

AP Technology™

Technical training

Catalogue IPH 2016



IPH-Institut Paul Hérault
An AP Technology™ Service



Domains treated:

- CA: Carbon
- CG: Casting
- EL: Electrolysis (Reduction)
- EN: Environment
- MS: Handling-Storage
- ST: Sub-Station
- PL: Potlining

RioTinto

Introduction

IPH-Institut Paul Héroult

Created in 1989 for AP Technology™ users, Institut Paul Héroult (IPH) is a world-renowned training facility for smelter managers, supervisors and staff. The institute is named after the 19th-century inventor of the aluminium reduction process.

Word from the AP Technology Director

The Institut Paul Héroult (IPH) is a Training Centre dedicated to AP Technology Users which was founded in 1989 to support the sale of AP™ technology through technical training on knowledge and know-how. It has thus contributed to the successful implementation of new production sites around the world and ensured their subsequent development.

Foundational concepts that have made the IPH's reputation for over 25 years are based on:

- **Comprehensive training programs** to acquire the basics in each of the major technical fields of an aluminium smelter;
- **Subprograms** which break down the programs into divisible entities in time or in space, to better accommodate site visits and optimize transportation of participants, based on their availability;
- **Modules** that make up the master unit for the transmission of technical knowledge on the subjects to be mastered in each of the subprograms;
- **Certified trainers** who are experts in the technical and technological environment of the modules they provide;
- **Training sites** near production plants selected in line with the technology presented in the modules;
- **Training formats** that mix classroom theoretical approaches, application exercises, practical work and site visits.

The IPH not only caters to licensees of the AP™ Technology but also to teams from RIO TINTO Aluminium Product Group. The IPH offers intra-site or inter-site **training sessions** which include programs, sub-programs or modules that address the identified needs. The terms depend on the number of participants from each site, the technologies used by each of them, and the constraints to protect intellectual property.

Word from the IPH Director

As part of its mission to support the Technology Sales Team in the transfer of technical knowledge to customers, the IPH focuses on a range of world-class services and products. Through its lookout and networking actions in the learning field, its proximity with AP technology experts and its ability to innovate by adapting learning strategies and knowledge transfer tools, we offer a training catalogue that aims to best meet customer needs. With generic curricula and field-specific modules, we can define training courses suited to the demand and offer customized solutions.

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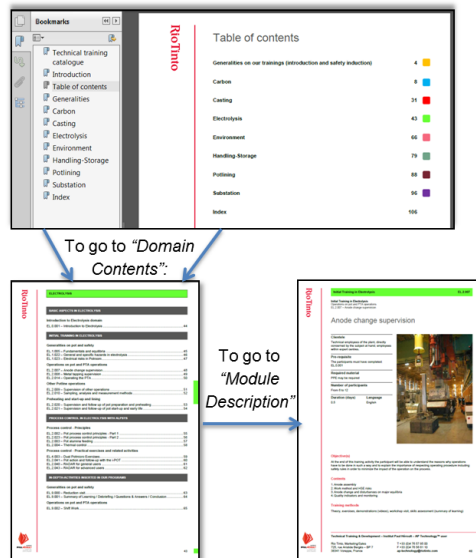
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How to use this PDF document

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- Click on the hyperlinks in “Domain Contents” to go to “Module Description”.



If you are interested in a training course

Download the corresponding file on our web site:

<https://www.ap-technology.com/SitePages/Products/iph.aspx>

GENERALITIES ON OUR TRAININGS (INTRODUCTION AND SAFETY INDUCTION)

GENERAL COURSES

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General Courses

Introductory courses

GE.9.003 – Safety induction

Safety induction

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the main risks of the host plant and identify the prevention and controls measures.

Contents

1. Risks related to the process
2. Preventive and control measures

Training methods

Theory, exercises

General Courses

Introductory courses

GE.0.007 – Intellectual property - AP technology

Intellectual property - AP technology

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- comply with the requirements relating to Intellectual Property (IP),
- recognize IP zones,
- recognize who has access to IP zones,
- prohibit or manage the use of cameras and mobile phones,
- recognize an IP-sensitive document (yellow) or derivative document (blue).

Contents

1. Introduction to Intellectual Property
2. Identifying and managing IP-restricted zones and equipment
3. Identifying and managing IP-sensitive information media
4. Information dissemination and communication devices
5. Reminder of prevention and protection means

Training methods

Theory, participative teaching, competencies assessment (summary of learning)

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AP Technology™

General Courses

General Visit
GE.9.000 – General Plant Visit

General Plant Visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this activity the participant will be able to describe the smelter process and the main risks of the host plant.

Contents

1. Carbon process
2. Reduction process
3. Casting process
4. Gas treatment process
5. Handling & Storage
6. Substation

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

CARBON

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Basic Aspects in Carbon

Introduction to Carbon domain
CA.0.001 – Carbon in general

Carbon in general

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the constituents and origin of the raw materials used to produce anodes,
- give a general description of the three main processes in the Carbon sector: green anode production, baking and rodding
- describe the anode quality criteria and ways in which they are affected by the anode production process.

Contents

1. Description and use of anode assemblies
2. Basic concepts and raw materials
3. The green process
4. The baking process
5. The rodding process
6. Anode quality criteria and links with the process

Training methods

Theory, exercises, participative teaching, demonstration (animation), workshop visit, skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)

CA.1.007 – Raw materials - Coke

Raw materials - Coke

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

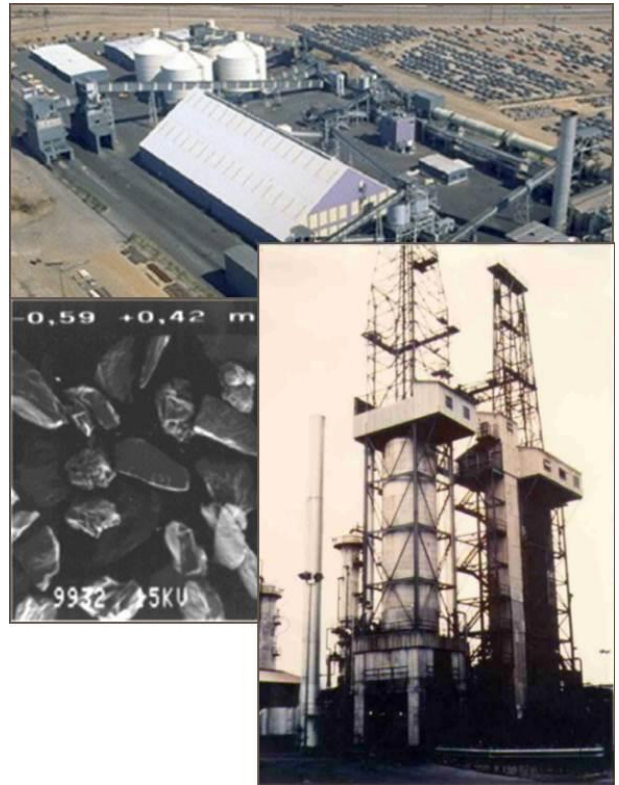
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the impacts of coke properties on the aluminium production.

Contents

1. Carbonaceous raw materials
2. Coke production and calcination
3. Coke properties and aluminium production

Training methods

Theory, exercises, interactive teaching, case study (real-life problems), skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)
CA.1.008 – Raw materials - Pitch

Raw materials - Pitch

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

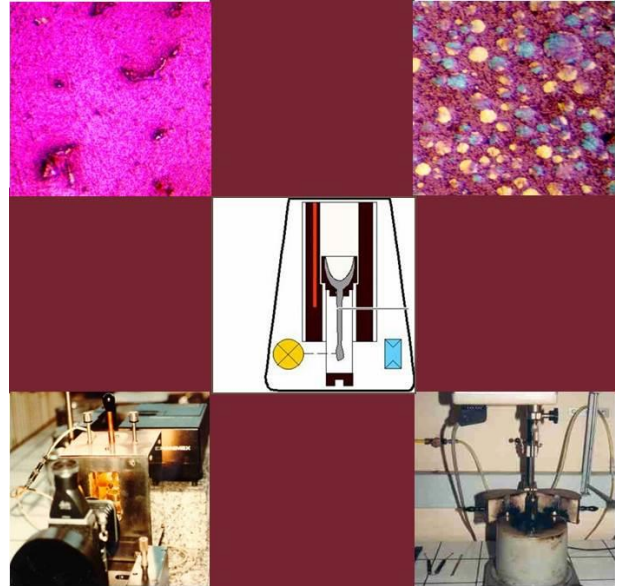
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the pitch manufacturing process and the relevant criteria used in its characterization.

Contents

1. General
2. Pitch characteristics
3. Coal pitch production
4. Pitch behaviour during coking
5. Toxicological risks

Training methods

Theory, exercises, interactive teaching, case-study (real-life problems), skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)

CA.1.003 – The aggregate constitution

The aggregate constitution

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

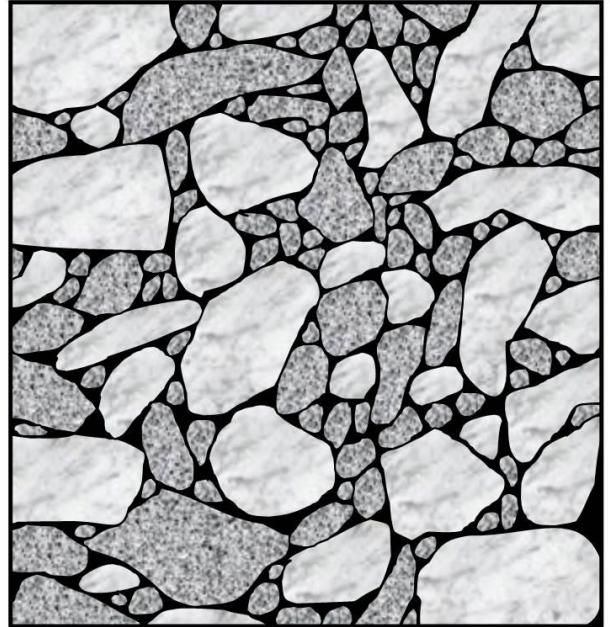
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to ensure the respect of the aggregate regularity in relation to the G/S ratio and ultrafines.

Contents

1. Raw materials
2. The process and its monitoring
3. Granulometry

Training methods

Theory, demonstration, exercises, case study (real-life problems), skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)
CA.1.004 – Paste mixing

Paste mixing

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001
CA.1.003

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to maintain the optimal level for the paste mixing process' key parameters.

Contents

1. The process
2. Binding rate

Training methods

Theory, exercises, demonstration, case study (real-life problems), skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)

CA.1.005 – Cooling and forming

Cooling and forming

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:

CA.0.001

CA.1.004

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this training, the participant will be able to maintain, at the optimal level, the key parameters for forming and cooling, according to the required anode quality.

Contents

1. The process
2. The key parameters
3. Anode qualities and integrity

Training methods

Theory, exercises, skills assessment (summary of learning).

Initial Training in Carbon

Green Process (Paste Plant)

CA.2.017 – Green anode - Equipment used in the conventional process

Green anode - Equipment used in the conventional process

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

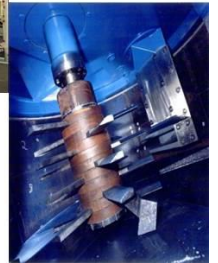
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the main equipment and their basic function in the green anode production process.

