

TECHNICAL GUIDELINE

Selection and Specification of Pumps and Pump Sets



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Major Changes Incorporated In the June 2005 Edition

The following lists the major changes to the February 2005 edition of TG 27, which have been incorporated in this edition:

1. Addition of Section 3, Sizing of Pump Motors.
2. Updating of References.

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Referenced Documents

Water Pumping & Distribution Manual

Section 1: Scope

Sets out the criteria for the selection of pumps and the types of pumps that are preferred for various SA Water applications.

Section 2: Selection of Pumps and Pump Sets

This material is under review and development and care must be taken in its application. When using this information please consult with the Manager Engineering Services to verify the appropriateness of its application.

The background to the selection of pumps is well documented in Section 5 of the Water Pumping & Distribution Manual.

A check list for the selection and specification of pump sets has been included as Appendix A.

Section 3: Sizing of Pump Motors

The steps to be undertaken in the sizing of pump motors are as follows:

1. Select pump, impellor, and operating speed(s) for the duty point(s).
2. Determine maximum power input required for the selected pump and impellor at the operating speed(s). This will generally be at the end of the pump curve, not at the project-specific duty point(s). This is the "maximum load" referred to in TG13 and TS79.
3. Add an additional 10% to the maximum power requirement.
4. Select a motor that is rated for continuous duty S1 to at least this power after appropriate derating for the effects of ambient temperature, harmonics, and unbalanced supply.

Appendix A: Checklist: Selection and Specification of Pumps and Pump Sets

Item	Aspects to be Considered
System Characteristics	<ul style="list-style-type: none"> • System curve(s) to standard format. • System and operation details eg PRV's, Tanks etc. • Static Head; DPL; and Suction Head. • Medium to be pumped (eg: water, sewage, brine, chemical, etc)
Pumping Station Requirements	<ul style="list-style-type: none"> • Number of pumps; operating modes; and standby requirements. • Pump Level. • Station duty for each operating mode • Duty for each pump. • Start up and shut down conditions.
Selection & Specification of Pumps	<ul style="list-style-type: none"> • Type of pump (eg: horizontal split casing; end suction; vertical wet well; submersible; positive displacement; column; direct or shaft driven). • Appropriate protection devices (eg: leakage). • Capitalised cost of power (Ref. TG35). • Pump working & test pressures. • Suction Conditions • Pump materials <ul style="list-style-type: none"> ○ Casing: cast steel; cast iron; stainless steel. ○ Impeller: cast iron; bronze; stainless steel. ○ Shaft: Steel, Stainless Steel (grade). • Bearing and seal requirements. • Pump coatings <ul style="list-style-type: none"> ○ External: epoxy or alkyd gloss enamel. ○ Internal/impeller: Belzona; epoxy. • Solids Passage for sewage pumps (80 mm sphere, unless otherwise approved) • Suction and discharge flanges • Spare parts and special tools. • Drawing/s required from the Manufacturer. • Copies of the hydrostatic and material test certificates from the Manufacturer. • Determine if work tests are required or if only test certificates are required.
Pump Details & Appurtenances	<ul style="list-style-type: none"> • Lifting facilities. • Mounting and Frame. • Coupling requirements. • Machined Surfaces for Vibration Measurement. • Gland water and seal pipework. • Casing drainage. • Pressure transmitters and gauges. • Temperature transmitters and switches (bearing and casing).

Item	Aspects to be Considered
Pump Motor	<ul style="list-style-type: none"> • Motor power / speed. • Motor starting: DOL; soft start; auto transformer; star/delta; VSD • Motor speed control / VSD. • Motor Sizing (Refer Section 3, TG13 section 3.2, and TS 79 section 4.8 (5)).

Associated Engineering Work

Advise other designers of any associated requirements e.g.

- Power supply
- Instrumentation & controls
- Connecting pipework (flange details)
- Loads to be resisted by pump bases
- Pump holding down bolts
- Gland water and drainage
- Lifting
- Maintenance Access
- Noise