ESWATINI GOVERNMENT

NATIONAL TRADE STANDARD

APPROVED BY THE INDUSTRIAL TRAINING BOARD

FOR TRADE TESTING IN THE TRADE/OCCUPATION

OF

INSTRUMENTATION

(A) Practical Skill Requirements Grade III

Every applicant must be able to;

1. Observe all safety precautions – personal and equipment.
2. Identify instruments.
3. Use basic hand tools – tube bending.
4. Laydown instruments cables.
5. Identify different types of piping and fitting.
6. Identify instrumentation cables.

(b) Tools and Equipment requirement - Grade III

The candidate must have the following tools;

Hacksaw	tube bender	steel rule
Electrician's pliers	wire stripper	spanners (7-24)
Tape measure	engineers square	crimping tool
Trimming knife	side cutters	scriber
Pipe wrench	spirit level	screw drivers
Multimeters	hammer	centre puncture
Files		

Tool list B

The candidate must be able to use tools as supplied:

Angle grinder

Hand drill

Portable arc welding machine

Pipe thread

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(A) Practical Skill Requirements Grade II

In addition to fulfilling the Grade III / semi- skilled:

Every applicant must be able to;

1. Disconnect and connect instruments
   - Control valves
   - Transmitters
   - Temperature transmitters
   - Pressure gauges
2. Install brackets
3. Install junction boxes
4. Gland and terminate cables
5. Panel wiring
6. Identify and test temperature sensing devices e.g. thermocouples type J, K, T and RTD' s
7. Use blow lamps, soldering irons, solders and fluxes
8. Overhaul instruments – replacing kits and gaskets
9. Use of all instrumentation testing and calibrating instruments used in the trade.
10. Read and interpret engineering drawings and manuals.

(B) **Related Knowledge Requirements Grade II**

In addition to fulfilling the Grade III requirements,

Every applicant must have the following knowledge of;

1. Electrical, Instrumentation P&ID drawings
2. Have knowledge of temperature sensors
3. Relating resistance to temperature in RTD charts.
4. Relating millivolts to temperature in thermocouple charts.
5. To interpret standard signals.
6. Basic knowledge of control systems.

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(a) Practical Skill Requirements Grade I

In addition to fulfilling the Grade II,

Every applicant must be able to;

1. Observe all safety precautions – personal and equipment
2. Calibrate and stroke control valves
3. Calibrate pressure gauges and all transmitters
4. Design and build a temperature with **PID** controller
5. Design and fault find a relay circuit
6. Design and build cascade loop instruments using symbols and tuning
7. Trouble shoot on cascade loop instruments

(b) Tools and Equipment Requirement - Grade I

Multimeter tester

Terminal screw drivers

Boot-lace crimper

Allen keys

Set of spanners

Insulation crimper

Pipe cutter

Cable knife

Long-nose plier

Side cutters

Wire stripper

soldering irons

blow lamps

(c) Related Knowledge Requirements Grade I

In addition to fulfilling the Grade II requirements

Every applicant must have a sound knowledge of;

1. Electrical, Instrumentation P&ID drawings
2. Workshop instrumentation calculations
3. Understanding advantages and disadvantages of the standard signals.
4. Advanced knowledge of control systems e.g PLC, DCS etc.
5. Must be computer literate.