

Engine Control Systems

Connecticut School Bus Retrofit Program Vendor Requirements and Expectations

Wednesday, February 25th, 2004

Engine Control Systems

- Founded in the Newmarket area in 1980
- ECS was acquired by Lubrizol in 1995 and is now a division of Lubrizol Canada Limited
- Market leader in diesel emission controls



Engine Control Systems

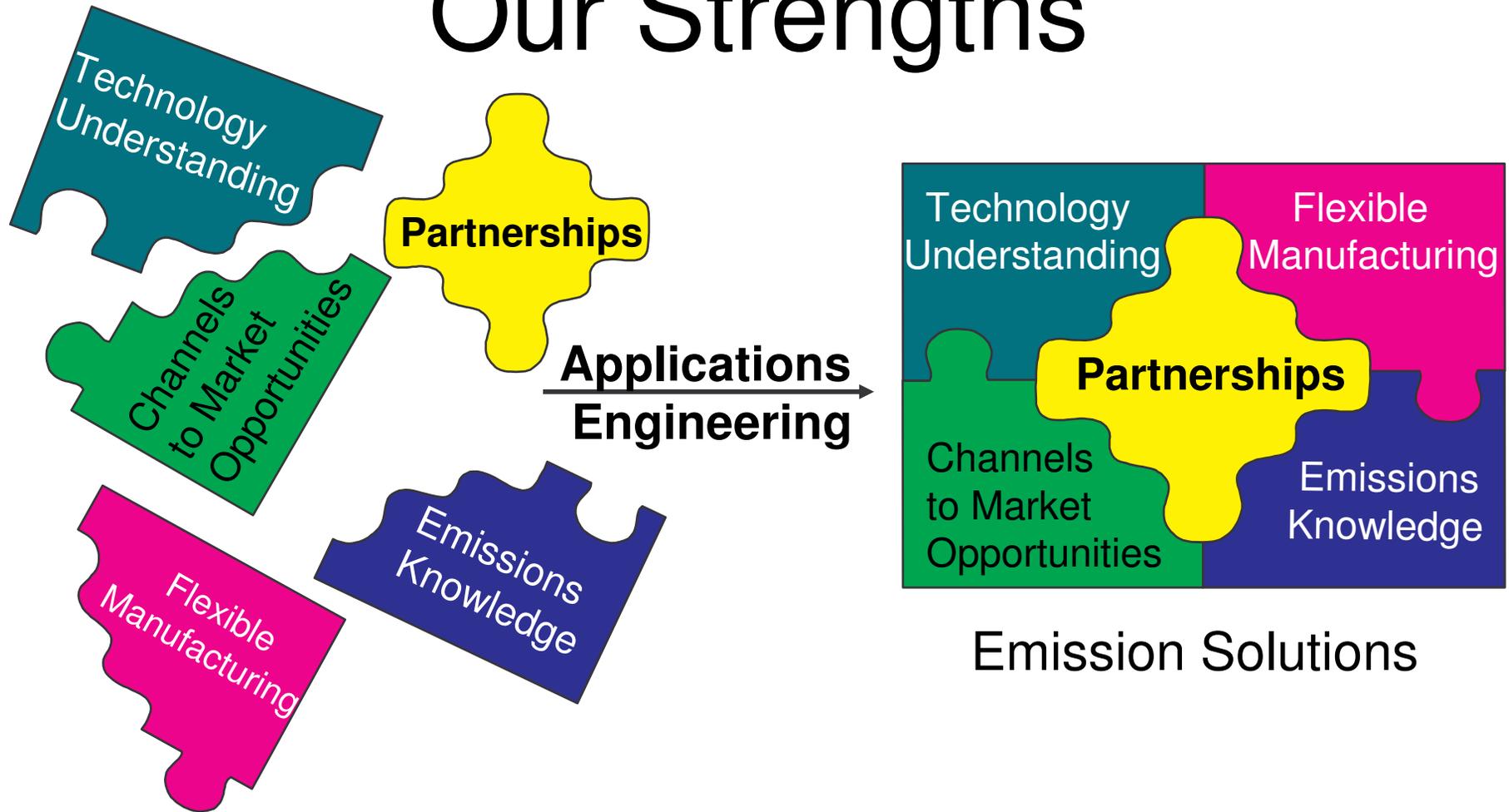
- Complete Catalytic Muffler, Diesel Particulate Filter and regular muffler manufacturing capabilities
- Complete line of accessories
 - Clamps
 - Brackets
 - Flex Tube



Customer Service

- **Technicians available to perform**
 - Fleet survey
 - Data logging as necessary
 - Installation and training
- **Grant application assistance**
 - Special Projects Manager and Environmental Policy & Regulatory Affairs department
- **Competitive pricing structure**
- **Dedicated service lines**
 - Telephone 800-661-9963
 - Technical Services email ecstech@lubrizol.com

