Accredited Africa Training Institute for Capacity Development
Unit FO409, Hatfield Plaza · 1122 Burnett St, Hatfield 0028 · Pretoria, Gauteng · South Africa
Tel: +27 12 004 8389 · Mobile: +27 65 077 6310
Email: apply@aaticd.co.za · Website: www.aaticd.co.za

COURSE BROCHURE

Kraft Pulping By Product Conversion To Recyclable Chemicals And Steam Training

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 114267 · NQF Level 4 · 31 Credits · 28 Days

COURSE OVERVIEW

This course equips learners with the knowledge and skills to convert by-products from the kraft pulping process into recyclable chemicals and steam. It covers the principles of chemical recovery, energy efficiency, and environmental compliance within the pulp and paper industry.

Category	Manufacturing, Engineering and Technology
Subfield	Manufacturing and Assembly
Unit Standard	114267
Accreditation	SAQA Accredited · NQF Level 4 · 31 Credits
Duration	28 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS — verifiable online

LEARNING OUTCOMES

- Describe the chemical recovery cycle in kraft pulping and identify key by-products.
- Apply principles of black liquor evaporation and combustion to generate steam and recover chemicals.
- Analyze the efficiency of recovery processes and identify opportunities for improvement.
- Implement safety procedures for handling high-temperature and high-pressure recovery equipment.
- Evaluate environmental impacts and compliance requirements for chemical recovery operations.
- Demonstrate proper start-up, shutdown, and troubleshooting of recovery boiler operations.

WHO SHOULD ATTEND

- This course is designed for process operators, chemical engineers, and technical personnel working in or entering the kraft pulping sector who need to understand by-product recovery and conversion.

COURSE OUTLINE

Day 1: Introduction to Kraft Pulping and By-Products

- Overview of kraft pulping chemistry.
- By-product formation mechanisms.
- Composition and properties of black liquor.
- Turpentine and tall oil recovery basics.
- Environmental regulations and sustainability.
- Economic drivers for by-product conversion.

Day 2: Black Liquor Evaporation and Concentration

- Principles of evaporation.
- Multiple-effect evaporator design.
- Heat transfer and steam economy.
- Scaling and fouling issues.
- Viscosity and solids content control.
- Safety considerations in evaporation.

Day 3: Recovery Boiler Operation and Steam Generation

- Recovery boiler components.
- Combustion chemistry of black liquor.
- Steam cycle and heat recovery.
- Bed burning and smelt formation.
- Emissions control (SOx, NOx, particulates).
- Emergency shutdown procedures.

Day 4: Causticizing and Lime Kiln Operations

- Green liquor clarification.
- Slaking and causticizing reactions.
- White liquor production.
- Lime mud filtration and washing.
- Lime kiln operation and fuel options.
- Energy integration in the recovery loop.

Day 5: Turpentine Recovery and Processing

- Sources of turpentine in kraft mills.
- Gas collection and cooling systems.
- Decanter design and operation.
- Turpentine purification.
- Storage and handling safety.
- Market applications (solvents, resins).

Day 6: Tall Oil Recovery and Refining

- Soap skimming from black liquor.
- Acidulation process (sulfuric acid).
- Crude tall oil composition.
- Distillation and fractionation.
- Rosin and fatty acid applications.

- Environmental management of tall oil refining.

Day 7: Steam Distribution and Utilization in the Mill

- Steam headers and pressure reduction.
- Steam traps and condensate return.
- Heat exchangers and process heating.
- Power generation via back-pressure turbines.
- Energy balance optimization.
- Insulation and heat loss reduction.

Day 8: Chemical Recovery Efficiency and Optimization

- Mass balance for sodium and sulfur.
- Reduction efficiency in recovery boiler.
- Causticizing efficiency.
- Lime kiln operation effects.
- Non-process elements and purge.
- Process control strategies.

Day 9: Environmental Management and Emissions Control

- TRS (total reduced sulfur) emissions.
- Particulate matter control.
- Wastewater from evaporation and causticizing.
- Odor control systems.
- Effluent treatment (primary, secondary).
- Environmental monitoring and reporting.

Day 10: Safety, Health, and Risk Management

- Chemical hazards (caustic, acid, H2S).
- Fire and explosion risks.
- Confined space entry.
- Personal protective equipment.
- Emergency response plans.
- Safety audits and incident investigation.

