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. Pipe Bursting units

- General operation techniques;
- Type of Pipe Bursting units and basic selection criteria;
- Pipe puller and expander;
- Pipe Fusion method;
- Pipe lubrication system;

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 and remedial measures / precaustions;

D. Project realization

- Pipeline failures and performance requirements;
- Consequences of pipeline failure and management of failure;
- Defects identification and evaluation of the causes;
- Pipeline material specifications;
- Pipeline failure detection & location techniques;
- Job site set-up;
- Documentation of system basics;
- Daily job reports.

E. Pipe lubrication

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

F. Entry and exit pits

- Sizing pits;
- Location of the pits;
- Groundwater control methods;
- Lateral earth, groundwater and surcharge pressure considerations;
- Entry and exit seal requirements.

G. Pipe material & design considerations

Pipe materials;

- Host pipe material
- Replacement pipe materials
  - ⇒ HDPE pipe
  - ⇒ MDPE pipe
  - ⇒ Cast iron pipe
  - ⇒ Vitrified clay pipe, and
  - ⇒ Reinforced concrete pipe
- Basics of the technical standards and norms
- Special handling features

Pipe Design considerations;

- Degree of upsizing required
- Depth of existing pipeline
- Length of Bursting
- Need for bypassing
- Ground conditions
- Groundwater conditions
- Surrounding utilities

H. Pipe Bursting tools

- Pneumatic Tool
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Static Tool
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Lateral Tool
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Winch;
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Expander;
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Air Compressor
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.
- Guide Head
  - ⇒ Construction and mode of operation;
  - ⇒ Field of application.

I. Recording and monitoring

- Distance
- Machine thrust
- Inclination and position
- Rate of installation

J. 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.