



What range of fuel can Waukesha Gas Engines burn?

Our engines and gensets can run on fuels as high as 2350 BTU/scf; in the case of the 7042 GSI S5, with no derate. They can also handle up to 50 micrograms/BTU of H₂S (ex: ~1000 ppm with commercial quality natural gas), although three-way catalyst requirements may require lower levels. Our ESM2 fuel system can also handle fuel swings of +/- 150 BTU without adjustment. We also have LPG options available; contact us for details.

What emissions levels are your engines/gensets capable of?

Our lowest published levels for our rich burn engines and gensets (using a three-way catalyst) are 0.15 g/bhp-hr NO_x and 0.3 g/bhp-hr CO, but we have made lower levels available as part of a Special Application Approval (SAA). We also feature very low VOC and methane emissions levels, which help keep CO₂e/GHG levels low.

How do they compare with gas turbines, esp. smaller (< 10 MW) units, including microturbines?

Rich burn gas engines and gensets offer advantages vs. gas turbines, specifically with regards to derate and total cost of ownership. At elevated ambient temperature and altitudes, turbines can experience significant derates, which can drive up their specific upfront cost (\$/kWe), making them less attractive vs. rich burn gas engines. Because Waukesha engines for power generation are virtually identical to their gas compression versions,

the same labor force can service both drivers. Waukesha can provide a total cost of ownership analysis, including upfront cost and expected operations expenses (including fuel cost).

Can gas engine-driven gensets be used for front-of-meter utility applications?

Yes. Today's electrical grid faces a unique set of challenges: a) changing power generation mix - growing dynamic power sources like renewables, declining baseload power sources like coal and nuclear, b) aging transmission and distribution infrastructure, c) environmental events taking power offline and straining the grid. Because of all these factors, adding grid resiliency is becoming more critical. Rich burn gas engines can provide this benefit to utilities as a front-of-meter resource that is distributed, low emission, quick to start/load, and readily dispatchable. Competing rich burn engines/gensets are typically built for standby use with a max rating of ~1 MWe vs. Waukesha engines that can be used for standby and/or continuous use and have a max rating of 1.8 MWe.

How can Waukesha engines compete with diesels in the drilling rig application?

Waukesha's rich burn engines have load acceptance performance that is similar to diesels, so they run well in the highly transient load cycles of a drilling rig. With the implementation of Tier 4 and the additional exhaust after-treatment (diesel particulate filters, oxidation catalysts, and/or selective catalyst reduction systems) that are required to meet that emissions standard, the upfront and operating cost difference between natural gas and diesel has been drastically reduced, making a natural gas option a smart choice. Waukesha has also made several product improvements recently to better serve this market going forward.

Can you use your engines for heat recovery/CHP/cogeneration applications?

Yes. Because rich burn engines have a higher exhaust temperature than lean burns, they are great fits for applications where high-quality heat can be used to heat buildings or oil and gas process streams, which helps to reduce site emissions and save on additional fuel cost. In oil and gas

specifically, the combination of high fuel flexibility with hotter exhaust energy vs. a lean-burn gas engine gives Waukesha engines an advantage for CHP applications.