



# Curriculum Framework

## Gravure Cylinder Preperation



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## 1 Introduction:

Gravure Cylinder Preparation Lithography is a well established and defined trade in a fast growing industry. Technological advancement in the last decade has left the only structured mode of learning, namely apprenticeships, far behind.

It has therefore become necessary to address the currency and quality of the curriculum for apprenticeships.

The introduction of the amendment to the Skills Development Act has also strongly influenced the approach to this curriculum framework. There is a shift from the established Competency Based Modular Training system to an Outcomes Based approach.

In addition to the shift to Outcomes Based education, there is also a shift to strong occupationally based exit level outcomes. In an attempt to recognise occupations within the trade qualifications, previously unrecognised occupations like machine assistants and the like, will now find a recognised and formalised learning path.

The qualification framework also addresses the inclusion/exclusion of certain processes within the trade by using **elective** exit level outcomes. This will enable the employer and the apprentice to define the learning path that the apprentice will specialise in based on the company equipment and the apprentice areas of interest.

## 2 Background:

The Printing and Packaging industries have a legacy of above average artisan training. Implementation of apprentice training has gradually evolved from a time-based apprenticeship with the option to do a voluntary trade test, to CBMT (Competency Based Modular Training) and now there is an inevitable shift to Outcomes Based training.

This evolution in delivery modes has strived to improve the control over context and quality of learning. The benefit of Outcomes Based training lies in an approach that has a strong focus on occupations and the fundamental, core and elective learning that will enable the learner to not only master a skill, but apply it in a fast developing economy.

In order to compete in the global economy, the apprenticeship system and its curricula has to transform into a mode of delivery that will produce artisans who are knowledgeable, skilled and adaptable with strong critical thinking and problem solving abilities.

This curriculum framework is the culmination of the best technical experts and curriculum development experts applying a clean slate approach without discarding the work previously done by advisory groups and technical committees.



### 3 Purpose of the qualification:

This qualification is to be registered at level 3 / 4 on the National Vocational Qualifications framework.

It is designed to equip learners with an integrated practical and theoretical grounding in the basic principles and practices of Gravure Cylinder Preparation.

It will equip learners to be able to successfully complete the Gravure Cylinder Preparation processes within a range of printing industry contexts.

It will include broad areas of learning including, the impact of printing on the environment and the basics of mechanical, pneumatical, hydraulic and electronic equipment.

Learners acquiring this qualification will demonstrate competencies across areas including maintenance and the operation of high quality Gravure Cylinders Preparation equipment.

Further to these qualifying learners will be able to specialise in various elective components which will include quality and colour standards.

The fundamental learning will prepare the learner for the business environment, communication, mathematical, scientific and computer abilities together with life skills.

Learners completing this qualification will be able to operate proficiently in this fast growing Gravure Cylinder Preparation environment.

#### Learning to be assumed to be in place:

Learners will be assumed to be competent in the following abilities:

Using Science and Technology	NQF level 2 / grade ten
Solving mathematical problems	NQF level 2 / grade ten
Literacy & Numeracy	NQF level 2 / grade ten



#### 4 Range Statement:

The learning will cover all aspects of the trade / related trades limited to the printing industry. The learning will cover all aspects of the Gravure Cylinder Preparation operation, related practices such as Environmental, Health and Safety and all related theoretical underpinning knowledge.

The learning is intended to act as an entry level programme, initiating a potential career in the printing industry. The learning in this qualification will not cover subject matter at an advanced level (assumed to be contained in a future programme designed for advanced / technician studies.

The learning will be primarily practical or on site training with the learner exposed to theoretical training in traditional 'block release programmes.

#### 5 Assumptions:

This Qualification Framework assumes that learners will be in possession of a minimum of a grade ten qualification?