Day 11: Instrumentation and Process Control

- Flow, level, temperature, pressure sensors.
- Online analyzers (pH, conductivity, solids).
- DCS and PLC basics.
- Control strategies (cascade, feedforward).
- Alarm management.
- Data logging and trending.

Day 12: Maintenance and Reliability of Recovery Equipment

- Corrosion and erosion in evaporators.
- Recovery boiler tube failure mechanisms.
- Lime kiln refractory maintenance.
- Pump and valve maintenance.
- Condition monitoring techniques.
- Spare parts management.

Day 13: Energy Recovery and Cogeneration

- Back-pressure and extraction turbines.
- Condensing turbines.
- Heat recovery steam generators.
- Power generation economics.
- Load following and grid integration.
- Energy efficiency benchmarks.

Day 14: Advanced By-Product Conversion Technologies

- Lignin precipitation and filtration.
- Lignin to biofuel conversion.
- Black liquor gasification.
- Turpentine to renewable chemicals.
- Tall oil biodiesel.
- Integration with pulp mill operations.

Day 15: Quality Control and Product Specifications

- Turpentine purity tests (distillation range).
- Tall oil acid number and saponification.
- White liquor effective alkali.
- Steam purity and conductivity.
- Laboratory analytical techniques.
- Statistical process control.

Day 16: Troubleshooting and Problem Solving

- Evaporator scaling and fouling.
- Recovery boiler bed instability.
- Causticizing lime mud quality issues.
- Turpentine contamination.
- Tall oil emulsion problems.
- Case studies and group exercises.

Day 17: Regulatory Compliance and Reporting

- National Environmental Management Act.
- Air Quality Act (emission limits).
- Water Use License conditions.
- Waste classification and disposal.
- Reporting to authorities.
- Environmental audits.

Day 18: Economic Analysis and Cost Optimization

- Cost of chemicals (NaOH, lime).
- Energy costs and savings.
- Payback period for new equipment.
- Life cycle cost analysis.
- Benchmarking against best practices.
- Business case development.

Day 19: Integration of By-Product Conversion with Mill Operations

- Effect of pulp production on by-product yields.
- Balancing steam and power demands.
- Impact of wood species.
- Seasonal variations.
- Debottlenecking strategies.
- Case study: mill integration.

Day 20: **Course Review and Assessment**

- Review of key concepts.
- Written exam (theory).
- Practical assessment.
- Group discussion and Q&A.;
- Course evaluation.
- 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 **31 NQF credits** at **NQF Level 4**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 81,900.00	**R 81,900.00**
1	In-House	R 106,500.00	**R 106,500.00**
1	On-Campus (Pretoria)	R 122,800.00	**R 122,800.00**

UPCOMING SESSIONS

Start	End	Method	Venue
05 Aug 2026	11 Sep 2026	On-Campus	Johannesburg, South Africa
06 Aug 2026	14 Sep 2026	On-Campus	Mauritius
07 Aug 2026	15 Sep 2026	On-Campus	Cape Town, South Africa
10 Aug 2026	16 Sep 2026	On-Campus	Pretoria, South Africa
11 Aug 2026	17 Sep 2026	On-Campus	Abu Dhabi, UAE
12 Aug 2026	18 Sep 2026	On-Campus	Durban, South Africa
12 Aug 2026	18 Sep 2026	On-Campus	Mauritius
13 Aug 2026	21 Sep 2026	On-Campus	Cape Town, South Africa

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

HOW TO GET A QUOTE OR APPLY

1. **Get an instant quotation online:** visit **www.aaticd.co.za**, open the page for this course (Unit Standard 114267) and click **Get A Quote / Apply**. Select your training method and number of delegates — your quotation is generated immediately and emailed to you with the course brochure attached.
2. **Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to **apply@aaticd.co.za** — our team will reply with a formal quotation.
3. **Apply by phone or WhatsApp:** call **+27 12 004 8389** or WhatsApp **+27 65 077 6310** and we will prepare your quotation and reserve your seats.
4. **Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically — the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

Accredited Africa Training Institute for Capacity Development
Unit FO409, Hatfield Plaza, 1122 Burnett St, Hatfield 0028, Pretoria, Gauteng, South Africa
Tel: +27 12 004 8389 · WhatsApp: +27 65 077 6310 · apply@aaticd.co.za · www.aaticd.co.za