



U.S. Department of Energy
Energy Efficiency and Renewable Energy

industrial technologies program

Plant Energy Profiler

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Agenda

- ❑ Introduction to Quick Plant Energy Profiler (QuickPEP)
- ❑ Introduction to Styrotek, Inc plant
- ❑ Application of QuickPEP tool at the Styrotek plant
- ❑ Results & Discussions
- ❑ Summary & Conclusions



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US Department of Energy's

QuickPEP Tool

Quick Plant Energy Profiler Tool

Website

<http://www1.eere.energy.gov/industry/quickpep>



QuickPEP evaluates the Big Picture in your Plant

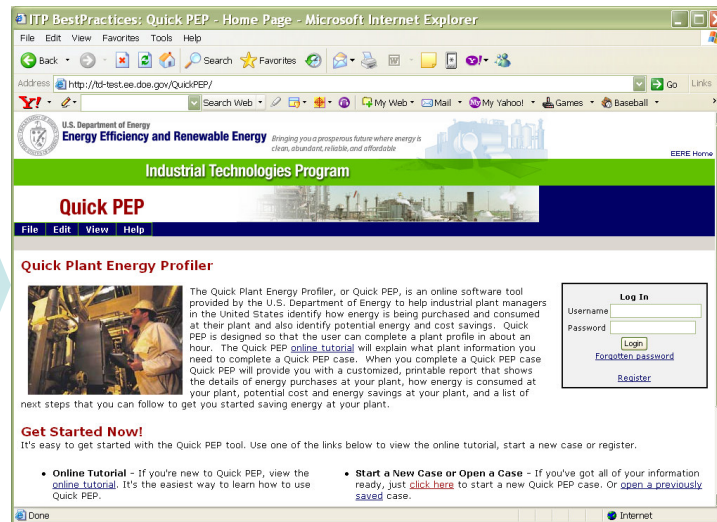
- ❑ 5,000 – 10,000 ft level approach
- ❑ Looking at the forest first
 - Understanding your plant from an energy supply & demand perspective
 - Different supply streams
 - Different energy consumption (conversion) systems
 - Puts everything down on one piece of paper
- ❑ Limited resources
 - Time – major constraint
 - Available information



QuickPEP Tool

INPUTS

- Plant description
- Utility supply data – electricity, fuel & steam
- Energy consuming system information
- Scorecard responses



OUTPUTS

- Overall picture of plant energy use
- Summary of energy cost distributions
- Preliminary assessment & comparison
- Areas for energy efficiency improvement
- Energy cost reduction potential



Styrotek, Inc. Plant

- ❑ Location – Delano, CA
- ❑ Feedstock – EPS beads – B bead sizes
- ❑ Product - Expandable Polystyrene (EPS) Foam Produce Containers
- ❑ Plant 1 – 24 machines
- ❑ Plant 2 – 14 machines
- ❑ Plant operates 10 months – 24x7
- ❑ Annual Production – 17,000,000 boxes
- ❑ Annual utility (gas & electric) - \$2,500,000

