



		Curriculum Document			
Curriculum Code		Curriculum Title		Logo	
211301001		Chemist			
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SECTION 1: CURRICULUM SUMMARY

1. Occupational Information

1.1 Associated Occupation

211301: Surface Coatings Technologist

1.2 Occupation or Specialisation Addressed by this Curriculum

211301001: Chemist

1.3 Alternative Titles used by Industry

- Laboratory chemist

2. Curriculum Information

2.1 Curriculum Structure

This qualification is made up of the following compulsory Knowledge and Practical Skill Modules:

Knowledge Modules:

- 211301001-KM-01, Basic Surface Coatings Technology, NQF Level 4, Credits 9
- 211301001-KM-02, Surface Coatings Application, NQF Level 4, Credits 9
- 211301001-KM-03, Solvents and binders, NQF Level 5, Credits 10
- 211301001-KM-04, Pigmentation and Dispersion, NQF Level 5, Credits 12
- 211301001-KM-05, Modifiers, NQF Level 5, Credits 7
- 211301001-KM-06, Testing of surface coatings, NQF Level 5, Credits 6
- 211301001-KM-07, Convertible binders, NQF Level 5, Credits 12
- 211301001-KM-08, Formulating Principles, NQF Level 5, Credits 6
- 211301001-KM-09, Basic Project Management and Information Management, NQF Level 4, Credits 6
- 211301001-KM-10, Managing interpersonal relationships in the Surface Coatings Industry, NQF Level 4, Credits 6

Total number of credits for Knowledge Modules: 83

Practical Skill Modules:

- 211301001-PM-01, Design parameters of surface coatings formulation, NQF Level 6, Credits 16
- 211301001-PM-02, Ensure optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16
- 211301001-PM-03, optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16

Total number of credits for Practical Skill Modules: 48

This qualification also requires the following Work Experience Modules:

- 211301001-WM-01, Surface coatings design parameters, NQF Level 5, Credits 20
- 211301001-WM-02, Optimised formulations of surface coatings products for production, NQF Level 5, Credits 20
- 211301001-WM-03, Technical support processes on surface coatings, NQF Level 5, Credits 20

Total number of credits for Work Experience Modules: 60

2.2 Entry Requirements

Standard 10 or grade 12 in English, Mathematics and Science is the normal minimum requirement. For those who do not meet this requirement, an assessment to determine prior learning is done. A Basic Science module is available to those who feel they wish to supplement their school science knowledge

3. Assessment Quality Partner Information

Name of body: South African Paint Manufacturing Association

Address of body: P.O. Box 751605 Gardenvue Johannesburg 2047

Contact person name: Mr Derick Spence

Contact person work telephone number: 011 455 2503

4. Part Qualification Curriculum Structure

No part qualifications are applicable

SECTION 2: OCCUPATIONAL PROFILE

1. Occupational Purpose

Surface Coatings Technologist develops surface coatings formulations, optimises existing surface coatings formulations and provides technical support services to surface coatings manufacturers and end users

2. Occupational Tasks

- Designing and developing surface coatings design parameters for surface coatings products (NQF Level 4)
- Optimising surface coatings formulations for surface coatings products (NQF Level 4)
- Providing technical support on technical coatings to internal and external customers (NQF Level 4)

3. Occupational Task Details

3.1. Designing and developing surface coatings design parameters for surface coatings products (NQF Level 4)

Unique Product or Service:

Surface coatings design parameters developed

Occupational Responsibilities:

- Design parameters of surface coatings formulation

Occupational Contexts:

- Surface coatings design processes

3.2. Optimising surface coatings formulations for surface coatings products (NQF Level 4)

Unique Product or Service:

Optimised formulations for surface coatings products for production

Occupational Responsibilities:

- Ensure optimised field performance of the finished surface coatings product

Occupational Contexts:

- Optimised formulations of surface coatings products for production

3.3. Providing technical support on technical coatings to internal and external customers (NQF Level 4)

Unique Product or Service:

Technical support on technical coatings provided

Occupational Responsibilities:

- Provide correct technical specifications, advice and information leading to satisfaction of internal and external customers

Occupational Contexts:

- Technical support processes on surface coatings

SECTION 3: CURRICULUM COMPONENT SPECIFICATIONS

SECTION 3A: KNOWLEDGE MODULE SPECIFICATIONS

List of Knowledge Modules for which Specifications are included

- 211301001-KM-01, Basic Surface Coatings Technology, NQF Level 4, Credits 9
- 211301001-KM-02, Surface Coatings Application, NQF Level 4, Credits 9
- 211301001-KM-03, Solvents and binders, NQF Level 5, Credits 10
- 211301001-KM-04, Pigmentation and Dispersion, NQF Level 5, Credits 12
- 211301001-KM-05, Modifiers, NQF Level 5, Credits 7
- 211301001-KM-06, Testing of surface coatings, NQF Level 5, Credits 6
- 211301001-KM-07, Convertible binders, NQF Level 5, Credits 12
- 211301001-KM-08, Formulating Principles, NQF Level 5, Credits 6
- 211301001-KM-09, Basic Project Management and Information Management, NQF Level 4, Credits 6
- 211301001-KM-10, Managing interpersonal relationships in the Surface Coatings Industry, NQF Level 4, Credits 6

1. 211301001-KM-01, Basic Surface Coatings Technology, NQF Level 4, Credits 9

1.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of the basic principles of surface coatings technology and serves as a good platform on which the learners can base their subsequent studies. It focuses on reasons for use of coatings, performance of surface coatings components and film formation of surface coatings, stages in surface coatings manufacturing process and correct surface preparation and main methods of application and testing

The learning will enable learners to demonstrate an understanding of:

- KM-01-KT01: Surface coatings components (35%)
- KM-01-KT02: Surface coatings manufacturing (30%)
- KM-01-KT03: Surface coatings application (35%)

1.2 Guidelines for Topics

1.2.1. KM-01-KT01: Surface coatings components (35%)

Topic elements to be covered include:

- KT0101 Components of Surface coatings
- KT0102 Film formation
- KT0103 Viscosity
- KT0104 Pigmentation
- KT0105 Film formers and solvents
- KT0106 Safety

Internal Assessment Criteria and Weight

- IAC0101 The various components of surface coatings such as film formers, solvents, pigments, extenders, additives are listed and analysed (Weight 5%)
- IAC0102 The properties of the components of surface coatings are described and analysed (Weight 5%)
- IAC0103 The components are compared in terms of the application possibilities with reference to the advantages and disadvantages (Weight 4%)
- IAC0104 The concept of film formation is described (Weight 5%)
- IAC0105 The curing of binders systems are described (Weight 4%)

- IAC0106 Different curing methods such as heat cure, air drying, chemical cure, UV cure, infra-red, etc. are listed and analysed (Weight 6%)
- IAC0107 The properties of the different curing methods are described (Weight 5%)
- IAC0108 The application of these methods are analysed and compared (Weight 5%)
- IAC0109 The concept of viscosity is defined (Weight 5%)
- IAC0110 A classification of flow is provided and analysed (Weight 5%)
- IAC0111 Methods of viscosity measurement are described and analysed (Weight 4%)
- IAC0112 Surface coatings components are compared in terms of their properties related to viscosity (Weight 6%)
- IAC0113 The performance properties required under a variety of application substrates are stated (Weight 4%)
- IAC0114 The classification of pigments is described (Weight 4%)
- IAC0115 Pigmentation properties such as optical properties, gloss, particle shapes, and sizes are described and analysed (Weight 4%)
- IAC0116 The advantages and disadvantages of pigment testing procedures are compared and analysed in terms of the advantages and disadvantages (Weight 5%)
- IAC0117 Resin types are identified and their properties are analysed (Weight 5%)
- IAC0118 Solvents types are identified and their properties are analysed (Weight 5%)
- IAC0119 The advantages and disadvantage such and interactions, properties (flammability, evaporation rate etc) are compared (Weight 5%)
- IAC0120 Hazards and risks related to surface coatings components and identify alternatives and solutions are discussed (Weight 2%)
- IAC0121 Risk and safety management is discussed (Weight 7%)

(Weight 35%)

1.2.2. KM-01-KT02: Surface coatings manufacturing (30%)

Topic elements to be covered include:

- KT0201 Surface coatings manufacturing processes
- KT0202 Surface coatings manufacturing machinery and equipment

- KT0203 Quality Control
- KT0204 Surface coatings packaging and labeling

Internal Assessment Criteria and Weight

- IAC0201 Various manufacturing processes such as pigment dispersion, filtration, etc. are defined (Weight9%)
- IAC0202 Various manufacturing processes are compared and the advantages and disadvantages are stated (Weight10%)
- IAC0203 Surface coatings manufacturing machinery and equipment are identified (Weight11%)
- IAC0204 Hazards and risks related to machinery and equipment are identified (Weight11%)
- IAC0205 The importance of personal protective equipment and the role of it in safety (human and organization) are discussed (Weight10%)
- IAC0206 Strategies to enhance safety are proposed (Weight11%)
- IAC0207 Surface coatings manufacturing quality and the purpose thereof are discussed (Weight9%)
- IAC0208 Methods or processes of quality control testing are defined and compare in terms of the advantages and disadvantages (Weight10%)
- IAC0209 Packaging and labeling requirements are identified and analysed (Weight10%)
- IAC0210 The function of labeling is analysed (Weight9%)

(Weight 30%)

1.2.3. KM-01-KT03: Surface coatings application (35%)

Topic elements to be covered include:

- KT0301 Surface preparation and treatment
- KT0302 Preparation and pre-treatment
- KT0303 Surface coatings application methods
- KT0304 Preparation of test panels
- KT0305 Surface coatings testing

Internal Assessment Criteria and Weight

- IAC0301 Types of substrates are listed (Weight9%)

- IAC0302 The properties of various substrates are analysed (Weight9%)
- IAC0303 Contamination causes and prevention methods are analysed (Weight9%)
- IAC0304 The function of preparation and pre-treatment are analysed (Weight9%)
- IAC0305 Preparation and pre-treatment methods are analysed in terms of their advantages and disadvantages (Weight6%)
- IAC0306 Define the various surface coatings application methods such as surface coatings brush, roller, conventional spray, electro-static, airless, dipping, roller coating, curtain coating, etc. (Weight8%)
- IAC0307 The advantages and disadvantages of a variety of application methods are analysed (Weight8%)
- IAC0308 Types and functions of test panels are identified and discussed (Weight7%)
- IAC0309 The preparation of test panels are analysed in terms of aspects such as film application, influence of temperature and humidity, curing, film thickness, etc. (Weight7%)
- IAC0310 The advantages and disadvantages of various types of test panels are analysed and compared (Weight8%)
- IAC0311 The concept of surface coatings testing is discussed (Weight6%)
- IAC0312 The principles of surface coatings testing are discussed (Weight8%)
- IAC0313 Test methods are discussed and the advantages and disadvantages are analysed with reference to aspects such as instrumentation, film properties, dry time, hardness, flexibility, gloss, colour, hiding power (Weight6%)

(Weight 35%)

1.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape,

Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane varnish, tray for roller, scraper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

1.4 Exemptions

- None

2. 211301001-KM-02, Surface Coatings Application, NQF Level 4, Credits 9

2.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of the nature of substrates, the preparation and pre-treatment of substrates, surface coatings application methods and drying and curing process of applied coatings

The learning will enable learners to demonstrate an understanding of:

- KM-02-KT01: Substrates (40%)
- KM-02-KT02: Advanced surface coatings application (30%)
- KM-02-KT03: Curing of surface coatings film (30%)

2.2 Guidelines for Topics

2.2.1. KM-02-KT01: Substrates (40%)

Topic elements to be covered include:

- KT0101 The nature of substrates
- KT0102 Surface preparation
- KT0103 Quality Control and safety
- KT0104 Chemical pre-treatment methods

Internal Assessment Criteria and Weight

- IAC0101 Types of substrates such as ferrous and non-ferrous, wood, masonry, fibre board, plastic, glass, rubber are identified and analysed (Weight8%)
- IAC0102 The properties of various types of substrates are discussed (Weight6%)
- IAC0103 The surface coatings requirements of each substrate are listed and discussed (Weight8%)
- IAC0104 The properties of substrates are analysed and the advantages and disadvantages are analysed (Weight7%)
- IAC0105 The concept of contaminants and prevention are analysed (Weight7%)
- IAC0106 Treatments of previously surface coatingsed surfaces are identified (Weight10%)
- IAC0107 Preparation types such de-greasing methods, rust removal methods (chemical, hand, abrasive blasting), are analysed and contrasted (Weight6%)
- IAC0108 Surface coatings application quality control is defined and the purpose thereof is discussed (Weight6%)