Learners will be assessed to determine whether they have the aptitude to deal with the level of learning required;

The level of reading / writing and arithmetic assumed to be in place will be at a NQF level of 2 or the minimum of a grade ten;

The printing industry will continue to require the trades to be defined narrowly in a functional specific manner as Gravure Cylinder Preparation as an example;

The industry will define trades in two levels, one of technicians for more complex environments and one of trades for more rudimentary purposes of learning;

Learning will be provided by a range of learning providers, but primarily by the industry accepted 'colleges' of learning for the foundational aspects and by the workplace providers and workplace context;

Learners will be assigned to accredited workplaces to complete there workplace context learning requirements;

The qualification framework will serve as a guide until such time as the vocationally based qualification frameworks are released / approved by the relevant ETQA;



**6 Criteria for inclusions / Exclusions:**

<b>Inclusion Criteria:</b>	<b>Exclusion Criteria:</b>
Core Gravure Cylinder Preparation; Broad underpinning knowledge to ensure flexibility; Critical cross field outcomes to be provided through delivery modality; Generic applications; Minimum plant practices such as overall operating procedures / health & safety / small groups, etc.	Plant specific training requirements; Dated machine technologies (to be covered by plant specific training if required); Plant specific applications / technologies; International Best Practices (Learners should be able to carry special credits but not required for minimum pass rates)



## 7 Applied Competence (Exit Level Outcomes)

Fundamental		Core		Elective	
8.	Demonstrate an understanding of the printing industries impact on the <b>environment</b>	8.	Understand the principles of <b>densitometry</b> .		
7.	Demonstrate and understanding basic printing <b>science</b>	7.	Understand the process and demonstrate competence in <b>engraving</b> a gravure cylinder using the company specific equipment.		
6.	Apply basic <b>mathematical</b> calculations specific to the printing environment	6.	Understand <b>imposition schemes</b> for various press requirements and impose different formats.		
5.	Demonstrate an understanding of production <b>economics</b> for a printing / bookbinding operation.	5.	Demonstrate an understanding of the <b>pre-flight</b> process and requirements and pre-flight various customer supplied materials.	5.	Understand the process and demonstrate competency in <b>re-etching</b> a gravure cylinder.
4.	Demonstrate an understanding of the principles of <b>mechanical</b> , pneumatic, hydraulic and electronic components of bookbinding equipment.	4.	Understand the process and demonstrate competence in <b>chrome plating</b> and assessing a gravure cylinder.	4.	Understand the <b>polish master</b> operation and specific cylinder specifications.
3.	Demonstrate an understanding of printing <b>industry processes</b> , terms, concept and principles.	3.	Understand the process and demonstrate competence in <b>copper plating</b> and assessing a gravure cylinder.	3.	Understand and implement <b>colour standards</b> .
2.	Demonstrate an understanding of basic <b>computer skills</b> and the use of Graphic User Interface equipment.	2.	Understand the process and demonstrate competence in <b>stripping</b> and assessing a gravure cylinder.	2.	Understanding and implement national and international <b>quality standards</b> .
1.	Demonstrate an understanding of <b>company policies</b> and procedures as applied to your specific work area.	1.	Understand various raw materials and <b>handling procedures</b> in a cylinder preparation environment.	1.	Understand gravure cylinder <b>proofing</b> and demonstrate competence in the process.



## 8 Specific Outcomes

### Fundamental Outcomes:

#### Exit Level Outcomes:

**F1:** Demonstrate an understanding of company policies and procedures as applied to your specific work area.

Specific Outcome:	
SP1:	They must have a basic understanding of discipline, grievance & appeals.
SP2:	A basic understanding of the company policies.
SP3:	A basic understanding of basic health and safety act as applied to their workplace.
SP4:	A basic First Aid understanding.
SP5:	A basic understanding of HIV & AIDS.
SP5:	An Understanding of company structure, roles and responsibilities of their reporting line.
SP6:	An understanding of basic legislation as applied to their role.

#### Exit Level Outcomes:

**F2:** Demonstrate an understanding of basic computer skills and the use of Graphic User Interface equipment.

Specific Outcome:	
SP1:	Learners must have an understanding of computer hardware and peripherals.
SP2:	An basic understanding of the computer operating system.
SP3:	A basic understanding of mail applications and the internet.
SP4:	A basics understanding of MS Office applications.
SP5:	Understand the basics of (GUI) graphic user interface applications.



