



# Diesel Retrofit Technologies for Off-Road Construction Equipment

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## Extengine Transport Systems

- Based in Fullerton, California.
- Designs, assembles, and installs retrofit systems for older diesel-powered vehicles and off-road equipment.
- Developed proprietary SCR system that cuts smog-causing NOx and PM emissions by as much as 90 percent without diminishing engine performance or increasing fuel consumption.
- Provides field service and technical support to users.
- Presently has the ONLY CARB-verified SCR system with NOx reduction of 80% (ADEC-1)
  - Applicable to selected Tier 0 off-road engines
  - Nearly 100 installed systems



## Typical Extengine Technology Performance

	PM Level	PM	NOx	HC	CO	Fuel Consumption
ADECI	I*	28%	88%	97%	95%	1%
20% TruBlue Biodiesel	I	30%	8%	20%	5%	-3%
LEV2	II	60%	5%	70%	80%	0%
ADECII	III	95%	75%	98%	80%	1%
MaxTRAP	III	95%	5%	95%	90%	1%

\*Verified at 25% PM and 80% NOx for selected off-road applications



## Extengine ADECI DOC/SCR System





## **New Generation Products in Verification**

### **ADEC II – Level 3 Active PM filter with SCR (75-90% NOx control)**

- currently in joint CARB/EPA verification for on-road engine applications

### **MaxTrap – Level 3 Actively regenerated PM filter**

- currently beginning aging as part of the ADECII system and has been installed on off-road construction equipment

### **LEV2 – Level 2 Flow Through Filter**

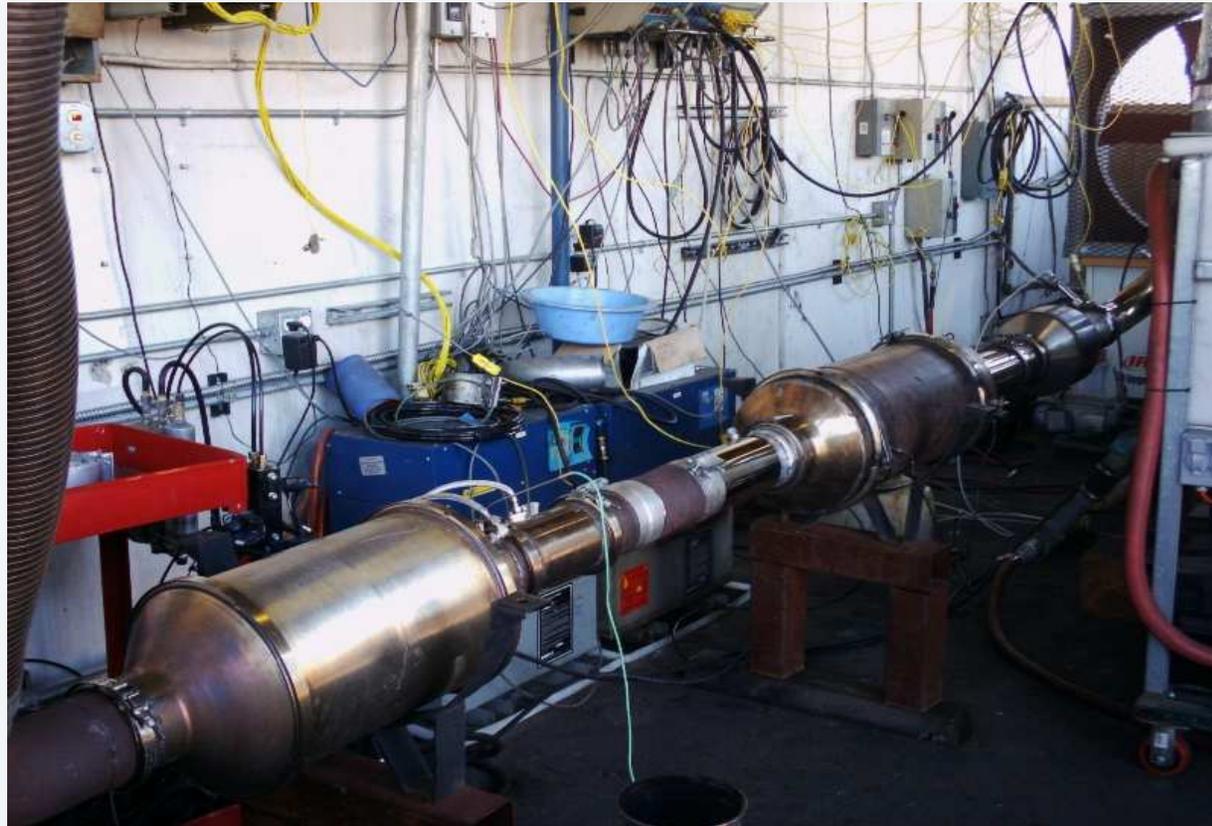
- currently in ARB verification for on-road engines as a stand alone device and combined with TruBlue biodiesel fuel