Our Strengths



Purifilter™

- Diesel Particulate Filter with *Heat Sense* silicon carbide center body
- Reduces Particulate Matter, Hydrocarbons, and Carbon Monoxide
- Available with quick release clamps and handles for quick & safe handling
- Provided with Backpressure Monitor



Purifilter Durability Results

EPA ETV / ARB Verification Program at SwRI

Hwy FTP – HDE Transient

ULSD (<15ppm)



Engine	Purifilter Hours	PM	HC	CO	NOx
2001 DDC Series 50 urban bus	1404	92%	90%	79%	0.8%
1999 Navistar B250 7.3L school bus	1404	94%	84%	67%	0.5%

CombiClean™

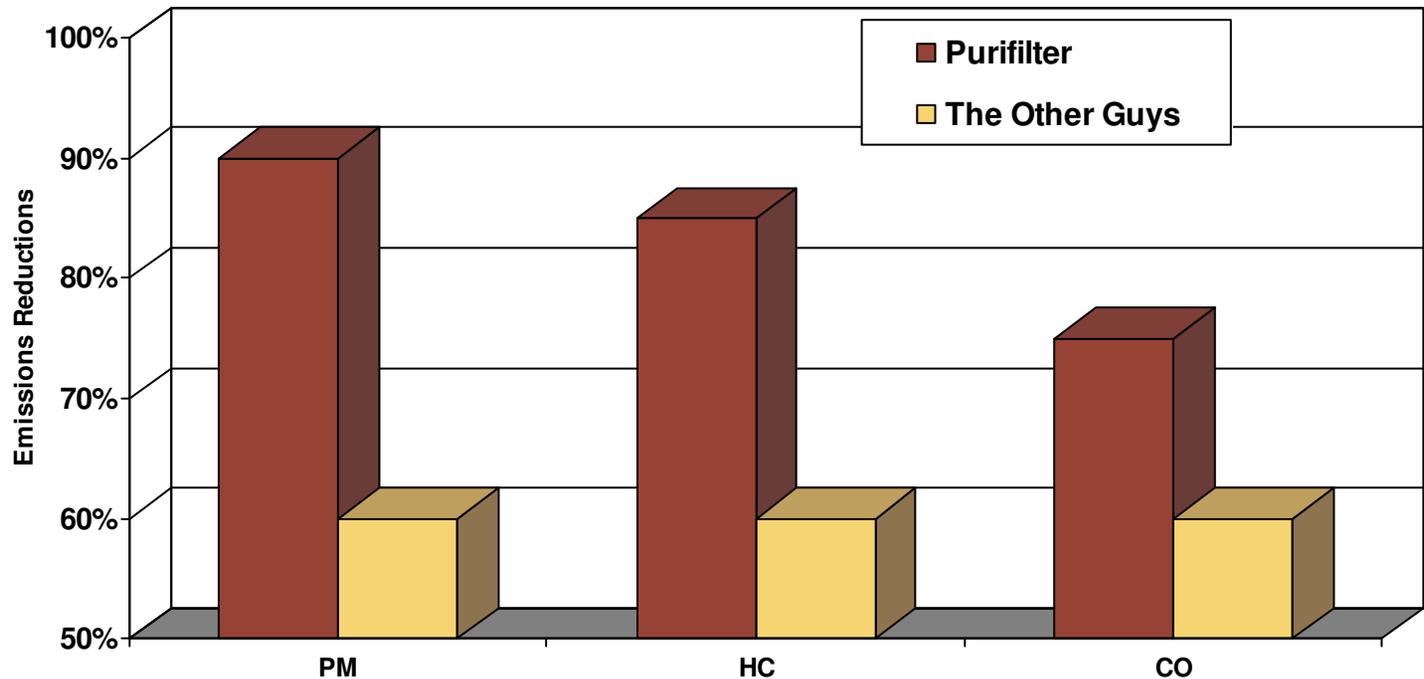
- Diesel particulate filter cleaning station designed to safely perform maintenance on all DPF's
- Easiest and most efficient way to clean and restore a filter
- Built with over 25 years proven regeneration technology
- 3-step system of vacuum – heat – vacuum
- Vacuum system removes soot and ash from filters
- Does not allow contaminants to escape into the air
- Clean cordierite and silicon carbide filter blocks between 3 and 20 liters



Purifilter Verifications

- ✓ California Air Resources Board
- ✓ US EPA (ETV will be listed in March)
- ✓ Vehicle Certification Agency of the United Kingdom
- ✓ UK Energy Saving Trust TransportEnergy
- ✓ Swedish Environmental Zones
- ✓ VERT