Contents

1. Composition of grain size fractions (primary milling, separation, fines circuit, conveyance systems, dedusting)
2. Paste preparation (dry product proportioning, preheating, pitch dosing, mixing and cooling)
3. Anode forming (vibrocompacting, cooling)

Training methods

Theory, exercises, participative teaching, demonstration (animation), workshop visit, skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)

CA.2.018 – Furnace description and fire organization

Furnace description and fire organization

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the fixed and mobile equipment related to the anode baking furnace.

Contents

1. Civil engineering of the concrete casing and thermal insulation
2. Flue walls and headwalls
3. Crossover and waste gas fume collector
4. Section, pit and anode numbering
5. Heating equipment
6. Control system
7. Fume treatment centre

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)

CA.2.001 – Physical and chemical transformation of anodes during the baking process

Physical and chemical transformation of anodes during the baking process

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

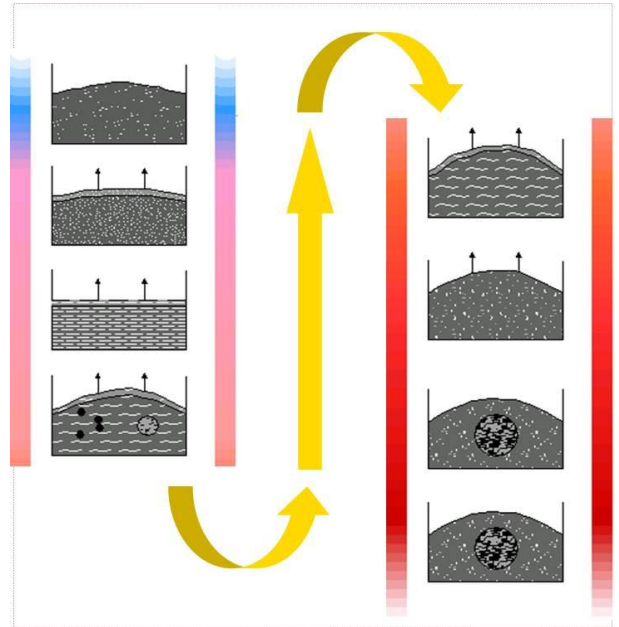
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the physical and chemical transformation of anodes during the baking process,
- describe the pitch transformation as the most critical phase of anode baking.

Contents

1. The purpose of baking
2. Reminder of pitch formation
3. Pitch coking or pyrolysis
4. Characteristic phenomena of anode baking
5. Emission of pollutants during the baking process
6. Risks to anodes undergoing baking and remedies

Training methods

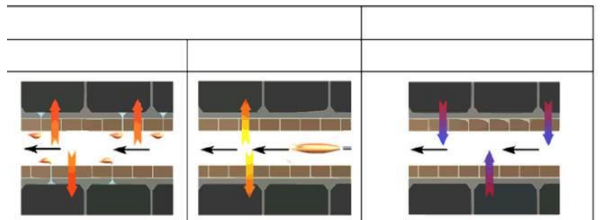
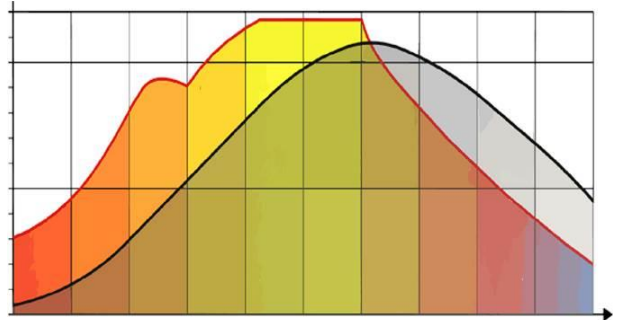
Theory, exercises, participative teaching, demonstration (animation), skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)
 CA.1.001 – Baking process in a horizontal flue ring furnace

Baking process in a horizontal flue ring furnace

Clientele	
Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.	
Pre-requisite	
The participants must have completed: CA.0.001	
Required material	
PPE may be required	
Number of participants	
From 6 to 12	
Duration (days)	Language
0.5	English



Objective(s)

At the end of this module, the participant will be able to propose solutions to the fundamental problems related to the anode baking process.

Contents

1. Basic principles of heat exchanges
2. Circulation of gas flows in flue walls
3. Supplying combustion zones with oxygen
4. Heat transfers during baking and cooling
5. Heat balance
6. Optimization of gas flows
7. Process control
8. Anode baking level

Training methods

Theory, exercises, best practices, demonstration (animation) workshop visit, skills assessment (summary of learning)

Initial Training in Carbon

Baking Process (Anode Baking Furnace)
CA.1.002 – Process operation

Process operation

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the process operation of an anode baking furnace.

Contents

1. Fire description
2. Fire move, the permutation
3. Fire control in straight line
4. Fire control in crossover
5. Checks at beginning and during shift
6. Special situation and incident

Training methods

Theory, exercises, participative teaching, demonstration (video, animation), skills assessment (summary of learning)

Initial Training in Carbon
 Baking Process (Anode Baking Furnace)
 CA.2.002 – Combustion

Combustion

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

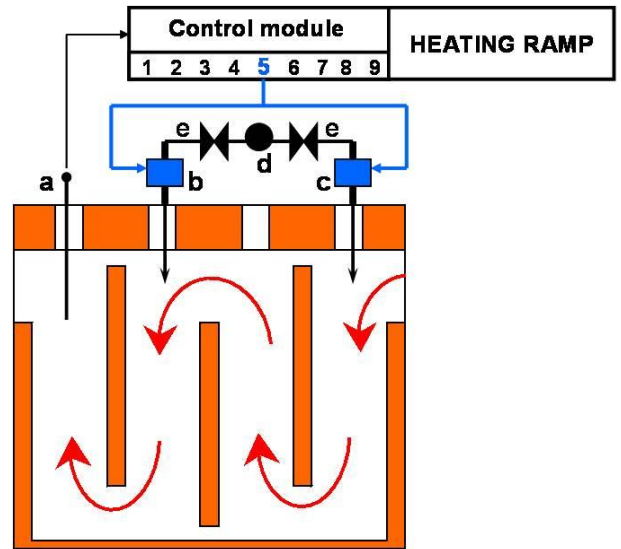
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, the participant will be able to describe the combustion of the fuel and gases of volatiles.

Contents

1. Basic of combustion
2. Application to the baking furnace
3. Injection of combustible
4. Efficiency of combustion
5. Safety devices and functions

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)
CA.1.009 – Anode handling

Anode handling

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

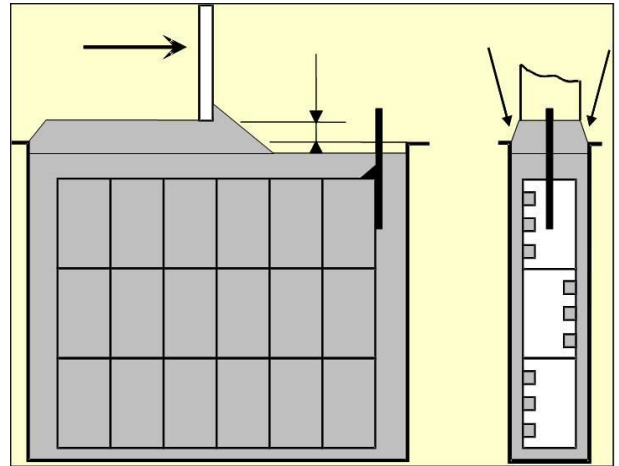
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the general operation procedures of the furnace tending assembly (FTA) for anode and packing coke handling during loading and unloading.

Contents

1. Basic functions
2. Tending assembly
3. Correct loading of anodes
4. Loading
5. Unloading
6. Organization
7. Packing coke

Training methods

Theory, exercises, participative teaching, demonstration (video), skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)
CA.2.003 – Drying and start-up of a furnace

Drying and start-up of a furnace

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)	Language
0.5	English

**Objective(s)**

At the end of this module, the participant will be able to describe the furnace drying program and the start-up of fires in the production phase.

Contents

1. Purpose of drying
2. Drying scenario
3. Loading scenario
4. Preparation of drying
5. Loading and positioning of equipment
6. Drying and control
7. Start-up

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)

CA.2.004 – Refractory lining maintenance – Baking furnace

Refractory lining maintenance – Baking furnace

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the causes of refractory lining deterioration and the ways of remedying it.

Contents

1. Factors affecting anode baking furnaces
2. Materials used
3. Types of deterioration
4. Routine maintenance
5. Repair and construction operations
6. Monitoring furnace status and work organization

Training methods

Theory, exercises, participative teaching, demonstration (video), workshop visit, skills assessment (summary of learning).

Initial Training in Carbon

Baking Process (Anode Baking Furnace)
CA.1.014 – Checking green and baked anodes

Checking green and baked anodes

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to recognize the main properties and characteristics of anodes, and identify the process parameters to adjust for quality control.

Contents

1. Properties required for an anode
2. Measuring anode properties and methods of analysis
3. Correlations and the influence of process parameters
4. Process monitoring and anode traceability

Training methods

Theory, exercises, demonstration (animation), workshop visit , skills assessment (summary of learning)

Initial Training in Carbon

Rodding process (Rodding shop)

CA.1.010 – Rodding shop - The process

Rodding shop - The process

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Carbon sector; employees within expert centres.

Pre-requisite

The participants must have completed: CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the main characteristics and different steps in processing the anode assemblies,
- associate the expected quality criteria with the different steps.

Contents

1. Anode assembly description
2. Anode assembly use
3. Processing the anode assembly and recycling the products
4. Quality criteria and rodding incidents

Training methods

Theory, exercises, interactive teaching, workshop visit, demonstration (animations, film), skills assessment (summary of learning)

Initial Training in Carbon

Rodding process (Rodding shop)
CA.2.008 – Induction furnace

Induction furnace

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)	Language
1	English

**Objective(s)**

At the end of this module, the participant will be able to identify the pre-requisites for using the induction furnace to guarantee safety, quality and production within the rodding shop, while optimizing energy efficiency.

Contents

1. Description of a crucible induction furnace
2. Properties of cast iron
3. Optimizing the shot blasting machine
4. Lining material
5. Operating an induction furnace
6. Energy efficiency
7. Replacing the lining material
8. Malfunctions and how to deal with them

Training methods

Theory, exercises, participative teaching, demonstration (animation), skills assessment (summary of learning).

Initial Training in Carbon

Rodding process (Rodding shop)
CA.2.007 – Rodding shop operation

Rodding shop operation

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the factors having an effect on rodding shop performance.

Contents

1. Description of the operation
2. Important performance factors
3. Incidence of these factors on operations
4. Rules for optimizing performance
5. Follow-up indicators

Training methods

Theory, exercises, participative teaching, demonstration (animation), skills assessment (summary of learning).

In-depth-activities inserted in our programs

CA.9.000 – Carbon workshop visit

Carbon workshop visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

**Pre-requisite**

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

1

Language

English

Objective(s)

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Carbon process.

Contents

1. Examples of equipment or operations being observed:
2. Coke and pitch storage
3. Aggregate constitution equipment
4. Mixer/cooler
5. Forming and cooling equipment
6. Anode pits and Furnace Tending Assembly
7. Anode handling conveyors
8. Rodding shop equipment
9. Induction furna

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

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AP Technology™

In-depth-activities inserted in our programs

CA.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

In-depth-activities inserted in our programs
CA.0.002 – Health and safety in anode operations

Health and safety in anode operations

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

The participants must have completed:
CA.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, the participant will be able to identify the risks in the various stages of the anode plant operations and take action in event of incidents or accidents.