### **TruBlue - Level 1 Biodiesel Fuel**

- currently in ARB verification as alternative diesel fuel

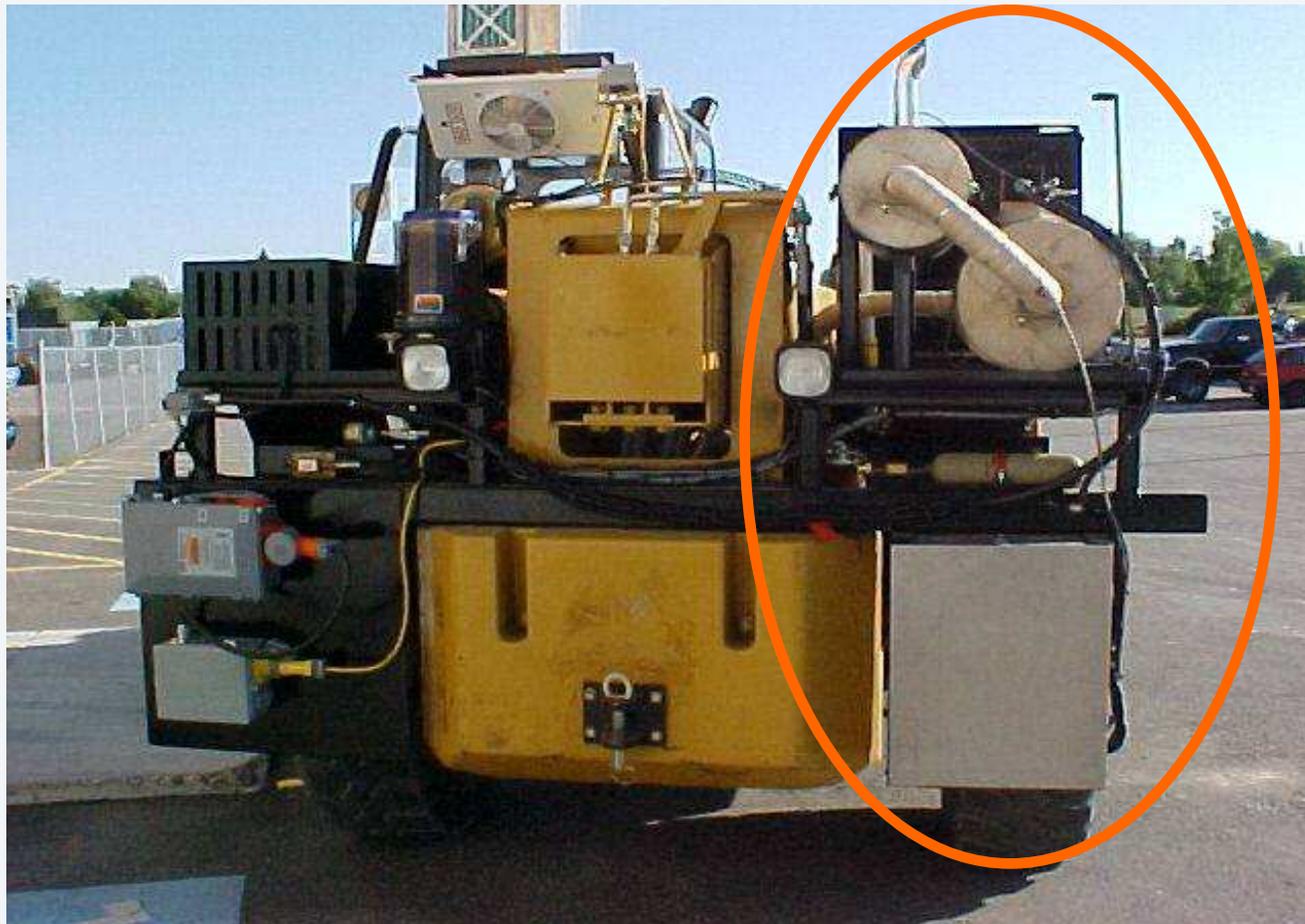


## Extengine ADECII SCR/Active DPF System Undergoing Laboratory Testing



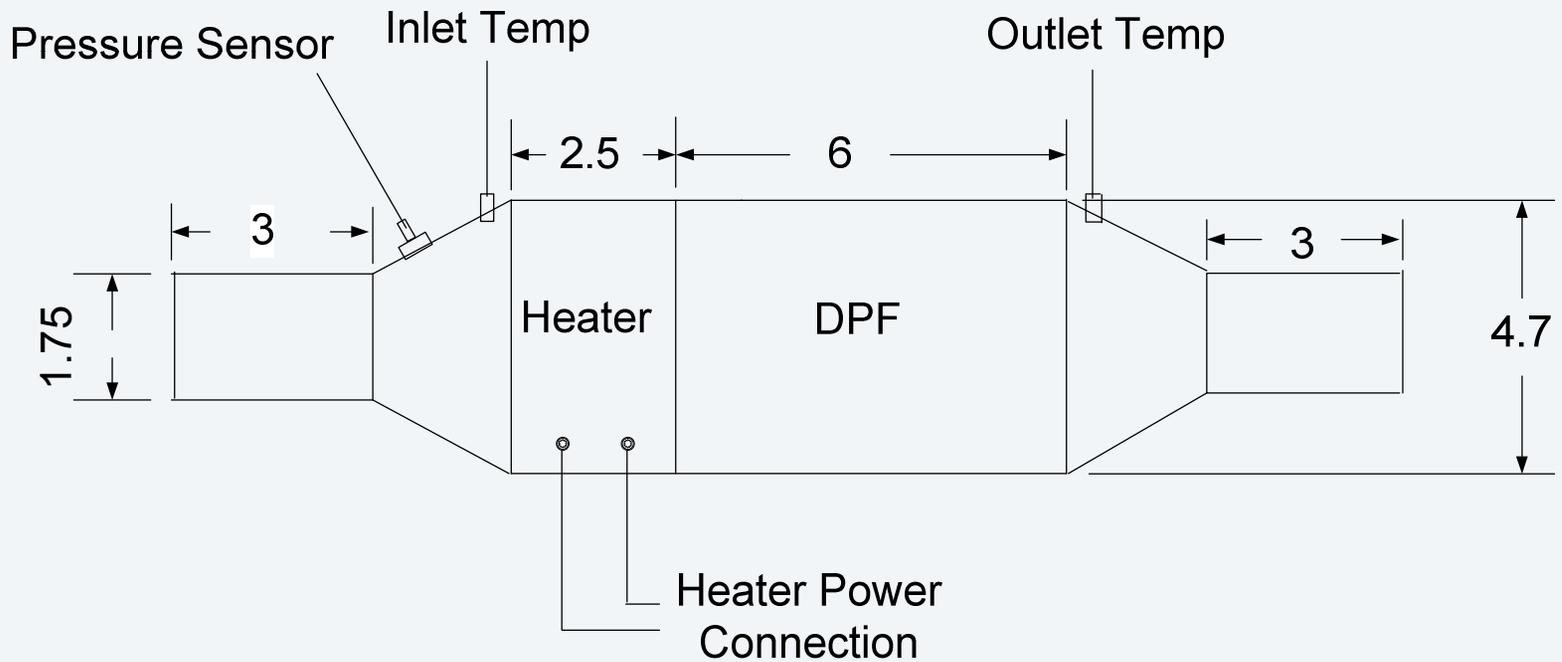


## Extengine ADECII SCR/Active DPF System Installed on Typical Front Loader



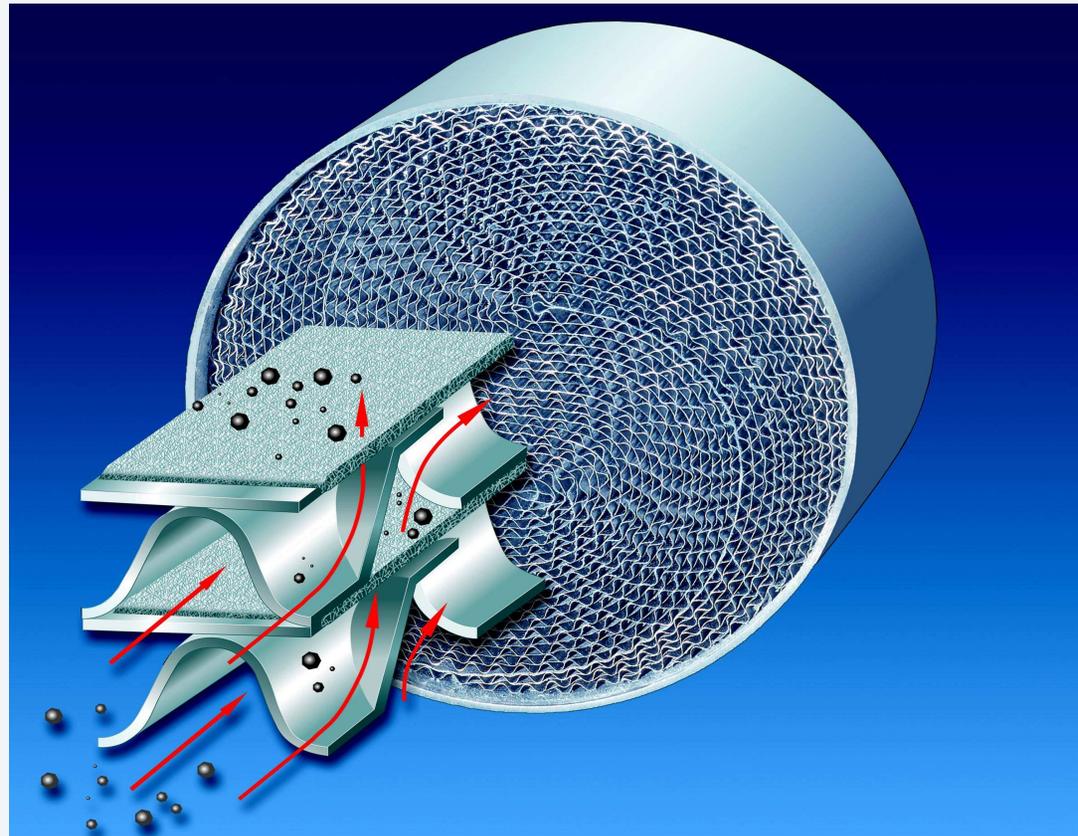


# Small Engine Active Level III Filter





## Extengine LEV2 Level II Flow Through Filter



Filter is preceded by a DOC in same 10" long body



## ADECII SCR System Components





## **Advantages of SCR for NOx Reduction Combined with PM Controls**

- Easy retrofit installation
- Very cost-effective for continuous duty NOx emission equipment
- Operating cost is approximately 5% of fuel cost
- NOx emission reductions may be surplus which could be off-set by emission credits



## Summary

Extengine has

- a verified and field proven Level1 PM system which includes NOx control.
- Extengine has new technologies for PM and NOx reduction which are available for demonstration projects in 2007.
- Extengine has PM and NOx reduction technologies that are cost-effective and have low user risk