

# Purifiers for diesel engine applications



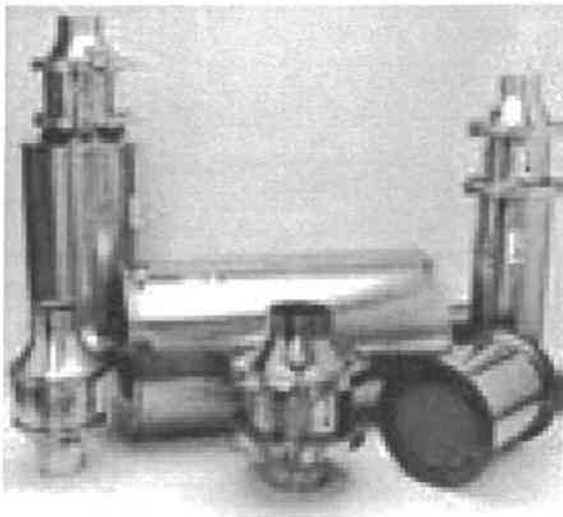
Material handling  
Construction  
Industrial  
On-highway  
Mining



## Diesel purifiers

Engine Control Systems diesel purifiers consist of either a ceramic (AZ series) monolith or a metallic (DZ series) monolith coated with advanced precious metal catalysts and packaged into stainless steel housings. These purifiers oxidise hazardous carbon monoxide (CO) and hydrocarbons (HC) to form harmless carbon dioxide and water. Engine Control Systems AZ diesel purifiers will also reduce total particulate emissions by typically 25%-40% by oxidising the soluble organic fraction of the particulate.

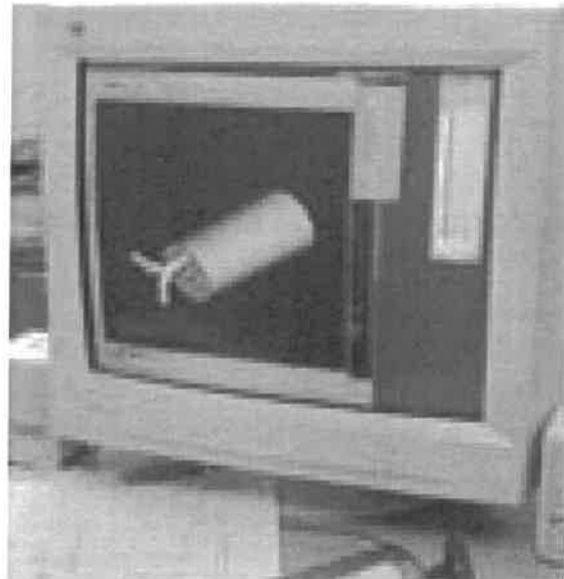
Both the AZ and DZ series purifiers are designed for ease of installation and feature quick release clamps to allow for easy removal of the catalyst centerbody for periodic inspection and baseline smoke testing.



## Custom design Purimufflers™

Often standard in-line design catalysts can not be utilised due to the restrictions of space. For these applications AZ / DZ or EZ purifiers are available as custom designed units specifically tailored to suit the installation restrictions of the vehicle. Specialist custom designs are often manufactured as silencer replacement products. Selecting from an extensive CDTi database, many designs are available for present and past ranges of vehicle models.

Please consult CDTi for selection and recommendation, providing vehicle make, model and engine type details. Selection lists by vehicle make are often available – on request.



## Product sizing

1. If available, use the actual engine intake air flow from the original engine manufacturer (OEM) and locate this value in the included product charts to obtain the proper product model for your engine. If you do not have the actual OEM engine intake air flow, use the general equation below to determine the approximate value. Locate this value in the appropriate product-sizing chart.

2. If your engine intake air flow value is in the range of two models of purifier, exhaust back pressure and equipment duty cycle should be used as a guide to choose the appropriate product model. In general, the larger model will provide improved carbon monoxide and hydrocarbon reductions and lower exhaust back pressure.

3. When sizing DMS and DMXS-II add-on silencers, ensure that the flange dimension (E) is the same for both the purifier and silencer. If flange dimensions (E) do not match, select an adjacent model of silencer with the correct flange size that meets exhaust friction requirements.