Contents

1. Risks encountered in the Carbon Plant
2. Risks specific to the paste plant
3. Risks specific to the anode baking furnace
4. Risks specific to the rodding shop

Training methods

Theory, exercises, participative teaching, workshop visit, skills assessment (summary of learning).

CASTING

BASIC ASPECTS IN CASTING

Introduction to Casting domain

CG.0.001 Introduction to Casting 32

INITIAL TRAINING IN CASTING

Casting Furnace

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Basic Aspects in Casting

Introduction to Casting domain
CG.0.001 – Introduction to Casting

Introduction to Casting

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE may be required

Number of participants

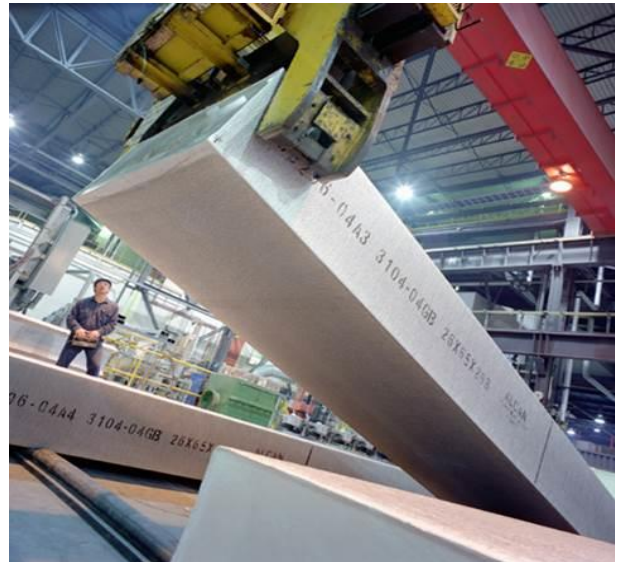
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- explain the manufacturing processes of the various casthouse products made by Rio Tinto;
- explain the various ways in which these products are used by customers;
- indicate the main HSE risks present in a casthouse;
- indicate the main performance improvement leverages;
- indicate the main customers and competitors;
- indicate the main production characteristics of the various Rio Tinto smelter casthouses.

Contents

1. Introduction
2. General process
3. Specific features of casthouses
4. Key messages

Training methods

Theory, exercises, play activities, demonstrations, workshop visit, best practices exchange, skills assessment (summary of learning).

Initial Training in Casting

Casting Furnace

CG.1.001 – Furnace equipment/Heat efficiency

Furnace equipment/Heat efficiency

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

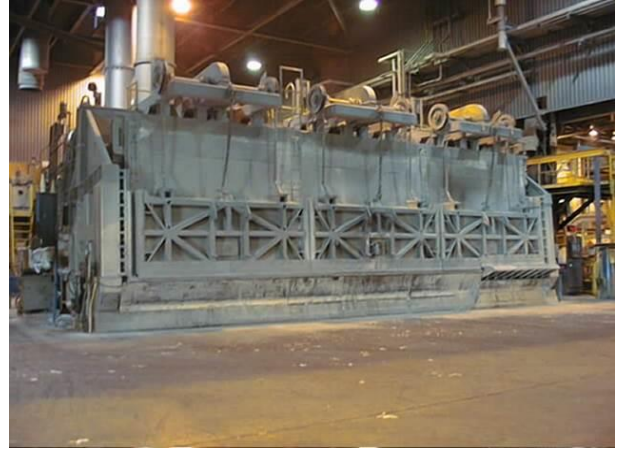
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- explain the principles of energy efficiency of the furnaces,
- increase the lifespan and performance of the equipment,
- maximise remelt and minimise energy consumption in an optimised cycle time.

Contents

1. Introduction
2. Theory
3. Measures and controls
4. Calculations and applications

Training methods

Theory, exercises, demonstration (animation), workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Furnace
CG.1.008 – Furnace preparation

Furnace preparation

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

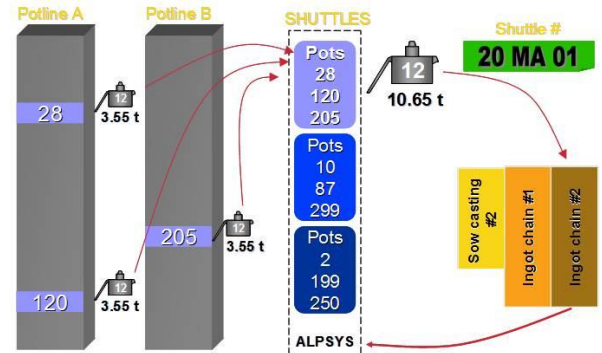
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

- At the end of this module, the participant will be able to:
- describe the metal flow from the potroom to the casthouse,
 - describe the casting shuttle schedule from the pot to the furnace.

Contents

1. General information on casthouse and furnace preparation
2. The different stages of preparation in a smelter casthouse

Training methods

Theory, exercises, participative teaching, demonstration (animations), workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Products

CG.2.002 – Ingot chain casting

Ingot chain casting

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the process flow and identify the stakes of the ingot chain casting.

Contents

1. Aluminium ingots
2. Casting installations
3. Ingot casting

Training methods

Theory, exercises, participative teaching, workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Products

CG.2.003 – Sow casting line

Sow casting line

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to explain the process of sows solidification and identify the significant parameters.

Contents

1. The sow production
2. Sow caster
3. Operation: casting control
4. Downgraded operation

Training methods

Theory, exercises, demonstration (video), evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Quality and Treatment
CG.1.006 – Sampling

Sampling

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CG.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the main goals of metal sampling,
- explain how to take, identify and machine a metal sample,
- identify best practices in sampling molten aluminium in furnaces and during a cast,
- identify the main causes of analytical variations related to sampling and sample preparation.

Contents

1. General
2. Sampling tools
3. Sampling
4. Sample preparation
5. Analysis

Training methods

Theory, exercises, demonstration (video), workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Quality and Treatment

CG.1.014 – Dross forming and treatment

Dross forming and treatment

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the mechanism and identify means to limit dross generation.

Contents

1. Oxidation of aluminium - Theoretical aspects
2. Dross generation in the casthouse process
3. Dross treatment

Training methods

Theory, exercises, demonstration (videos, animations), workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Casting

Casting Quality and Treatment
CG.1.007 – Water network

Water network

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed:
CG.0.001

Required material

PPE may be required

Number of participants

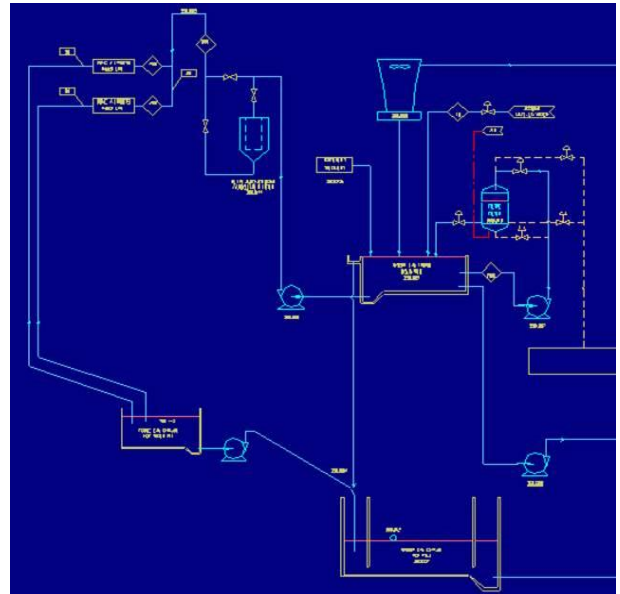
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the role of the cooling water network in the casthouse, the associated quality constraints and the equipment making up the circuit.

Contents

1. Introduction
2. Cooling water quality
3. The water circuit
4. Measurements, water treatment and HSE

Training methods

Theory, exercises, workshop visit, evaluative skills assessment (summary of learning).

In-depth-activities inserted in our programs

CG.9.000 – Casthouse visit

Casthouse visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE

Number of participants

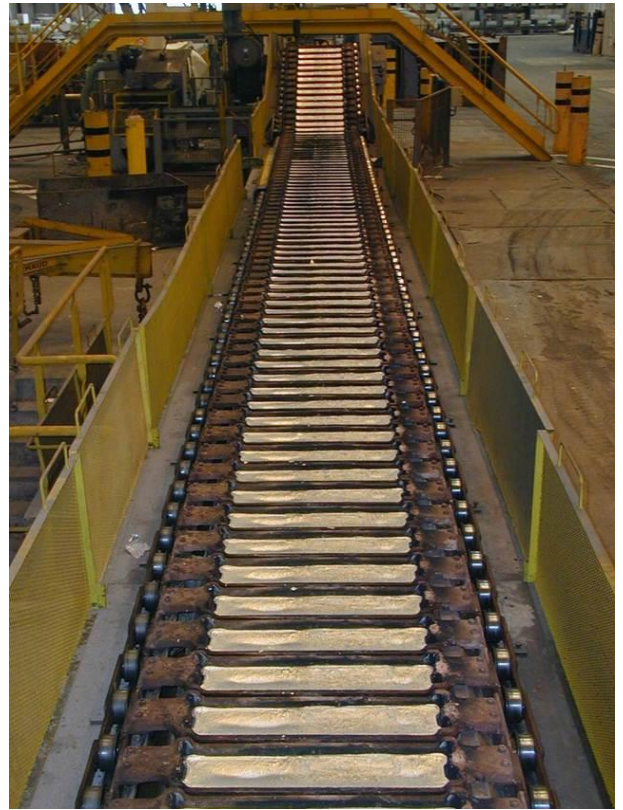
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Casting process.

Contents

1. Examples of equipment or operations being observed:
2. Furnaces
3. Filtration systems
4. Casting equipment
5. Storage/shipping zone
6. Control rooms
7. Water treatment

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

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In-depth-activities inserted in our programs

CG.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

In-depth-activities inserted in our programs
CG.1.004 – Health/Safety/Explosion hazards

Health/Safety/Explosion hazards

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Casting sector; employees within expert centres.

Pre-requisite

The participants must have completed: CG.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, participants will be able to describe the impacts of the process parameters and casting equipment on safety, covering and slab quality.

Contents

1. Rolled products
2. Process description
3. Formation of the curl
4. Control the curl
5. Equipment preparation
6. Solidification
7. Steady state
8. Defects, corrections and performance indicators
9. Automatic control system

Training methods

Theory, exercises, demonstrations, play activities, best practices exchange, participative teaching, skills assessment (summary of learning).