- IAC0109 Methods or processes of quality control testing are defined and discussed and the advantages and disadvantages are compared (Weight5%)
- IAC0110 Surface coatings manufacturing machinery and equipment are identified (Weight7%)
- IAC0111 Hazards and risks related to machinery and equipment are discussed (Weight7%)
- IAC0112 The importance of personal protective equipment and the role of it in safety (human and organization) is discussed (Weight8%)
- IAC0113 Chemical pretreatment methods and systems (phosphating, chromating, anodizing, and acid pickling) are compared and contrasted (Weight6%)
- IAC0114 Hazards and risks related to chemical pre-treatment methods are assessed (Weight9%)

(Weight 40%)

2.2.2. KM-02-KT02: Advanced surface coatings application (30%)

Topic elements to be covered include:

- KT0201 Surface coatings application methods and procedures
- KT0202 Surface coatings application equipment
- KT0203 Coating defects and trouble shooting

Internal Assessment Criteria and Weight

- IAC0201 Various surface coatings application methods and procedures such as air assisted, airless, electrostatic, surface coatings roller, powder coating, brush, curtain coating, dipping, roller or coil coating, spray booths, etc are identified and assessed (Weight12%)
- IAC0202 The advantages and disadvantages of various surface coatings application method and procedures are compared and contrasted (Weight11%)
- IAC0203 Hazards and risks related to surface coatings methods and systems are identified and suitable avoidance strategies are analysed (Weight11%)
- IAC0204 Quality Control principles and mechanisms are analysed (Weight11%)
- IAC0205 Surface coatings application equipment machinery and equipment are identified and assessed (Weight11%)
- IAC0206 Hazards and risks related to surface coatings equipment are identified and suitable avoidance strategies are analysed (Weight11%)

- IAC0207 The importance of personal protective equipment and the role of it in safety (human and organization) are discussed (Weight10%)
- IAC0208 Methods of identifying coating defects are appraised and the advantages and disadvantages are analysed (Weight12%)
- IAC0209 Trouble shooting methods are discussed and suitability to product and substrate are justified (Weight11%)

(Weight 30%)

2.2.3. KM-02-KT03: Curing of surface coatings film (30%)

Topic elements to be covered include:

- KT0301 Drying and curing methods and processes
- KT0302 Drying and curing equipment

Internal Assessment Criteria and Weight

- IAC0301 The principles of drying and curing of surface coatings film are discussed (Weight22%)
- IAC0302 Various methods of drying and curing such as air drying, thermal, radiation (UV and Infra-red) and chemical are analysed and compared (Weight19%)
- IAC0303 Surface coatings drying and curing equipment and machinery are identified and assessed (Weight21%)
- IAC0304 Hazards and risks related to surface coatings drying and curing equipment are identified and suitable avoidance strategies are analysed (Weight18%)
- IAC0305 The importance of personal protective equipment and the role of it in safety (human and organization) are discussed (Weight20%)

(Weight 30%)

2.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar,

hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, mandrel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

2.4 Exemptions

- None

3. 211301001-KM-03, Solvents and binders, NQF Level 5, Credits 10

3.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of the range of binders and various types of solvents used in surface coatings and the properties, composition and drying behaviour of convertible and non-convertible binders. It also focuses on properties of solvents and solvent mixtures used in conjunction with binders

The learning will enable learners to demonstrate an understanding of:

- KM-03-KT01: Solvents (30%)
- KM-03-KT02: Binders (35%)
- KM-03-KT03: Manufacturing of solvents and binders (35%)

3.2 Guidelines for Topics

3.2.1. KM-03-KT01: Solvents (30%)

Topic elements to be covered include:

- KT0101 Characteristics of solvents
- KT0102 Chemical properties of solvents
- KT0103 Solvent blends
- KT0104 Selection criteria

Internal Assessment Criteria and Weight

- IAC0101 Solvents are defined (Weight10%)
- IAC0102 The concept of solvents in the surface coatings products is described (Weight13%)
- IAC0103 The characteristics of solvents such as polarity, volatility, solvency power, evaporation rate, refractive index, flash points and density are described (Weight13%)
- IAC0104 The chemical properties of a variety of solvents are analysed (Weight11%)
- IAC0105 Solvent blends are defined (Weight12%)
- IAC0106 The requirements of solvent blends are discussed (Weight13%)
- IAC0107 The advantages and disadvantages of a variety of solvent blends are contrasted (Weight14%)
- IAC0108 Selection criteria are described for a variety of solvents and solvent blends in relation to the use, context and substrate (Weight14%)

(Weight 30%)

3.2.2. KM-03-KT02: Binders (35%)

Topic elements to be covered include:

- KT0201 Classification of binders
- KT0202 Non-convertible binders
- KT0203 Convertible binders

Internal Assessment Criteria and Weight

- IAC0201 The classification of binders is described with reference to convertible and non-convertible binders, functionality and chemical structures (Weight9%)
- IAC0202 Non-convertible binders are defined (Weight8%)
- IAC0203 A variety of non-convertible binders such as natural resins, nitro cellulose, aqueous and solvent dispersions (emulsions), plasticisers, chlorinated rubber, bituminous binders, acrylics, vinyls are identified (Weight8%)
- IAC0204 The characteristics and chemical structures of a variety of non-convertible binders are evaluated (Weight9%)
- IAC0205 The drying or curing mechanisms for a variety of non-convertible binders are evaluated (Weight9%)
- IAC0206 The functionality of a variety of non-convertible binders is evaluated (Weight9%)
- IAC0207 Convertible binders are defined (Weight8%)
- IAC0208 A variety of convertible binders such as vegetable oils and fatty acids, oleo resinous, hydro carbon resins, saturated polyesters, unsaturated polyesters, alkyds and varnishes are identified (Weight9%)
- IAC0209 The characteristics and chemical structures of a variety of convertible binders are evaluated (Weight9%)
- IAC0210 The drying or curing mechanisms for a variety of convertible binders are evaluated (Weight9%)
- IAC0211 The functionality of a variety of convertible binders is evaluated (Weight9%)
- IAC0212 The composition of binders is described (Weight8%)

(Weight 35%)

3.2.3. KM-03-KT03: Manufacturing of solvents and binders (35%)

Topic elements to be covered include:

- KT0301 Manufacturing processes
- KT0302 Manufacturing equipment
- KT0303 Safety, health environment and quality

Internal Assessment Criteria and Weight

- IAC0301 The manufacturing processes of binders and solvents are identified and analysed (Weight14%)
- IAC0302 The manufacturing equipment of binders and solvents are identified and described terms of purpose, functionality and safety (Weight15%)
- IAC0303 Various quality control mechanisms and the purpose thereof in the manufacturing processes of binders and solvents are defined (Weight14%)
- IAC0304 Methods or processes of quality control testing are defined and discussed and compared in terms of the advantages and disadvantages (Weight14%)
- IAC0305 Identify hazards and risks related to machinery and equipment (Weight14%)
- IAC0306 The importance of personal protective equipment and the role of it in safety (human and organization) are discussed (Weight15%)
- IAC0307 Environmental requirements are identified and discussed and the adherence to those is analysed (Weight14%)

(Weight 35%)

3.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume

cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

3.4 Exemptions

- None

4. 211301001-KM-04, Pigmentation and Dispersion, NQF Level 5, Credits 12

4.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of the basic elements that technologists should know regarding the international standards for pigments within the South African context. It focuses on colour, colour theory, and the dispersion and utilisation of pigments. It also includes principles of colour, description and measurement of colour, rheology, production and testing of pigments, pigmentation of coatings, principles of dispersion and associated equipment

The learning will enable learners to demonstrate an understanding of:

- KM-04-KT01: Colour theory and its application (30%)
- KM-04-KT02: Pigments (40%)
- KM-04-KT03: Dispersion (30%)

4.2 Guidelines for Topics

4.2.1. KM-04-KT01: Colour theory and its application (30%)

Topic elements to be covered include:

- KT0101 Colour theory
- KT0102 Application of colour theory

Internal Assessment Criteria and Weight

- IAC0101 Basic concepts of pigments and dispersion are described and evaluated (Weight11%)
- IAC0102 Principles of colour theory are defined and described (Weight14%)
- IAC0103 Colour measurement is defined and described and methods of interpretations of measurements are evaluated (Weight14%)
- IAC0104 The concepts of colour by addition, subtraction and metamerism are defined and compared and contrasted (Weight11%)
- IAC0105 The characteristics and basic chemistry of pigments are discussed (Weight11%)
- IAC0106 The principles of mixing, matching and tinting are defined and evaluated (Weight13%)
- IAC0107 Measuring equipment is identified and requirements are analysed in terms of purpose, functionality and safety (Weight11%)
- IAC0108 The calibration of measuring equipment is discussed and motivated (Weight12%)

(Weight 30%)

4.2.2. KM-04-KT02: Pigments (40%)

Topic elements to be covered include:

- KT0201 The production of pigments
- KT0202 Pigment testing
- KT0203 Pigmentation of coatings

Internal Assessment Criteria and Weight

- IAC0201 Pigment, chemistry and manufacturing processes (wet and dry processes, micronising, etc.) are defined, described and analysed (Weight14%)
- IAC0202 Pigment manufacturing equipment is identified and analysed in terms of purpose, functionality and safety (Weight14%)
- IAC0203 Pigment testing equipment is identified (Weight15%)
- IAC0204 Pigment testing methods and procedures are described and analysed (Weight15%)
- IAC0205 Methods of performance testing are identified and analysed (Weight14%)
- IAC0206 Selection and incorporation (such as critical volume concentration, etc.) of pigmentation is analysed and motivated (Weight14%)
- IAC0207 The effect on physical properties of surface coatings film is analysed and motivated (Weight14%)

(Weight 40%)

4.2.3. KM-04-KT03: Dispersion (30%)

Topic elements to be covered include:

- KT0301 Principles of dispersion
- KT0302 Dispersing equipment
- KT0303 Rheology
- KT0304 Safety, health environment and quality

Internal Assessment Criteria and Weight

- IAC0301 The principles of dispersion are defined and evaluated (Weight10%)

- IAC0302 Wetting and dispersion agents are identified and the characteristics and properties are identified and analysed (Weight11%)
- IAC0303 Dispersing equipment is identified and analysed in terms of purpose, functionality and safety (Weight11%)
- IAC0304 The concept of rheology is explained (Weight11%)
- IAC0305 Internal flow characteristics of a fluid specific to pigments is described and analysed (Weight11%)
- IAC0306 Various quality control mechanisms and the purpose thereof in dispersion processes are defined (Weight11%)
- IAC0307 Methods or processes of quality control testing are defined and discussed and compared in terms of the advantages and disadvantages (Weight12%)
- IAC0308 Hazards and risks related to dispersion are identified and avoidance strategies are suggested (Weight12%)
- IAC0309 Environmental requirements are identified and discussed and the adherence to those is analysed (Weight11%)

(Weight 30%)

4.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, mostest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand, thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

4.4 Exemptions

- None

5. 211301001-KM-05, Modifiers, NQF Level 5, Credits 7

5.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of this module equips learners with knowledge of modifiers or additives which assist pigment dispersion, product stability, application, film polymerization, film appearance and film properties

The learning will enable learners to demonstrate an understanding of:

- KM-05-KT01: Dispersion processes (35%)
- KM-05-KT02: Storage (30%)
- KM-05-KT03: Application (35%)

5.2 Guidelines for Topics

5.2.1. KM-05-KT01: Dispersion processes (35%)

Topic elements to be covered include:

- KT0101 Dispersion processes

Internal Assessment Criteria and Weight

- IAC0101 Principles and methods of problem identification and rectification are discussed (Weight18%)
- IAC0102 The characteristics of de-foamers are described and the role and function thereof is analysed (Weight18%)
- IAC0103 The characteristics of wetting and dispersing agents are described and the role and function thereof is analysed (Weight17%)
- IAC0104 The characteristics of anti-floating agents are described and the role and function thereof is analysed (Weight16%)
- IAC0105 The characteristics of surface active agents are described and the role and function thereof is analysed (Weight17%)
- IAC0106 The HLB process is described and the role and function thereof is analysed (Weight14%)

(Weight 35%)

5.2.2. KM-05-KT02: Storage (30%)

Topic elements to be covered include:

- KT0201 Storage properties

Internal Assessment Criteria and Weight

- IAC0201 Stability problems are identified and discussed and possible solutions are suggested (Weight13%)
- IAC0202 The concept of in-can stability is described and factors enhancing it are identified (Weight16%)
- IAC0203 The characteristics of anti-settling agents are described and the role and function related to modifiers is explained (Weight14%)
- IAC0204 The characteristics of anti-skinning agents and the role and function thereof are described (Weight14%)
- IAC0205 The characteristics of moisture absorbers and the role and function thereof are described (Weight14%)
- IAC0206 The characteristics of thickening agents and the role and function thereof are described (Weight14%)
- IAC0207 The characteristics of biocides and the role and function thereof are described (Weight15%)

