

Hydraulic turbines, storage pumps and pump-turbines — Tendering Documents —

Part 6: Guidelines for technical specifications for pump-turbines

ICS 27.140

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the IEC title page, page ii, pages 1 to 19 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

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Table 1 — Summary of guide for the preparation of Tendering Documents for hydraulic turbines, storage pumps and pump-turbines

Contents of guide IEC 61366-1 to IEC 61366-7			Sample table of contents of tendering documents (TD) (Example for the francis turbines; see 61366-1, Annex A)	
Part	Clause	Title	Chapter	Title
1		General and annexes	1	Tendering requirements
1	—		2	Project information
1	1	Object and scope of this guide	3	General conditions
1	2	Reference documents and definitions	4	Special conditions
1	3	Arrangement of Tendering Documents	5	General requirements
1	4	Guidelines for tendering requirements	6	Technical specifications
1	5	Guidelines for project information	6.1	Technical requirements
1	6	Guidelines for general conditions, special conditions and general requirements	6.1.1	Scope of work
			6.1.2	Limits of the contract
			6.1.3	Supply by Employer
			6.1.4	Design conditions
			6.1.5	Performance and other guarantees
			6.1.6	Mechanical design criteria
			6.1.7	Design documentation
			6.1.8	Materials and construction
			6.1.9	Shop inspection and testing
			6.2	Technical specifications for fixed/embedded components
			6.3	Technical specifications for stationary/removable components
			6.4	Technical specifications for guide vane regulating apparatus
			6.5	Technical specifications for rotating parts, bearings and seals
			6.6	Technical specifications for thrust bearings
			6.7	Technical specifications for miscellaneous components
			6.8	Technical specifications for auxiliary systems
			6.9	Technical specifications for instrumentation
			6.10	Spare parts
			6.11	Model tests
			6.12	Installation and commissioning
			6.13	Field acceptance tests
2 to 7		Technical specifications		
2		Francis turbines		
3		Pelton turbines		
4		Kaplan and propeller turbines		
5		Tubular turbines		
6		Pump-turbines		
7		Storage pumps		

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Hydraulic turbines, storage pumps and pump-turbines –

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Part 6: Guidelines for technical specifications for pump-turbines

*Turbines hydrauliques, pompes d'accumulation
et pompes-turbines –*

Documents d'appel d'offres –

*Partie 6:
Guide des spécifications techniques pour les pompes-turbines*



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0 Introduction to technical specifications

The main purpose of the technical specifications is to describe the specific technical requirements for the hydraulic machine for which the Tendering Documents (TD) are being issued. To achieve clarity and to avoid confusion in contract administration, the Employer should not specify anything in the technical specifications which is of importance only to the preparation of the tender. Such information and instructions should be given only in the instructions to Tenderers (ITT). Accordingly, the ITT may refer to other chapters and sections of the Tendering Documents but not vice versa. *As a general rule the word "Tenderer" should be confined in use only to TD chapter 1 "Tendering requirements"; elsewhere the term "Contractor" should be used.*

Special attention should be given to items of a project specific nature such as materials, protective coating systems, mechanical piping systems, electrical systems and instrumentation. It is common for the Employer to use technical standards for such items which would apply to all contracts for a particular project or projects. In this event, detailed technical standards should be specified in TD chapter 5 "General requirements".

Technical specifications for the various types of hydraulic machines included in this guide are provided in the following parts.

- Francis turbines (Part 2);
- Pelton turbines (Part 3);
- Kaplan and propeller turbines (Part 4);
- Tubular turbines (Part 5);
- Pump-turbines (Part 6);
- Storage pumps (Part 7).

The guidelines for preparation of pump-turbine specifications include technical specifications for the following:

- Design conditions: Project arrangement, hydraulic conditions, specified conditions, modes of operation conditions, generator characteristics, motor characteristics, synchronous condenser characteristics, speed-up procedure for pump mode, transient behaviour data, change-over times and characteristics, stability of the system, noise, vibration, pressure fluctuations and safety requirements.

— Technical performance and other guarantees:

- power
- discharge
- specific hydraulic energy (head)
- efficiency
- maximum momentary pressure
- minimum momentary pressure
- maximum momentary overspeed
- maximum steady-state runaway speed
- cavitation pitting
- hydraulic thrust
- change-over times
- maximum weights and dimensions for transportation, erection and maintenance

— Mechanical design criteria: design standards, stresses and deflections and special design considerations (earthquake acceleration, etc.).

— Design documentation: Contractor's input needed for the Employer's design, Contractor's drawings and data, Contractor's review of the Employer's design and technical reports by the Contractor.

— Materials and construction: material selection and standards, quality assurance procedures, shop methods, corrosion protection and painting.

— Shop inspection and testing: general requirements and reports, material tests and certificates, dimensional checks, shop assembly and tests.

— Fixed/embedded components: spiral case with compressible wrapping (if any), stay ring, foundation ring, discharge ring, draft tube, draft tube liner, pit liner, and foundation plates and anchorages.

— Stationary/removable components: headcover, bottom ring, facing plates, stationary wearing ring, guide vanes.

— Regulating apparatus for guide vanes: servomotor, connecting rods, regulating ring (if any), guide vane linkage system, guide vane overload protection and locking devices and mechanical synchronizing device (if any).

— Rotating parts, bearings and seals: runner (impeller), main shaft, intermediate shaft (if any), guide bearing with oil supply, oil/water cooler, main shaft seal, standstill (maintenance) seal.