ELECTROLYSIS

BASIC ASPECTS IN ELECTROLYSIS

Introduction to Electrolysis domain

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INITIAL TRAINING IN ELECTROLYSIS

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PROCESS CONTROL IN ELECTROLYSIS WITH ALPSYS

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IN-DEPTH-ACTIVITIES INSERTED IN OUR PROGRAMS

Generalities on pot and safety

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Operations on pot and PTA operations

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Basic Aspects in Electrolysis

Introduction to Electrolysis domain
EL.0.001 – Introduction to Electrolysis

Introduction to Electrolysis

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

Calculator
PPE may be required

Number of participants

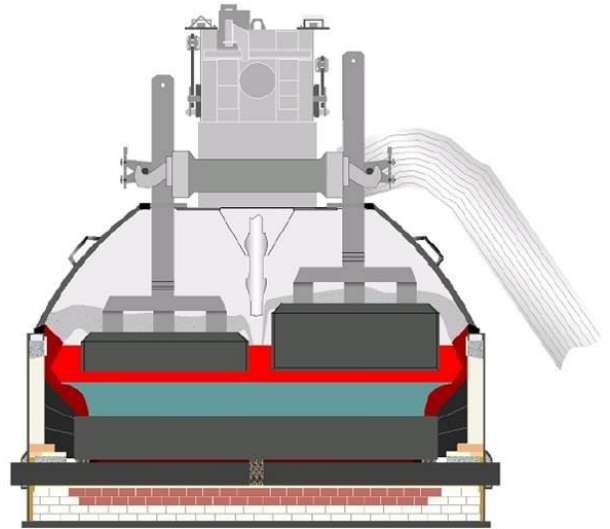
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- date the main events linked to the development of electrolysis techniques;
- explain the main outlines of the process;
- name the main characteristics of the inputs;
- match the components of a potroom up with their respective role;
- identify the challenges and stakes of the electrolysis process.

Contents

1. History and development of technologies
2. The electrolysis process
3. The material flow
4. The components of a potline and a pot
5. The challenges and stakes

Training methods

Theory, exercises, demonstrations, participative teaching, workshop visit, play activity, skills assessment (summary of learning).

Initial Training in Electrolysis

Generalities on pot and safety
EL.1.005 – Fundamentals and equilibria

Fundamentals and equilibria

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Electrolysis sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

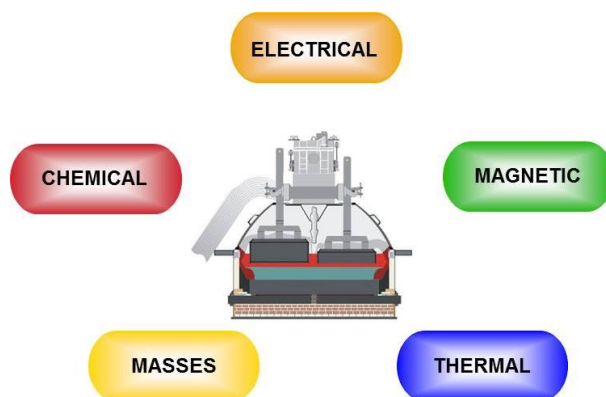
From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the main phenomena present in the pot,
- describe the equilibria involved in alumina reduction,
- identify their main interactions, understand pot design,
- describe the developments in AP technology,
- be familiar with the main material flows,
- identify the main components of a modern pot.

Contents

1. Introduction
2. Phenomena involved
3. Equilibria
4. Interactions between equilibria
5. Design and upgrading of a pot generation
6. Main material flows
7. Main components of a modern pot

Training methods

Theory, exercises, participative teaching, demonstration (videos, animations), skills assessment (summary of learning).

Initial Training in Electrolysis

Generalities on pot and safety

EL.1.022 – General and specific hazards in electrolysis

General and specific hazards in electrolysis

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Electrolysis sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

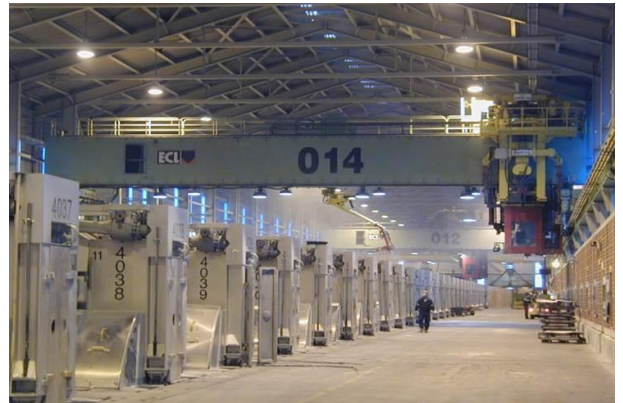
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this training activity and in consideration of the risks existing in the Reduction department, the participant will be able to explain the reasons for taking operating mode measures that will ensure people's health and safety and protect the materials.

Contents

1. Introduction
2. General hazards and how to prevent them
3. Explosions/splattering and burns
4. Electrical hazards

Training methods

Theory, exercises, demonstrations (videos), play activities, best practices exchange, skills assessment (summary of learning)

Initial Training in Electrolysis

Generalities on pot and safety
EL.1.023 – Electrical risks in Potroom

Electrical risks in Potroom

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Electrolysis sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module and in consideration of the electrical risks existing in the Electrolysis department, the participant will be able to:

- explain the reasons for having the installations and equipment designed to limit electrical hazards;
- explain the importance of the rules for the prevention of electrical hazards, in particular the wearing of PPE;
- explain how to prevent electrical hazards.

Contents

1. The effects of current on people
2. Potroom measurements and analysis
3. The various potential zones
4. Electrical hazards and how to limit them
5. Possible incidents and downgraded situations
6. Electrical hazards at the basement

Training methods

Theory, exercises, demonstrations (videos), play activities, best practices exchange, skills assessment (summary of learning)

Initial Training in Electrolysis

Operations on pot and PTA operations
EL.2.007 – Anode change supervision

Anode change supervision

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

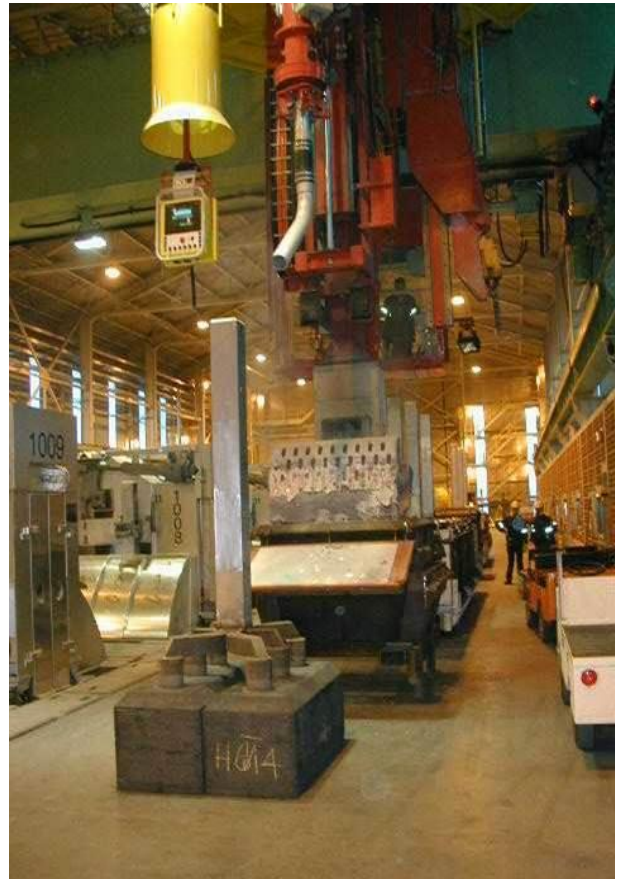
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this training activity the participant will be able to understand the reasons why operations have to be done in such a way and to explain the importance of respecting operating procedure including safety rules in order to minimize the impact of the operation on the process.

Contents

1. Anode assembly
2. Work method and HSE risks
3. Anode change and disturbances on major equilibria
4. Quality indicators and monitoring

Training methods

Theory, exercises, demonstrations (videos), workshop visit, skills assessment (summary of learning)

Initial Training in Electrolysis

Operations on pot and PTA operations
EL.2.008 – Metal tapping supervision

Metal tapping supervision

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

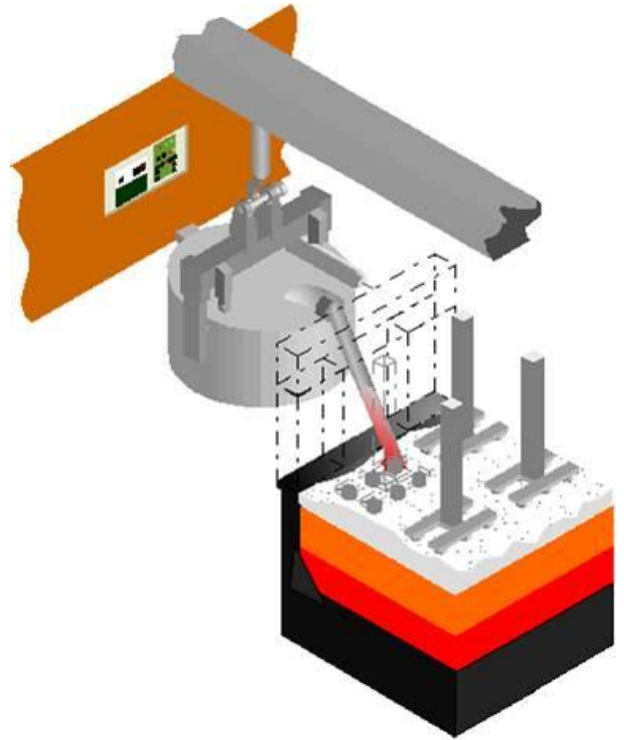
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the route of the metal produced from the pot to the Casthouse, and the actions to be taken to ensure optimum supervision of this operation.

Contents

1. The customer-supplier relationship between Potline and Casthouse
2. The metal tapping facilities
3. The metal tapping procedure

Training methods

Theory, exercises, demonstrations (videos), workshop visit, skills assessment (summary of learning)

Initial Training in Electrolysis

Operations on pot and PTA operations
EL.2.014 – Operating the PTA

Operating the PTA

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:

EL.2.002
EL.2.023
EL.2.007
EL.2.008

Required material

PTA simulator
PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the PTA and its main features,
- identify equipment of PTA and operations for which they are used,
- identify the information of the man-machine interfaces from the cabin and remote box, including diagnostic help,
- state and explain the main safety rules related to the use of PTA.

Contents

1. Overview and organization
2. PTA presentation
3. PTA use
4. PTA & ALPSYS exchange

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning)

Initial Training in Electrolysis

Other Potline operations

EL.2.009 – Supervision of other operations

Supervision of other operations

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: EL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- list the pot operations,
- identify the key points of the actions to be carried out on the pots during these operations in order to limit pot disturbance, reduce the risks - for the operators and limit emissions,
- explain the advantages of following the operating procedure for each operation regarding the reasons given above.

Contents

1. Organisation of potline operations
2. Anode beam raising
3. Bath tapping
4. Anode cover maintenance
5. Pot tending
6. Anode effect treatment
7. Anode problem treatment
8. Metal transfer
9. Replacing a feeding device

Training methods

Theory, exercises, participative teaching, demonstrations (videos, animations), skills assessment (summary of learning)

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Initial Training in Electrolysis

Other Potline operations

EL.2.010 – Sampling, analysis and measurement methods

Sampling, analysis and measurement methods

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the measurement equipment used,
- describe the measurement and sampling methods implemented on a pot,
- interpret the measurements taken and identify the drifts,
- explain the possible consequences of incorrect measurement on operation of the Reduction process,
- identify the HSE risks associated with the various measurements and samplings and describe the appropriate inspection and prevention means.