(Weight 30%)

5.2.3. KM-05-KT03: Application (35%)

Topic elements to be covered include:

- KT0301 Application requirements
- KT0302 Convertible coating curing mechanisms
- KT0303 Film property modifiers
- KT0304 Corrosion inhibitors
- KT0305 Safety, health environment and quality

Internal Assessment Criteria and Weight

- IAC0301 The role and function of additives in application methods and problems are analysed (Weight7%)
- IAC0302 The characteristics of Rheology modifiers are described and the role and function thereof is analysed (Weight7%)

- IAC0303 The characteristics of flow control agents are described and the role and function thereof is analysed (Weight6%)
- IAC0304 The characteristics of conductivity agents are described and the role and function thereof is analysed (Weight6%)
- IAC0305 The characteristics of anti-static agents are described and the role and function thereof is analysed (Weight7%)
- IAC0306 Types of driers, hardners, accelerators, curing agents are described and the role and function thereof is analysed (Weight6%)
- IAC0307 A variety of film agents such as matting and texturing agents, UV agents, adhesion promoters, anti-scuffing agents, lubricants, heat stabilizers, optical brighteners, anti-fouling, biocides, plasticizing agents, etc are defined and described and analysed in terms of their characteristics, properties and role and function (Weight7%)
- IAC0308 Types of finish such as wrinkle, hammertone, crackle, spatter finish are identified and analysed in terms of their characteristics, properties and role and function (Weight7%)
- IAC0309 The mechanisms of corrosion are explained (Weight7%)
- IAC0310 Corrosion prevention mechanisms are described and analysed (Weight6%)
- IAC0311 Anti-corrosion agents are identified and analysed in terms of their characteristics, properties and role and function (Weight7%)
- IAC0312 Various quality control mechanisms are defined and the purpose thereof is justified (Weight7%)
- IAC0313 Methods or processes of quality control testing are defined and discussed and a comparison between the advantages and disadvantages is done (Weight6%)
- IAC0314 Hazards and risks related to modifiers are identified and preventative measures are justified (Weight7%)
- IAC0315 Environmental requirements are identified and adherence is analysed (Weight7%)

(Weight 35%)

5.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.

- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

5.4 Exemptions

- None

6. 211301001-KM-06, Testing of surface coatings, NQF Level 5, Credits 6

6.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of testing procedures and methodologies to ensure that a manufactured product complies with an agreed performance standard. It focuses on familiarising learners with knowledge and understanding of initial preparation and testing techniques, mechanical properties, chemical resistance properties, biological properties, colour change and test specifications

The learning will enable learners to demonstrate an understanding of:

- KM-06-KT01: Surface coatings specifications (30%)
- KM-06-KT02: Testing of the properties of Surface coatings (30%)
- KM-06-KT03: Testing apparatus (40%)

6.2 Guidelines for Topics

6.2.1. KM-06-KT01: Surface coatings specifications (30%)

Topic elements to be covered include:

- KT0101 Concept of testing
- KT0102 Creation of specifications

Internal Assessment Criteria and Weight

- IAC0101 The concept of testing is defined and discussed (Weight13%)
- IAC0102 The role of testing in quality control is justified (Weight13%)
- IAC0103 Reasons for specifications and standards are explained (Weight12%)
- IAC0104 Process methods are described in terms of purpose, functionality and safety (Weight13%)
- IAC0105 The consequences of faulty testing are explained as it impacts on the product, company standards, customer satisfaction and safety (Weight12%)
- IAC0106 The role and function of test standards are described (Weight12%)
- IAC0107 Reporting requirements are identified and evaluated (Weight12%)
- IAC0108 The role and function of reporting in the maintenance of standards and product quality are justified (Weight13%)

(Weight 30%)

6.2.2. KM-06-KT02: Testing of the properties of Surface coatings (30%)

Topic elements to be covered include:

- KT0201 Wet surface coatings testing methods
- KT0202 Dry film testing methods of physical properties
- KT0203 Dry film testing methods of chemical resistance properties

Internal Assessment Criteria and Weight

- IAC0201 Types of tests are identified and justified in terms of purpose, functionality and safety (Weight8%)
- IAC0202 Methods of assessment of new formulations are explained and compared (Weight7%)
- IAC0203 The concept of compliance with product specifications is justified in terms of product quality and industry standards and safety (Weight7%)
- IAC0204 The selection and preparation of test panels are discussed (Weight7%)
- IAC0205 The role and function of test standards are described (Weight7%)
- IAC0206 Reporting requirements are identified and evaluated (Weight8%)
- IAC0207 The role and function of reporting in the maintenance of standards and product quality are justified (Weight7%)
- IAC0208 Results of testing procedures are interpreted and justified (Weight7%)
- IAC0209 The testing methods for a variety of physical properties such as flexibility, hardness, adhesion, gloss, colour, drying time, film porosity, weathering, UV resistance, heat resistance, fire retardance, colour and light fastness, colour measurement, wash-ability and scrub resistance abrasion resistance, opacity are identified and described (Weight8%)
- IAC0210 Results of testing procedures are interpreted and justified (Weight8%)
- IAC0211 Chemical resistance properties such as corrosion theory, resistance to liquids, resistance to chemicals (acids and alkaline), corrosion and humidity resistance, fouling are identified and reasoned (Weight8%)
- IAC0212 Dry film testing methods are identified and reasoned (Weight8%)
- IAC0213 Results of testing procedures are interpreted and justified (Weight10%)

(Weight 30%)

6.2.3. KM-06-KT03: Testing apparatus (40%)

Topic elements to be covered include:

- KT0301 Surface coatings testing apparatus
- KT0302 Safety, health environment and quality

Internal Assessment Criteria and Weight

- IAC0301 The care, maintenance and calibration of testing apparatus are discussed (Weight22%)
- IAC0302 Various quality control mechanisms are defined and the purpose thereof is justified (Weight20%)
- IAC0303 Methods or processes of quality control testing are defined and discussed and a comparison between the advantages and disadvantages is done (Weight20%)
- IAC0304 Hazards and risks related to modifiers are identified and preventative measures are justified (Weight18%)
- IAC0305 Environmental requirements are identified and adherence is analysed (Weight20%)

(Weight 40%)

6.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, mandrel, pencils, filter paper, moisture chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballast sand, thermometer, paper towels, fume cupboard, black and white contrast ratio chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane varnish, tray for roller, scraper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

6.4 Exemptions

- None

7. 211301001-KM-07, Convertible binders, NQF Level 5, Credits 12

7.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of convertible binders required to formulate a range of sophisticated coatings. It focuses on the main reactions occurring when convertible binders used in surface coatings making undergo curing

The learning will enable learners to demonstrate an understanding of:

- KM-07-KT01: Convertible binders (20%)
- KM-07-KT02: Curing reaction (20%)
- KM-07-KT03: Resins (20%)
- KM-07-KT04: Polyurethanes (20%)
- KM-07-KT05: Water reducible polymers (20%)

7.2 Guidelines for Topics

7.2.1. KM-07-KT01: Convertible binders (20%)

Topic elements to be covered include:

- KT0101 Concept of convertible binders

Internal Assessment Criteria and Weight

- IAC0101 Convertible binders are defined (Weight50%)
- IAC0102 The characteristics and properties of convertible binders are identified and discussed (Weight50%)

(Weight 20%)

7.2.2. KM-07-KT02: Curing reaction (20%)

Topic elements to be covered include:

- KT0201 Reactive groupings

Internal Assessment Criteria and Weight

- IAC0201 Reactive groupings of binders such as phenolic, alkyds, polyesters, epoxy, isocyanate, thermosetting acrylic, amino are identified and discussed (Weight40%)
- IAC0202 The characteristics of binders are discussed (Weight30%)

- IAC0203 Reaction conditions are identified and explained (Weight30%)

(Weight 20%)

7.2.3. KM-07-KT03: Resins (20%)

Topic elements to be covered include:

- KT0301 Epoxy resins
- KT0302 Amino resins
- KT0303 Acrylic resins

Internal Assessment Criteria and Weight

- IAC0301 The chemical structure of epoxy resins is discussed (Weight7%)
- IAC0302 The characteristics of epoxy resins are discussed in terms of functional groups and safety (Weight7%)
- IAC0303 The chemical reactions with other resin types (phenolic, amino, amine, polyamide) are discussed (Weight8%)
- IAC0304 Calculations with regard to the uses of epoxy resins are performed taking all variables into consideration (Weight7%)
- IAC0305 Various uses of epoxy resins are compared and contrasted (Weight6%)
- IAC0306 Types of amino resins such as urea, melamine, formaldehyde and benzoguanamine are identified (Weight6%)
- IAC0307 The characteristics of amino resins are discussed in terms of the chemical structure and functional groups (Weight6%)
- IAC0308 Application risks, hazards and safety precautions are defined and justified (Weight7%)
- IAC0309 Calculations with regard to the application of polyurethanes are performed taking all variables into consideration (Weight6%)
- IAC0310 The advantages and disadvantages of the application methods and procedures are compared and contrasted (Weight7%)
- IAC0311 The characteristics of acrylic resins are identified and explained in terms of chemical structure, functional groups and chemical reactions with other resin types such as amino, epoxy, alkyd, polyester and isocyanates (Weight7%)
- IAC0312 Concepts such as thermosetting and thermoplastic are defined (Weight8%)

- IAC0313 Calculations with regard to the application of acrylic resins are performed taking all variables into consideration (Weight6%)
- IAC0314 Application risks, hazards and safety precautions are defined and justified (Weight6%)
- IAC0315 The advantages and disadvantages of various acrylic resin production processes and procedures are compared and contrasted (Weight6%)

(Weight 20%)

7.2.4. KM-07-KT04: Polyurethanes (20%)

Topic elements to be covered include:

- KT0401 Types of polyurethanes
- KT0402 Characteristics and properties of polyurethanes
- KT0403 Application of polyurethanes

Internal Assessment Criteria and Weight

- IAC0401 Types such as single pack pre-reacted, single pack moisture cure, single pack heat cured, twin pack cold cured, twin pack polyol are defined and analysed (Weight20%)
- IAC0402 The characteristics and properties of polyurethanes are discussed in terms of chemical structure, functional groups and chemical reactions with other resin types such as amino, epoxy, alkyd, polyester, isocyanates (Weight20%)
- IAC0403 Define the various application methods and contrast the advantages and disadvantages thereof (Weight20%)
- IAC0404 Calculations with regard to the application of polyurethanes are performed taking all variables into consideration (Weight20%)
- IAC0405 Application risks, hazards and safety precautions are defined and justified (Weight20%)

(Weight 20%)

7.2.5. KM-07-KT05: Water reducible polymers (20%)

Topic elements to be covered include:

- KT0501 Emulsified and water reducible polymers
- KT0502 Emulsifiable blends

- KT0503 Application requirements

Internal Assessment Criteria and Weight

- IAC0501 Types of emulsified and water reducible polymers are identified (Weight11%)
- IAC0502 The characteristics and properties of emulsified and water reducible polymers are discussed in terms of chemical structure and functional groups (Weight11%)
- IAC0503 The processes involved to produce water reducibility are described and analysed (Weight10%)
- IAC0504 Types of emulsifiable blends such as alkyd, acrylic, polyester, epoxy and polyurethane are identified (Weight11%)
- IAC0505 The characteristics and properties of emulsifiable blends are discussed in terms of chemical structure and functional groups (Weight11%)
- IAC0506 Define the various emulsified and water reducible polymers application methods (Weight11%)
- IAC0507 The advantages and disadvantages of a variety of application methods are analysed (Weight12%)
- IAC0508 Application risks, hazards and safety precautions are defined and justified (Weight12%)
- IAC0509 Calculations with regard to the application of emulsified and water reducible polymers are performed taking all variables into consideration (Weight11%)

(Weight 20%)

7.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning

solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane varnish, tray for roller, scraper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3-in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

7.4 Exemptions

- None

8. 211301001-KM-08, Formulating Principles, NQF Level 5, Credits 6

8.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of the principles of formulating coatings intended for use in various situations. It focuses on the principles underlying the selection of constituents for various types of coatings and the basic formulation requirements for use in a selection of and use situations

The learning will enable learners to demonstrate an understanding of:

- KM-08-KT01: General principles of the formulation of surface coatings (50%)
- KM-08-KT02: Applications (50%)

8.2 Guidelines for Topics

8.2.1. KM-08-KT01: General principles of the formulation of surface coatings (50%)

Topic elements to be covered include:

- KT0101 Formulation processes
- KT0102 Coating types
- KT0103 Principal physical and chemical resistance properties
- KT0104 Pigmentation
- KT0105 Surface coatings and coating ingredients (raw material)