**Engine intake air flow (m<sup>3</sup>/h) =**

$$\frac{\text{Engine displacement (liters)} \times \text{maximum RPM of engine} \times \text{VE} \times 60}{\text{Engine cycle} \times 500}$$

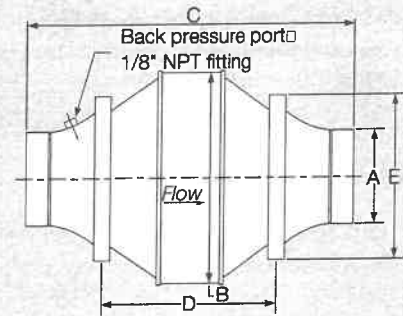
**Engine cycle =** 2 for two-stroke engines  
and 4 for four-stroke

**VE =** 0.85 for normally aspirated engines  
1.7 for turbocharged  
2.0 for turbocharged and aftercooled

## DZ diesel purifiers

The DZ series (metallic monolith), long an industry favourite, offers compact size and low exhaust back pressure. For optimum performance, we recommend that you install the DZ purifier as close to the engine exhaust manifold as possible (within 300 - 500 mm).

To further ensure low exhaust back pressure and noise, CDTi offers a complete line of low restriction DMS and DMXS-II clamp-on silencers.

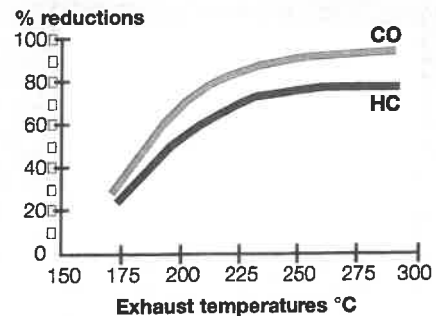
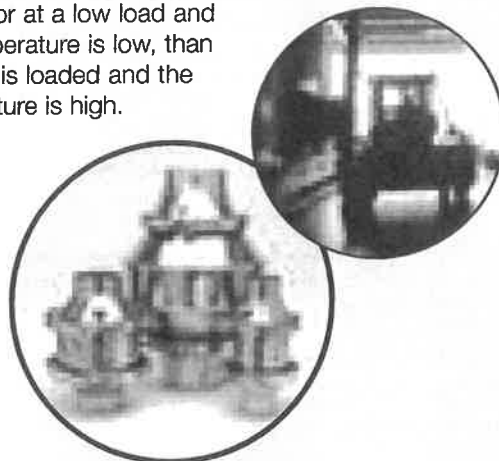


### DZ purifier dimension and sizing chart

Engine Control Systems model	Part number	Dimension B mm	Dimension C mm	Dimension D mm	Dimension E mm	Inlet/Outlet Dimension A mm	Engine intake air flow (m <sup>3</sup> /h)	Exhaust restriction (mm water)
5DZ	A20-0148	108	266	94	153	51	110 - 205	75 - 200
	A20-0154				64			
	A20-0157				76			
6DZ	A20-0194	133	266	94	179	76	195 - 320	75 - 200
	A20-0195				89			
	A20-0197				102			
7DZ	A20-0239	159	266	94	204	76	315 - 465	75 - 200
	A20-0243				89			
	A20-0245				102			
8DZ	A20-0267	184	304	94	229	76	460 - 635	125 - 200
	A20-0268				89			
	A20-0305				102			
	A20-0306				114			
	A20-0274				127			
10DZ	A20-0009	222	453	244	229	102	630 - 920	125 - 200
	A20-0012				114			
	A20-0013				127			
12DZ	A20-0042	264	453	244	229	102	910 - 1360	125 - 200
	A20-0043				114			
	A20-0044				127			
	A20-0046				152			
14DZ	A20-0070	295	453	244	229	127	1350 - 1720	125 - 200
	A20-0072				152			
16DZ	A20-0098	372	453	244	229	127	1700 - 2745	125 - 200
	A20-0099				152			

### DZ and EZ purifier performance

The temperature of the exhaust gases determines the degree of reduction of carbon monoxide (CO) and hydrocarbons (HC). The reduction is less when idling or at a low load and the exhaust temperature is low, than when the engine is loaded and the exhaust temperature is high.