Contents

1. Basic notions
2. Measurements and samples to be taken
3. Main measurements and sampling impact on equilibria
4. Operating procedures
5. Problematic situations

Training methods

Theory, exercises, participative teaching, demonstration (videos) skills assessment (summary of learning)

Initial Training in Electrolysis

Preheating and start-up and lining

EL.2.020 – Supervision and follow up of pot preparation and preheating

Supervision and follow up of pot preparation and preheating

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

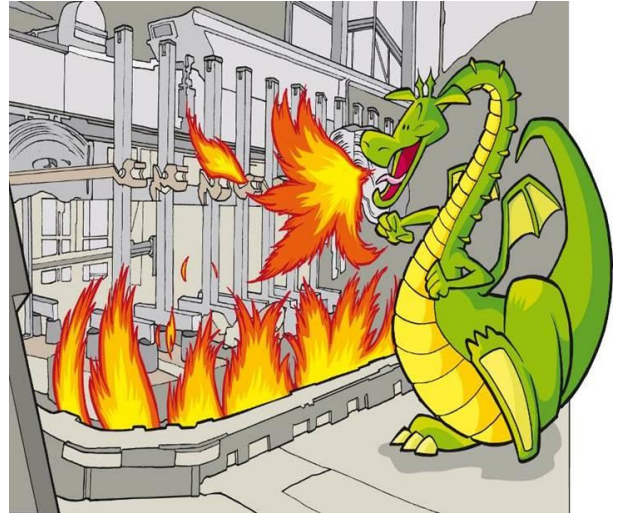
From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe operations of start-up, from pot preparation to pot preheating,
- explain how react facing possible incidents.

Contents

1. Introduction
2. Pot preparation
3. Pot energizing
4. Pot preheating
5. Problems

Training methods

Theory, exercises, participative teaching, demonstration (videos) skills assessment (summary of learning)

Initial Training in Electrolysis

Preheating and start-up and lining

EL.2.021 – Supervision and follow-up of pot start-up and early life

Supervision and follow-up of pot start-up and early life

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the operations of pot start-up, from the end of preheating to the metal addition, and the evolution of the process parameters in the early life of the pot,
- explain the sequence of the operations for putting a pot into service and their importance for operation and life time of the pot.

Contents

1. Start-up
2. Post start-up operations
3. Pot early life
4. Case study

Training methods

Theory, exercises, participative teaching, play activities, demonstration (videos) skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys
 Process control - Principles
 EL.2.002 – Pot process control principles - Part 1

Pot process control principles - Part 1

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: EL.0.001

Required material

PPE may be required

Number of participants

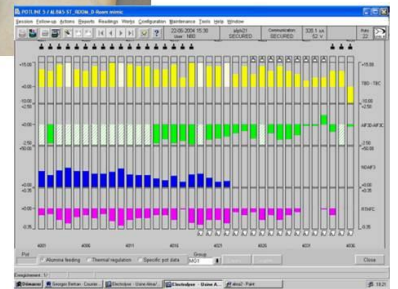
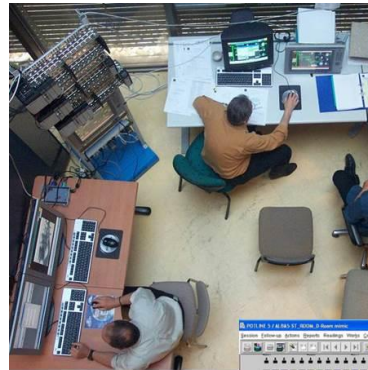
From 6 to 12

Duration (days)

1

Language

English



Objective(s)

At the end of this module, the participant will be able to describe the general architecture of the pot process control system, that is to say:

- operating principle normal and specific,
- equipment,
- main control variables of pots, more particularly the Anode-Cathode Distance (ACD).

Contents

1. Introduction to pot process control
2. Operating principle of pot process control
3. Equipment used for pot process control
4. Specific operating modes
5. Acquisition and monitoring of pot voltage and potline amperage
6. Adjustment of anode-cathode distance

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys

Process control - Principles

EL.2.023 – Pot process control principles - Part 2

Pot process control principles - Part 2

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: EL.0.001

Required material

PPE may be required

Number of participants

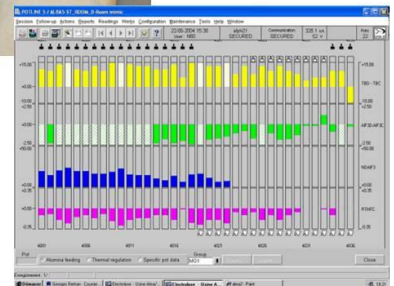
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the main pot process control procedures and identify the possible interactions between all of them,
- understand some interactions between these procedures.

Contents

1. Instability treatment
2. Anode effect treatment
3. Potline shutdown procedure
4. Anode change procedure
5. Anode beam raising procedure
6. Operating principle of alumina content control
7. Operating principle of thermal control
8. Chisel-bath contact procedure
9. FCN monitoring

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys

Process control - Principles
EL.2.003 – Pot alumina feeding

Pot alumina feeding

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- explain the importance of alumina characteristics in order to optimize potline operation and more particularly point feeding system,
- describe the principle used to manage pot alumina feeding.

Contents

1. Alumina
2. Alumina feeding control

Training methods

Theory, exercises, participative teaching, demonstration (videos, animations) skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys
 Process control - Principles
 EL.2.004 – Thermal control

Thermal control

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
 EL.0.001

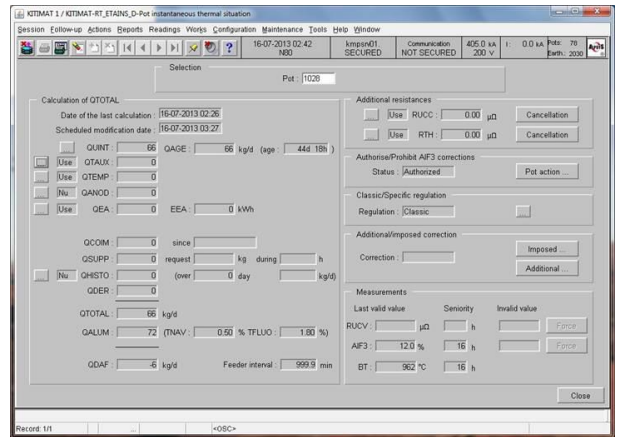
Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)	Language
1	English



Objective(s)

- At the end of this module, the participant will be able to:
- explain how thermal control maintains the thermal equilibrium of each pot,
 - explain main reports connected with thermal control.

Contents

1. Thermal equilibrium
2. Aluminium trifluoride
3. Principles of thermal control
4. Supervision and work by operating team

Training methods

Theory, exercises, participative teaching, demonstration (animations) skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys
 Process control - Practical exercises and related activities
 EL.4.003 – Dual Potmicro Exercises

Dual Potmicro Exercises

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
 EL.2.002
 EL.2.023
 EL.2.003

Required material

1 Dual Potmicro included in the training and test bench
 1 notebook

Number of participants

From 6 to 12

Duration (days)

2

Language

English



Objective(s)

At the end of this module, using the test bench, the participant will be able to:

- describe the ALPSYS Dual Potmicro front panel,
- perform on the Dual Potmicro all the actions related to pot operation.

Contents

1. Modifying a parameter
2. Setting orders
3. Crustbreaker/feeder stoppage and test
4. Tapping/Anode change/Anode cover request
5. Anode beam raising
6. Pot voltage and current monitoring
7. Anode effect treatment
8. Purge tracking
9. Order discrepancy fault

Training methods

Participative teaching, practical exercises

Process Control in Electrolysis with Alpsys

Process control - Practical exercises and related activities
EL.2.041 – Pot action and follow-up with the i-POT

Pot action and follow-up with the i-POT

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:

EL.2.002
EL.2.023
EL.2.007
EL.2.008

Required material

i-POT device

Number of participants

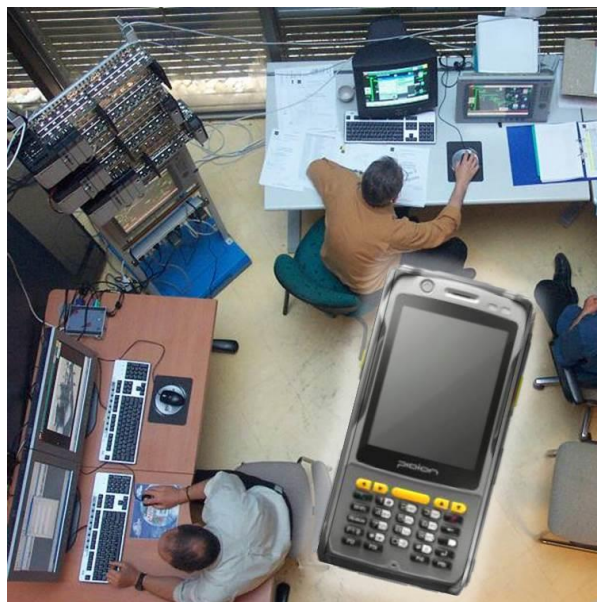
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the different pot follow-up options available with the i-POT,
- list the main pot actions that can be activated with the i-POT,
- list the different work procedures that can be launched with the i-POT.

Contents

1. Equipment used and architecture
2. User interface
3. Follow-up functions
4. Work procedure functions
5. Pot action functions

Training methods

Theory, exercises, participative teaching, demonstration (videos, animations), skills assessment (summary of learning).

Process Control in Electrolysis with Alpsys

Process control - Practical exercises and related activities
EL.2.040 – RADAR for general users

RADAR for general users

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.2.002
EL.2.023

Required material

Computer
RADAR software

Number of participants

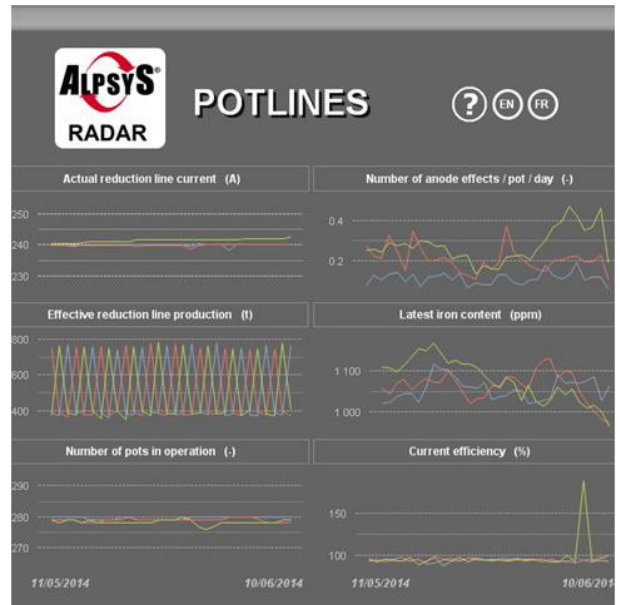
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the functions available from the RADAR application,
- operate the RADAR dashboard pages,
- use the RADAR analytic pages,
- extract data from RADAR.

