



# MINE ENGINEERS CERTIFICATE OF COMPETENCY ANNEXURE E BOOKLET



**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**



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# **MINE ENGINEER'S CERTIFICATE OF COMPETENCY**

## **ELECTRICAL AND MECHANICAL ENGINEERING -**

### **ANNEXURE E BOOKLET**

## **BIOGRAPHIC DETAILS:**

**SURNAME:**

**FULL NAMES:**

**ID NUMBER:**

**GENDER:**

**RACE:**

**PHYSICAL ADDRESS:**

## **INTENDED OUTCOMES:**

**The Engineer-in-Training (EIT) should once all modules are signed-off be able to:**

- 1. Implement and monitor systems to operate, repair and maintain applicable machinery and infrastructure.**
- 2. Inspect and test applicable machinery.**
- 3. Comply with legislation, regulations, policies, procedures, standards and codes of practice.**
- 4. Comply with health, safety and environmental requirements.**

**NOTE: The Engineer who evaluates the EIT on any module, must complete the applicable areas and sign off for those modules after assessment of competence irrespective of the Mine Section and/or machine or system where an EIT gains such experience.**

Module		1. Winding Plant, Shafts and Headgears						
Duration		60 days						
Winder Permit Number (s)								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1.1	Double drum							
1.2	Single drum							
1.3	Multi rope							
1.4	Automatic							
1.5	Stage winders							
2.1	AC							
2.2	DC closed loop							
2.3	Variable speed							
3	Signalling and safety devices							
4	Wire ropes and attachments							
5.1	Front and back ends rope cuts							
5.2	NDT testing							
5.3	EMT testing							
6	Sheaves, sheave spindles and sheave bearings including sheave profile							
7	Cages, skips and other types of conveyances							
8	Rope, steel, timber and rail guides							
9	Loading and unloading arrangements for persons, material and minerals							
10	Headgear's bins and loading chutes							

Module		1. Winding Plant, Shafts and Headgears								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
11	Shafts and shaft operations									
12	Shaft sinking operations									
13	Signalling systems									
14	Safety devices including slack and tight rope systems									
15	Emergency procedures									
16	Inspections and tests									
17	Applicable regulations and SANS standards									
I hereby certify that I have evaluated and found the EIT competent										
Name of evaluating Certificated Engineer		<div style="text-align: center; height: 300px;"> <p>Mine Stamp</p> </div>								
Certificate Number										
Contact Details									Telephone	
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Module		2. Electrical Systems						
Duration		40 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Electrical power reticulation (Eskom feeds)							
2	Underground and surface electrical reticulation and ring feeds							
3	Transformers							
4	Switchgear							
4.1	Oil							
4.2	Vacuum circuit breaker							
4.3	SF 6							
5	Electrical power control and measurements							
6	All type of electrical motors							
6.1	AC							
6.2	DC							
6.3	Synchronous motors							
7	Emergency power generating installations							
8	Heating equipment							
9	Lighting equipment							
10	Protection against lightning surges							
11	Earth leakage and overload protection including discrimination and testing of equipment							
12	Fault current calculations							
13	Power factor and power factor correction							

