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**Technical guideline for 1 000 MW class Francis hydraulic
turbines**

1000MW级混流式水轮机技术导则

(English Translation)

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Foreword

This instructional document has been 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 for Standardization of Hydraulic Turbines (SAC/TC175).

The main drafting of the technical guidance of the unit. Harbin Electric Works Co., Ltd., Dongfang Electric Group Dongfang Electric Co., Ltd., China Academy of Water Conservancy and Hydropower Research, China Three Gorges Corporation, China East Construction Engineering Research Institute Co., Ltd., Yangtze River Survey Planning Design Co., Ltd.

Introduction

The overall level of large-scale hydropower equipment manufacturing industry continues to improve, stand-alone capacity continues to grow, stand-alone capacity of one million kilowatts of hydroelectric units for the staged achievements, it is necessary to organize the development of standards and provide technical preparation for the commissioning of units.

This guiding technical document is based on the project of Wudongde and Baihetan Hydropower Station and is based on the research results of the following two research projects.

1) National Science and Technology Support Project "Research on Key Technologies of 1000MW Hydropower Units"; 2) China Three Gorges Corporation Project "One Million the overall design of hydroelectric generating units, turbine hydraulic design and model tests. " this guidance document is based on the construction, of large-scale hydro-generator set design, manufacture, operating experience to study, sum up and total Based on the conclusion, according to the relevant current international, national and industry standards or norms for preparation.

The basic principles for the preparation of this technical guidance document are to highlight the characteristics and important concerns of a million-kilowatt hydroelectric generating unit.

The basic requirements and the current standards have repeated content, is the stage of innovative products in the development phase of the guidance document.

Technical Guidelines for 1000MW Francis Turbine

1 Scope

This Guidance Document specifies the main technical parameters and performance requirements for a 1000MW Francis turbine. The overall structure Etc.

This Guidance Document is applicable to the preparation, design, manufacture, installation, operation, etc. of bidding documents of 1000MW Francis turbine the guidance and reference.

This Guidance Document 1000MW Francis turbine refers to the turbine rated power (or nameplate power) 862MW ~ 1100MW, and the rated head range of 100m ~ 300m Francis turbine.

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 2900.45 Electrotechnical terminology Hydropower equipment (GB/T 2900.45-2006, IEC/T R61364.1999, MOD) GB/T 8564 turbine generator installation technical specifications Hydraulic turbine, accumulator pump and pump turbine flow passage components - Technical conditions GB/T 11348.5-2008 Rotating machinery - Measurement and assessment of radial vibration of shafts - Part 5. Hydroelectric power plants and pumping units (ISO 7919-5:2005, IDT) GB/T 15468 turbine basic technical conditions GB/T 15469.1-2008 turbines, storage pumps and pump turbines cavitation assessment Part 1 cavitation erosion of the impact turbine assessment GB/T 17189 hydraulic machinery (turbines, storage pumps and pump turbines) vibration and pulsation field measurement procedures (GB/T 17189-2007, IEC 60994:1991, MOD) NB/T 47013.10-2015 Nondestructive testing of pressure equipment - Part 10 - Ultrasonic testing by diffractometry

3 Terms and definitions

GB/T 2900.45, GB/T 15468 defined terms and definitions apply to this document.

4.1 General principles

General Principles for Parameter Selection and Performance Requirements of 1000 MW Francis Turbine Units.

- a) The main technical parameters should be selected to meet the dry season (or high water head) with high efficiency, flood season (or low head) can generate more electricity in principle;
- b) When there is a conflict between the energy performance and the stability of the unit, priority should be given to the stability;
- c) The long-term stability of the unit to ensure the scope of the appropriate head should use 60% to 100% of the guaranteed power to increase its service life;