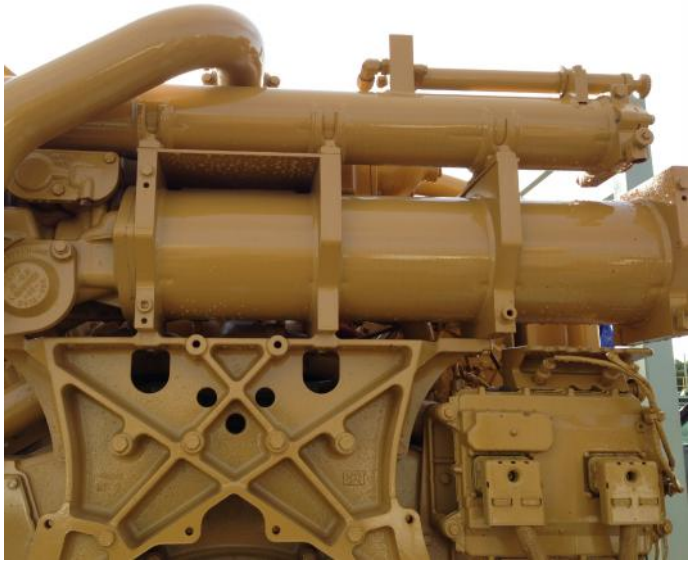
HY-PRO FILTRATION



Avoid Costly Contamination Related Engine Rebuilds

Extend Lube Oil Change Interval from 1000 hours to 2000 + hours

Hy-Pro One-Piece Element Design Easy Service (Say No to Stacking)

Protect & Extend Expensive High Pressure Fuel Injectors

Glass Media Upgrades from Hy-Pro . . . ISO Codes Right on Target

Hy-Pro glass media is rated βx[c] > 1000 which means it removes 99.9% of the rated size particles and larger. Its also good at removing smaller particles below the absolute rating. Cellulose media is rated βx[c] = 2 and only removes about 50% of the particles or the rated size and larger. All those particles that get through accumulate and can make lube oil like sandpaper wearing the inside of your engine. If you are stacking cellulose media elements like the ones listed below keep that engine rebuild in your budget, or upgrade to Hy-Pro elements and get serious about cleanliness, reliability and protecting the environment.

1. Pick The Right Lube Oil Element Upgrade . . .

Elements Stacked	Existing Cellulose Element Part Number	Hy-Pro Lube Oil Element Upgrade Part Number	Description	Engine Models
1 x	1R-0726, 4P2839, 7N7500, P557500, P7003	HPQ330524L10-25MB	Lube Oil Element	3508, 3508DITA
3 x	1R-0726, 4P2839, 7N7500, P557500, P7003	HPQ330524L30-25MB	Lube Oil Element	3512, 3516, G3508, G3512, G3516, PM3508, PM3512, PM3516, D90KS,
4 x	1R-0726, 4P2839, 7N7500, P557500, P7003	HPQ330524L40-25MB	Lube Oil Element	3508 Marine, 3512B, 3612

2. Then Pick The Right On-Board Fuel Element Upgrade. . .

Elements Stacked	Existing Cellulose Element Part Number	Hy-Pro Fuel Element Upgrade Part Number	Description	Engine Models
1 x	8N9850, 1R-0718, 1R-0756, PF7655, P559850	HPQ330758L9-3MB	On-Board Fuel Element	3508, 3512,3508DITA
5 x	8N9850, 1R-0718, 1R-0756, PF7655, P559850	HPQ330758L46-3MB	On-Board Fuel Element	3512, 3516
7 x	8N9850, 1R-0718, 1R-0756, PF7655, P559850	HPQ330758L65-3MB	On-Board Fuel Element	3508 Marine, 3512, 3516

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The Challenge

One of our long time hydraulic and lube oil solutions customers asked if we could help with their large diesel engine reliability and extend engine oil change interval from 1,000 to 2,000 hours. The initial lube oil sample we received was heavily contaminated with particles from combustion, internal wear and TBN was below acceptable levels.