Module		2. Electrical Systems						
Duration		40 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
14	Power costs and tariff calculations							
15	Explosion protected apparatus (coal mines)							
16	Classification of hazardous locations (coal mines)							
17	Repair and manufacturing of electrical equipment (coal mines)							
18	Energy management							
19	Applicable regulations and SANS standards							
I hereby certify that I have evaluated and found the EIT competent								
Name of evaluating Certificated Engineer			<div style="text-align: center; height: 200px;"> <p>Mine Stamp</p> </div>					
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Module		3. Workplace Experience								
Duration		30 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Acting as Foreman for a Section of the Mine									
2	Acting as Section Engineer for a Section of the Mine									
3	Applicable regulations and SANS standards									
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Module		4. Environmental Engineering								
Duration		25 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Ventilating and cooling including main and auxillary fans									
2	Refrigeration plants including heat exchangers									
3	Air conditioning systems									
4	Precautions with ammonia fridge plants									
5	Dust and fumes: cause and prevention									
6	Noise: cause and prevention									
7	Hearing protection									
8	Illumination of working places									
9	Applicable regulations and SANS standards									
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Module		5. Trackless Mobile Machines								
Duration		25 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Surface trackless equipment including open cast HME									
2	Underground trackless equipment									
3	Use of flame proof and non-flameproof diesel engines in fiery mines and hazardous locations									
4	Transport scheduling									
5	Fleet and traffic management									
6	Trailing cable repair shop									
7	Garage workshop									
8	Earth moving vehicles									
9	Tyre repair shops									
12	Applicable regulations and SANS standards									
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Module		6. Civils and Structural Engineering								
Duration		20 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Buildings and structures which will include those for plant and machinery, cranes and lifting gear, scaffolding, sewage and water treatment, dams, silos and towers, dumps and stockpiles, lamproom, storage and salvage yards, as applicable									
2	Concrete including basic design of foundations and concrete structures, reinforced and pre-stressed concrete, composite beams, shuttering, curing, protection against wear and corrosion, integrity of structures and foundations, slump and cube tests and backfill									
3	Steel structures									
4	Stress in structures									
5	Protection against chemical wear									
6	Corrosion and abrasion protection of steel and concrete									
7	Construction and maintenance									
8	Applicable regulations and SANS standards									
I hereby certify that I have evaluated and found the EIT competent										
Name of evaluating Certificated Engineer		<div style="text-align: center; height: 150px;"> <p>Mine Stamp</p> </div>								
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Module		7. Management, Policies and Procedures						
Duration		20 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Project planning methods and management							
2	Control and implementation of projects							
3	Critical path scheduling including Gantt charts							
4	Financial and budget control, including net present values, internal rates of return, initial, interim, progress and retention payments							
5	Resource management							
6	Risk management, safety processes, isolation and lockouts, risk assessments and risk profiles							
7	Workplace procedures, including policies, plans, standards, engineering guidelines, instructions, operating procedures, codes of practice, notices and instructions							
8	Change management processes and programmes							
9	Production strategy and production plans							
10	Asset utilisation programme, resource/service sourcing, procurement and allocation							
11	Maintenance strategy, planning and control							
12	Condition monitoring							
13	Financial budgeting and control							
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Module		8. Operations and Maintenance of Process Plants						
Duration		20 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Operations							
2	Crushing plant and equipment							
3	Storing, screening, washing plant							
4	Grinding plant (mills)							
5	Mill product thickening							
6	Filtering							
7	Vacuum systems							
8	Recovery							
9	Flotation							
10	Residue handling and residue deposits							
11	Automation in operating or production processes							
12	Applicable regulations and SANS standards							
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Module		9. Pumping and Fluids Handling						
Duration		20 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Stope drainage							
2	Haulage water drainage							
3	Mine de-watering pump station							
4	Underground settlers							
5	Underground dams/plugs							
6	Multi-stage pumps high pressure							
7	Sludge pumps							
8	Water treatment							
9	Measurement of flow							
10	Underground water system							
11	Theory and application of Pelton wheels							
12	Water balance							
13	Applicable regulations and SANS standards							
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Module		10. Surface and Underground Workshops						
Duration		20 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Electrical workshop							
2	Fitting shop							
3	Boiler shop							
4	Hand held tools							
5	Mine store							
6	Workshop organisation							
7	Applicable regulations and SANS standards							
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Module		11. Conveyors and Materials Handling						
Duration		15 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Conveyors							
2	Winches - installation, operation and maintenance							
3	Endless rope and mono-winch installation							
4	Mono rail installations							
5	Man riding conveyors							
6	Applicable regulations and SANS standards							
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Module		12. Drilling Equipment and Mining Methods								
Duration		15 days								
