Waukesha Engine
Presentation Topics

- Waukesha Introduction
- Traditional Markets
- Alternative Applications

Christian Hanlon
Waukesha Engine
• Waukesha, WI
• 18 Acre Campus
• 900 Employees
• One million sq.ft manufacturing space
• 100th year anniversary in 2006
Product Overview
<table>
<thead>
<tr>
<th>Engine Products</th>
<th>RPM</th>
<th>BHP</th>
<th>kWb</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATGL</td>
<td>900 – 1000</td>
<td>1565 – 4500</td>
<td>1170 - 3356</td>
</tr>
<tr>
<td>APG</td>
<td>1200 – 1800</td>
<td>1390 – 4425</td>
<td>1036 - 3300</td>
</tr>
<tr>
<td>VHP</td>
<td>900 – 1200</td>
<td>246 – 1980</td>
<td>183 - 1583</td>
</tr>
<tr>
<td>VGF</td>
<td>1200 – 1800</td>
<td>160 – 1175</td>
<td>120 - 880</td>
</tr>
<tr>
<td>VSG</td>
<td>1200 – 1800</td>
<td>85 – 250</td>
<td>60 - 186</td>
</tr>
</tbody>
</table>

**Waukesha Engine Products**

**Power Ratings**

<table>
<thead>
<tr>
<th>RPM</th>
<th>BHP</th>
<th>kWb</th>
</tr>
</thead>
</table>
What Markets Do We Serve?

60% Gas Compression
35% Power Generation
5% Mechanical Drives
Waukesha VHP
Reliable Gas Compression
Joint funding through Waukesha’s partnership with the US Department of Energy has allowed Waukesha to go well beyond conventional engine practices in developing the world’s most advanced 1 Megawatt engine.
Mechanical Drive Applications

- Water/Flood Pumps
- Air Compressors
- Direct Drive Chillers
- Oil & Liquid Pumps
- Air/Gas Blowers
- Hydraulic Pumps
- Variable Frequency Drives
- Car Shredders
- Miscellaneous PTO Drives
Water/Flood Pumps

- Municipal Pumping Stations
- Flood Control-Drainage Areas

- Excellent Availability
  - No onsite fuel storage/refill issues
  - No electric grid dependence/integrity issues

- Water District Safety/Security
Water/Flood Pumps

Four VHP L5790G engines driving right angle turbine pumps.

VGF F18G driving a right angle gear pump.
Air Compressors

- High volume compressed air supply
- Large manufacturing operations

- High Reliability
  - Continuous duty engines stay running
  - Quick recovery under load
  - Air supply not dependant on electricity
Air Compressors

VGF F18GSID driving a LeROI Air Compressor. Providing shop air for a manufacturing facility.
Direct Drive Chillers

- Building space cooling
- Chilled liquid for manufacturing

- Strong Engine Turndown
  - Consistent power/torque through load cycle.
  - Easily match engine’s energy consumption to demand for cooling.
Direct Drive Chillers

Three 12V-AT25GL engines driving 4000 ton York centrifugal chillers. Cold water for building air conditioning.
Oil & Liquid Pumps

- Material handling and transmission
- High pressure liquid processes

- Strong Engine Turndown
  - Consistent power/torque through speed range.
  - Steady head pressure with variable flows.
Oil & Liquid Pumps

Two VHP L7042GSI driving petroleum liquid pump.

VGF F18GSI driving packaged Leistritz oil pump.
Air/Gas Blowers

- Landfill Gas Collection
- WWTP – Lagoon aeration
- Manufacturing Air Handlers

- Efficient, Proven Technology
  - Fuel readily available in Low Btu applications.
  - Continuous duty engines and Roots blowers.
Air/Gas Blowers

Three VHP L7042G driving aeration blowers.

VHP L7042G driving air blower.
Hydraulic Pumps

• Oil and Liquid Pumping
• High Pressure Applications
• Cyclical Process Manufacturing

• Efficient Control of Power
  • Minimal power loss with hydraulics.
  • Engines able to handle extreme cyclic loads.
Hydraulic Pumps

Hydraulics used to power Weatherford Ram Pump.

VGF H24GL driving hydraulic pump.
Variable Frequency Drives

• Variable Speed Chiller Drive
• Efficient Building Cooling

• Power to Match Cooler Load
  • Chiller controls speed of Enginator.
  • Efficient use of fuel, maintains emissions.
  • Chiller available during power outages.
Variable Frequency Drives

Chiller electrically coupled to a dedicated Enginator.
Car Shredders

• Scrap Metal Yards
• Shred Entire Cars and Volume Metal

• Unmatched Power and Load Response
  • Waukesha rich burn engines easily handle drastic load swings and variable speeds.
  • Consistent torque through speed range.
Car Shredders

VHP L7042GSI with belt drive pulleys for car shredder.
Miscellaneous PTO Drives

- Any Alternative Application.
- Dependable Availability, High Uptime
- Common PTO Interface for Easy Coupling
Summary

• Waukesha has a 100 year proven history in engine drive applications.
• Gas Engines have more uses than just the common generator/CHP.
• Gas Engines offer availability and reliability not found with electric motors.
• Waukesha excels in applications with large load steps and varying speeds.
Powering the World

Waukesha has Power for the Application
Thank You

Christian Hanlon

Waukesha Engine, Dresser Inc.
16701 Greenspoint Park Drive, Suite 120
Houston, TX 77060

direct: 281-775-4006
cell: 281-660-8413
christian.hanlon@dresser.com