Contents

1. Background
2. Solution overview
3. General users' functions

Training methods

Theory, exercises, participative teaching, demonstration (videos, animations), skills assessment (summary of learning)

Process Control in Electrolysis with Alpsys

Process control - Practical exercises and related activities
EL.2.043 – RADAR for advanced users

RADAR for advanced users

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
EL.2.002
EL.2.023

Required material

Computer
RADAR software

Number of participants

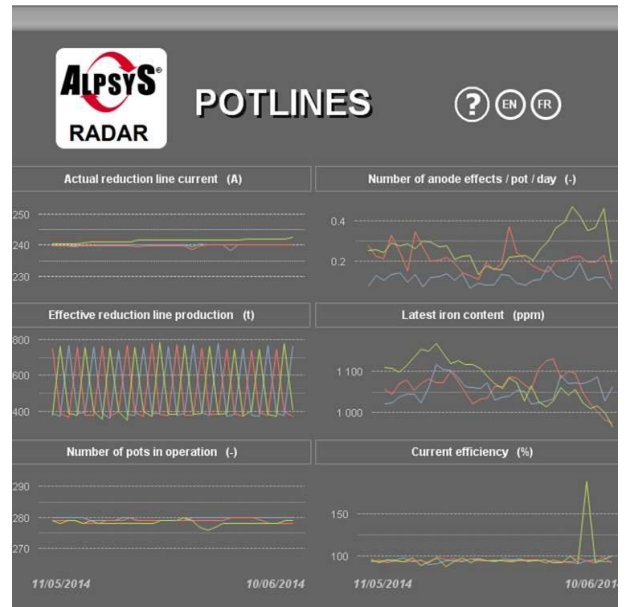
From 6 to 12

Duration (days)

2

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the main features of the QlikView product,
- configure RADAR application,
- adapt dashboards & analytics from RADAR application.

Contents

1. Introduction
2. Configuration
3. MMI customization

Training methods

Theory, exercises, participative teaching, demonstration (videos, animations), skills assessment (summary of learning)

In-depth-activities inserted in our programs

Generalities on pot and safety
EL.9.000 – Reduction visit

Reduction visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

**Pre-requisite**

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

1

Language

English

Objective(s)

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Reduction process.

Contents

1. Examples of equipment or operations being observed:
2. Pot components
3. Pot operations
4. Pot tending Assembly (PTA)
5. ALPSYS system
6. Control room

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

In-depth-activities inserted in our programs

EL.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

In-depth-activities inserted in our programs

Operations on pot and PTA operations
EL.9.002 – Shift Work

Shift Work

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).



Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

1

Language

English

Objective(s)

At the end of this activity, the participant will be able to identify the equipment and operations of the Reduction process.

Contents

- 1. Shift work observation (Production & operations, process & measurements)

Training methods

Workshop visit, demonstration, discussion, exercises

ENVIRONMENT

BASIC ASPECTS IN SCRUBBING-ENVIRONMENT

Introduction to Scrubbing-Environment Domain

EN.0.001	Environment – General aspects.....	68
EN.0.002	Gas and fume treatment technologies	69

INITIAL TRAINING IN SCRUBBING-ENVIRONMENT

Gas Treatment Center - Reduction interface

EN.1.003	Scrubbing/Potline interfaces.....	70
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Gas Treatment Center

EN.1.004	Description of gas treatment installations	71
EN.1.005	Operation of a gas treatment centre	72
EN.1.006	GTC - Key points of the process	73

Gas Treatment Center Commissioning

EN.2.006	Start-up of Gas Treatment installations (I).....	74
EN.2.007	Start-up of Gas Treatment installations (II).....	75

Fume Treatment Center

EN.1.008	The Fume Treatment Centre	76
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Environmental Monitoring

EN.1.009	Evolution and emission control - Measurement of atmospheric evolution and emissions	77
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IN-DEPTH-ACTIVITIES INSERTED IN OUR PROGRAMS

EN.9.000	Gaz Treatment Center/Fume Treatment Center/Environment visit	78
EN.9.001	Summary of Learning / Debriefing / Questions & Answers / Conclusion	79

Basic Aspects in Scrubbing-Environment
Introduction to Scrubbing-Environment Domain
EN.0.001 – Environment – General aspects

Environment – General aspects

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, the participant will be able to:

- identify the main impacts generated by an aluminium smelter and their effects on the natural environment and human health,
- identify the emissions standards, smelter performance figures and targets,
- identify possible drivers for action.

Contents

1. Introduction
2. Main impacts
3. Major risks
4. Performance
5. Pollution: effects and prevention

Training methods

Theory, exercises, play activity, interactive teaching, skills assessment (summary of learning).

Basic Aspects in Scrubbing-Environment
 Introduction to Scrubbing-Environment Domain
 EN.0.002 – Gas and fume treatment technologies

Gas and fume treatment technologies

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

The participants must have completed: EN.0.001

Required material

PPE may be required

Number of participants

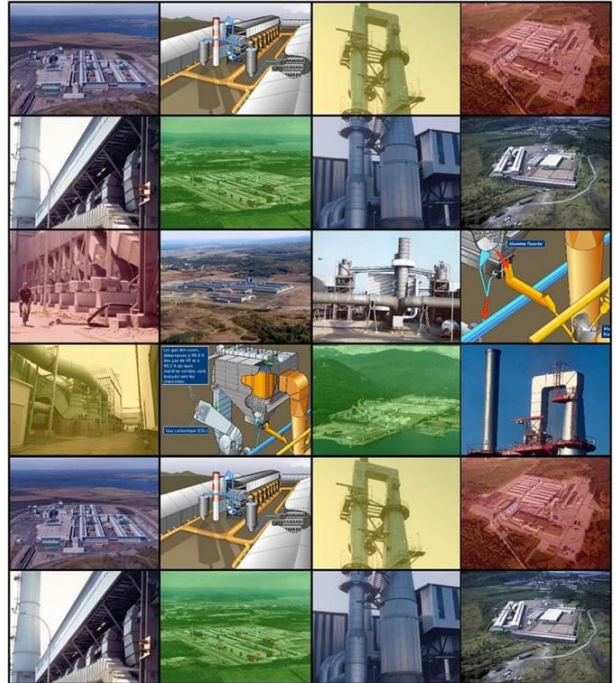
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this training activity, the participant will be able to:

- identify the key points of the gaseous emissions treatment processes and the control parameters,
- implement the available levers for action for controlling atmospheric emissions.

Contents

1. Wet scrubbing and dry scrubbing
2. Functions that collection and treatment must fulfil
3. Adsorption and fluidization
4. Control parameters
5. Major accidents and downgraded situations

Training methods

Theory, exercises, play activities, demonstrations, participative teaching, evaluative skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Gas Treatment Center - Reduction interface
EN.1.003 – Scrubbing/Potline interfaces

Scrubbing/Potline interfaces

Clientele

Supervisors/shift technical supervisors;
technicians/superintendents/Manager;
process engineer; scrubbing and Electrolysis
employees of the site.

Pre-requisite

The participants must have completed:
EN.0.001.
EN.0.002.

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, the participant will be able to implement best practices and interact efficiently with the other sector to enhance installation performance and ensure compliance with applicable environmental standards.

Contents

1. Reminder of basic notions
2. Process follow-up and KPI
3. Best practices
4. Assessment of the current situation
5. Contract/Charter

Training methods

Theory, exercises, best practices exchange, real life cases presentation, carrying out on-site audit, mini on-site audit exercise, evaluative skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Gas Treatment Center

EN.1.004 – Description of gas treatment installations

Description of gas treatment installations

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Scrubbing-Environment sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EN.0.001.
EN.0.002.

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the gas treatment centre (GTC).

Contents

1. Generalities and reminders
2. Gas circuits
3. Alumina circuits
4. Filters
5. Exhaust fans
6. Centre supervision and ancillary installations

Training methods

Theory, exercises, competencies assessment.

Initial Training in Scrubbing-Environment

Gas Treatment Center

EN.1.005 – Operation of a gas treatment centre

Operation of a gas treatment centre

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Scrubbing-Environment sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EN.0.001.
EN.0.002.

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe and participate to the operation of a GTC.

Contents

1. General
2. Operation
3. Troubleshooting

Training methods

Theory, exercises, practical exercise, skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Gas Treatment Center

EN.1.006 – GTC - Key points of the process

GTC - Key points of the process

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Scrubbing-Environment sector; employees within expert centres.

Pre-requisite

The participants must have completed:

EN.0.001.

EN.0.002.

Required material

Calculator

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to control and use key points.

Contents

1. Pot evolutions
2. Collection & Treatment
3. Alumina properties
4. Gas flow
5. Filtration velocity
6. Fluoride emissions
7. Energy consumption

Training methods

Theory, exercises, demonstration (animation), workshop visit, calculation theoretical exercise, practical exercise, skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Gas Treatment Center Commissioning

EN.2.006 – Start-up of Gas Treatment installations (I)

Start-up of Gas Treatment installations (I)

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:

EN.0.001.

EN.0.002.

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participants will be able to:

- describe their role in the start-up of a GTC,
- simulate a start-up of a GTC.

Contents

1. General
2. Start-up organization
3. GTC checks and cold commissioning tests

Training methods

Theory, exercises, practical exercise, skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Gas Treatment Center Commissioning

EN.2.007 – Start-up of Gas Treatment installations (II)

Start-up of Gas Treatment installations (II)

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:

EN.0.001.

EN.0.002.

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe his/her role in the start-up of a GTC,
- simulate a start-up of a GTC.

Contents

1. Hot commissioning for a GTC
2. Ramp-up of a GTC

Training methods

Theory, exercises, practical exercise, skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Fume Treatment Center

EN.1.008 – The Fume Treatment Centre

The Fume Treatment Centre

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Electrolysis sector; employees within expert centres.

Pre-requisite

The participants must have completed:

EN.0.001.

EN.0.002.

Required material

Calculator

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- understand the requirements of the baking furnace,
- describe a FTC,
- describe the operation of a FTC,
- explain and/or participate the commissioning of a FTC.

Contents

1. Description of a FTC
2. Operation of a FTC
3. Key points of the process
4. Troubleshooting
5. Commissioning of a FTC

Training methods

Theory, exercises, participative teaching, play activities, workshop visit, skills assessment (summary of learning).

Initial Training in Scrubbing-Environment

Environmental Monitoring

EN.1.009 – Evolution and emission control - Measurement of atmospheric evolution and emissions

Evolution and emission control - Measurement of atmospheric evolution and emissions

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Scrubbing-Environment sector; employees within expert centres.

Pre-requisite

The participants must have completed:
EN.0.001.
EN.0.002.

Required material

Calculator
PPE may be required

Number of participants

From 6 to 12

Duration (days)	Language
4	English

**Objective(s)**

At the end of this module, the participant will be able to:

- understand the main steps to carry out stack sampling, roof vent sampling and GTC and FTC inlet sampling,
- describe some continuous analyzers,
- calculate pollutant concentrations and emissions.

Contents

1. Reminder - General
2. Sampling points and conditions
3. Preliminary calculations and measurements in the gas streams
4. Sampling train
5. Tar and PAH sampling
6. Roof vent sampling
7. Analysis and final calculations
8. Continuous analyzers

Training methods

Theory, exercises, calculation theoretical exercise, practical exercise, illustrative demonstration, workshop visit, skills assessment (summary of learning).

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In-depth-activities inserted in our programs

EN.9.000 – Gaz Treatment Center/Fume Treatment Center/Environment visit

Gaz Treatment Center/Fume Treatment Center/Environment visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Fume Treatment process.

