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

JB/T 10499-2005

**Guide for design and application of turbine generators under
abnormal operating conditions**

透平型发电机非正常运行工况设计 and 应用导则

(English Translation)

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1 Scope

This Standard specifies the operating range and degree of turbo generators under various abnormal operating conditions.

This Standard is applicable to turbo synchronous generators of which the capacity range is greater than 100 MW.

This Standard can be used as the basis by user and manufacturer when signing technical agreement. Special requirements for specific products shall be agreed by both supplier and buyer.

2 Normative references

The following standards contain the provisions which, through reference in this

Standard, constitute the provisions of this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this

Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB 755-2000 Rotating electrical machines - Rating and performance (idt IEC 60034-1: 1996)

GB/T 7064-2002 Requirements for turbine type synchronous machine (IEC 60034-3: 1988, NEQ)

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 asynchronous operation

Asynchronous operation state caused by excitation-loss.

4.8 Water-break operation

The allowable water-break operation duration time of water cooled motor is 30 s. If the backup pump cannot restore the water supply within the aforementioned time, it must be power-trip.

4.9 Out-of-phase synchronization

It shall ensure that the power generator can withstand 180° out-of-phase synchronization for 5 times or 120° out-of-phase synchronization for 2 times during its life time.

4.10 Single-phase reclosing-switch

The power generator shall have the capability of withstanding single-phase high-voltage line reclosing-switch, which shall not affect its reliability.

4.11 Start and stop times of generator set

Two-shift peak-adjustment set is allowed to start and stop for 10000 times during its life time.

Non two-shift set shall withstand start and stop for 3000 times during its life time.

4.12 Examination on turbo generator after large system disturbance

The turbo synchronous generator shall withstand sudden short circuit of stator winding outlet end under rated voltage, rated active power and rated power factor.

Generator shutdown inspection shall be conducted for direct cooling or indirect cooling turbo generator after withstanding large system disturbance. The abnormal operation working conditions requiring post inspection are as follows:

- Generator outlet; in some cases, it also includes three-phase or two- phase sudden short circuit of high-pressure side of step-up transformer of electrical transformer unit;
- Sudden short circuit of generator transformer unit and system networking when they are operating near generator transformer proximal end;
- Generators and network operation failure, e.g., out-of-phase synchronization reclosing-switch;
- Asynchronous operation that exceeds the allowable limit (especially high rotating-difference rate) and out-of-step operation;

- High negative sequence current operation is not allowed;
- Abnormal rise in rotational speed caused by turbine.

After serious abnormal operation, visual inspection and some tests shall be conducted based on specific abnormal operating conditions. For example, inspections on heating of rotor surface, stator end windings and structural parts, coupling screws and voltage resistance test and dye penetration test, etc.

4.13

Matters not specified in this Standard shall comply with the provisions of GB/T 7064.

_____ END _____