**Exit Level Outcomes**

**F3:** Demonstrate an understanding of printing industry processes, terms, concept and principles. (Induction to printing)

<b>Specific Outcome:</b>	
SP1:	An overview of the history of the entire printing industry.
SP2:	Understand the production flow of the publishing environment.
SP3:	Understand the pre-press processes and environment.
SP4:	An understanding of the major printing processors and their markets.
SP5:	Understand the history, current state and future of Gravure Cylinder Preparation .

**Exit Level Outcomes:**

**F4:** Demonstrate an understanding of the principles of mechanical, pneumatic, hydraulic and electronic components of Gravure Cylinder Preparation equipment.

<b>Specific Outcome:</b>	
SP1:	Understand basic mechanical principles.
SP2:	Understand the basic principles of pneumatics.
SP3:	Understand the basic principles of hydraulics.
SP4:	Understand the basic principles of electronic components.
SP5:	Understand the basics of problem solving techniques.
SP5:	Understand maintenance aspects in the Gravure Cylinder Preparation environment.



**Exit Level Outcomes:**

**F5:** Demonstrate an understanding of production economics for a printing / bookbinding operation.

<b>Specific Outcome:</b>	
SP1:	Understanding the cost implications of raw materials.
SP2:	Understand the cost implications of labour costs and value added costs.
SP3:	Understand the cost implications of maintenance and replacement.
SP4:	Understand the basics of estimating.
SP5:	Understand work tickets.

**Exit Level Outcomes:**

**F6:** Apply basic **mathematical** calculations specific to the printing environment

<b>Specific Outcome:</b>	
SP1:	Understand arithmetic.
SP2:	Understand basic algebra applied to the printing industry.
SP3:	Understand basic geometry applied to the printing industry.
SP4:	Understand units of measurement methods.



**Exit Level Outcomes:****F7:** Demonstrate and understanding of basic printing science

<b>Specific Outcome:</b>	
SP1:	An understanding of basic science.
SP2:	An understanding of heat and humidity.
SP3:	Understand the properties of fluids.
SP4:	Understand chemical types and reactions.
SP5:	Understand PH in printing.
SP6:	Understand light and colour.
SP7:	Understand metals.
SP8:	Understand the properties and principles of inks, varnishes and adhesives.

**Exit Level Outcomes:****F8:** Demonstrate an understanding of the printing industries impact on the environment.

<b>Specific Outcome:</b>	
SP1:	Have a good understanding of waste management.
SP2:	Have a good understanding of pollution.
SP3:	Have a good understand of supplier accreditation.
SP4:	Have a good understanding of energy management.



### Core Outcomes

#### Exit Level Outcome:

- C1:** Understand various raw materials and handling procedures in a cylinder preparation environment.

Specific Outcome:	
SP1:	Understand the characteristics of the various storage and cylinder movement operations.
SP2:	Understand characteristics, grades and types of paper.
SP3:	Understand the characteristics of different chemicals and solutions used in the cylinder preparation environment.
SP4:	Understand the properties of copper and the chromic flakes.
SP5:	Understand the various safety criteria in the cylinder preparation department.

#### Exit Level Outcome:

- C2:** Understand the process and demonstrate competence in stripping and assessing a gravure cylinder.

Specific Outcome:	
SP1:	Understand the process and identification of the correct cylinders to strip.
SP2:	Inspect the sides and shafts of the cylinder for damage and ink build-up.
SP3:	Safely cut and strip the skin from the cylinder.
SP4:	Clean the sides and prepare the cylinder for plating.
SP5:	Assess base copper for any damage and make recommendation.



**Exit Level Outcome:**

- C3:** Understand the process and demonstrate competence in copper plating and assessing a gravure cylinder.

<b>Specific Outcome:</b>	
SP1:	Understand the principles and process requirements for copper plating.
SP2:	Prepare the baths for copper plating.
SP3:	Degrease the cylinder for copper plating process, ensuring even coverage of the separating solution.
SP4:	Understand the programming of the bath and choose the correct programme according to cylinder requirements.
SP5:	Plate cylinder.
SP6:	Understand the programme of the grinders and grind the cylinder to specification.
SP7:	Check hardness, cylinder size and assess for engraving and print suitability.

**Exit Level Outcome:**

- C4:** Understand the process and demonstrate competence in chrome plating and assessing a gravure cylinder.

