



New & Improved VHP Series Five Rich-Burn Gas Engines

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Agenda

- ESM2—Next generation engine control
- Enhanced rich-burn cylinder head
- VHP Series Five



GE's Waukesha ESM2

ESM2 - Features/Benefits

- No laptop required for commissioning or parameter changes
- Module LED flash codes obsolete
- Optimized ignition timing over WKI range (3D map)
- Oil pressure differential and pressure permissive added; exhaust and main bearing temps read by ESM2
- 12" (15" & 19" options) touch-screen HMI w/ all operating parameters, fault monitoring, logging
- Service tool capability integrated
- Upgrade kits to ESM2 for all Series Four VHP GSI engines



Applies To:

- F3514/24GSI
- L5794GSI
- L7042GSI S4
- L7044GSI
- L7042GSI S5
- L7044GSI S5

Availability Date:

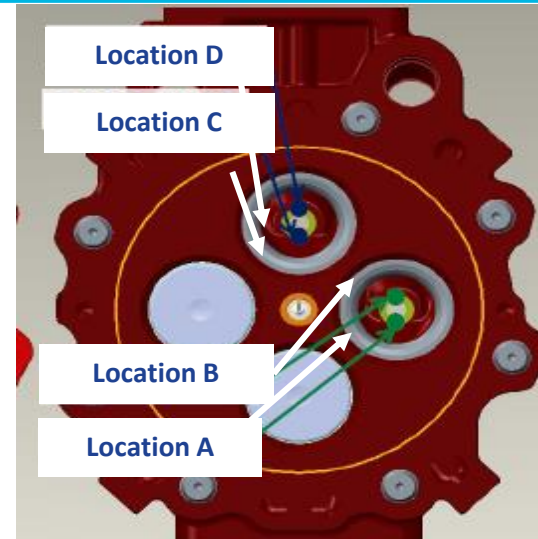
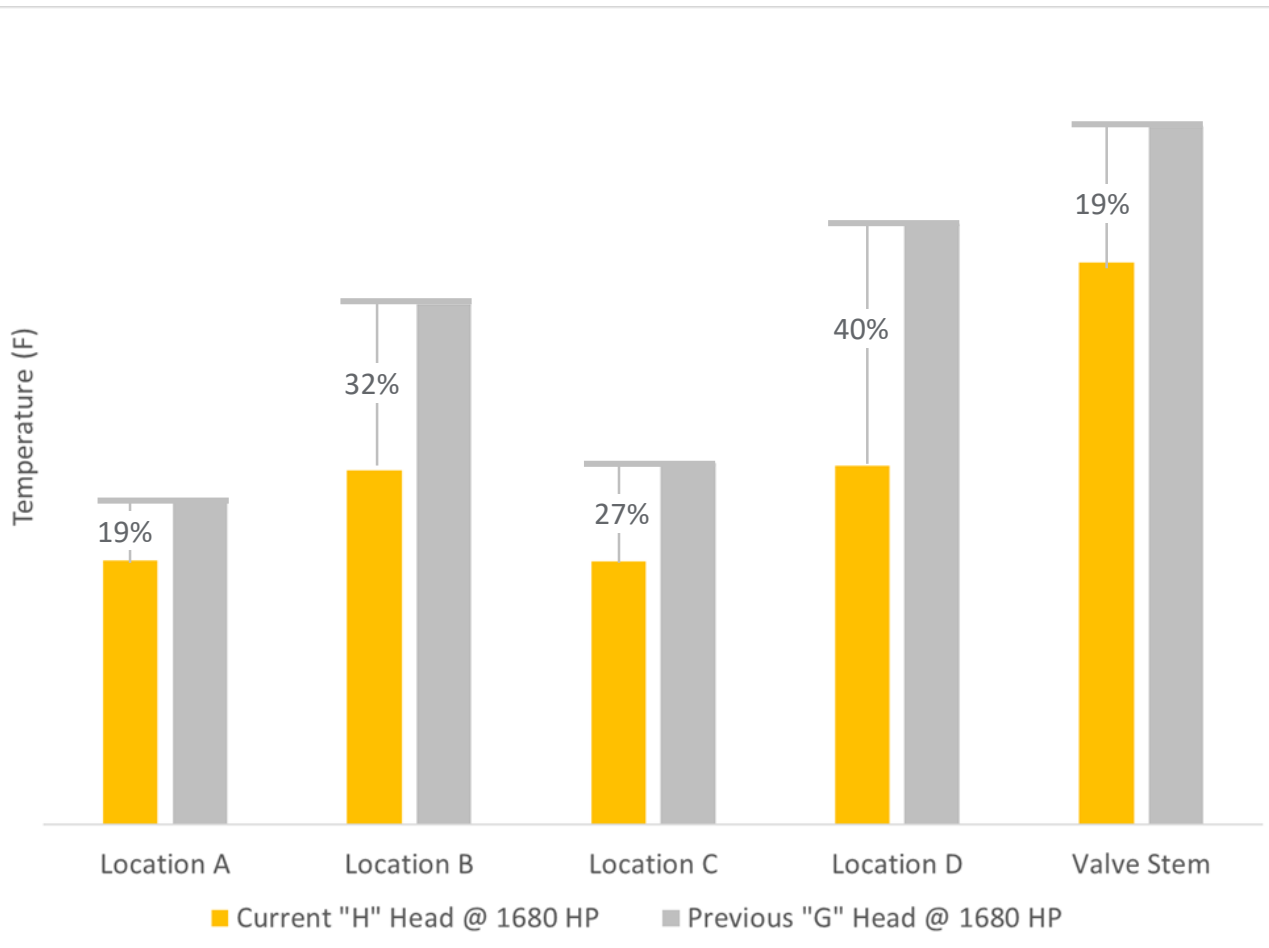
- In production-- standard on units shipped from factory on/after July 1, 2017



