



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

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Technical standard for water wells

机井工程技术标准

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1 General provisions

1.0.1 The standard was drawn up in order to unify the technical requirements for the construction and management of water well works, to secure the quality and safety of water well construction, to raise the level of management, to bring out the full benefit of the works, and to achieve sustainable development and use of groundwater resources together with protection of the groundwater environment.

1.0.2 The standard applies to the planning, design, construction, ancillary equipment, acceptance, rebuilding, repair and abandonment of water wells for agricultural, industrial and domestic water supply.

1.0.3 The planning and design of water wells shall be carried out on the basis of a hydrogeological survey and an evaluation of groundwater resources.

1.0.4 The materials used in a water well shall be free of pollution and non-toxic.

1.0.5 A water well shall be put into use only after it has passed acceptance.

1.0.6 Records shall be kept for a water well project.

1.0.7 A water well that has been abandoned or has finished its service function shall be backfilled or sealed, and the work shall be recorded and filed. A water well that has been sealed shall be given a permanent marker.

1.0.8 Besides this standard, the planning, design, construction, ancillary equipment, acceptance, rebuilding, repair and abandonment of water wells shall also comply with the provisions of the relevant national standards in force.

2 Terms

2.0.1 Water well: a well from which water is lifted by a pump driven by a power machine.

2.0.2 Tube well: a well more than 10 m deep with a well diameter of 50 mm to 1000 mm, made up of the well head, the casing pipe, the screen and the sediment pipe.

2.0.3 Large opening well: a well with a diameter greater than 1 m.

2.0.4 Radial well: a well fitted with transverse radial pipes or holes.

2.0.5 Limited well-screen entrance velocity: the maximum permissible velocity at which groundwater enters the screen.

2.0.6 Limited well-bore seepage velocity: the maximum permissible velocity at which groundwater enters the bore from the aquifer.

2.0.7 Tube well structure: the technical elements forming the columnar section of a tube well, including the depth of the well, the diameter of each well section, the diameter and length of the well pipe, the gravel pack and the sealing positions.

2.0.8 Bore diameter: the diameter of the cross-section of the bore, including the starting diameter and the final diameter.

2.0.9 Well diameter: the diameter of the cross-section of the well.

2.0.10 Well pipe: the collective name for casing pipe, screen pipe and sediment pipe.

2.0.11 Casing pipe: a seamless pipe without holes that supports and seals the well wall.

2.0.12 Sediment pipe: a seamless pipe without holes at the bottom of the well in which sand grains and sediment settle.

2.0.13 Well screen: the device placed in the production section that filters the water, holds back sand and protects the wall.

2.0.14 Screen pipe: the skeleton pipe of the screen, called the water-filtering pipe for short; when used on its own it is also called the screen.

2.0.15 Gravel pack: solid particles of given size, grading and hardness that fill the annular gap between the screen pipe and the bore wall.

2.0.16 Gravel-packed screen: a screen with gravel pack of a given specification filled around the outside of the screen pipe.

2.0.17 Non-gravel-packed screen: a screen with no gravel pack.

2.0.18 Gravel-precoated screen: a screen made by bonding gravel with an adhesive onto a skeleton pipe of steel, plastic or other material.

2.0.19 Prepacked gravel screen: a screen made by filling gravel of a given grain size into the annular gap between an inner and an outer screen pipe.

2.0.20 Wire-wound screen: a screen wound with wire of a given specification and having a given porosity.

2.0.21 Bridge slot screen pipe: a screen pipe made by punching a steel sheet so that the punched parts stand out from the wall as bridge-shaped ridges with two vertical slots on the two sides of the bridge, then rolling the sheet into a tube and welding it.

2.0.22 V wire wrap screen pipe: a screen pipe made from several longitudinal support bars of triangular, trapezoidal or circular section, wound circumferentially with wire of triangular or trapezoidal section and welded at the crossing points of the longitudinal bars and the circumferential wire so as to leave a given void; also called a Johnson pipe.

2.0.23 Aperture ratio of screen pipe: the ratio of the total area of the holes or slots of the screen pipe to the outer surface area of the screen pipe.

2.0.24 Porosity of screen: the collective name for the porosity of the outer inlet face of the screen and its effective porosity.

2.0.25 Flushing medium: the substance used during drilling to carry the cuttings, clean the bottom of the hole, cool and lubricate the drilling tools and protect the bore wall.

2.0.26 Well completion technology: the construction processes carried out after the drilling of a water well is finished, namely well probing, mud replacement, well pipe installation, gravel packing and sealing, together with well flushing, the pumping test and the collection of water samples.

2.0.27 Gravel packing: the process of placing gravel of the specified grade into the annular space between the screen pipe and the bore wall.

2.0.28 Sealing: the process of using impervious material and the related measures outside the well pipe to stop the hydraulic connection between the layer targeted for abstraction or recharge and the other strata.

2.0.29 Well flushing: the process of removing the flushing medium, silt and cuttings from inside and outside the well, opening up the aquifer and raising the permeability around the tube well.

2.0.30 Pumping test: a field hydrogeological test in which water is pumped from the well to determine its yield capacity, to check the quality of the sealing and of the well flushing, to obtain the hydrogeological parameters of the aquifer and to establish the hydrogeological conditions.