Latest Technology Improvements in Melamine Production

Melamine 2008 – Moscow
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Melamine: Latest Technology Improvements Agenda

- Introduction
- Process and General Advantages
- Challenges for Improvement
- Alliance for Advanced Technology
- Technology Developments
- Development History & References
- Today’s Advanced Technology
- Highlights
- Summary
Melamine Production

HP Process > 80 bar
- Liquid Quench
- Gaseous Quench

LP Process < 10 bar
- Liquid Quench
- Gaseous Quench

Lurgi’s Choice
Lurgi’s Choice is based on:

- **Product**: Highest Quality
- **Consumption**: Low Raw Material Consumption
- **Process**: Straight forward
  - No HP
  - No Water Quench
  - No Corrosion
  - No Complicated Rotating Equipment
  - No Drying Unit
  - Lowest Investment
Process Flow Diagram

Urea Scrubber → Urea Cooler → Urea Pump → Gas Melt

Gas Scrubbing

Urea Pump → Bed Compressor → Gas Scrubber

Urea Melt → Gas Cooler

Gas Scrubbing

Ammonia → Catalyst Fines → Circulation Gas Blower

Reaction and Filtration

Gas Cooler → Reactor → Filter

Crystallization and Separation

Off-Gas to Treatment → Crystallizer → Melamine Product
Needs for Improvement even on a solid Technology Basis

Most important Requirements have been identified:

- Improved Economy of Scale
- World Scale Capacity in a Single Train
- Higher On-Stream Efficiency

⇒ Target: ADVANCED TECHNOLOGY
Melamine: Latest Technology Improvements
Alliance for Advanced Technology

Edgein
Technology Developer & Producer

- Proven Technology
- Vast Operation Experience
- Reference Plants
- Training at Site
- Site Visits
- Support during Commissioning and Start-up
- Service during Production

ALLIANCE
Exchange and Cooperation

Advanced Technology

Lurgi
Technology Licensor & Engineering

- A Century of Experience in Technology Licensing
- Experience Petrochemical/Chemical Technology
- High Competence in Value Engineering and Process Optimization
- Project Execution World Wide
- World Wide Support in Project Development
  - Financing
  - Product Off Take
  - Partnering

Client
### Melamine: Latest Technology Improvements

#### Development History & References

<table>
<thead>
<tr>
<th>Time Period / Year of Start-up</th>
<th>Plant Capacity [mt / y]</th>
<th>No. of Plants</th>
<th>Status</th>
<th>Technology Generation</th>
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Results:

- Confirmed Existence of Technology Advantages (e.g. Product Quality)
- Higher Plant Capacities at Moderate Additional Capital Cost
- World Scale Capacity in a Single Train
- Higher On-Stream Efficiency

Achieved by:

- Operational Experience out of Many References
- Optimum Adaptation of Equipment to the Process Needs
- Adapted Process Conditions (e.g. Elevated Pressure)
- Improved Design of Equipment (Better Availability)
Achieved Melamine Product

Characteristics:

- High Purity (> 99.9 wt%)
- Low Water Content (0.02 – 0.04 wt%)
- Excellent Whiteness/Color (APHA ~ 5)
- Small Particle Size
- Uniform Particle Distribution, no Lumps (Narrow Span)

Reasons:

- Efficient Product Separation
- No Water Quench
- No Corrosion Problems
- Gas Phase Crystallization/Desublimation

⇒ Perfect Product for all Downstream Applications, including Paints and Coatings
Technology and Operation:

- Simple and Straight Process
- Easy to Operate
- Less Process Steps / Equipment
- Use of Standard Equipment and Standard Steel Grades
- Less Maintenance

→ Higher On-Stream Time
Lurgi’s Melamine Process:

- Proven and Reliable Technology
- Lowest Investment
- Low Raw Material Consumption
- Highest Melamine Product Quality
- Most Suitable for all Downstream Applications
- Economy of Scale

➡️ The Technology of Choice
Thank you for your attention!