

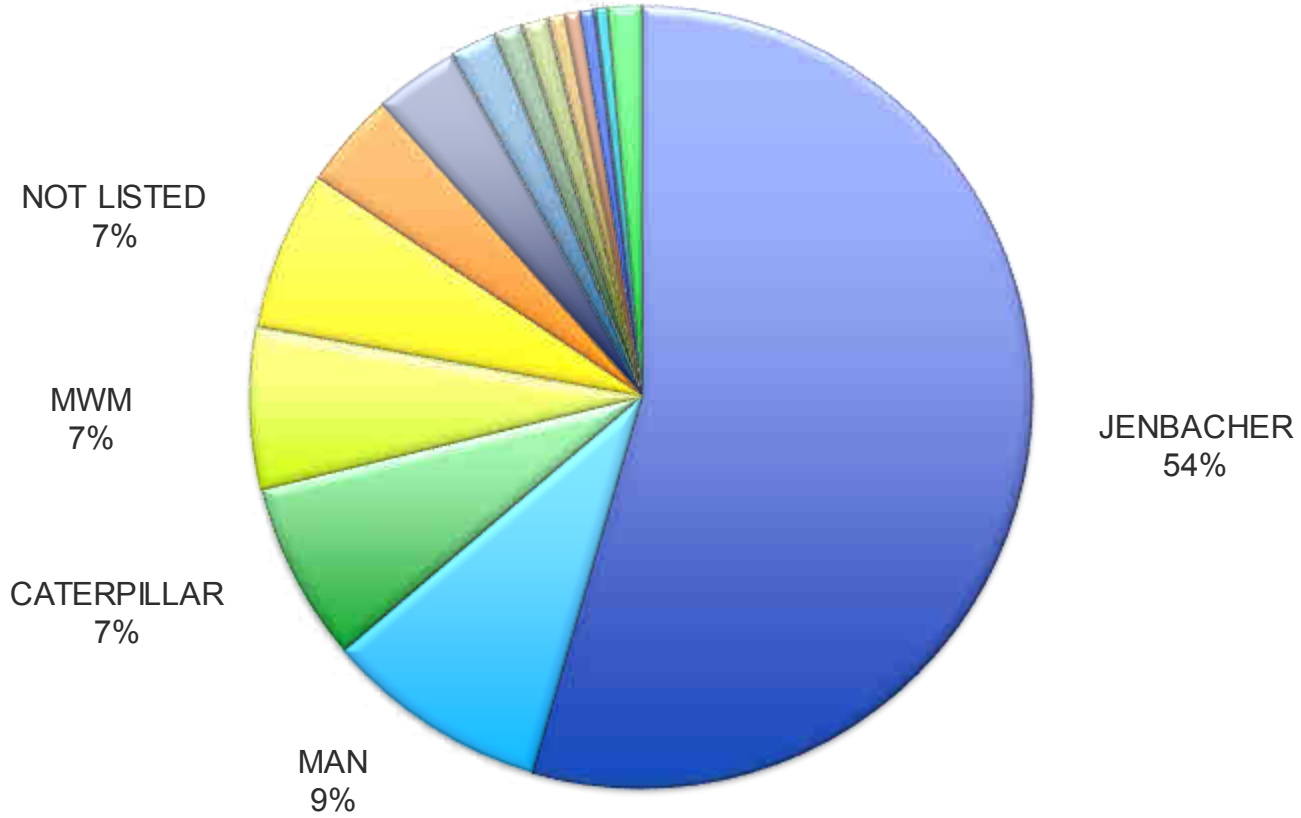
2 May 2019

Another step forward in gas engine lubrication?

Energy lives here™

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Landfill Gas UOA (Global)



Engine Development Drivers

- Increase efficiency and reduce emissions (CO, HC, Nox)
 - Increase compression ratio
 - Reduce crevice volume
 - Use of cutting rings
 - Reduce top piston ring height
- Higher compression ratio reduces clearance
 - Makes engine sensitive to ash deposits
- Newer GEO products generally lower ash
 - Limits potential oil life
 - Could reduce load carrying ability

Jenbacher Approved Oils (Landfill Gas)

Lubricant	2 & 3	4A & 4B	TBN	Sulphated Ash
Petro Canada Sentron CG 40 Plus	Y	Y	4.5	0.52
Chevron HDAX 9500	Y	Y	4.5	0.55
Repsol Long Life Biogas 4005	Y	Y	4.5	0.55
Valvoline GEO Plus LA 40	Y		4.5	0.55
Shell Mysells S3 N		Y	5	0.45
Shell Mysella S5 S	Y	Y	5.3	0.57
Mobil Pegasus 605 Ultra	Y	Y	5.3	0.6
Total Nateria MH 40		Y	5.5	0.45
Q8 Mahler G5	Y	Y	6	0.5
Castrol Duratec MX	Y		7.2	0.7
Q8 Mahler HA	Y		7.9	0.9
Q8 Mahler G8	Y		8	0.8
Q8 Mahler GR8	Y		8	0.8
Petro Canada Sentron CG 40	Y		8.1	0.93
Fuchs Titan Ganymet	Y		8.1	0.99
Shell Mysella S3 S	Y		8.5	0.9
Mobil Pegasus 610	Y		8.6	1.0

Our objective – what, why, and how

- Extend oil drain intervals (If silicon is not limiting oil life)
- Reduce frequency of decokes
- Reduce wear
- Reduce cost of overhauls
- Reduced downtime
 - Increased productivity
 - Increased revenue
- Listening carefully to customer needs

J320 1,006kW

119 hours competitor oil



4,184 hours on Mobil Pegasus



J320 1,006kW 475 hours



Customer Feedback

“Whatever you’re doing on [that] engine, keep doing it!”

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Fuchs Titan Ganymet	Y		8.1	0.99
Shell Mysella S3 S	Y		8.5	0.9
Mobil Pegasus 610	Y		8.6	1
Mobil Pegasus 610 Ultra			10.5	1

ExxonMobil