

TEST COVERAGE

In order to verify the above competencies, the test is aimed to evaluate the workers' knowledge in the following fields:

A. Basics of mathematics / natural sciences

- Units and their conversion
- Calculation of cross-section and volumes (i.e. annuli, pits)
- Basic of technical mechanics (power, torque, tension)
- Work, energy, capacity
- Basics of fluid mechanics (hydrostatic pressure, flow-rate, viscosity, pressure loss in fluids)

B. Auger Boring units

- General operation techniques;
- Type of drilling units and basic selection criteria;
- Cutting head and auger flight;
- Power units for rotating cutting head and auger flight;
- Steel casings and pipe jacking system;
- Control, track system and technique;
- Lubrication system;
- Line and Grade Control;

C. Project basics

- Location plans and terrain profiles;
- Basics of classification of soils and physical characteristics of subsoil;
- Basics of detection techniques like cable locator, GPR.
- Classification of the subsoil;
- Ground water conditions;
- Line installation plans (overhead lines, lines installed underground);
- Basics of bore path investigation (geo-radar);
- Practical training.
- Pollution hazards of drilling fluids and spoils with remedial measures / precautions;

D. Project realization

- Job site set-up (mini/midi);
- Documentation of system basics;
- Daily job reports;
- Bore log files.

E. Pipe lubrication Selection

- Fluid types;
- Functions and compositions;
- Measuring lubricating fluid requirements;
- Selection criteria;
- Lubrication plant.

F. Shaft design and construction

- Sizing shafts;

- Shaft excavation support methods;
- Groundwater control methods;
- Lateral earth, groundwater and surcharge pressure considerations;
- Lateral resistance for the thrust block;
- Launching and exit seal requirements.

G. Boring

- Cutter heads;
 - ⇒ Types of cutter heads
 - ⇒ Cutter heads selection considerations
 - ⇒ Construction and mode of operation;

H. Guidance and control system

- Walk-over system
- Waterline System
- Mechanical Line and Grade Control Systems
- Electrical Line and Grade Control Systems
- Guided boring method
- Steerable Line and Grade Control Systems

I. Pipe material & design considerations

Casing pipe

- Casing pipe material
- Basics of the technical standards and norms
- Casing Pipe Design considerations;
 - ⇒ Axial loads
 - ⇒ Dimension tolerance
 - ⇒ Testing of casing pipe

Product pipe

- Product pipe materials
- Casing spacers
- Product pipe installation considerations

J. Jacking system

- Jacking frame
- Hydraulic jacks
- Hydraulic pressures pump
- Thrust block
- Anchoring system
- Intermediate jacking station

K. Recording and monitoring

- Distance
- Machine torque & thrust
- Steering jack pressure and position
- Inclination and position
- Rate of excavation and penetration

L. Authority regulations / safety at work / environmental protection / work sheets

- Responsible persons;
- Work safety;
- Water protection;
- Pollutant and noise emission;
- Regulations for handling dangerous materials and agents;
- Basics of working and civil laws for drilling operations (liability, negligence etc.);
- Regulatory guidelines;
- Relevant laws, rules and regulations;
- Work sheet standards.