Contents

1. Examples of equipment or operations being observed:
2. Gas circuits
3. Alumina circuits
4. Filters
5. Exhaust fans

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

In-depth-activities inserted in our programs

EN.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

HANDLING-STORAGE

BASIC ASPECTS IN HANDLING-STORAGE

Introduction to Handling-Storage Domain

MS.0.001	HDPS Basics	81
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INITIAL TRAINING IN HANDLING-STORAGE

Handling-Storage - Raw materials, process and equipment

MS.2.001	Handling and storage on the smelter - Raw materials.....	82
MS.2.002	Handling and storage on the potline – General description of installations	83
MS.2.003	Handling and storage on the smelter – Basic handling techniques	84
MS.2.004	Handling and storage on the smelter – Basic storage techniques	85
MS.2.005	Handling and storage at plant discharging installations and on the potline – Description of equipment	86

IN-DEPTH-ACTIVITIES INSERTED IN OUR PROGRAMS

MS.9.000	Alumina handling and Storage visit	87
MS.9.001	Summary of Learning / Debriefing / Questions & Answers / Conclusion.....	88

Basic Aspects in Handling-Storage
 Introduction to Handling-Storage Domain
 MS.0.001 – HDPS Basics

HDPS Basics

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE may be required

Number of participants

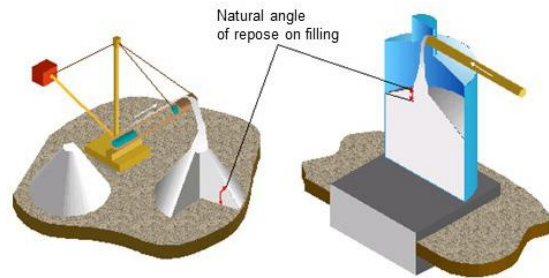
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this training activity, the participant will be able to describe the electrolytic pot feeding process using the HDPS (Hyper Dense Phase System) and to explain how it operates.

Contents

1. Raw materials: characteristics concerning handling and storage operations
2. Basic principles concerning fluidization techniques
3. Basic principles of continuous feeding of alumina to the pots in a potline: Hyper Dense Phase System

Training methods

Theory, participative teaching approach, competencies assessment (summary of learning).

Initial Training in Handling-Storage

Handling-Storage - Raw materials, process and equipment
MS.2.001 – Handling and storage on the smelter - Raw materials

Handling and storage on the smelter - Raw materials

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
MS.0.001

Required material

PPE may be required

Number of participants

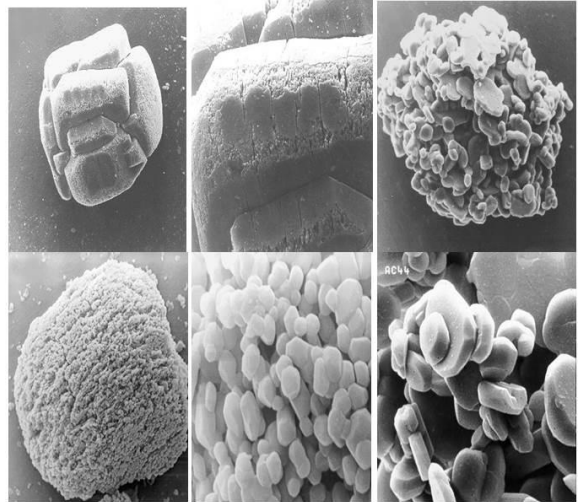
From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- identify the raw materials used on the smelter,
- name the characteristics and uses of the different raw materials used at an aluminium smelter,
- identify the influence of these characteristics on the conditions for handling and storing these products.

Contents

1. Raw materials
2. General description of installations
3. Basic handling techniques
4. Basic storage techniques
5. Description of equipment

Training methods

Theory, exercises, participative teaching, evaluative skills assessment (summary of learning).

Initial Training in Handling-Storage

Handling-Storage - Raw materials, process and equipment

MS.2.002 – Handling and storage on the potline – General description of installations

Handling and storage on the potline – General description of installations

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
MS.0.001

Required material

PPE may be required

Number of participants

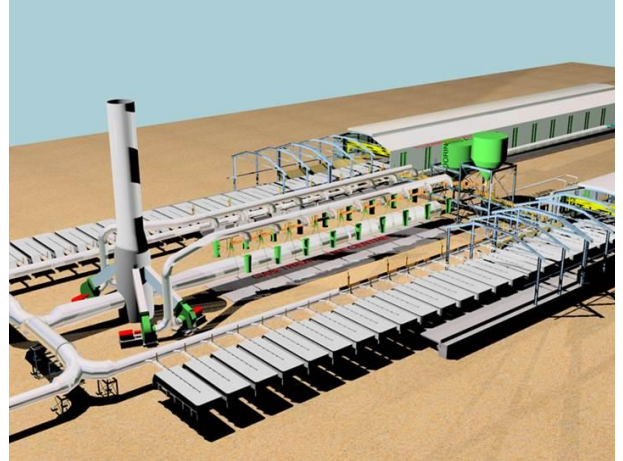
From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the functions of potline installations,
- explain the material flows in the potline,
- explain the operating principles.

Contents

1. Raw materials
2. General description of installations
3. Basic handling techniques
4. Basic storage techniques
5. Description of equipment

Training methods

Theory, exercises, participative teaching, workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Handling-Storage

Handling-Storage - Raw materials, process and equipment
MS.2.003 – Handling and storage on the smelter – Basic handling techniques

Handling and storage on the smelter – Basic handling techniques

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
MS.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- name and differentiate the main techniques for handling raw materials,
- explain the technologies used for:
 - pneumatic transport,
 - mechanical transport,
 - transport using fluidization,
- identify the uses of these techniques,
- describe in his own words:
 - what influences the air circulation velocity,
 - how to avoid load breaks and increase the average flow rate,
 - how the modern pots are fed with alumina.

Contents

1. Raw materials
2. General description of installations
3. Basic handling techniques
4. Basic storage techniques
5. Description of equipment

Training methods

Theory, exercises, participative teaching, demonstration (video and fluidization test), evaluative skills assessment (summary of learning).

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Initial Training in Handling-Storage

Handling-Storage - Raw materials, process and equipment
MS.2.004 – Handling and storage on the smelter – Basic storage techniques

Handling and storage on the smelter – Basic storage techniques

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
MS.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- differentiate the different types of storage,
- quote the risks related to storing in silos,
- identify the techniques for eliminating them,
- explain the suitable methods for storing alumina and coke,
- describe in his own words:
 - what happens during pile formation,
 - how the particle size varies during reclaiming,
 - the advantages of mass flow in comparison with funnel flow.

Contents

1. Raw materials
2. General description of installations
3. Basic handling techniques
4. Basic storage techniques
5. Description of equipment

Training methods

Theory, exercises, participative teaching, demonstration (models), evaluative skills assessment (summary of learning).

Initial Training in Handling-Storage

Handling-Storage - Raw materials, process and equipment

MS.2.005 – Handling and storage at plant discharging installations and on the potline – Description of equipment

Handling and storage at plant discharging installations and on the potline – Description of equipment

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: MS.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the characteristics of the handling and storage equipment used at the unloading area and on the potline,
- describe the key points of its operation and maintenance,
- identify any risks presented by this equipment.

Contents

1. Raw materials
2. General description of installations
3. Basic handling techniques
4. Basic storage techniques
5. Description of equipment

Training methods

Theory, exercises, participative teaching, demonstration (video), evaluative skills assessment (summary of learning).

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In-depth-activities inserted in our programs
MS.9.000 – Alumina handling and Storage visit

Alumina handling and Storage visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).



Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

Objective(s)

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Handling-Storage process.

Contents

1. Examples of equipment or operations being observed:
2. Unloading station
3. Fresh and fluorinated alumina facilities
4. Conveyors
5. HDPS
6. Storage in courtyard or blower room

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

In-depth-activities inserted in our programs

MS.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

POTLINING

BASIC ASPECTS IN POTLINING

Introduction to Potlining Domain

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INITIAL TRAINING IN POTLINING

Potlining activities - Supervision and follow-up

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Basic Aspects in Potlining
Introduction to Potlining Domain
PL.0.001 – Introduction to Potlining

Introduction to Potlining

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

At the end of this module, the participant will be able to describe the pot construction, the activities influencing its performance and the mutual impacts with the other fields.

Contents

1. Impacts of the lining on the pot's performance
2. Pot construction
3. Main relations between potlining and the other areas

Training methods

Theory, exercises, participative teaching, play activities, workshop visit, competencies assessment (summary of learning)

Initial Training in Potlining

Potlining activities - Supervision and follow-up
PL.2.001 – Potlining products acceptance

Potlining products acceptance

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
PL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- explain the principles of the potlining product acceptance,
- follow the specifications to check the potlining materials.

Contents

1. Organization of potlining product supplies
2. Pot shell
3. Refractory materials
4. Carbon materials
5. Metallic and miscellaneous materials

Training methods

Theory, exercises, participative teaching, demonstration (videos), skills assessment (summary of learning)

Initial Training in Potlining

Potlining activities - Supervision and follow-up
 PL.2.002 – Supervision and follow-up of cathode block sealing

Supervision and follow-up of cathode block sealing

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
 PL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- describe the cathode block sealing process,
- identify the HSE risks and all parameters linked with the different sealing steps,
- identify the main quality checks to carry out and determine the potential impacts.

Contents

1. Description - Purpose - Effects
2. Sealing Operation
3. Traceability
4. Quality

Training methods

Theory, exercises, participative teaching, demonstration (videos), skills assessment (summary of learning)

Initial Training in Potlining

Potlining activities - Supervision and follow-up

PL.2.003 – Supervision and follow-up of brickwork, cathode block, SiC slabs and preformed block laying

Supervision and follow-up of brickwork, cathode block, SiC slabs and preformed block laying

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
PL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe in detail the following steps of the pot construction:

- brickwork, cathode block and preformed block laying.

Contents

1. Principle and objectives
2. Brickwork
3. Cathode block laying
4. Side brickwork
5. SiC slab laying
6. Preformed block laying
7. Other activities
8. Potlining file

Training methods

Theory, exercises, participative teaching, skills assessment (summary of learning)

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Initial Training in Potlining

Potlining activities - Supervision and follow-up
 PL.2.004 – Supervision and follow-up of ramming and lining completion

Supervision and follow-up of ramming and lining completion

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
 PL.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to:

- explain the principle and the ramming method,
- supervise and follow-up the ramming and lining completion.

Contents

1. Lining paste
2. Equipment
3. Operations and inspections
4. Anomalies

Training methods

Theory, exercises, participative teaching, demonstration (videos), skills assessment (summary of learning)

In-depth-activities inserted in our programs

Other Potline operations
PL.9.000 – Potlining visit

Potlining visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

2

Language

English

**Objective(s)**

At the end of this activity, the participant will be able to identify the equipment and the steps of the Potlining process.

Contents

1. Examples of equipment or operations being observed:
2. Pot components
3. Cathode sealing process and equipment
4. Raw materials storage
5. Potlining stages/pits
6. Ramming equipment
7. Delining equipment

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

In-depth-activities inserted in our programs

PL.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

SUBSTATION

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Basic Aspects in Substation

Introduction to Substation domain
ST.0.001 – Substation general

Substation general

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

Calculator
PPE may be required

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

At the end of this training activity, the participant will be able to define the substation as a process and describe its fundamental role for operation of the smelter and, in particular, operation of the potline.

