

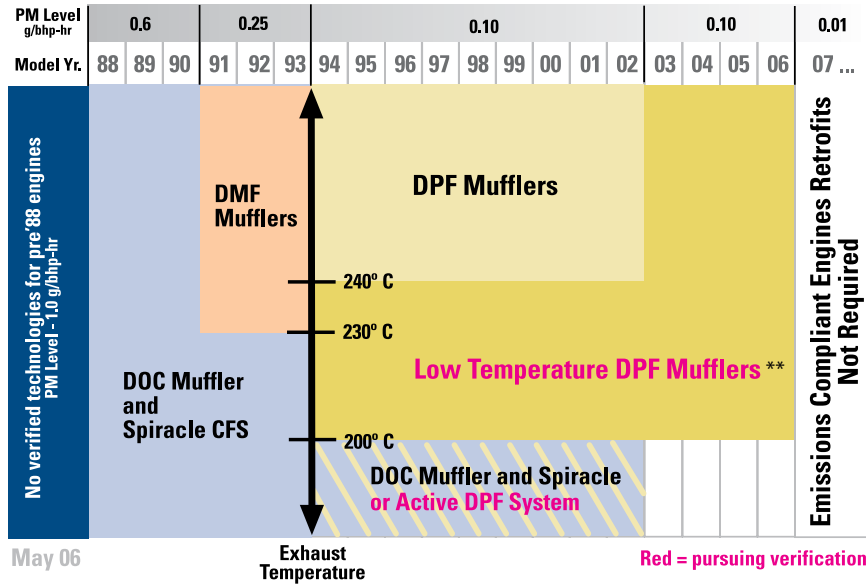


EPA and California ARB Verified Solutions



Donaldson Emissions Retrofit Solutions

Best Available Emissions Control Technologies for On-Road Diesel Engines 4 Stroke 150-600 horsepower



www.donaldson.com/emissions

Basic Technology Comparison

	Spiracle™ Crankcase Filtration System	Diesel Particulate Filter Mufflers	Diesel Multi-stage Filter Mufflers	Diesel Oxidation Catalyst Mufflers
Emissions Technology	Barrier	Wall Flow	Multiple stage flow-through filter	Flow Through
Efficiency (%)	100%	90%	71-75%	20-30%
with Spiracle CFS	--	90-95%	75-80%	25-49%
Temperature Sensitivity	None	Low** - Medium	Low	None
Fuel Type	Any	ULSD	ULSD	Any
Install Time	2-3 hrs	2-3 hrs	1-2 hrs	1-1.5 hrs
Maintenance	Filter Replacement	Ash Clean	None	None

** Low Temperature Filter (LTF) Muffler use two filters to extend the operating temperature range, verification in process.

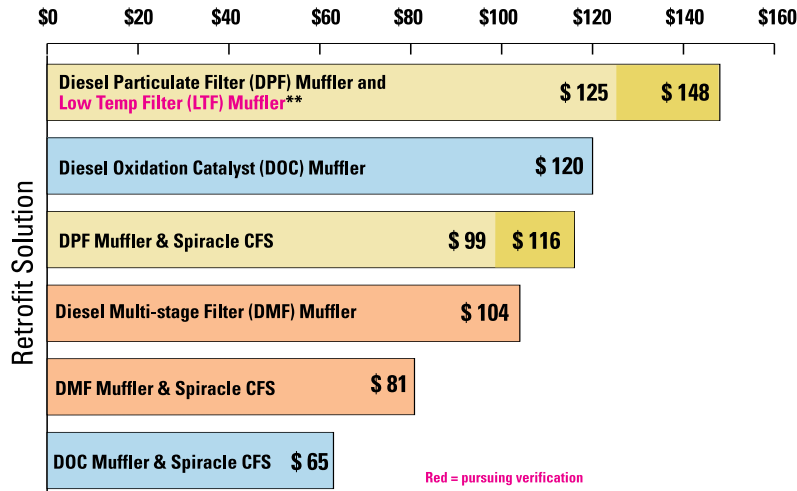
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Efficiency and Cost Comparison* by Technology

Based on FTP test cycle: 25% of emissions come from the crankcase, 75% from the tailpipe.

Emissions Technology		Highest Efficiency with Routine Maintenance (Level 3)				High Efficiency with Minimal Maintenance (Level 2)				Cost-Effective with Minimal Maintenance (Level 1 w/Spiracle)			
		Diesel Particulate Filter		Diesel Multi-Stage Filter		Diesel Oxidation Catalyst							
		DPF Muffler		DPF Muffler with Spiracle™ CFS		DMF Muffler		DMF Muffler with Spiracle™ CFS		DOC Muffler		DOC Muffler with Spiracle™ CFS	
(ER) Emissions Reduction and (RC) Relative Contribution to Emissions Reduction		ER	RC	ER	RC	ER	RC	ER	RC	ER	RC	ER	RC
Tailpipe Emissions	75%	85%	64%	85%	64%	70%	53%	70%	53%	20%	15%	20%	15%
Crankcase Emissions	25%	0%	0%	100%	25%	0%	0%	100%	25%	0%	0%	100%	25%
Total Emissions Reduced %		64%		89%		53%		78%		15%		40%	
Cost*		\$8,000 - \$11,000				\$6,000 - \$8,000				\$2,000 - \$4,000			

Cost Per % of Emissions Reduced



* Costs shown include installation and are for comparative purposes only, actual cost may vary. Spiracle CFS system cost range is \$800 - \$1,200.

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Spiracle CFS (crankcase filtration system) is registered trademark of Donaldson Company, Inc.
California ARB Site: <http://www.arb.ca.gov/diesel/verdev/verdev.htm>
U.S. EPA Diesel Retrofit Web Site: <http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm>

Brochure No. F111180 (05/02/06)
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