Internal Assessment Criteria and Weight

- IAC0101 The original development of formulation processes is discussed (Weight7%)
- IAC0102 Methods of alteration or modification of existing formulations or compositions are described and compared (Weight7%)
- IAC0103 Binder system comparisons are performed and explained (Weight6%)
- IAC0104 The characteristics and potential uses of formulae are discussed (Weight7%)
- IAC0105 Coating types are identified and the characteristics are described (Weight7%)
- IAC0106 The classification of coating types is described (Weight6%)
- IAC0107 The requirements and functions of various coating types such as primers, fillers, stoppers, undercoats, surfacer, finish or topcoats are described (Weight7%)

- IAC0108 The physical and chemical resistance properties such as flexibility, extensibility, hardness, adhesion, impact resistance, abrasion resistance, corrosion resistance, acid and alkaline resistance are identified and described and explained in terms of application possibilities (Weight7%)
- IAC0109 Organic and inorganic pigments are identified (Weight6%)
- IAC0110 The physical characteristics of pigments are identified and explained (Weight7%)
- IAC0111 The concept CPVC (critical pigment volume concentration) is explained in terms of its role in surface coatings formulations (Weight6%)
- IAC0112 Binder selection principles are analysed (Weight7%)
- IAC0113 Pigment selection principles are analysed (Weight6%)
- IAC0114 The use of extenders in surface coatings formulation is analysed (Weight7%)
- IAC0115 Pigment concentration in coatings formulations is analysed (Weight7%)

(Weight 50%)

8.2.2. KM-08-KT02: Applications (50%)

Topic elements to be covered include:

- KT0201 Exterior woodwork
- KT0202 High performance applications
- KT0203 Powder coatings
- KT0204 Automotive coatings OEM (Original Equipment Manufacturer)
- KT0205 Automotive refinish coatings
- KT0206 Linings for beverage and food containers

Internal Assessment Criteria and Weight

- IAC0201 The formulation requirements of exterior woodwork substrates are identified and analysed (Weight3%)
- IAC0202 The application requirements of exterior woodwork formulations are discussed in terms of product quality and safety (Weight2%)
- IAC0203 Performance properties of exterior woodwork formulae are identified and evaluated (Weight2%)
- IAC0204 Exterior woodwork surface coatings systems are described and analysed (Weight3%)

- IAC0205 The preparation, priming, filling, undercoating and finishing of exterior woodwork coatings applications are described with reference to quality, problem solving and safety (Weight2%)
- IAC0206 The requirements for typical guide formulations are identified and justified (Weight3%)
- IAC0207 Types of high performance substrates such as structural steel work, pipe work, marine coating, corrosion prevention, coating types (chlorinated rubber, epoxy, zinc silicates, coal tar), anti-fouling coatings, vinyls, twin pack polyurethane are identified and described in terms of characteristics, requirements and functionality (Weight3%)
- IAC0208 The formulation requirements of high performance applications are identified and analysed (Weight3%)
- IAC0209 The application requirements of high performance formulations are discussed in terms of product quality and safety (Weight3%)
- IAC0210 Performance properties of high performance formulae are identified and evaluated (Weight2%)
- IAC0211 High performance applications surface coatings systems are described and analysed (Weight2%)
- IAC0212 The preparation, priming, filling, undercoating and finishing of high performance coatings applications are described with reference to quality, problem solving and safety (Weight3%)
- IAC0213 The requirements for typical guide formulations are identified and justified (Weight2%)
- IAC0214 Typical guide formulations (Weight3%)
- IAC0215 General industrial applications and end-uses for powder coatings are described (Weight2%)
- IAC0216 Types such as liquid and powder coating types are described in terms of properties such as curing mechanisms, and chemical reactions (Weight3%)
- IAC0217 The formulation requirements of powder coating substrates are identified and analysed (Weight2%)
- IAC0218 The application requirements of powder coating formulations are discussed in terms of product quality and safety (Weight3%)
- IAC0219 Performance properties of powder coating formulae are identified and evaluated (Weight2%)
- IAC0220 Powder coating surface coatings systems are described and analysed (Weight3%)
- IAC0221 The preparation, priming, filling, undercoating and finishing of powder coating applications are described with reference to quality, problem solving and safety (Weight2%)

- IAC0222 The requirements for typical guide formulations are identified and justified (Weight2%)
- IAC0223 The formulation requirements of Automotive coatings OEM substrates are identified and analysed (Weight2%)
- IAC0224 The application requirements of Automotive coatings OEM formulations are discussed in terms of product quality and safety (Weight2%)
- IAC0225 Performance properties of Automotive coatings OEM formulae are identified and evaluated (Weight2%)
- IAC0226 Automotive coatings OEM surface coatings systems are described and analysed (Weight3%)
- IAC0227 The preparation, priming, filling, undercoating and finishing of Automotive coatings OEM coatings applications are described with reference to quality, problem solving and safety (Weight2%)
- IAC0228 The requirements for typical guide formulations are identified and justified (Weight3%)
- IAC0229 On overview of the automotive production process is given (Weight2%)
- IAC0230 The formulation requirements of automotive refinish coatings substrates are identified and analysed (Weight3%)
- IAC0231 The application requirements of automotive refinish coatings formulations are discussed in terms of product quality and safety (Weight2%)
- IAC0232 Performance properties of automotive refinish coatings formulae are identified and evaluated (Weight3%)
- IAC0233 Automotive refinish coatings surface coatings systems are described and analysed (Weight2%)
- IAC0234 The preparation, priming, filling, undercoating and finishing of automotive refinish coatings applications are described with reference to quality, problem solving and safety (Weight3%)
- IAC0235 The requirements for typical guide formulations are identified and justified (Weight2%)
- IAC0236 The formulation requirements of linings for beverage and food containers substrates are identified and analysed (Weight3%)
- IAC0237 The application requirements of linings for beverage and food containers formulations are discussed in terms of product quality and safety (Weight2%)
- IAC0238 Performance properties of linings for beverage and food containers formulae are identified and evaluated (Weight3%)
- IAC0239 The preparation, application and finishing of linings for beverage and food containers are described with reference to quality, industry standards, problem solving and safety (Weight2%)

- IAC0240 The requirements for typical guide formulations are identified and justified (Weight2%)
- IAC0241 Manufacturing processes of cans are described in terms of substrate types, food grade coatings, chemical resistance and types of coatings such as oleoresinous, alkyds, phenolics, epoxy-phenolics, epoxy-UF, vinyls, acrylics (Weight3%)

(Weight 50%)

8.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand, thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,

- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

8.4 Exemptions

- None

9. 211301001-KM-09, Basic Project Management and Information Management, NQF Level 4, Credits 6

9.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of project management and will equip the learners with basic principles and techniques that will enable them to effectively and efficiently plan, allocate tasks and evaluate a surface coatings projects in order to conclude such projects within agreed time-frame with desired outcomes. It focuses on principles, techniques and methods of project management, project planning team work and report writing skills using computer technology

The learning will enable learners to demonstrate an understanding of:

- KM-09-KT01: Basic Project Management Fundamentals (50%)
- KM-09-KT02: Information management (50%)

9.2 Guidelines for Topics

9.2.1. KM-09-KT01: Basic Project Management Fundamentals (50%)

Topic elements to be covered include:

- KT0101 Terminology and definitions
- KT0102 Basic nature of projects
- KT0103 Explain the nature and application of project management
- KT0104 Explain the types of structures that are found in a project environment
- KT0105 Explain the major processes and activities required to manage a project
- KT0106 Project management methods, techniques and tools

Internal Assessment Criteria and Weight

- IAC0101 Basic terminology and definitions of project management including: project management, project, programme, phase, stage, life cycle, product, deliverable, milestone, activities, tasks, close out, scope, risk, scheduling (Weight5%)
- IAC0102 The concept and role of product, project and operations life cycles (Weight5%)
- IAC0103 The characteristics of a project are explained with examples (Weight4%)
- IAC0104 A basic project life cycle is explained with examples of possible phases (Weight5%)
- IAC0105 The reasons for undertaking projects are explained with practical examples (Weight4%)
- IAC0106 A range of types of projects and their complexity are explained in simple terms (Weight5%)

- IAC0107 Project management is defined and its application is explained according to recognised published standards (Weight4%)
- IAC0108 The major project management processes are described and explained according to recognised best practice (Weight5%)
- IAC0109 The differences between project management and general management are explained with examples of each (Weight4%)
- IAC0110 The difference between project management processes and technical (end product related) processes is explained with examples of each (Weight5%)
- IAC0111 Project management processes are those associated with the management of a project and technical processes are those required to produce the required deliverables to satisfy the objectives of the project (Weight5%)
- IAC0112 The difference between a project team member and the project manager is explained in accordance with role descriptions (Weight4%)
- IAC0113 The reasons for defining structures for a project are explained with examples (Weight5%)
- IAC0114 The concept of programme and project hierarchies is explained with an example (Weight4%)
- IAC0115 The purpose of decomposing a project into manageable components or parts is explained with practical examples (Weight5%)
- IAC0116 The concepts of breakdown structures for product, work and cost are explained in simple terms (Weight4%)
- IAC0117 Key processes and activities that take place to manage a project are described from beginning to end and may include but are not limited to start up, initiation, planning, controlling, monitoring, execution, implementing, closing, evaluating (Weight5%)
- IAC0118 The supplementary management sub-processes and activities required to support the key processes and activities are briefly described with examples of each (Weight4%)
- IAC0119 The reasons for planning and controlling a project are explained with examples of the consequences of not planning and controlling (Weight5%)
- IAC0120 The purpose of project management tools and techniques (Weight4%)
- IAC0121 A range of tools and techniques used on a project are identified and explained in accordance with project requirements (Weight5%)
- IAC0122 Limitations and advantages of project management tools and techniques are explained using examples (Weight4%)

(Weight 50%)

9.2.2. KM-09-KT02: Information management (50%)

Topic elements to be covered include:

- KT0201 Concept and principles
- KT0202 Information management
- KT0203 Computer literacy and computer applications
- KT0204 Information capturing

Internal Assessment Criteria and Weight

- IAC0201 Information management principles and methods are discussed (Weight10%)
- IAC0202 Information gathering, analysis, synthesizing and interpretation procedures are explained and evaluated (Weight11%)
- IAC0203 Problem solving methods are compared (Weight9%)
- IAC0204 Report writing methods are discussed (Weight11%)
- IAC0205 Basic research concepts and methodologies are explained (Weight12%)
- IAC0206 Key board skills are applied to capture information on a Graphic User Interface (GUI) application (Weight11%)
- IAC0207 Use of Graphic User Interface (GUI) based database applications to solve problems (Weight10%)
- IAC0208 Use a Graphical User Interface (GUI)-based database application to design forms (Weight8%)
- IAC0209 Manage files using Graphical User Interface environment (Weight8%)
- IAC0210 Design complex tables using Graphical User Interface based database to resolve problems (Weight10%)

(Weight 50%)

9.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand, thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit

- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

9.4 Exemptions

- None

10. 211301001-KM-10, Managing interpersonal relationships in the Surface Coatings Industry, NQF Level 4, Credits 6

10.1 Purpose of the Knowledge Modules

The main focus of the learning in this knowledge module is to build an understanding of managing interpersonal relationships within the Surface coatings Industry. It equips the learner with knowledge and skills on customers' needs, teams' structures, diversity and self-directed work teams. It focuses on interaction with internal departments, team work, and managing diversity, developing self-directed work teams, empowering team members, building capacity among team members and communication skills in order to minimize conflicts among team members and ensure a common understanding of the direction of the organization

The learning will enable learners to demonstrate an understanding of:

- KM-10-KT01: Team work (25%)
- KM-10-KT02: Fundamentals of communication (25%)
- KM-10-KT03: Customer care (25%)
- KM-10-KT04: Legislation (25%)

10.2 Guidelines for Topics

10.2.1. KM-10-KT01: Team work (25%)

Topic elements to be covered include:

- KT0101 General principles
- KT0102 Define and discuss team work and group dynamics
- KT0103 Team leadership
- KT0104 Working in a multi-disciplinary team
- KT0105 Self-Directed Work Teams

Internal Assessment Criteria and Weight

- IAC0101 The basic principles of team work are analysed (Weight5%)
- IAC0102 Explain external factors which will impact on teamwork. (Weight5%)
- IAC0103 Explain methods to encourage team cohesion and empowerment (Weight5%)
- IAC0104 Explain how the different team members
- IAC0105 Describe the dynamics of a well-functioning team (Weight5%)