Names and locations of drilling equipment studied										
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Theory and application of different mining methods									
2	Underground chamber support of excavation									
3	Rotary and percussion machines for drilling - pneumatic and hydraulic									
4	Machines for cutting rock									
5	Rock drill machine									
6	Raise bore and drop raising machines									
7	Diamond drilling and cover drilling									
8	Hydraulic drills									
9	Applicable regulations and SANS standards									
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Module		13. Railbound Equipment RBE (Underground)						
Duration		15 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Installation of rail infrastructure including rails, sleepers, ballast, switches							
2	Operating procedures relating to RBE activities							
3	Locos, hoppers, guard cars, loaders, material cars and explosive cars							
4	Battery bays, workshops and diesel bays							
5	Illumination and any signalling arrangements							
6	Tips, boxes and other loading points							
7	All safety devices and precautions associated with RBE activities							
8	Rail engineering principals including superelevation and gauge widening							
9	Applicable regulations and SANS standards							
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Module		14. Steam Generation and Pressure Vessels						
Duration		15 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Type of boilers							
1.1	Gas							
1.2	Coal							
1.3	Electrical							
1.4	Oil							
2	Safety devices							
3	Ancillary equipment							
4	Steam piping systems							
5	Autoclaves and super heaters							
6	Pressure vessels - manufacture, inspection and test							
7	Condensers							
8	Water treatment							
9	Boiler inspections and tests							
10	Applicable regulations and SANS standards							
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Module		15. Underground Mining Equipment						
Duration		15 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	In stope winches, fans, support and illumination							
2	Anfex loaders, Jack pot pumps, emulsion loaders							
3	In stope water handling, vertical spindle pumps							
4	Stope grizzlies, ore passes and box fronts							
5	Stope and haulage electrical reticulation and protection							
9	Applicable regulations and SANS standards							
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Module		16. Chairlifts								
Duration		10 days								
Chairlift Official Number (s)										
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Safety devices									
2	Ropes, splices and tensioning systems									
3	Chairs and attachments									
4	Braking systems									
5	Boarding/alighting stations									
6	Barrel, sidewall, hanging and foot wall clearances									
7	Illumination									
8	Inspections and tests									
9	Applicable regulations and SANS standards									
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Module		17. Compressed Air and Reticulation						
Duration		10 days						
Names and locations of compressors studied								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Air compressor types							
1.1	Rotary							
1.2	Screw							
1.3	Piston							
2	Ancillary equipment including cooling towers, heat exchangers and pumps							
3	Control of safety devices							
4	Water treatment							
5	Reticulation including piping, valves, filters and controls							
6	Measurement of compressed air (auto compression)							
7	Compressed air motors							
8	Condition monitoring							
9	Testing of air compressor systems including vessels under pressure							
10	Applicable regulations and SANS standards							
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Module		18. Elevators								
Duration		10 days								
Elevator Number (s)										
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Types of elevators									
1.1	AC									
1.2	DC									
1.3	Rack and pinions									
1.4	Hydraulic									
2	Safety devices									
3	Ropes and chains									
4	Hatchway and wells									
5	Cars and counterweights									
6	Motor room and controls									
7	Applicable regulations and SANS standards									
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Module		19. Engineering Theory and Application								
Duration		10 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Tribology and lubrication including elementary theory of lubrication, general properties of oil and greases, modification of properties by additives such as detergents, extreme pressure additives and antioxidants, condition monitoring, storage of new and used lubricants, disposal of used lubricants and failure analysis									
2	Mechanical properties of various type of steel and alloys									
3	Strength of materials including mechanical properties and application of materials, including various types of steel and alloys									
4	Applicable regulations and SANS standards									
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Module		20. Human Resources								
Duration		10 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Appointment of competent persons to execute legal obligations									
2	Appointments not made by the Engineer									
3	Human resource plans and planning including succession and personal development, training and retraining, coaching and mentoring, consultation and negotiation, disciplinary processes and procedures plus performance management									
4	Applicable regulations and SANS standards									
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Module		21. Lifting Operations						
Duration		10 days						
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature
1	Lifting machines							
1.1	Mobile cranes, forklifts and lifting platforms							
1.2	Overhead cranes							
2	Lifting tackle							
3	Rigging plans							
4	Inspections and testing							
5	Applicable regulations and SANS standards							
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Module		22. Fire Monitoring, Prevention and Control								
Duration		5 days								
Item	Description	Start Date	End Date	Working Days	Name of Mine	Name of Engineer	Engineer Signature	EIT Signature		
1	Fire monitoring, prevention and control									
2	Use of different types of fire extinguishers									
3	Maintenance and repair of fire prevention and suppression systems									
4	Applicable regulations and SANS standards									
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