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**Design guidelines of thyristor valves for high voltage direct
current (HVDC) power transmission**

高压直流输电晶闸管阀设计导则

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Foreword

This Guidance Document is drafted in accordance with the rules given in GB/T 1.1-2009. This guidance document is proposed by China Electrical Equipment Industry Association. This Guidance Document is organized by the National Committee of Technical Standardization of Power Electronics (SAC/TC60). The drafting of the technical guidance of this document. Xi'an West Power System Co., Ltd., Xi'an Institute of High Voltage Electric Co., Ltd., South Power Grid Research Institute Co., Ltd., China Electric Power Research Institute, Xi'an Institute of Power Electronics, State Grid Electric Power Research Hospital, Nanjing NARI Electric Co., Ltd., Xu Ji Group Co., Ltd., Rongxin Power Electronics Co., Ltd., Nanjing Automation shares Co., Ltd., Alstom Power Grid Department, Hangzhou Cheung Bo Electric Co., Ltd., Guangzhou Gao Lan Energy Saving Technology Co., Ltd. The main drafters of this technical document are Liu Ning, Li Xia, Zhang Wanrong, Xu Shukai, Wen Jialiang, Wei Hongqi, Zhou Guanyun, Yang Xiaohui, Hu Ming, Wang Xiaohong, Chen Chihan, Zhang Jian, Chang Zhongting, Zhang Fanyong, Yang Zhiyong, Cao Junzheng, Zhou Changchun, Wang Hu, Wang Wenqi, Zheng Xiaohong, Tian Fang, Ma Zhenjun, Lou Yan Tao. HVDC Thyristor Valve Design Guidelines

1 Scope

GB/Z 30424-2013 is the Chinese national standard on design guidelines of thyristor valves for high voltage direct current (hvdc) power transmission, in the field of electrical engineering. The /Z suffix marks it as a guiding technical document: it does not prescribe requirements that can be certified against, but sets out the technique, the method or the state of the art that the standards bodies recommend following. It was issued on 31 December 2013 by the State Administration for Market Regulation; Standardization Administration of China. As a guiding technical document it carries no separate date of entry into force: it applies from publication. Classification: ICS 29.200, CCS K46. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken

from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This guideline specifies the basic requirements for the design of thyristor valves for high voltage direct current (hereinafter referred to as valves). This guidance applies to water cooled, air insulated, and indoor mounted valves.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 3859.1 General requirements for semiconductor converters and commutation converter - Part 1-1 - Basic requirements specification (GB/T 3859.1-2013, IEC 60146-1-1.2009, MOD)

GB/T 16927.1 high voltage test techniques - Part 1. General definitions and test requirements (GB/T 16927.1-2011, IEC 60060-1.2006, MOD) GB/T 13498 HVDC terms (GB/T 13498-2007, IEC 60633.1998, IDT)

GB/T 20989 HVDC converter station loss determination (GB/T 20989-2007, IEC 61803.1999, IDT)

GB/T 20990.1 HVDC thyristor valves - Part 1. Electrical test (GB/T 20990.1-2007, IEC 60700-1. 1998, IDT)

3 Terms and definitions

GB/T 13498 defined and the following terms and definitions apply to this document.

3.1 Maximum direct current maximumdirectcurrent Valve under the specified operating conditions, (theoretically unlimited time) to the load output of the maximum DC current.

Note. Generally different cooling media and ambient temperature have different values. 3.2 2h overload DC current 2hoverloadaddirectcurrent Valve within the specified 2h, can output to the load DC current.

Note. Generally different cooling media and ambient temperature have different values.

3.3 Short-time overload (overload) DC current shorttimeoverloadaddirectcurrent Valve in the specified short period of time (such as 10s, 5s, 3s), to the load DC current output.

Note. Thyristor current stress is the primary limiting factor.

3.4 Rated DC current rateddirectcurrent According to the provisions of the load conditions and conditions of use, the manufacturer for the inverter DC current (average).

3.5 Maximum ideal no-load DC voltage U_{di0max} Generally refers to the inverter in the case of no-load maximum DC voltage (U_{di0max}).

Note. At this point, all voltage drops and grid voltage fluctuations are neglected.

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