- IAC0106 Describe the role of a team (Weight4%)
- IAC0107 Describe the composition of a team (Weight5%)
- IAC0108 Methods to building team members
- IAC0109 Describe the practices of leadership (Weight5%)
- IAC0110 Describe the principles of leadership (Weight4%)
- IAC0111 List and discuss the characteristics of a leader (Weight5%)
- IAC0112 Define the concept of leadership (Weight4%)
- IAC0113 A common understanding of the direction of the organization is ensured (Weight5%)
- IAC0114 The nature of multi-disciplinary teams is described (Weight4%)
- IAC0115 The role and functions of Multi-disciplinary teams are considered (Weight5%)
- IAC0116 The composition of a multi-disciplinary team is explained (Weight4%)
- IAC0117 Group dynamics to interact and participate meaningfully in discussions and initiatives are explained (Weight5%)
- IAC0118 The nature of self-directed work teams is described (Weight4%)
- IAC0119 The role and functions of self-directed work teams are considered (Weight5%)
- IAC0120 Composition of a self-directed work teams are explained (Weight4%)
- IAC0121 Group dynamics of self-directed work teams to interact and participate meaningfully in discussions and initiatives are discussed (Weight5%)
- IAC0122 Methods for developing self-directed work teams are explained (Weight4%)

(Weight 25%)

10.2.2. KM-10-KT02: Fundamentals of communication (25%)

Topic elements to be covered include:

- KT0201 Principles of communication

Internal Assessment Criteria and Weight

- IAC0201 List and discuss the principles of communication in relation to giving instructions to the members of the work team and reporting to management and advising customers (Weight20%)

- IAC0202 Describe the importance of correct listening techniques and decoding messages(Weight20%)
- IAC0203 Describe listening and communication techniques (Weight10%)
- IAC0204 Explain the binding nature of written communication and describe the impact thereof on the service provider (Weight20%)
- IAC0205 List important information in the workplace pertaining to the surface coatings advisor and describe the implication thereof on the team and company practices (Weight10%)
- IAC0206 List types of communication and describe the uses of each (Weight20%)

(Weight 25%)

10.2.3. KM-10-KT03: Customer care (25%)

Topic elements to be covered include:

- KT0301 Customer relations
- KT0302 Types of customers
- KT0303 Dealing with customers
- KT0304 Customer complaints
- KT0305 Customer Advice

Internal Assessment Criteria and Weight

- IAC0301 The standards for customer service in the surface coatings manufacturing industry are explained and motivated (Weight3%)
- IAC0302 The manner in which a professional appearance is promoted is explained and justified (Weight4%)
- IAC0303 Communication with customers are described (Weight4%)
- IAC0304 Dealing with cultural differences is described (Weight5%)
- IAC0305 The types of customers are listed and a brief description of each type is given (Weight4%)
- IAC0306 The characteristics of each type are identified (Weight5%)
- IAC0307 Various customer attitudes are listed and the effect that it might have on customer care are explained (Weight4%)

- IAC0308 A description of the common needs of customers is given and how it can be fulfilled is justified (Weight4%)
- IAC0309 Professional conduct when dealing with customers is evaluated (Weight4%)
- IAC0310 Different ways of addressing customers are described with appropriate examples (Weight4%)
- IAC0311 Techniques to determine customer needs are identified and analysed (Weight5%)
- IAC0312 The point at which a customer should be handed over to a supervisor is identified and justified (Weight4%)
- IAC0313 Steps for dealing with customer complaints with examples of good and bad practice are evaluated (Weight4%)
- IAC0314 Techniques to solve customer related problems are analysed (Weight4%)
- IAC0315 Techniques of contact with the customer that diffuses the emotions and minimises disruption are identified and motivated (Weight4%)
- IAC0316 Ways in which to address queries and complaints in a manner that satisfies both the business and the customer are explained with examples of good and bad practice are motivated (Weight4%)
- IAC0317 Methods to deal with conflict are compared (Weight4%)
- IAC0318 Listening and questioning methods are analysed (Weight3%)
- IAC0319 Techniques to assess customer needs are compared (Weight3%)
- IAC0320 Customer referral techniques are described (Weight4%)
- IAC0321 The importance of maintaining information on new products are motivated (Weight3%)
- IAC0322 The implications of working with outdated information is described (Weight4%)
- IAC0323 The key aspects of the Act are identified and the impact thereof on the industry is analysed (Weight4%)
- IAC0324 The implications of the Act when interacting with consumers is evaluated (Weight5%)
- IAC0325 The procedures which will have to change to accommodate the aspects of the act are listed (Weight4%)

(Weight 25%)

10.2.4. KM-10-KT04: Legislation (25%)

Topic elements to be covered include:

- KT0401 Consumer protection act

Internal Assessment Criteria and Weight

- IAC0401 The key aspects of the Act are identified and the impact thereof on the industry is analysed (Weight35%)
- IAC0402 The implications of the Act when interacting with consumers is evaluated (Weight30%)
- IAC0403 The procedures which will have to change to accommodate the aspects of the act are listed (Weight35%)

(Weight 25%)

10.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, mostest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of primers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.

- Facilitators have at least five years experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

10.4 Exemptions

- None

SECTION 3B: PRACTICAL SKILL MODULE SPECIFICATIONS

List of Practical Skill Module Specifications

- 211301001-PM-01, Design parameters of surface coatings formulation, NQF Level 6, Credits 16
- 211301001-PM-02, Ensure optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16
- 211301001-PM-03, optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16

1. 211301001-PM-01, Design parameters of surface coatings formulation, NQF Level 6, Credits 16

1.1 Purpose of the Practical Skill Modules

The focus of the learning in this module is on providing the learner an opportunity to apply the underlying principles of surface coatings design in the selection of constituents for various types of coatings and the basic formulation requirements for use in various situations

The learner will be required to:

- PM-01-PS01: Develop surface coatings design parameters
- PM-01-PS02: Develop a project plan
- PM-01-PS03: Assess and select surface coatings raw materials based on their characteristics and chemistry
- PM-01-PS04: Develop the surface coatings formulation
- PM-01-PS05: Adapt or reformulate the surface coatings design based on feed back

1.2 Guidelines for Practical Skills

1.2.1. PM-01-PS01: Develop surface coatings design parameters

Scope of Practical Skill

Given a set of client requirements for a surface coating the learner must be able to:

- PA0101 Interpret requirement(s) correctly
- PA0102 Plan surface coatings design parameters which meet the design and formulation requirements
- PA0103 Document project design parameters

Applied Knowledge

- AK0101 Techniques to develop a step diagram
- AK0102 Information collection techniques
- AK0103 Techniques to compile a technical data sheet
- AK0104 Techniques to prepare test samples
- AK0105 Project planning techniques
- AK0106 Project plan formats
- AK0107 Analytical calculations

Internal Assessment Criteria

- IAC0101 The importance of a project design parameters in designing surface coatings parameters is evaluated (Weight20%)
- IAC0102 The elements of design parameters are listed and analysed (Weight20%)
- IAC0103 The success factors of a project plan are analysed (Weight20%)
- IAC0104 Procedures to follow in producing surface coatings design parameters are demonstrated in a step diagramme and analysed (Weight20%)
- IAC0105 The project design parameters are evaluated for addressing the initial customer specifications (Weight20%)

1.2.2. PM-01-PS02: Develop a project plan

Scope of Practical Skill

Given the design parameters for a surface coatings product the learner must be able to:

- PA0201 Estimate cost of the product
- PA0202 Establish a time line for the development of the product
- PA0203 Establish the availability of the applicable equipment
- PA0204 Establish suitable procedures for the formulation of the product
- PA0205 Do a task allocation which complies with the project plan and design requirements

Applied Knowledge

- AK0201 Techniques to develop a step diagram
- AK0202 Information collection techniques
- AK0203 Techniques to compile a technical data sheet
- AK0204 Techniques to prepare test samples
- AK0205 Project planning techniques
- AK0206 Project plan formats
- AK0207 Analytical calculations

Internal Assessment Criteria

- IAC0201 The project plan is justified in relation to timelines, cost implications, availability of raw material and profitability of the end product (Weight35%)
- IAC0202 The consequences of incorrect estimations or calculations for surface coatings formulations are analysed (Weight35%)
- IAC0203 The cost effectiveness of the project plan is evaluated in relation to surface coatings design parameters (Weight30%)

1.2.3. PM-01-PS03: Assess and select surface coatings raw materials based on their characteristics and chemistry

Scope of Practical Skill

Given the project plan and a technical data sheets with empirical data of raw materials the learner must be able to:

- PA0301 Analyse the characteristics and chemistry of surface coatings raw materials
- PA0302 Screen for current and available technology
- PA0303 Prepare test samples in order to assess suitability
- PA0304 Select raw material taking into account cost, availability of raw material and profitability
- PA0305 Comply with test parameters and hazardous material codes

Applied Knowledge

- AK0301 Techniques to develop a step diagram
- AK0302 Information collection techniques
- AK0303 Techniques to compile a technical data sheet
- AK0304 Techniques to prepare test samples
- AK0305 Project planning techniques
- AK0306 Project plan formats
- AK0307 Analytical calculations

Internal Assessment Criteria

- IAC0301 The chemistry and characteristics of the surface coatings raw material are analysed and evaluated for suitability for the product (Weight25%)
- IAC0302 Surface coatings formulation principles are analysed in relation to the design (Weight25%)

- IAC0303 Surface coatings raw material is selected based on availability, chemical behaviour and cost implications and these considerations are compared and contrasted to justify the best selection (Weight25%)
- IAC0304 Paint testing apparatus is selected and is suitable to the design (Weight25%)

1.2.4. PM-01-PS04: Develop the surface coatings formulation

Scope of Practical Skill

Given appropriate technical data, technology principles and raw materials the learner must be able to:

- PA0401 Perform necessary analytical calculations such as pigment volume concentration, pigment to binder ratio, volume solids, mass solids, stoichiometric ratio, etc.
- PA0402 Establish correct process sequence
- PA0403 Comply with Safety, Health and Environmental (SHE) aspects

Applied Knowledge

- AK0401 Techniques to develop a step diagram
- AK0402 Information collection techniques
- AK0403 Techniques to compile a technical data sheet
- AK0404 Techniques to prepare test samples
- AK0405 Project planning techniques
- AK0406 Project plan formats
- AK0407 Analytical calculations

Internal Assessment Criteria

- IAC0401 Paint test samples are prepared by applying the correct methods and procedures (Weight35%)
- IAC0402 The suitability of paint test samples is assessed (Weight30%)
- IAC0403 The analytical calculations are correctly performed (Weight35%)

1.2.5. PM-01-PS05: Adapt or reformulate the surface coatings design based on feed back

Scope of Practical Skill

Given a completed small scale surface coatings sample the learner must be able to:

- PA0501 Perform all the testing according to specifications
- PA0502 Interpret results emanating from the tests
- PA0503 Adjust surface coatings formulation according to the above interpretation
- PA0504 Re-manufacture surface coatings formulation according to the test results
- PA0505 Prepare new small scale surface coatings samples and repeat this step until the surface coatings formulation complies with requirements

Applied Knowledge

- AK0501 Techniques to develop a step diagram
- AK0502 Information collection techniques
- AK0503 Techniques to compile a technical data sheet
- AK0504 Techniques to prepare test samples
- AK0505 Project planning techniques
- AK0506 Project plan formats
- AK0507 Analytical calculations

Internal Assessment Criteria

- IAC0501 The results are correctly evaluated and interpreted (Weight18%)
- IAC0502 The adjustment of surface coatings formulation are correctly motivated and justified (Weight16%)
- IAC0503 The re-manufacturing processes and procedures are analysed and motivated (Weight18%)
- IAC0504 Situations that will require re-formulation are indicated (Weight18%)
- IAC0505 The execution of the adjustment to surface coatings design or formulation is in accordance with customer requirements (Weight16%)
- IAC0506 The reformulated surface coatings sample meets the client specifications (Weight14%)

1.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand, thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush, zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit

- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

1.4 Exemptions

- None

2. 211301001-PM-02, Ensure optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16

2.1 Purpose of the Practical Skill Modules

The focus of the learning in this module is on providing the learner an opportunity to manufacture, test and apply a small scale sample of a surface coatings product

The learner will be required to:

- PM-02-PS01: Prepare a small scale surface coatings sample
- PM-02-PS02: Assess, evaluate and optimise surface coatings formulation
- PM-02-PS03: Apply the developed surface coating
- PM-02-PS04: Design final technical literature or information

2.2 Guidelines for Practical Skills

2.2.1. PM-02-PS01: Prepare a small scale surface coatings sample

Scope of Practical Skill

Given a simulated situation in the laboratory environment the learner must be able to:

- PA0101 Use laboratory surface coatings raw material and apply scientific principles and manufacturing techniques to weigh, add ingredients; define the formulation process, establish the mill charge, mix, disperse and establish the colour of the surface coatings sample according to the draft guideline formulation and in line with work instructions

