31431-2015 Fire extinguishing system Class A fire test standard burner

3 Terms and definitions

The following terms and definitions as defined in GB 5135.1 apply to this document.

3.1 Conductivity factor A measure of the thermal conductivity of a heat sensitive element of a showerhead and its fixture.

Note. The unit is (meters per second) $2[(m/s)^2]$.

3.2 Actual watering density actualdelivereddensity ADD The density of sprinkling water that penetrates the fire plume to the surface of the combustion.

3.3 Early suppression of earlysuppression In the early stage of the fire, the sprinkler system can have enough water to quickly act on the fire even if only a few nozzles are activated, and extinguish or suppress the fire. Fire to an acceptable level.

3.4 Early suppression fast response (ESFR) sprinkler earlysuppressionfastresponse (ESFR) automaticsprinkler Under the action of heat, the heat sensitive component is self-started within a predetermined temperature range, and the water is distributed in a certain shape and density in the design.