<b>Specific Outcome:</b>	
SP1:	Understand the principles and process requirements for chrome plating.
SP2:	Prepare the baths for chrome plating.
SP3:	Degrease the cylinder for chrome plating process.
SP4:	Understand the programming of the bath and choose the correct programme according to cylinder requirements.
SP5:	Plate cylinder.
SP6:	Understand the programme of the grinders and grind the cylinder to specification.
SP7:	Assess the cylinder for print suitability.
SP8:	Understand the de-chroming process and de-chrome when required.



**Exit Level Outcome:**

- C5:** Demonstrate an understanding of the pre-flight process and requirements and pre-flight various customer supplied materials.

<b>Specific Outcome:</b>	
SP1:	Understand the quality principles of origination for gravure printing.
SP2:	Have a thorough understanding of file formats, image formats, resolution and fonts.
SP3:	Understand the use of pre-flight software.
SP4:	Prepare various client supplied materials for imposition.
SP5:	Be able to communicate all problems and solutions to clients.

**Exit Level Outcome:**

- C6:** Understand imposition schemes for various press requirements and impose different formats.

<b>Specific Outcome:</b>	
SP1:	Understand imposition for gravure, specific press requirements and various fold configurations.
SP2:	Master relevant imposition software.
SP3:	Check work ticket, impose and render for engraving purposes.
SP4:	Play out proofs for checking purposes.



**Exit Level Outcome:**

- C7:** Understand the process and demonstrate competence in engraving a gravure cylinder using the company specific equipment.

<b>Specific Outcome:</b>	
SP1:	Understand the principles and process requirements for engraving.
SP2:	Check work ticket and prepare the engravers for engraving.
SP3:	Prepare and measure cylinder sets.
SP4:	Place cylinders in relevant engraving machines.
SP5:	Pre-engraving make ready procedures.
SP6:	Make test cuts, evaluate and correct for ribbon balance.
SP7:	Evaluate quality of diamonds and assess for suitability of colour to be engraved.
SP8:	Copy correct image data and proceed with engraving.
SP9:	Inspect and evaluate engraving according to quality criteria.
SP10:	Perform general maintenance as required.

**Exit Level Outcome:**

- C8:** Understand the principles of densitometry.

<b>Specific Outcome:</b>	
SP1:	Understand the standard colour bar and company specific colour bar.
SP2:	Understand the basic operation of and maintenance requirements of a densitometer and its uses.
SP3:	Understand greyscale and greyscale controls and purpose
SP4:	Measure and evaluate density results.



**Elective Outcomes:****Exit Level Outcome:**

**E1:** Understand gravure cylinder proofing and demonstrate competence in the process.

<b>Specific Outcome:</b>	
SP1:	Read the work ticket and gather the correct paper and ink mixtures.
SP2:	Make ready for proofing.
SP3:	Proof cylinders.
SP4:	Evaluate Proof and submit for approval.
SP5:	Maintain the proofing machine for optimal results.

**Exit Level Outcome:**

**E2:** Understanding and implement national and international quality standards.

<b>Specific Outcome:</b>	
SP1:	Research various quality standards.
SP2:	Analyse their benefits.
SP3:	Apply an international quality standard to achieve consistent quality control.
SP4:	Understand the difference between the various quality standards.



**Exit Level Outcome:****E3:** Understand and implement colour standards.

<b>Specific Outcome:</b>	
SP1:	Research various colour standards.
SP2:	Analyse their benefits.
SP3:	Apply an international colour standard to achieve consistent colour control.
SP4:	Understand the difference between the various colour standards.
SP5:	Understand the electronic colour control systems.

**Exit Level Outcome:****E4:** Understand the polish master operation and specific cylinder specifications.

<b>Specific Outcome:</b>	
SP1:	Re-asses and determine cylinder repair requirements.
SP2:	Make ready the polish master machine.
SP3:	Cut cylinders to requirements.
SP4:	Final quality inspection.