Applied Knowledge

- AK0101 Techniques to analyse the results of a surface coatings samples
- AK0102 Assessment techniques applicable to surface coatings
- AK0103 Techniques to compile technical literature
- AK0104 Calibration of equipment

Internal Assessment Criteria

- IAC0101 The scientific principles and manufacturing procedures informing the preparation of a small scale sample is evaluated and motivated (Weight20%)
- IAC0102 A small scale surface coatings sample is prepared by following the correct steps (Weight20%)

- IAC0103 The results obtained from the small scale surface coatings sample is analysed and justified (Weight20%)
- IAC0104 The characteristics of substrates are analysed and explained in relation to the formula (Weight20%)
- IAC0105 A small scale surface coatings sample is prepared (Weight20%)

2.2.2. PM-02-PS02: Assess, evaluate and optimise surface coatings formulation

Scope of Practical Skill

Given access to a surface coatings laboratory or physical sample the learner must be able to:

- PA0201 Perform appropriate testing methods
- PA0202 Interpret the obtained results
- PA0203 Adjust surface coatings formulation in line with test results to achieve final objective
- PA0204 Apply the correct laboratory procedures
- PA0205 Comply with safety regulations

Applied Knowledge

- AK0201 Techniques to analyse the results of a surface coatings samples
- AK0202 Assessment techniques applicable to surface coatings
- AK0203 Techniques to compile technical literature
- AK0204 Calibration of equipment

Internal Assessment Criteria

- IAC0201 The paint testing methods to employ in testing the small scale surface coatings sample are selected and justified according to the advantages and disadvantages (Weight15%)
- IAC0202 The testing or assessment of the sample is executed by applying the method correctly and by applying safety procedures (Weight15%)
- IAC0203 The results obtained from the small scale surface coatings sample are analysed and compared to the expected results and motivated (Weight17%)
- IAC0204 The adjustments (if necessary) which are made on the small scale surface coatings sample are appropriate and according to the evaluation (Weight17%)

- IAC0205 The reasons for the adjustments made to the small scale surface coatings sample are justified (Weight18%)
- IAC0206 An optimised surface coatings formulation is produced (Weight18%)

2.2.3. PM-02-PS03: Apply the developed surface coating

Scope of Practical Skill

Given the surface coatings laboratory sample, assessment knowledge, selection of appropriate application technique, and calculations the learner must be able to:

- PA0301 Prepare test panels or samples
- PA0302 Ensure optimum functioning of equipment
- PA0303 Adjust equipment according to user specifications
- PA0304 Apply the coating as per test requirements
- PA0305 Assess the wet and dry coating performance with reference to items such as drying or curing, spreading rates, etc. according to formulation requirements

Applied Knowledge

- AK0301 Techniques to analyse the results of a surface coatings samples
- AK0302 Assessment techniques applicable to surface coatings
- AK0303 Techniques to compile technical literature
- AK0304 Calibration of equipment

Internal Assessment Criteria

- IAC0301 The selected paint application tools or apparatus are suitable for the product and the substrate (Weight21%)
- IAC0302 The preparation of substrate prior to application of surface coating is correctly done (Weight20%)
- IAC0303 Correct application methods and techniques are used on the panels or samples (Weight20%)
- IAC0304 The performance of surface coatings on panels are analysed and described (Weight19%)
- IAC0305 The calibration of equipment is accurate according to user manuals (Weight20%)

2.2.4. PM-02-PS04: Design final technical literature or information

Scope of Practical Skill

Given the optimized product the learner must be able to:

- PA0401 Finalise manufacturing processes and product specifications
- PA0402 Prepare draft or technical data sheet
- PA0403 Prepare a Material Safety Data Sheet (MSDS)
- PA0404 Prepare user instructions
- PA0405 Specify surface coatings product packaging
- PA0406 Develop accurate product information which complies to both legislative requirements and consumer needs

Applied Knowledge

- AK0401 Techniques to analyse the results of a surface coatings samples
- AK0402 Assessment techniques applicable to surface coatings
- AK0403 Techniques to compile technical literature
- AK0404 Calibration of equipment

Internal Assessment Criteria

- IAC0401 The importance of the technical data sheets is analysed (Weight17%)
- IAC0402 The importance of Material Safety Data Sheet is justified (Weight16%)
- IAC0403 The important aspects to consider when putting together user instructions guide are listed and justified (Weight17%)
- IAC0404 The user instructions guide is accurate and suitable to the product and end user (Weight17%)
- IAC0405 The recommended surface coatings packaging is explained and motivated (Weight16%)
- IAC0406 The technical literature or information sheet meets legislative requirements and consumer needs and displays accurate product information (Weight17%)

2.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.
- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit

- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

2.4 Exemptions

- None

3. 211301001-PM-03, optimised field performance of the finished surface coatings product, NQF Level 6, Credits 16

3.1 Purpose of the Practical Skill Modules

The focus of the learning in this module is on providing the learner an opportunity to execute an on site evaluation of paint or coating problems and provide guidance to end users of paint

The learner will be required to:

- PM-03-PS01: Provide correct diagnosis to surface coatings problems
- PM-03-PS02: Generate a technical report or provide verbal advice
- PM-03-PS03: Address customer needs and expectations in respect of surface coatings formulation problems
- PM-03-PS04: Compare properties of equivalent products to identify an alternative product

3.2 Guidelines for Practical Skills

3.2.1. PM-03-PS01: Provide correct diagnosis to surface coatings problems

Scope of Practical Skill

Given a customer feedback such as a problem or a request the learner must be able to:

- PA0101 Assess the nature of the request
- PA0102 Perform a site examination
- PA0103 Apply identified diagnostic tools and by following set procedures in the laboratory and field to diagnose the problem
- PA0104 Apply relevant product knowledge and technical expertise to provide a solution
- PA0105 Provide feedback to the relevant parties

Applied Knowledge

- AK0101 Diagnostic techniques
- AK0102 Report writing techniques
- AK0103 An on-site examination of surface coatings techniques
- AK0104 Professional conduct
- AK0105 Interpersonal relations

Internal Assessment Criteria

- IAC0101 Possible on site causes of problems related to surface coatings products are identified (Weight16%)
- IAC0102 An on-site examination of the performance of the product or the problem raised by the client is executed (Weight17%)
- IAC0103 Possible solutions to provide to customers regarding complaints raised are identified (Weight16%)
- IAC0104 The importance of good interpersonal relations and professional conduct on site when providing technical support to customers is justified (Weight17%)
- IAC0105 The importance of ethical behaviour both on the job and on site is explained (Weight18%)
- IAC0106 A written report on the analysis of the problem and the recommendations is compiled (Weight16%)

3.2.2. PM-03-PS02: Generate a technical report or provide verbal advice

Scope of Practical Skill

Given a customer request or complaint the learner must be able to:

- PA0201 Consult technical literature or previous reports
- PA0202 Resolve problems when feasible
- PA0203 Prepare a technical report for appropriate action by others
- PA0204 File technical report and related documentation

Applied Knowledge

- AK0201 Diagnostic techniques
- AK0202 Report writing techniques
- AK0203 An on-site examination of surface coatings techniques
- AK0204 Professional conduct
- AK0205 Interpersonal relations

Internal Assessment Criteria

- IAC0201 Possible resources to refer to in seeking answers to problems raised are identified (Weight25%)
- IAC0202 Procedures to follow in escalating or resolving the problem is described (Weight25%)

- IAC0203 The importance of record keeping is explained (Weight25%)
- IAC0204 An official report template is used to compile a technical report (Weight25%)

3.2.3. PM-03-PS03: Address customer needs and expectations in respect of surface coatings formulation problems

Scope of Practical Skill

Given a customer request for assistance the learner must be able to:

- PA0301 Perform site inspections as necessary
- PA0302 Assist with production trouble shooting when applicable
- PA0303 Prepare application specification such as calculating quantity usage
- PA0304 Compile a relevant report for filing or reference purposes
- PA0305 Provide input to marketing strategy

Applied Knowledge

- AK0301 Diagnostic techniques
- AK0302 Report writing techniques
- AK0303 An on-site examination of surface coatings techniques
- AK0304 Professional conduct
- AK0305 Interpersonal relations

Internal Assessment Criteria

- IAC0301 The critical aspects to observe during site inspections are identified and discussed (Weight35%)
- IAC0302 The importance of ethical and professional conduct on site when providing technical support is explained (Weight35%)
- IAC0303 A written report on the analysis of the problem and the recommendations is compiled (Weight30%)

3.2.4. PM-03-PS04: Compare properties of equivalent products to identify an alternative product

Scope of Practical Skill

Given a reference standard (product sample, technical literature) the learner must be able to:

- PA0401 Compare and assess the qualities of the given product against the relevant performance standard
- PA0402 Produce a technical report for action by others
- PA0403 Utilise results to formulate a matching product if required
- PA0404 Match product information to situation requirements

Applied Knowledge

- AK0401 Diagnostic techniques
- AK0402 Report writing techniques
- AK0403 An on-site examination of surface coatings techniques
- AK0404 Professional conduct
- AK0405 Interpersonal relations

Internal Assessment Criteria

- IAC0401 The importance of comparing properties of equivalent products is evaluated (Weight50%)
- IAC0402 Product information is assessed in terms of the situation requirements (Weight50%)

3.3 Provider Programme Accreditation Criteria

Physical Requirements:

- Facility: sufficient ventilation and extraction fans, access to internet, access to electronic and or hard copy information.
- Equipment: Testing equipment such as orifice viscometer, Brookfield, viscometer, dry film thickness, glass beaker, burette, boss and clamp, steel panels, wood panels, glass panel, drawn down bar, hydrometer, wet film gauges, stop watch, paint brushes, paint roller, crosshatch adhesion tester, manderel, pencils, filter paper, morest chart, glass meter, reflectometer, cotton wheel, specific gravity cup, hard dry testing apparatus, sand or ballatoni sand , thermometer, paper towels, fume cupboard, black and white contrast ration chart, glazed tile, laboratory hot plate, adhesive tape, Stanley knife, abrasive paper, dropper, surfaces- ferrous metals, plastics, non-ferrous metals, previously painted substrate, 5l tins and 500ml tins, oven that is fan assisted, alkaline cleaning solution, commercial water dispersible degreaser, improvised salt spray apparatus, spray gun or bush , zinc phosphate steel panels and iron phosphate mild steel panels, sanding block, various

grades of wet and dry sand paper, wood filler, wood stain, urethane vanish, tray for roller, scrapper, stiff brush, scouring pad.

- Paint coating materials: e.g. various solvents, various types of resins, various coatings, various type of coatings (paint), pigments and extenders linseed oil, 3 -in-one multipurpose oil, various types of premiers, household dish wash liquid, oil based product, undercoats (intermediate coat) etc, as required
- Laboratory equipment including but not limited to high speed mixing equipment, HSF, media mills

Human Resource Requirements:

- Learner to facilitator ratio for training in a simulated environment: 1:5.
- Facilitators have at least five years' experience in the paint manufacturing industry

Legal Requirements:

- Equipment: Goggles, face mask, apron, gloves, respiratory mask and boots.
- Facility: Special designated areas for waste disposal,
- No smoking, drinking and eating signage in a practical centre
- Health and Safety signage displayed on the wall
- Fire extinguishers displayed.
- Emergency exit clearly demarcated.
- Efficient wash basins
- Emergency shower area.
- First Aid kit
- Occupational Health, Safety and Environmental Protection Policies, Procedures
- Standard instructions on personal protective equipment

3.4 Exemptions

- None

SECTION 3C: WORK EXPERIENCE MODULE SPECIFICATIONS

List of Work Experience Module Specifications

- 211301001-WM-01, Surface coatings design parameters, NQF Level 5, Credits 20
- 211301001-WM-02, Optimised formulations of surface coatings products for production, NQF Level 5, Credits 20
- 211301001-WM-03, Technical support processes on surface coatings, NQF Level 5, Credits 20

1. 211301001-WM-01, Surface coatings design parameters, NQF Level 5, Credits 20

1.1 Purpose of the Work Experience Modules

The focus of the work experience is on providing the learner an opportunity to:

gain practical hands-on experience in a coatings manufacturing environment in planning, researching and developing design parameters for surface coatings whilst ensuring that procedural standards and conditions for developing a formulation for coatings are met through analysis and proper documentation

The learner will be required to:

- WM-01-WE01: Select raw materials according to the customer requirements
- WM-01-WE02: Establish the available resources of the company (i.e. on production processes, laboratory instrumentation, product knowledge) applicable to the development of formulations
- WM-01-WE03: Develop the design parameters by applying knowledge of colour theory, product knowledge, applicable techniques and exposure to substrates
- WM-01-WE04: Assess the product on a specific substrate
- WM-01-WE05: Apply the requirements of applicable legislation and applicable standards when developing design parameters