Enhanced VHP Rich-Burn Cylinder Head

Enhanced Cylinder Head

Lower Temps → Longer Life, Higher Reliability, and More Power



- Up to 40% cooler guide temps w/less variation increases reliability and head life to 30k hours
- Direct replacement for "G" head
- "H" included on Series Five

Applies To:

- F3514/24GSI
- L5794GSI
- L7042GSI S4
- L7044GSI
- P9394GSI
- L7042GSI S5
- L7044GSI S5

New Units Availability Date:

- In production—standard on units shipping on/after February 1, 2018

Service Availability Date:

- Currently available to order



Series Five VHP Rich-Burn Engine

VHP Series Five—What is it?

- Enhanced version of 12-cylinder 7042/7044GSI engine
- 7044GSI S5 = 1900 hp @ 1200 rpm; 7042GSI S5 = 1500 hp @ 1200 rpm
- Smarter, not harder
- Reduced temps for more power
 - Enhanced rich-burn combustion for reduced exhaust temps similar to 9394GSI
 - Cylinder head updated to reduce temps in valve guide/stem region
 - Optimized piston/ring design reduces piston temps
- More fuel flexibility & increased efficiency
- 4k hour spark plug & oil change interval for reduced OpEx

Series Five works smarter, not harder, than current production Series Four



The 7044GSI S5—Working Smarter, not Harder

1900 hp @ 1200 RPM

Piston/Ring/Liner

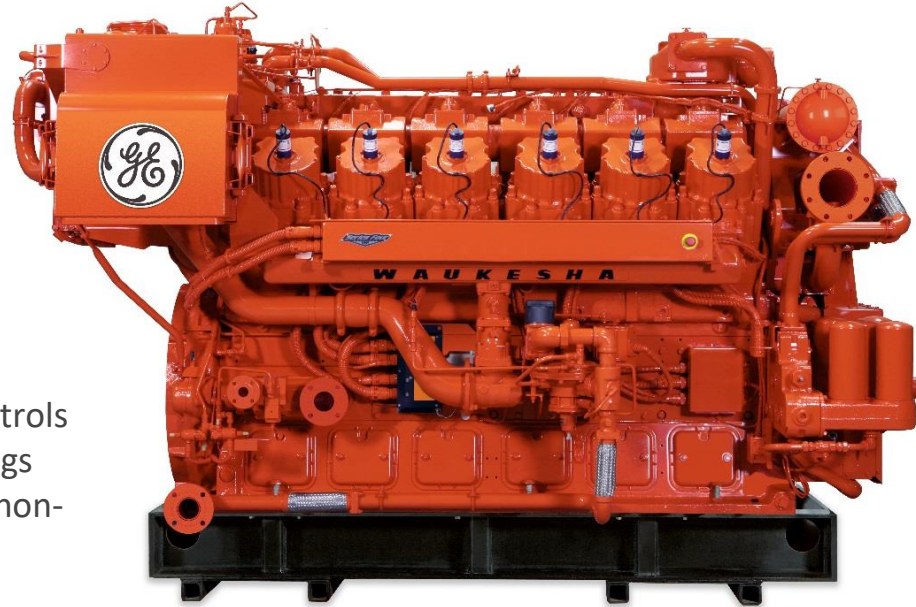
- Reduced piston temps
- 4k hour oil change interval
- Improved low-load oil consumption
- Improved fuel flexibility

Controls

- Next generation ESM2/AFR2 controls
- New ignition module & spark plugs
- 4k hour spark plug interval with non-precious metal plugs

Cylinder Heads

- Enhanced design/improved cooling
- 30k hour life and improved reliability



Unchanged from Series Four

- Centerline, mounting/connection points; allows for drop-in replacement

Performance Benefits

- Modified rating approach—1900 hp w/no overload
- +10% fuel consumption reduction = 7111 BTU/BHP-HR
- Improved fuel flex--full power to 55 WKI (1200 Btu/ft³ LHV); no fuel derate on L7042GSI S5
- 0.15 g/hp-hr NO_x