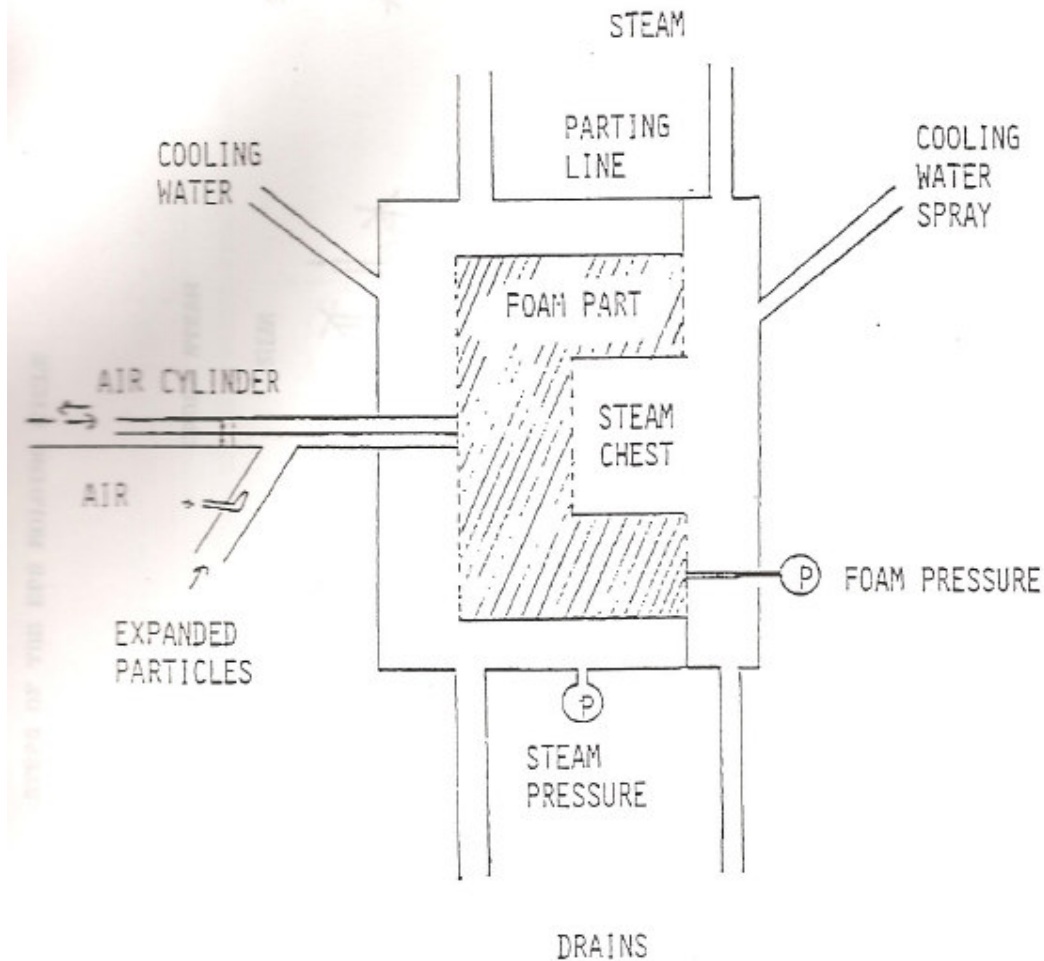


EPS Molding – Basic Requirements

- ❑ Molding machine
- ❑ Steam supply (volume, pressure and quality)
- ❑ Air supply (volume, pressure and quality)
- ❑ Water supply (volume, pressure and quality)
- ❑ Vacuum supply
- ❑ Press controls (steam, air and water)



Typical EPS Mold



- ❑ Raw material – 40 lb/ft³
- ❑ Five step process
 - Close the Mold
 - Fill the Mold with beads
 - Fuse the Foam
 - Cool the Mold
 - Open / Eject
- ❑ Finished product – 2.5 lb/ft³



Styrotek, Inc. Plant – Major Equipment List

□ Boilers

- CB 400 Hp
- CB 700 Hp
- BOSS Oxidizer 450 Hp

□ Air Compressors

- Sullair 125 Hp
- Sullair 200 Hp
- Gardner Denver 125 Hp
- Man ICE 375 Hp

□ Presses

- 38 Press Hydraulic presses (5 hp each)

□ Vacuum Pumps

- Nash Vac Pump 125 Hp
- Nash Vac Pump 50 Hp
- Nash Vac Pump 20 Hp
- Nash Vac Pump 20 Hp
- Sutorbilt Blower 60 Hp

□ Water Pumps

- Paco Pump 100 Hp
- Cooling Tower 50 Hp
- Pit Pumps 25 Hp



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Styrotek, Inc. Plant – QuickPEP Tool Application

**QuickPEP Tool
Demonstration**



Styrotek, Inc. Plant – Recommendations & Next Steps

- ❑ Increase hours of usage of ICE air-compressor
- ❑ Follow through on QuickPEP recommendations
- ❑ Steam turbine-driven boiler feedwater pump
- ❑ Boiler tune-up & addition of feedwater (or condensing) economizer
- ❑ Sequencing of boiler operations
- ❑ Waste heat recovery from the stack of the ICE compressor
- ❑ Provide training to plant personnel on DOE tools
- ❑ Pursue cost-share support on energy savings projects with Gas Company



QuickPEP - Summary & Conclusions

- Use a top-down approach at your plant with QuickPEP as a starting point to:
 - Understand energy flow
 - Identify cost impacts
 - Identify potential energy cost reduction project areas
 - Benchmark plants at a corporate level
 - Benchmark individual systems at the plant level
 - Monitor performance over a period of time



Summary & Conclusions

- ❑ Prioritize different energy systems based on energy savings potential and undertake an ESA on each of those systems
- ❑ Continue further due diligence to implement energy savings and performance improvement projects



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Questions & Answers