1.2 Guidelines for Work Experiences

1.2.1. WM-01-WE01: Select raw materials according to the customer requirements

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0101 Research the characteristics and theoretical performance of raw materials at the beginning of the project cycle to identify the quality and volume of raw materials
- WA0102 Utilize at least internet research, technical literature, appropriate course material and knowledge of paint technology
- WA0103 Access information through generic computer skills and or using specialised computer program(s) in order to meet customer specification for texture, finish, gloss requirements of a surface coating product
- WA0104 Repeat selection process regarding to three selection trials
- WA0105 Screen a full range of appropriate raw materials for at least ten complete formulating projects (which include at least three from each of the following range: modifying existing surface coatings formulations, development of new products, long term development)

Supporting Evidence

- SE0101 Project plan
- SE0102 Research report
- SE0103 List of selected raw material appropriate to end product
- SE0104 Screening results

1.2.2. WM-01-WE02: Establish the available resources of the company (i.e. on production processes, laboratory instrumentation, product knowledge) applicable to the development of formulations

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0201 Observe the production processes in a paint manufacturing environment for each of the individual processes (minimum 4) which includes mixing, dispersing, filling, colour matching and quality control
- WA0202 Determine availability and functionality of company resources to ensure full scale production

Supporting Evidence

- SE0201 A flow diagram of the processes
- SE0202 Inventory of equipment

1.2.3. WM-01-WE03: Develop the design parameters by applying knowledge of colour theory, product knowledge, applicable techniques and exposure to substrates

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0301 Initiate design parameters of completion of the material inventory
- WA0302 Match colours using colour theory, understanding the combinations of pigments and measurement of colour for at least a wide range of colours and metamerism covering the full colour wheel including shades and variations over three runs
- WA0303 Identify various surfaces (substrates) that require painting and identify the characteristics, behaviour and preparation, potential problem areas and failures of a range of substrate types using three types of substrates in line with parameters and customer requirements

- WA0304 Operate, maintain and calibrate a range of laboratory instrumentation and equipment related to the manufacturing of coating and samples and testing. (E.g. measurement of viscosity and measurement of hardness, gloss, opacity, colour, density, etc.). This is done until the desired levels of performance are reached

Supporting Evidence

- SE0301 Designed parameters
- SE0302 Pigment combination is valid
- SE0303 Colour is a perfect match to sample
- SE0304 Recommended correct paint for a particular substrate
- SE0305 List of various substrates, their characteristics, suitable paint for each, preparation methods for each
- SE0306 Chemicals or solvents used for preparation
- SE0307 List of possible problems to encounter if wrong paint is used
- SE0308 Different types of substrates (metal, wood, glazed substrates)
- SE0309 Characteristics, behaviour of each, appropriate solvent to use for preparation of each, applicable paint to use on each
- SE0310 Calibrated instrument giving rise to correct results
- SE0311 Reasons for using a particular instrument
- SE0312 Correct instrument for a specific test (viscosity, hardness, etc)

1.2.4. WM-01-WE04: Assess the product on a specific substrate

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0401 Initiate the process of assessing the product on a substrate once the instrumentation has been properly set
- WA0402 Apply product(s) to a representative sample of substrates according to specification(s) using a range of application techniques and equipment (spraying, brushing, rolling, bar coating, etc.)
- WA0403 Evaluate product(s) performance on a variety of substrates over a set time period

Supporting Evidence

- SE0401 Correct choice of substrate
- SE0402 Correct application technique, e.g. bar coating to give the correct and uniform thickness
- SE0403 Substrate covered correctly

1.2.5. WM-01-WE05: Apply the requirements of applicable legislation and applicable standards when developing design parameters

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0501 Observe environmental legislative requirements when selecting surface coatings raw material, (e.g. SHE, ISO 14001)
- WA0502 Observe testing standards (e.g. SANS)
- WA0503 Observe fire regulations
- WA0504 Observe the Occupational, Health and Safety (OHS) Act, Transport of dangerous Goods Act, Hazardous Substances Act, Water Act
- WA0505 Apply workplace procedures and work instructions

Supporting Evidence

- SE0501 Safety equipment (PPE)
- SE0502 House keeping

1.3 Contextualised Workplace Knowledge

1 Workplace Standard Operations Procedures (SOP)

2 Safety, Health and Environmental (SHE) requirements

3 Meeting procedures

4 Hazard ratings, including Material Safety Data Sheets (MSDS)

5 Workplace specific equipment

6 Purchasing procedures and specifications of surface coatings raw material

7 Manufacturer's specifications

8 Information Management techniques

- 9 Packaging and transport requirements
- 10 Storage and waste disposal procedures
- 11 Maintenance and calibration of paint testing equipment
- 12 Supervisory procedures, techniques and methods
- 13 Project planning techniques and methods
- 14 Reporting structures
- 15 Paint testing equipment used in the laboratory and on the field
- 16 Production machinery in the factory
- 17 Material handling and storage processes and procedures
- 18 Information management processes
- 19 Internal and external customers, suppliers and fellow technologists
- 20 Workplace specific quality standards

1.4 Criteria for Workplace Approval

Physical Requirements:

Human Resource Requirements:

Legal Requirements:

1.5 Additional Assignments to be Assessed Externally

2. 211301001-WM-02, Optimised formulations of surface coatings products for production, NQF Level 5, Credits 20

2.1 Purpose of the Work Experience Modules

The focus of the work experience is on providing the learner an opportunity to:

gain practical, hands-on experience in a coatings manufacturing environment, of the requirements for optimizing formulations for surface coating products and to ensure that formulations being developed meet specifications through rigorous field testing and use of formulation meets all applicable industry standards and product requirements

The learner will be required to:

- WM-02-WE01: Compare properties of equivalent products to identify an alternative product
- WM-02-WE02: Develop trial surface coatings formulations and samples and test until optimised
- WM-02-WE03: Transfer surface coatings formulations to production

2.2 Guidelines for Work Experiences

2.2.1. WM-02-WE01: Compare properties of equivalent products to identify an alternative product

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0101 Analyse a reference standard (product sample, technical literature) and match product information to situation requirements
- WA0102 Compare and assess the qualities of a product against the relevant performance standard
- WA0103 Produce a technical report for action by others
- WA0104 Utilise results to formulate a matching product if required

Supporting Evidence

- SE0101 Alternative product specifications

2.2.2. WM-02-WE02: Develop trial surface coatings formulations and samples and test until optimised

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0201 Prepare a minimum of 8 laboratory trial surface coatings formulations and samples utilizing a minimum of three different simulated production processes (e.g. high speed mixing equipment, HSF, media mills)
- WA0202 Perform a minimum of 10 paint tests (e.g. viscosity, gloss, colour, hardness, etc.) utilizing a range of equipment
- WA0203 Match colours using colour theory, understanding the combinations of pigments and measurement of colour for at least a wide range of colours and metamerism covering the full colour wheel including shades and variations
- WA0204 Make adjustments to the series of trial run formulations based on the testing and retesting until the surface coatings formulations meet requirements
- WA0205 Assess periodically and at prescribed points in the process information on a computerised data base. (e.g. Compuchem Programme)
- WA0206 Compile a technical data sheet
- WA0207 Compile a technical data sheet (TDS) for at least 5 products adhering to legal requirements
- WA0208 Compile surface coatings user instructions for at least 5 products adhering to legal requirements
- WA0209 Observe Safety, Health, Environmental and Quality (SHEQ) requirements
- WA0210 Adhere to Standard Operating Procedures (SOP)

Supporting Evidence

- SE0201 Trial surface coatings formulations
- SE0202 Samples of surface coatings formulation(s)
- SE0203 Tested paint that meets formulation specification
- SE0204 Required colour of paint
- SE0205 Complementary colours chosen
- SE0206 Make colours from pure organic pigments plus black iron oxides
- SE0207 Perfect colour match
- SE0208 Correct pigments to start with chosen
- SE0209 Adjusted coat formulation
- SE0210 Ability to use the program

- SE0211 Ability to perform calculations for paint, calculated optimum PVC, volume solids and costs using Compuchem program
- SE0212 Manufactured sample
- SE0213 Technical data sheet
- SE0214 Product benefits
- SE0215 Uses
- SE0216 Application
- SE0217 User instructions guide outlining dangerous components, health risks, first aid, fire fighting, handling and storage, exposure controls and PPE and transportation information
- SE0218 Regulatory information on labels
- SE0219 Formulation colour entries
- SE0220 Check list of compliance with SHE
- SE0221 Check list of compliance with SOP

2.2.3. WM-02-WE03: Transfer surface coatings formulations to production

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0301 Assist production team with trial production processes of the surface coatings formulation of a new development of at least 2 batches of the formulation of at least 5 processes of production processes
- WA0302 Effect adjustments until 2 batches have been successfully manufactured and complying with quality specifications of the manufacturer
- WA0303 Finalise the optimized surface coatings formulation for capture onto production systems
- WA0304 Generate final product report utilizing computer and report-writing skills and workplace formats
- WA0305 Report containing optimised surface coatings formulation
- WA0306 User instruction manual
- WA0307 Observe Safety, Health, Environmental and Quality (SHEQ) requirements

Supporting Evidence

- SE0301 Optimised surface coatings formulation
- SE0302 Report on correct process to put the paint through in order to yield the desired paint
- SE0303 Process section to assist with technology transfer
- SE0304 Feedback / report back with adjustment
- SE0305 Optimized surface coatings formulation
- SE0306 Final report on optimized surface coatings formulation

2.3 Contextualised Workplace Knowledge

- 1 Workplace Standard Operations Procedures (SOP)
- 2 Safety, Health and Environmental (SHE) requirements
- 3 Meeting procedures
- 4 Hazard ratings, including Material Safety Data Sheets (MSDS)
- 5 Workplace specific equipment
- 6 Purchasing procedures and specifications of surface coatings raw material
- 7 Manufacturer's specifications
- 8 Information Management techniques
- 9 Packaging and transport requirements
- 10 Storage and waste disposal procedures
- 11 Maintenance and calibration of paint testing equipment
- 12 Supervisory procedures, techniques and methods
- 13 Project planning techniques and methods
- 14 Reporting structures
- 15 Knowledge of factory machinery

2.4 Criteria for Workplace Approval

Physical Requirements:

Human Resource Requirements:

Legal Requirements:

2.5 Additional Assignments to be Assessed Externally

3. 211301001-WM-03, Technical support processes on surface coatings, NQF Level 5, Credits 20

3.1 Purpose of the Work Experience Modules

The focus of the work experience is on providing the learner an opportunity to:

gain practical hands on experience in providing surface coatings technical support to internal and external customers

The learner will be required to:

- WM-03-WE01: Handle customer situations requiring technical support on coatings solutions provided
- WM-03-WE02: Assess problems and provide technical solutions and advice for surface coatings services rendered
- WM-03-WE03: Generate a report on coatings specifications

3.2 Guidelines for Work Experiences

3.2.1. WM-03-WE01: Handle customer situations requiring technical support on coatings solutions provided

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0101 Attend to at least 5 external and 5 internal situations (customer complaints or request for advice) with in a manner that meets customer expectations and requirements

Supporting Evidence

- SE0101 Customer feedback
- SE0102 Problem analysis indicating root causes
- SE0103 Samples or paint flakes of the problem

3.2.2. WM-03-WE02: Assess problems and provide technical solutions and advice for surface coatings services rendered

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0201 Customer query logbook Analyse at least 5 external and 5 internal practical problem
- WA0202 Provide assessment of a variety customers

- WA0203 Present customers with practical advice or solutions for the duration of the technical support period with a given set of common problems

Supporting Evidence

- SE0201 Technical report on the client visit
- SE0202 Sample or paint flakes taken on-site
- SE0203 Problem analyses shows detailed information about the problem
- SE0204 Written finding of established root cause
- SE0205 Tested paint flakes
- SE0206 Report on the test result of problem paint or flakes
- SE0207 Recommendation on paint problem or application problem

3.2.3. WM-03-WE03: Generate a report on coatings specifications

Scope of Work Experience

The person will be expected to engage in the following work activities:

- WA0301 Generate at least reports on 5 customer queries
- WA0302 Provide satisfactory external practical coating specifications for at least 5 problems or requests

Supporting Evidence

- SE0301 Report written on standard reporting template
- SE0302 Recommended a coating system

3.3 Contextualised Workplace Knowledge

1 Workplace Standard Operations Procedures (SOP)

2 Safety, Health and Environmental (SHE) requirements

3 Workplace specific equipment

4 Meeting procedures

5 Hazard ratings, including Material Safety Data Sheets (MSDS)

6 Purchasing procedures and specifications of surface coatings raw material

7 Manufacturer's specifications

8 Packaging and transport requirements

9 Storage and waste disposal procedures

10 Maintenance and calibration of paint testing equipment

11 Reporting structures

12 Information Management techniques

3.4 Criteria for Workplace Approval

Physical Requirements:

Human Resource Requirements:

Legal Requirements:

3.5 Additional Assignments to be Assessed Externally

SECTION 4: STATEMENT OF WORK EXPERIENCE

Curriculum Number:	211301001
Curriculum Title:	Chemist

Learner Details	
Name:	
ID Number:	

Employer Details	
Company Name:	
Address:	
Supervisor Name:	
Work Telephone:	
E-Mail:	

211301001-WM-01, Surface coatings design parameters, NQF Level 5, Credits 20

WM-01-WE01	Select raw materials according to the customer requirements		
	Scope Work Experience	Date	Signature
WA0101	Research the characteristics and theoretical performance of raw materials at the beginning of the project cycle to identify the quality and volume of raw materials		
WA0102	Utilize at least internet research, technical literature, appropriate course material and knowledge of paint technology		
WA0103	Access information through generic computer skills and or using specialised computer program(s) in order to meet customer specification for texture, finish, gloss requirements of a surface coating product		
WA0104	Repeat selection process regarding to three selection trials		
WA0105	Screen a full range of appropriate raw materials for at least ten complete formulating projects (which include at least three from each of the following range: modifying existing surface coatings formulations, development of new products, long term development)		
	Supporting Evidence	Date	Signature
SE0101	Project plan		
SE0102	Research report		
SE0103	List of selected raw material appropriate to end product		

SE0104	Screening results		
WM-01-WE02	Establish the available resources of the company (i.e. on production processes, laboratory instrumentation, product knowledge) applicable to the development of formulations		
	Scope Work Experience	Date	Signature
WA0201	Observe the production processes in a paint manufacturing environment for each of the individual processes (minimum 4) which includes mixing, dispersing, filling, colour matching and quality control		
WA0202	Determine availability and functionality of company resources to ensure full scale production		
	Supporting Evidence	Date	Signature
SE0201	A flow diagram of the processes		
SE0202	Inventory of equipment		
WM-01-WE03	Develop the design parameters by applying knowledge of colour theory, product knowledge, applicable techniques and exposure to substrates		
	Scope Work Experience	Date	Signature
WA0301	Initiate design parameters of completion of the material inventory		
WA0302	Match colours using colour theory, understanding the combinations of pigments and measurement of colour for at least a wide range of colours and metamerism covering the full colour wheel including shades and variations over three runs		
WA0303	Identify various surfaces (substrates) that require painting and identify the characteristics, behaviour		

	and preparation, potential problem areas and failures of a range of substrate types using three types of substrates in line with parameters and customer requirements		
WA0304	Operate, maintain and calibrate a range of laboratory instrumentation and equipment related to the manufacturing of coating and samples and testing. (E.g. measurement of viscosity and measurement of hardness, gloss, opacity, colour, density, etc.). This is done until the desired levels of performance are reached		
	Supporting Evidence	Date	Signature
SE0301	Designed parameters		
SE0302	Pigment combination is valid		
SE0303	Colour is a perfect match to sample		
SE0304	Recommended correct paint for a particular substrate		
SE0305	List of various substrates, their characteristics, suitable paint for each, preparation methods for each		
SE0306	Chemicals or solvents used for preparation		
SE0307	List of possible problems to encounter if wrong paint is used		
SE0308	Different types of substrates (metal, wood, glazed substrates)		
SE0309	Characteristics, behaviour of each, appropriate solvent to use for preparation of each, applicable paint to use on each		
SE0310	Calibrated instrument giving rise to correct results		

SE0311	Reasons for using a particular instrument		
SE0312	Correct instrument for a specific test (viscosity, hardness, etc)		
WM-01-WE04	Assess the product on a specific substrate		
	Scope Work Experience	Date	Signature
WA0401	Initiate the process of assessing the product on a substrate once the instrumentation has been properly set		
WA0402	Apply product(s) to a representative sample of substrates according to specification(s) using a range of application techniques and equipment (spraying, brushing, rolling, bar coating, etc.)		
WA0403	Evaluate product(s) performance on a variety of substrates over a set time period		
	Supporting Evidence	Date	Signature
SE0401	Correct choice of substrate		
SE0402	Correct application technique, e.g. bar coating to give the correct and uniform thickness		
SE0403	Substrate covered correctly		
WM-01-WE05	Apply the requirements of applicable legislation and applicable standards when developing design parameters		
	Scope Work Experience	Date	Signature
WA0501	Observe environmental legislative requirements when selecting surface coatings raw material, (e.g. SHE, ISO 14001)		

WA0502	Observe testing standards (e.g. SANS)		
WA0503	Observe fire regulations		
WA0504	Observe the Occupational, Health and Safety (OHS) Act, Transport of dangerous Goods Act, Hazardous Substances Act, Water Act		
WA0505	Apply workplace procedures and work instructions		
	Supporting Evidence	Date	Signature
SE0501	Safety equipment (PPE)		
SE0502	House keeping		

	Contextualised Workplace Knowledge	Date	Signature
1	Workplace Standard Operations Procedures (SOP)		
2	Safety, Health and Environmental (SHE) requirements		
3	Meeting procedures		
4	Hazard ratings, including Material Safety Data Sheets (MSDS)		
5	Workplace specific equipment		
6	Purchasing procedures and specifications of surface		

	coatings raw material		
7	Manufacturer's specifications		
8	Information Management techniques		
9	Packaging and transport requirements		
10	Storage and waste disposal procedures		
11	Maintenance and calibration of paint testing equipment		
12	Supervisory procedures, techniques and methods		
13	Project planning techniques and methods		
14	Reporting structures		
15	Paint testing equipment used in the laboratory and on the field		
16	Production machinery in the factory		
17	Material handling and storage processes and procedures		
18	Information management processes		
19	Internal and external customers, suppliers and		

	fellow technologists		
20	Workplace specific quality standards		

	Additional Assignments to be Assessed Externally	Date	Signature
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211301001-WM-02, Optimised formulations of surface coatings products for production, NQF Level 5, Credits 20

WM-02-WE01	Compare properties of equivalent products to identify an alternative product		
	Scope Work Experience	Date	Signature
WA0101	Analyse a reference standard (product sample, technical literature) and match product information to situation requirements		
WA0102	Compare and assess the qualities of a product against the relevant performance standard		
WA0103	Produce a technical report for action by others		
WA0104	Utilise results to formulate a matching product if required		
	Supporting Evidence	Date	Signature
SE0101	Alternative product specifications		
WM-02-WE02	Develop trial surface coatings formulations and samples and test until optimised		

	Scope Work Experience	Date	Signature
WA0201	Prepare a minimum of 8 laboratory trial surface coatings formulations and samples utilizing a minimum of three different simulated production processes (e.g. high speed mixing equipment, HSF, media mills)		
WA0202	Perform a minimum of 10 paint tests (e.g. viscosity, gloss, colour, hardness, etc.) utilizing a range of equipment		
WA0203	Match colours using colour theory, understanding the combinations of pigments and measurement of colour for at least a wide range of colours and metamerism covering the full colour wheel including shades and variations		
WA0204	Make adjustments to the series of trial run formulations based on the testing and retesting until the surface coatings formulations meet requirements		
WA0205	Assess periodically and at prescribed points in the process information on a computerised data base. (e.g. Compuchem Programme)		
WA0206	Compile a technical data sheet		
WA0207	Compile a technical data sheet (TDS) for at least 5 products adhering to legal requirements		
WA0208	Compile surface coatings user instructions for at least 5 products adhering to legal requirements		
WA0209	Observe Safety, Health, Environmental and Quality (SHEQ) requirements		
WA0210	Adhere to Standard Operating Procedures (SOP)		
	Supporting Evidence	Date	Signature

SE0201	Trial surface coatings formulations		
SE0202	Samples of surface coatings formulation(s)		
SE0203	Tested paint that meets formulation specification		
SE0204	Required colour of paint		
SE0205	Complementary colours chosen		
SE0206	Make colours from pure organic pigments plus black iron oxides		
SE0207	Perfect colour match		
SE0208	Correct pigments to start with chosen		
SE0209	Adjusted coat formulation		
SE0210	Ability to use the program		
SE0211	Ability to perform calculations for paint, calculated optimum PVC, volume solids and costs using Compuchem program		
SE0212	Manufactured sample		
SE0213	Technical data sheet		
SE0214	Product benefits		
SE0215	Uses		
SE0216	Application		
SE0217	User instructions guide outlining dangerous components, health risks, first aid, fire fighting, handling and storage, exposure controls and PPE and transportation information		

SE0218	Regulatory information on labels		
SE0219	Formulation colour entries		
SE0220	Check list of compliance with SHE		
SE0221	Check list of compliance with SOP		
WM-02-WE03	Transfer surface coatings formulations to production		
	Scope Work Experience	Date	Signature
WA0301	Assist production team with trial production processes of the surface coatings formulation of a new development of at least 2 batches of the formulation of at least 5 processes of production processes		
WA0302	Effect adjustments until 2 batches have been successfully manufactured and complying with quality specifications of the manufacturer		
WA0303	Finalise the optimized surface coatings formulation for capture onto production systems		
WA0304	Generate final product report utilizing computer and report-writing skills and workplace formats		
WA0305	Report containing optimised surface coatings formulation		
WA0306	User instruction manual		
WA0307	Observe Safety, Health, Environmental and Quality (SHEQ) requirements		
	Supporting Evidence	Date	Signature
SE0301	Optimised surface coatings formulation		

SE0302	Report on correct process to put the paint through in order to yield the desired paint		
SE0303	Process section to assist with technology transfer		
SE0304	Feedback / report back with adjustment		
SE0305	Optimized surface coatings formulation		
SE0306	Final report on optimized surface coatings formulation		

	Contextualised Workplace Knowledge	Date	Signature
1	Workplace Standard Operations Procedures (SOP)		
2	Safety, Health and Environmental (SHE) requirements		
3	Meeting procedures		
4	Hazard ratings, including Material Safety Data Sheets (MSDS)		
5	Workplace specific equipment		
6	Purchasing procedures and specifications of surface coatings raw material		
7	Manufacturer's specifications		
8	Information Management		

	techniques		
9	Packaging and transport requirements		
10	Storage and waste disposal procedures		
11	Maintenance and calibration of paint testing equipment		
12	Supervisory procedures, techniques and methods		
13	Project planning techniques and methods		
14	Reporting structures		
15	Knowledge of factory machinery		

	Additional Assignments to be Assessed Externally	Date	Signature
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211301001-WM-03, Technical support processes on surface coatings, NQF Level 5, Credits 20

WM-03-WE01	Handle customer situations requiring technical support on coatings solutions provided		
	Scope Work Experience	Date	Signature
WA0101	Attend to at least 5 external and 5 internal situations (customer complaints or request for advice) with in a		

	manner that meets customer expectations and requirements		
	Supporting Evidence	Date	Signature
SE0101	Customer feedback		
SE0102	Problem analysis indicating root causes		
SE0103	Samples or paint flakes of the problem		
WM-03-WE02	Assess problems and provide technical solutions and advice for surface coatings services rendered		
	Scope Work Experience	Date	Signature
WA0201	Customer query logbook Analyse at least 5 external and 5 internal practical problem		
WA0202	Provide assessment of a variety customers		
WA0203	Present customers with practical advice or solutions for the duration of the technical support period with a given set of common problems		
	Supporting Evidence	Date	Signature
SE0201	Technical report on the client visit		
SE0202	Sample or paint flakes taken on-site		
SE0203	Problem analyses shows detailed information about the problem		
SE0204	Written finding of established root cause		
SE0205	Tested paint flakes		
SE0206	Report on the test result of problem paint or flakes		

SE0207	Recommendation on paint problem or application problem		
WM-03-WE03	Generate a report on coatings specifications		
	Scope Work Experience	Date	Signature
WA0301	Generate at least reports on 5 customer queries		
WA0302	Provide satisfactory external practical coating specifications for at least 5 problems or requests		
	Supporting Evidence	Date	Signature
SE0301	Report written on standard reporting template		
SE0302	Recommended a coating system		

	Contextualised Workplace Knowledge	Date	Signature
1	Workplace Standard Operations Procedures (SOP)		
2	Safety, Health and Environmental (SHE) requirements		
3	Workplace specific equipment		
4	Meeting procedures		
5	Hazard ratings, including Material Safety Data Sheets (MSDS)		

6	Purchasing procedures and specifications of surface coatings raw material		
7	Manufacturer's specifications		
8	Packaging and transport requirements		
9	Storage and waste disposal procedures		
10	Maintenance and calibration of paint testing equipment		
11	Reporting structures		
12	Information Management techniques		

	Additional Assignments to be Assessed Externally	Date	Signature
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