Baseline Situation

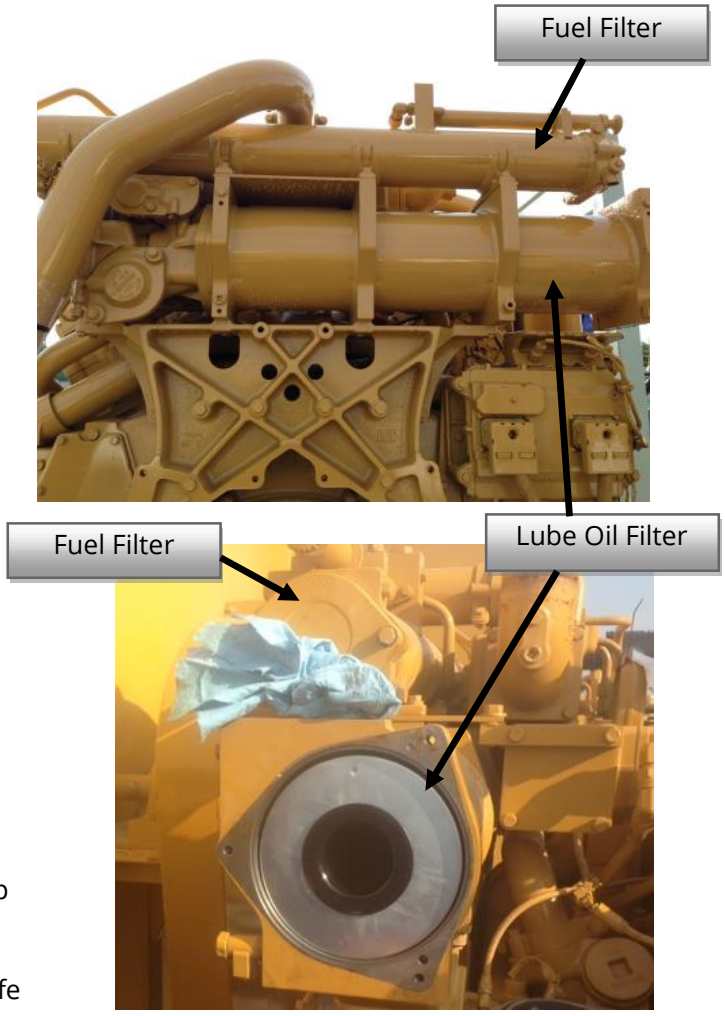
- Changing Lube Oil 1,000 hours
- Oil change costs $1,000
- Changing Filters 1,000 hours
- Current ISO Code 22/21/19
- Rebuilding engines 50,000 hours
- Top end rebuild $150,000
- Top/Lower end rebuild $300,000

Goal

- Extend oil change to 2,000 hours
- Achieve Target ISO code 17/15/13
- Maintain low element ΔP
- Extend rebuild to 60,000 hours
- Avoid contamination related premature engine rebuilds

Result

- Extend oil change to 2,000 hours
- Achieve Target ISO code 15/15/12
- After oil is cleaner than new oil
- Clean element ΔP 7.5 cold, 6.0 at operating temp
- No change in element ΔP over 2,000 hour test
- 98.9% reduction in particles 4 micron and larger
- Positive environmental by extending useful oil life



Original Lube Oil Element (cellulose media)	4«[c]	6«[c]	14«[c]
ISO Code	22	21	19
Actual Particles / ml	30,087	16,389	2,792

Hy-Pro Lube Oil Element Upgrade (DFE media)	4«[c]	6«[c]	14«[c]
ISO Code	15	15	12
Actual Particles / ml	304	165	28

Summary

A 98.9% reduction in particle 4 micron and larger should definitely translate to extension between engine rebuilds much greater than the target. There is also further opportunity to increase oil change intervals beyond the 2,000 hour success based on the ISO code results with no measureable increase in element ΔP.

Assuming 24 hour / day operation at the baseline ISO code of 22/21/19 delivered by the cellulose element, 6,742 Lbs of dirt would pass through the lubricated engine in one year. After the Hy-Pro element upgrade the amount of dirt that would pass through the lubricated engine was reduced to 54 Lbs annually. That's worth a second read.

This user is running 200+ of this engine and could save over $850,000 a year just by extending oil change interval not including cost avoidance by eliminating premature engine rebuilds caused by contamination.

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