

TYPE CERTIFICATION OF WIND TURBINES AS PER TAPS-2000

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1.0 INTRODUCTION:

Type Certification is obtained by wind turbine manufacturers for their wind turbine (WT) models, to demonstrate that wind turbine models are meeting the specified standards. Certification of wind turbines has a history of almost thirty years. Most of the countries with the active wind energy programmes have their National type certification / approval schemes along with testing facilities for Type certification / Approval of wind turbines. The scope for the certification is well defined in type certification schemes. The present trend is moving towards harmonization of certification requirements and International Standards (IEC) have been released on certification requirements. IEC standards are widely accepted.

2.0. Facility for Type Testing and Type Certification

Though, India has witnessed a rapid development in wind power generation during the last two decades, testing and certification facilities were not available in the country. Presently, the Indian WT manufacturers, with a few exceptions, are supplying the wind turbines of the types provided by their principals, which are certified by the type certification bodies in abroad. However, these type certificates are issued based on the European site conditions and approval schemes/technical criteria of the country in which they are carried out. In addition, the wind turbines installed in India undergo major/minor changes to suit the Indian conditions. All the major stakeholders expressed the need for establishing the testing facilities and certification system in the country. Based on the above, Ministry of New and Renewable Energy (MNRE) has established Testing and Standards and Certification (S&C) units as a part of Centre For Wind Energy Technology(C-WET). S&C unit has prepared a Type Certification scheme viz., “Type Approval - Provisional Scheme (TAPS-2000)”, the Indian Certification Scheme for wind turbines, which has been approved and issued by MNRE.

3.0 Type Certification

The purpose of the type certification is to confirm that the wind turbine type is designed, documented and manufactured in conformity with design assumptions, specific standards and other technical requirements. Type Certification applies to a series of WTs manufactured under the same design.

3.1 The Type Certification process can be broadly described as given below:

- Evaluation of
 - Design documentation
 - Type Test reports
 - Manufacturing system documentation
 - Type characteristic measurements (optional)
 - Foundation design (optional)
- Preparation of Final Evaluation Report
- Issue of Type Certificate, valid for a specified period
- Renewal of Type Certificate

4.0. Type Approval – Provisional Scheme (TAPS-2000)

S&C unit of C-WET, the Type Certification body, is the implementation agency of TAPS-2000. TAPS – 2000 aims to promote procedures and requirements for the establishment of uniform codes, standards and technical criteria for design, manufacturing and operation of wind turbines. TAPS – 2000 comprises of principles, procedures, requirements and the technical criteria for certification of wind turbines in India, addressed to applicants and others involved in the scheme. TAPS – 2000 was formulated in line with IEC standards. However the requirements of Indian standards are included wherever necessary to take into account of the Indian conditions. National and International rules, codes and standards relevant for certification of WTs. TAPS – 2000 is applicable only to the grid connected, horizontal axis WT.

Based on the implementation experience, TAPS-2000 was already amended in the year 2003.

4.1 As per TAPS-2000, Provisional Type Certification (PTC) is carried out according to three categories viz., Category-I, Category-II and Category-III. The outline of these three categories is mentioned below:

Category- I: PTC for wind turbine already possessing type certificate or approval.

Category- II: PTC for wind turbine already possessing type certificate or approval, with minor modifications/changes, including provisional type testing/measurements at the test site of C-WET / field.

Category- III: PTC for new or significantly modified wind turbine including provisional type testing/measurements at the test site of C-WET / field.

The documentation requirements for each category are detailed in TAPS- 2000.

4.2 External Conditions

Wind turbines are subjected to environmental and electrical conditions, which may affect their loading, durability and operation. In order to ensure the appropriate level of safety and reliability, the conditions of environmental, electrical, operational and soil parameters must be considered in the design and also explicitly stated in the design documentation. The design documentation must be submitted by the manufacturer/supplier to the Type Certification body.

The wind turbine, subjected to PTC for installation in India, should be designed using representative environmental and other design conditions. Especially, the grid conditions and extreme wind climate in India are different compared to European conditions. As per TAPS-2000, the design shall comply with the requirements specified in IEC 61400 – 1 standard and modifications to IEC 61400 – 1, as given in TAPS-2000 to incorporate the Indian conditions. It is also included that the evaluation of extreme wind conditions of any wind farm site

shall be carried out as per the Indian Standard IS : 875 (Part 3). The requirements on external conditions mentioned in TAPS-2000 are applicable for all the three categories of Provisional Type Certification.

4.3 Provisional Type Certificate

The Type Certification Body, Standards and Certification (S&C) unit of C-WET, will issue a Provisional Type certificate for a wind turbine model, based on satisfactory evaluation for completeness and correctness of the evaluation reports. The specifications of the certified wind turbine model are issued as a part of the Type Certificate. The make and model of components including allowable alternative suppliers are also mentioned in the Type Certificate.

5.0 Renewal process

The type certificate is valid for a specified period, as mentioned in the certificate, which is normally 1 year from the date of issue. Within the validity period of the certificate, a spot inspection of the installed wind turbine(s) of the model certified can be conducted. The renewal process includes the evaluation of quality system documentation and evaluation of any other minor modifications/ documentation, provided by the wind turbine manufacturers. The renewed certificate is issued after the successful completion of renewal process.

6.0 Conclusion

Type certification of wind turbines provides confidence to various stakeholders on the product. In order to ensure the quality of the wind turbines used in a wind farm project, availability of a type certificate is often included as a part of evaluation criterion by the developers, financial institutions and insurance companies in India. The type certification of wind turbines facilitates the industry to develop reliable wind turbines and also to ensure safety aspects.