**Exit Level Outcome:**

**E5:** Understand the process and demonstrate competency in re-etching a gravure cylinder.

<b>Specific Outcome:</b>	
SP1:	Have a thorough knowledge of the chemicals required and their uses in the re-etching process.
SP2:	Inspect the proof for colour balance, defects and imposition on the cylinder.
SP3:	Evaluate against client proofs and make recommendations on colour control.
SP4:	Perform corrections.
SP5:	Make dummy and prepare folder for press.
SP6:	Perform corrections during print run.



**9. Critical Cross Field Outcomes:**

1	Identifying and solving problems in which responses display that responsible decisions using critical and creative thinking have been made;	✓✓✓
2	Working effectively with others as a member of a team, group, organisation, community;	✓
3	Organising and managing oneself and one's activities responsibly and effectively;	✓
4	Collecting, analysing, organising and critically evaluating information;	✓
5	Communicating effectively using visual, mathematical and/or language skills in the modes of oral and/or written persuasion;	✓
6	Using science and technology effectively and critically, showing responsibility towards the environment and health of others;	✓✓
7	Demonstrating an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation;	✓
8	Contributing to the full personal development of each learner and the social and economic development of the society at large, by making it the underlying intention of any programme of learning to make an individual aware of the importance of: Reflecting on and exploring a variety of strategies to learn more effectively; Participating as responsible citizens in the life of local, national and global communities; Being culturally and aesthetically sensitive across a range of social contexts; Exploring education and career opportunities; and Developing entrepreneurial opportunities.	✓ ✓ ✓



## 10 Learning Map (Proposed structure of learning)

In order for an apprentice to qualify in Gravure Cylinder Preparation it is necessary to complete the whole fundamental component, the whole core component and a choice of **at least three electives** based on the companies equipment and the chosen field of specialisation.

The following occupations within the qualification can also be completed as skills programmes.

### 1. Gravure Cylinder Preparation Assistant

<b>Fundamental Exit Level Outcomes</b>	
F1	Demonstrate an understanding of <b>company policies</b> and procedures as applied to your specific work area.
F2	Demonstrate an understanding of basic <b>computer skills</b> and the use of Graphic User Interface equipment.
F3	Demonstrate an understanding of printing <b>industry processes</b> , terms, concept and principles.
F4	Demonstrate an understanding of the principles of <b>mechanical</b> , pneumatic, hydraulic and electronic components of Gravure Cylinder Preparation equipment.
F5	Demonstrate an understanding of production <b>economics</b> for a printing / bookbinding operation.
F6	Apply basic <b>mathematical</b> calculations specific to the printing environment
F7	Demonstrate and understanding basic printing <b>science</b>
F8	Demonstrate an understanding of the printing industries impact on the <b>environment</b>
<b>Core Exit Level Outcomes</b>	
C1	Understand various raw materials and <b>handling procedures</b> in a cylinder preparation environment.
C2	Understand the process and demonstrate competence in <b>stripping</b> and assessing a gravure cylinder.
C3	Understand the process and demonstrate competence in <b>copper plating</b> and assessing a gravure cylinder.
C4	Understand the process and demonstrate competence in <b>chrome plating</b> and assessing a gravure cylinder.
<b>Elective Exit Level Outcomes</b>	
No electives required	



## 11 References

- Current registered apprentice course maps and training programmes
- Work done by advisory committees.
- GATF training programme.
- Heidelberg handbook of print media
- Printing Science by F. Pateman & L. C Young
- Sappi resource material.
- Internet resources.

## 12 Review Period

This curriculum, once approved should be subject to the monitoring and continuous improvement guidelines and policies of the South African Qualifications Authority.

This would imply continuous improvement as technology evolves and a formal review every three years.

## 14 Definitions

CBMT	Competency based modular training
ETQA	Education training quality assurance body
Apprenticeship	A formally registered tri-party contract that culminates into a qualified artisan.
Skills Programme	A credit or non-credit bearing formal learning programme.
Exit Level Outcome	A group of specific standards, knowledge and skills defined as an outcome.
Fundamental	An underpinning knowledge component that supports the gaining of skills.
Core	The essential skills and knowledge based training component.
Elective	A field of specialisation within the formal training programme.
NQF	National Qualifications Framework.
VQF	Vocational Qualifications Framework.
Occupation	A combination of knowledge and skills that culminate in a recognised job.