Purifilter Verifications



EPA values	Technology	Baseline Fuel	Fuel with technology	Particulate Matter	Carbon Monoxide	Hydrocarbons
	Purifilter	≤500ppm	≤15ppm	90%	75%	85%

Highway: Heavy Heavy-Duty, Medium Heavy-Duty; Urban Bus; 4 cycle; model years 1994 - 2003; turbocharged or naturally aspirated; non-EGR engines

Purifier US & International Price List



Part Number	Model	Type	Suggested Net (\$USD)
Purifier			
A11-0017	SC02H	1	\$2,102.00
A11-0019	SC02H	2	\$2,102.00
A11-0021	SC02H	9	\$2,102.00
A11-0047	SC02H	2	\$2,102.00
A11-0049	SC02H	9	\$2,102.00
A11-0051	SC02H	2	\$2,102.00
A11-0077	SC02H	6	\$2,102.00
A11-0079	SC02H	6	\$2,102.00
A11-0081	SC02H	10	\$2,102.00
A11-0023	SC04H	1	\$2,795.00
A11-0025	SC04H	2	\$2,795.00
A11-0027	SC04H	9	\$2,795.00
A11-0053	SC04H	2	\$2,795.00
A11-0055	SC04H	9	\$2,795.00
A11-0057	SC04H	2	\$2,795.00
A11-0083	SC04H	6	\$2,795.00
A11-0085	SC04H	6	\$2,795.00
A11-0087	SC04H	10	\$2,795.00
A11-0029	SC06H	1	\$3,894.00
A11-0031	SC06H	2	\$3,894.00
A11-0033	SC06H	9	\$3,894.00
A11-0061	SC06H	9	\$3,894.00
A11-0063	SC06H	2	\$3,894.00
A11-0064	SC06H	2	\$3,894.00
A11-0089	SC06H	6	\$3,894.00
A11-0091	SC06H	6	\$3,894.00
A11-0093	SC06H	10	\$3,894.00
A11-0035	SC13H	1	\$5,905.00
A11-0037	SC13H	2	\$5,905.00
A11-0039	SC13H	9	\$5,905.00
A11-0065	SC13H	2	\$5,905.00
A11-0067	SC13H	9	\$5,905.00
A11-0069	SC13H	2	\$5,905.00
A11-0095	SC13H	6	\$5,905.00
A11-0097	SC13H	6	\$5,905.00

Part Number	Model	Type	Suggested Net (\$USD)
Purifier			
A11-0099	SC13H	10	\$5,905.00
A11-0107	SC17H	1	\$6,786.00
A11-0109	SC17H	2	\$6,786.00
A11-0111	SC17H	2	\$6,786.00
A11-0113	SC17H	2	\$6,786.00
A11-0115	SC17H	6	\$6,786.00
A11-0117	SC17H	6	\$6,786.00
A11-0119	SC17H	9	\$6,786.00
A11-0121	SC17H	9	\$6,786.00
A11-0123	SC17H	10	\$6,786.00
A11-0041	SC20H	1	\$7,432.00
A11-0043	SC20H	2	\$7,432.00
A11-0045	SC20H	9	\$7,432.00
A11-0071	SC20H	2	\$7,432.00
A11-0073	SC20H	9	\$7,432.00
A11-0075	SC20H	2	\$7,432.00
A11-0101	SC20H	6	\$7,432.00
A11-0103	SC20H	6	\$7,432.00
A11-0105	SC20H	10	\$7,432.00

Part Number	Pressure Setting	Voltage DC	Suggested Net (\$USD)
Backpressure Monitor			
A56-0013	27" H2O	12 & 24V	\$356.00
A56-0014	42" H2O	12 & 24V	\$356.00
A56-0017	60" H2O	12 & 24V	\$356.00

Part Number	Filter Size	Suggested Net (\$USD)
CombiClean™		
B19-0002	13 to 28 Liter 400V	\$8,600.00
B19-0003	2 to 12 Liter 230V	Call for quote
B19-0004	13 to 28 Liter 480V	\$8,600.00

HAMMOND SCHOOL BUS

CUSTOMER: School City of Hammond Transportation Department

CONTACT: John Molnar

BUS: Up to 30 buses, Thomas Built chassis and Caterpillar 3116 and 3126 engines

PRODUCT: AZ Purimuffler. Part numbers A17-0474 and A17-0475

WISSAHICKON SCHOOL BUS

CUSTOMER: Wissahickon School District

CONTACT: Perry Baer

BUS: Bluebird with Cummins 8.3L & 5.9L and 1 International DT466 engine

PRODUCT: DPF Retrofit of 31 vehicles. DOC Retrofit of 14 vehicles

DOC - Inline Purifier (AZ28 and AZ29) Part numbers A16-0146 and A16-0147

DPF – Purifier A11-0189 (Bluebird bus with Cummins 5.9L engine)