Contents

1. The substation and reduction
2. The substation process
3. Constraints and stakes

Training methods

Theory, exercises, demonstrations (animations), workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Sub-Station
 Process and equipment of the Sub-Station
 ST.1.002 – The pot – Electricity

The pot – Electricity

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Sub-station sector; employees within expert centres.

Pre-requisite

The participants must have completed: ST.0.001

Required material

PPE may be required

Number of participants

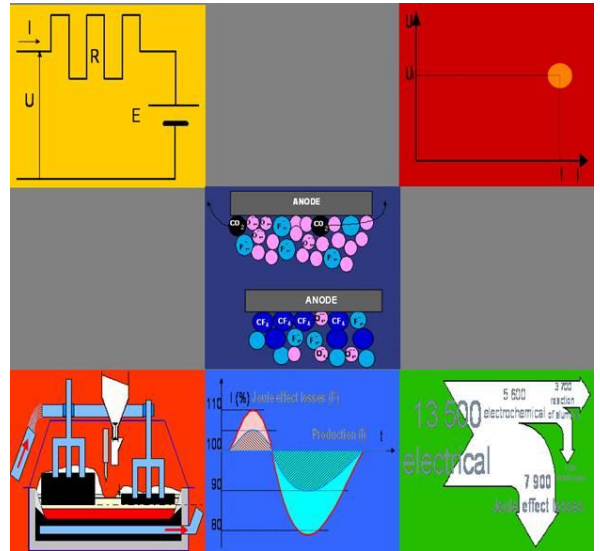
From 6 to 12

Duration (days)

1

Language

English



Objective(s)

- At the end of this module, the participant will be able to:
- explain the basis of the electrolysis process,
 - describe the electrical aspects within the process.

Contents

1. Paul Heroult's process
2. Alumina - Bayer process
3. Physico-chemical phenomena
4. Main characteristics
5. Equilibriums
6. Pot electrical power supply

Training methods

Theory, exercises, participative teaching, play activities, workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Sub-Station

Process and equipment of the Sub-Station
ST.1.003 – Potline – Electricity

Potline – Electricity

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Sub-station sector; employees within expert centres.

Pre-requisite

The participants must have completed:
ST.0.001

Required material

PPE may be required

Number of participants

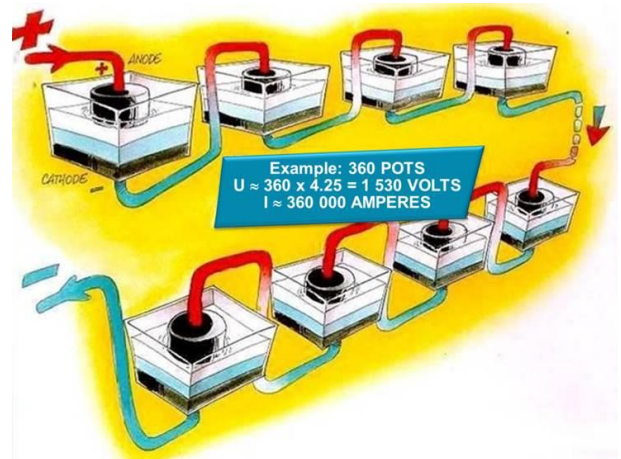
From 6 to 12

Duration (days)

1.5

Language

English

**Objective(s)**

At the end of this module, the participant will be able to describe the electric characteristics of the potlines from the perspective of the substation.

Contents

1. Pot power supply
2. Voltage/current characteristics
3. Current regulation
4. Incidents

Training methods

Theory, exercises, participative teaching, play activities, workshop visit, evaluative skills assessment (summary of learning).

Initial Training in Sub-Station

Process and equipment of the Sub-Station
ST.1.004 – Rectifiers - General

Rectifiers - General

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Sub-station sector; employees within expert centres.

Pre-requisite

The participants must have completed:
ST.0.001

Required material

PPE may be required

Number of participants

From 6 to 12

Duration (days)

2

Language

English

**Objective(s)**

At the end of this module, the participant will be able to explain the theory on which the operation of the Graetz bridge rectifier and of the self-saturated reactors is based.

Contents

1. Definitions
2. Graetz bridge
3. Commutation
4. Alternating currents
5. Conclusion

Training methods

Theory, exercises, participative teaching, demonstration (animation), evaluative skills assessment (summary of learning).

Initial Training in Sub-Station

Process and equipment of the Sub-Station
ST.1.005 – Sub-station - Principles and design

Sub-station - Principles and design

Clientele

Employees possessing technical skills linked to management of teams and plant trainers, in Sub-station sector; employees within expert centres.

Pre-requisite

The participants must have completed:
ST.0.001

Required material

PPE may be required

Number of participants

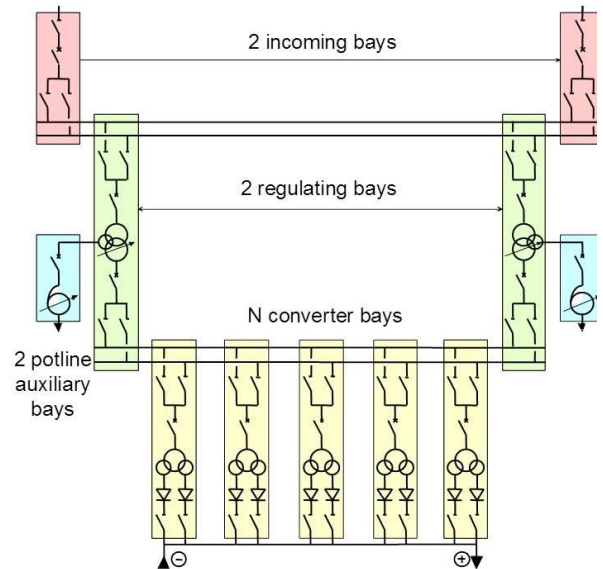
From 6 to 12

Duration (days)

2.5

Language

English



Objective(s)

At the end of this module, the participant will be able to state the distinguishing characteristics of the electrical engineering equipment used in a conversion substation considering the specific constraints (reliability, energy sources involved, operating continuity).

Contents

1. General
2. Incoming bays
3. Regulating bays
4. Converter bays
5. Auxiliary bays
6. Miscellaneous

Training methods

Theory, exercises, participative teaching, workshop visit, play activities, evaluative skills assessment (summary of learning).

Process Control in Sub-station
 SURMEC System
 ST.2.001 – Potline voltage and amperage

Potline voltage and amperage

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed: ST.0.001

Required material

PPE may be required

Number of participants

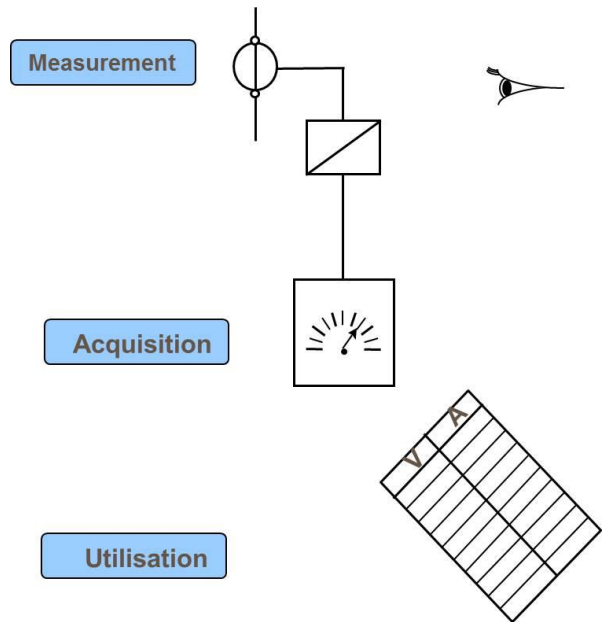
From 6 to 12

Duration (days)

0.5

Language

English



Objective(s)

- At the end of this module, the participant will be able to:
- describe the measuring systems for current, voltage and power in a potline, more specifically the elements of U, I and P measuring chains,
 - identify the stakes linked to accurate measurements.

Contents

1. Current sensors
2. Low voltage measurement
3. Potline voltage measurement
4. AC power measurement

Training methods

Theory, exercises, participative teaching, evaluative skills assessment (summary of learning).

Process Control in Sub-station
 SURMEC System
 ST.2.002 – SURMEC

SURMEC

Clientele

Technical employees of the plant, directly concerned by the subject at hand; employees within expert centres.

Pre-requisite

The participants must have completed:
 ST.0.001

Required material

PPE may be required

Number of participants

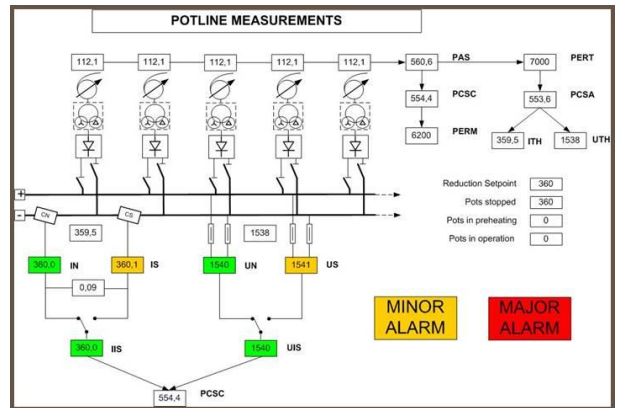
From 6 to 12

Duration (days)

2

Language

English



Objective(s)

At the end of this module, the participant will be able to:

- explain the choices made by the SURMEC for DC current, DC voltage and alternative power values,
- describe the main SURMEC parameters,
- explain the operation of the SURMEC equipment,
- proceed with troubleshooting on the SURMEC equipment.

Contents

1. Description of measurement chains
2. Description of measurement processing
3. SURMEC operation
4. SURMEC troubleshooting

Training methods

Theory, exercises, participative teaching, workshop visit, evaluative skills assessment (summary of learning)

In-depth-activities inserted in our programs

ST.9.000 – Sub-station visit

Sub-station visit

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

PPE

Number of participants

From 6 to 12

Duration (days)

1

Language

English



Objective(s)

At the end of this activity, the participant will be able to make the connection between the theoretical elements contained in the modules and the Substation equipment.

Contents

1. Examples of equipment or operations being observed:
2. Rectifiers
3. Potline
4. Measurements
5. SURMEC

Training methods

This activity is essential for the smooth running of the training programmes. It cannot not be presented on its own. It may appear in several different places during a training programme. The setting up of this activity will depend on the availability of facilities at the host site and the operations timetable at the time of the training course.

In-depth-activities inserted in our programs

ST.9.001 – Summary of Learning / Debriefing / Questions & Answers / Conclusion

Summary of Learning / Debriefing / Questions & Answers / Conclusion

Clientele

Employees possessing technical skills linked to management of teams (Plant trainers- whatever the speciality, employees within expert centres, managers, employees part of functional teams).

Pre-requisite

None

Required material

None

Number of participants

From 6 to 12

Duration (days)

0.5

Language

English

**Objective(s)**

This activity allows the participant to:

- describe the process (equipment and operations),
- identify his own area of improvement,
- list the key points of this training.

Contents

1. Time for validating the knowledge gained
2. Time for debriefing (mainly after workshop visits)
3. Time for answering all the questions participants might have
4. Time for looking over the key points dealt with during the training

Training methods

Summary of learning, Debriefing, Questions/Answers

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