Accredited Africa Training Institute for Capacity Development
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COURSE BROCHURE

Bagasse Pulp Production With Horizontal Continuous Digester Training

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 114245 · NQF Level 4 · 29 Credits · 26 Days

COURSE OVERVIEW

This course equips learners with the specialised knowledge and skills required to operate a horizontal continuous digester for bagasse pulp production. Participants will gain a deep understanding of the digestion process, from raw material preparation to pulp output, ensuring efficient and quality-controlled production in a pulp and paper mill environment.

Category	Manufacturing, Engineering and Technology
Subfield	Manufacturing and Assembly
Unit Standard	114245
Accreditation	SAQA Accredited · NQF Level 4 · 29 Credits
Duration	26 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS — verifiable online

LEARNING OUTCOMES

- Explain the principles of bagasse pulping using a horizontal continuous digester.
- Prepare and feed bagasse into the digester system according to standard operating procedures.
- Monitor and control critical process parameters such as temperature, pressure, and chemical dosage.
- Troubleshoot common operational issues and implement corrective actions.
- Evaluate pulp quality and adjust process variables to meet target specifications.
- Apply safety and environmental regulations relevant to the pulping process.

WHO SHOULD ATTEND

- This course is intended for production operators, process controllers, and technical staff working in the pulp and paper industry who are responsible for or involved in the operation of continuous digesters for bagasse pulping.

COURSE OUTLINE

Day 1: Introduction to Bagasse and Pulp Production

- Sugar cane processing and bagasse generation
- Chemical composition and fiber morphology of bagasse
- Overview of pulping methods: mechanical, chemical, semi-chemical
- Applications of bagasse pulp
- Environmental and economic benefits

Day 2: Overview of Continuous Digester Technology

- Types of digesters: vertical, horizontal, batch, continuous
- Horizontal continuous digester design and layout
- Feed system, cooking zone, discharge mechanism
- Process control variables: temperature, pressure, retention time
- Safety features and interlocks

Day 3: Raw Material Handling and Preparation

- Bagasse baling, stacking, and reclaiming
- Depithing: wet and dry methods
- Screening and cleaning systems
- Conveyor systems and metering
- Moisture content measurement and adjustment

Day 4: Chemistry of Bagasse Pulping

- Lignin, cellulose, hemicellulose structure
- Kraft pulping chemistry: reactions and mechanisms
- Effect of chemical concentration and temperature
- Pulp yield and kappa number
- Black liquor composition

Day 5: Process Parameters and Control

- Temperature profiles in cooking zones
- Pressure and steam control
- Retention time and production rate
- Chemical dosage and liquor-to-wood ratio
- Online sensors: pH, consistency, kappa number

Day 6: Digester Feed System Operation

- Chip bin and level control
- Low-pressure feeder operation
- High-pressure feeder and transfer circulation
- Steam and liquor injection
- Plug screw feeder design

Day 7: Cooking Zone Dynamics

- Axial and radial mixing
- Heat transfer from steam to chips
- Liquor flow and penetration
- Residence time distribution measurement

- Channeling and bypassing

Day 8: Blow Tank and Discharge System

- Blow tank design: bottom vs top discharge
- Pressure reduction and flash steam recovery
- Discharge valve types and control
- Pulp dilution and pumping
- Knot separation and screening

Day 9: Chemical Recovery and Recausticizing Overview

- Black liquor evaporation and combustion
- Smelt dissolving and green liquor
- Causticizing: lime slaking and causticizing reactions
- White liquor clarification and storage
- Recovery cycle efficiency

Day 10: Process Automation and DCS

- DCS architecture and HMI
- PID loops and cascade control
- Feedforward and ratio control
- Model predictive control basics
- Alarm management and operator response

Day 11: Quality Control and Testing

- Sampling procedures for pulp and liquor
- Kappa number determination (TAPPI/ISO
- Viscosity and degree of polymerization
- Brightness and bleachability
- Rejects and shives analysis

Day 12: Troubleshooting and Problem Solving

- High kappa number: causes and remedies
- Low yield and high rejects
- Plugging and bridging in feed system
- Steam consumption and pressure fluctuations
- Scaling and fouling

Day 13: Safety and Environmental Compliance

- Hot work and pressure vessel safety
- Chemical handling: NaOH, Na2S, lime
- Personal protective equipment (PPE
- Effluent treatment and air emissions
- Waste minimization and energy efficiency

Day 14: Maintenance and Reliability

- Inspection of refractory and linings
- Wear parts: screws, feeders, valves
- Corrosion monitoring and chemical treatment
- Vibration analysis and thermography
- Maintenance planning and spare parts

Day 15: Optimization for Yield and Quality

- Design of experiments for parameter tuning
- Response surface methodology
- SPC charts and capability analysis
- Energy optimization: steam and power
- Best available techniques (BAT

Day 16: Case Studies and Industry Best Practices

- Case study: reducing kappa number variability
- Case study: increasing production rate
- Benchmarking against industry standards
- Implementing a continuous improvement program
- Operator training and competency

Day 17: Advanced Topics: Non-Wood Pulping

- Wheat straw, bamboo, and other non-woods
- Silica and oxalate issues in bagasse
- Enzymatic pretreatment possibilities
- Biorefinery: lignin and hemicellulose valorization
- Future trends in non-wood pulping

Day 18: Integration with Paper Machine Operations

- Pulp washing and screening for paper machine
- Bleach sequence: D0, Eop, D1, D2
- Refining and fiber development
- Wet-end chemistry and retention
- Quality specs for different paper grades

Day 19: Simulation and Process Modeling

- Introduction to simulation tools (e.g., CADSIM, WinGEMS
- Building a digester model: mass and energy balances
- Sensitivity analysis of key parameters
- Dynamic simulation for startup and shutdown
- Case study: model-based optimization

Day 20: Final Review and Assessment

- Comprehensive review of key concepts
- Written test covering theory and calculations
- Practical assessment in simulator or plant
- Group discussion and lessons learned
- Course evaluation and certification

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **29 NQF credits** at **NQF Level 4**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 76,800.00	**R 76,800.00**
1	In-House	R 99,800.00	**R 99,800.00**
1	On-Campus (Pretoria)	R 115,200.00	**R 115,200.00**

UPCOMING SESSIONS

Start	End	Method	Venue
18 Jun 2026	23 Jul 2026	On-Campus	Maseru, Lesotho
18 Jun 2026	23 Jul 2026	On-Campus	Online
19 Jun 2026	24 Jul 2026	On-Campus	Nairobi, Kenya
19 Jun 2026	24 Jul 2026	On-Campus	Blantyre, Malawi
22 Jun 2026	27 Jul 2026	On-Campus	Mombasa, Kenya
22 Jun 2026	27 Jul 2026	On-Campus	Windhoek, Namibia
23 Jun 2026	28 Jul 2026	In-House	—
24 Jun 2026	29 Jul 2026	On-Campus	Maseru, Lesotho

Contact us if no suitable date is listed — on-demand sessions can be arranged for groups.

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