Purifier A11-0190 (Bluebird bus with Cummins 8.3L engine)

Purifier A11-0191 (Bluebird short body bus with Cummins 5.9L engine)

Purifier A11-0192 (International bus with International DT466 Engine)

NEW YORK CITY SCHOOL BUS

CUSTOMER: New York Power Authority / Atlantic Express School Bus

CONTACT: Bart Chezar

BUS: International with 9.0L engines

PRODUCT: AZ Purimuffler. Part number A17-0496 (AZ29)

CLOVIS SCHOOL BUS

CUSTOMER: Clovis Unified School District

CONTACT: Joe Bjerke

BUS: Bluebirds with Cat 3126, Crown with DDC 6V92, and Thomas with Cummins 8.3L engines

PRODUCT: AZ Purimuffler. Part Numbers A17-0543 and A17-0544 (Thomas with Cummins 8.3L engines)

AZ Purifier with part number A16-0151 (Crown with DDC 6V92 engine)

Purifier A11-0115 (Bluebird bus with Cat 3126 engine)

ECS SCHOOL BUS SUCCESS



Product Delivery

- Product Ordering
 - Dedicated Special Projects Manager
 - Each Purifilter can be labeled to match each bus
- Product Availability
 - We have standard lead times on all products we manufacture under ISO conditions
- Product Storage
 - We can store the Purifilters in our manufacturing facility to ship when needed, with one of our distributors to install as needed

- **Passive Diesel Particulate Filter Warranty**
 - ECS offers passive diesel particulate filter warranty when the application has been “approved” after submittal of a completed qualification form (ECS ISO form F7A6.A) Contact ECS for copies of the form. Prior to system purchase. A completed registration card must be also completed and submitted within 30 days of installation. Failure to submit the registration form may result in warranty coverage being revoked.
 - A Cattrap™ or Purifilter™ DPF centerbody shall be categorized as “failed” when the tail pipe smoke opacity measures above 40% of the engine out opacity reading and the measured pressure drop across the filter drops to 70% of the baseline recorded value at high idle.
 - Filter centerbody failure within the first 2,000 hours within 12 months from date of installation shall be replaced free of charge. Filters replaced under this section shall be covered for the balance of the original warranty.
 - Filter failures that occur between 2,000 and 4,000 hours within 12 months from date of installation shall be replaced on a pro rata basis. Example: The pro rata basis defines that a filter failed at 3000 hours has a replacement cost of 75% [Replacement cost = (usage hours / 4000)x100]. The filter replaced under this section shall be provided with new filter warranty coverage.
- **On-highway California ARB**
 - For vehicles with GVWR of at least 19,500 lbs and engines rated 250 hp +
 - 5 years or 150,000 miles, whichever may come first
 - For vehicles with GVWR of at least 19,500 lbs and engines rated 150 hp +
 - 5 years or 100,000 miles, whichever may come first
 - For vehicles with GVWR less than 19,500 lbs
 - 5 years or 60,000 miles, whichever may come first
- **Off-highway California ARB**
 - For applications 50 hp +
 - 5 years or 4200 engines hours, whichever may come first
- **US EPA**
 - 24 months or 40,000 miles, whichever may come first
- ECS offers passive diesel particulate filter warranty when the application has been “approved” after submittal of a completed qualification form (ECS ISO form F7A6.A). Contact ECS for copies of the form prior to system purchase.
- Each vehicle equipped with an ECS Purifilter is to have the ECS supplied Backpressure Monitor Kit installed and functional. Failure to maintain a functioning Backpressure Monitor may result in warranty claim being denied.
- A Purifilter DPF centerbody shall be categorized as “failed” when the tail pipe smoke opacity measures above 40% of the engine out opacity reading and the measured pressure drop across the filter drops to 70% of the baseline recorded value at high idle.

Safety

- The Purifilter fits in the same manner as the vehicle's original muffler.
- The operator will not notice a performance difference with a Purifilter installed
- The operators must be trained to watch for a red light on the backpressure monitor
- The maintenance of the Purifilter must be followed annually as stated in the owner's manual

Installation and Training

- Experienced technicians visit with arrival of product
 - Can install on entire fleet
 - Installation and exhaust pipe wrapping
 - Install and train at the same time
- Can be contracted out to a local distributor or left with Laidlaw and First Student



Training

- We have a full program in place for:
 - Installation training
 - Maintenance
 - Backpressure Monitor
 - Troubleshooting

Thank You

Engine Control Systems

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