Available On:

- L7042GSI S5
- L7044GSI S5

Full Production Availability Date:

- 3Q18

Service Availability Date:

- 3Q18

1900 HP available because engine works smarter, not harder, with reduced temps and improved controls



The 7042GSI S5—Ultimate Flexibility

1500 hp @ 1200 RPM

L7042GSI S5		Comp. Product
1500	HP	1380
115	Displacement (L)	69
1200	Engine Speed (rpm)	1400
141	BMEP (psi) Brake Mean Effective Pressure	180

Same components/dimensions as 1900 hp 7044GSI S5

- Power limited by ESM2 calibration
- Pricing adjusted on \$/hp basis

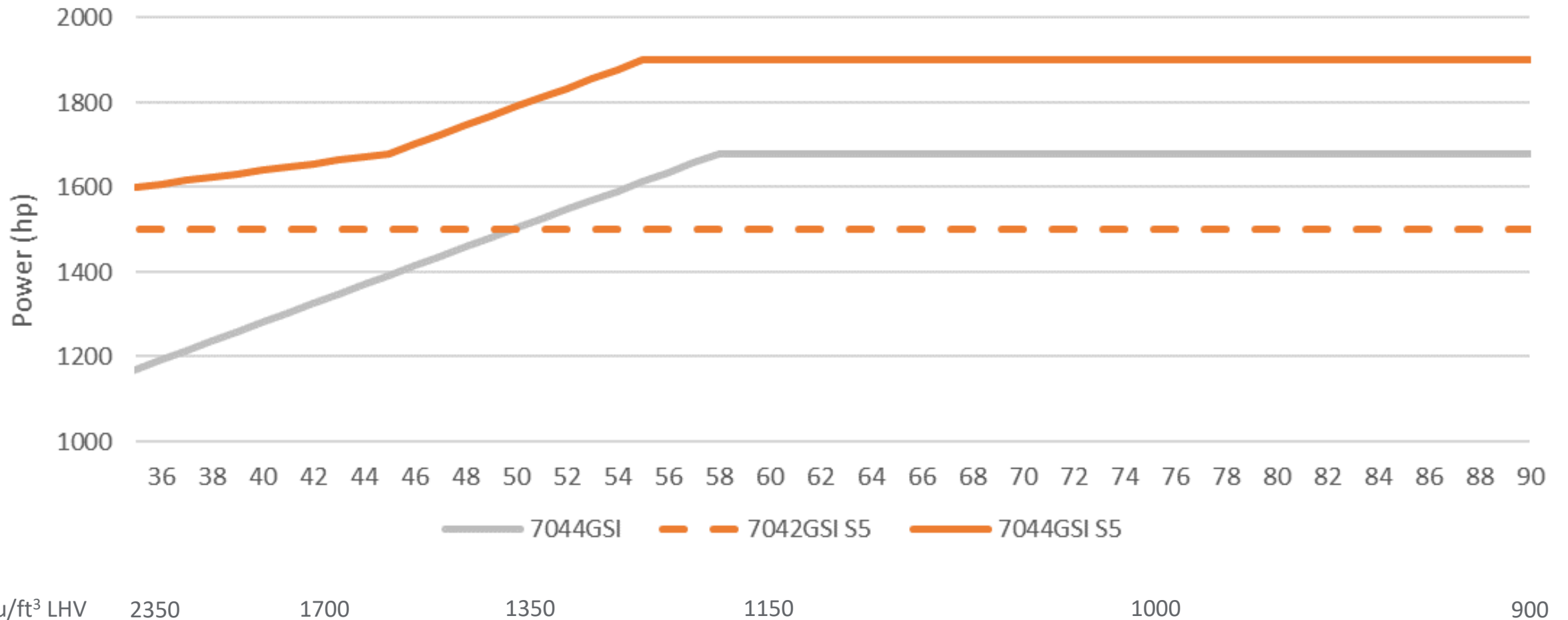
L7042GSI S5 creates power w/ displacement at lower BMEP—engine doesn't work as hard

- More power (1500 hp vs 1380 hp) than competitor
- Lower BMEP (141 vs 180 psi) increases operating window and reliability:
 - No fuel derate – full 1500 hp to 2300 BTU/ft³ LHV (35 WKI)
 - Full power at 120F ambient
- Lower emissions w/ 3-way catalyst

No derate—full 1500 hp—on almost any site



Series Five—More Power & Fuel Flex



Series Five Summary

7044GSI S5 – 1900 hp & 7042GSI S5 – 1500 hp from same components

- More power
- More fuel flexibility
- Better fuel efficiency
- Longer oil change and spark plug intervals
- Lower temperatures
- Higher reliability

Series Five improves on proven technology. Engine works smarter, not harder.