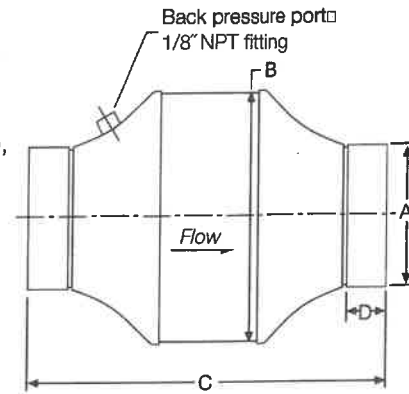


DZ and EZ purifier light-off curves

## EZ diesel purifiers

The EZ series purifier offers the same metallic substrate and catalyst as the DZ series but features all welded construction for an ultra compact size. The EZ purifier is an ideal in-line converter when retrofitting light industrial and highway vehicles where space for installation is limited.

For optimum performance, we recommend that you install the EZ purifier as close to the engine exhaust manifold as possible (within 300 - 500 mm), ahead of the vehicle's original muffler.



### EZ purifier dimension and sizing chart

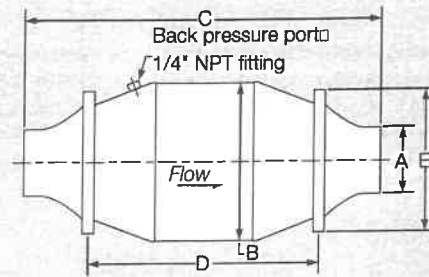
Engine Control Systems model	Part number	Dimension B mm	Dimension C mm	Inlet/Outlet Dimension A mm	Engine intake air flow (m <sup>3</sup> /h)	Exhaust restriction (mm water)
EZ20	A20-0395	57	178	25	0 - 60	125 - 200
	A20-0397			29		
	A20-0398			32		
	A20-0399			35		
	A20-0652			37		
	A20-0394			38		
	A20-0402			41		
	A20-0403			51		
EZ40	A20-0405	83	203	25	50 - 120	125 - 200
	A20-0684			32		
	A20-0407			35		
	A20-0685			38		
	A20-0686			44		
	A20-0411			48		
	A20-0687			51		
	A20-0413			57		
EZ50	A20-0425	110	229	32	110 - 205	125 - 200
	A20-0426			38		
	A20-0688			44		
	A20-0429			48		
	A20-0689			51		
	A20-0433			57		
	A20-0690			64		
	A20-0691			76		
A20-0437	89					
EZ60	A20-0449	133	254	44	195 - 320	125 - 200
	A20-0692			51		
	A20-0693			64		
	A20-0694			76		
	A20-0662			83		
	A20-0459			89		
	A20-0460			102		
	EZ70			A20-0472		
A20-0473		64				
A20-0476		76				
A20-0477		89				
A20-0478		102				
EZ80	A20-0487	184	267	76	460 - 635	150 - 200
	A20-0489			89		
	A20-0490			102		
	A20-0491			127		



## AZ diesel purifiers

The AZ series purifier (ceramic monolith) offers a unique zeolite washcoat base and precious metal catalyst that provides extraordinary emissions reduction performance on modern diesel engines.

The superior low temperature performance of the AZ catalyst is beneficial, especially in applications where installation 0.5 - 2m from the exhaust manifold is required.



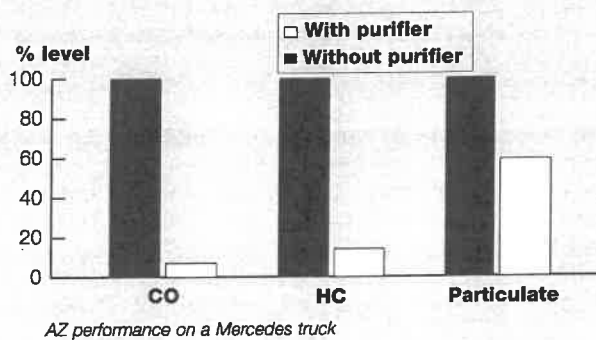
### AZ purifier dimension and sizing chart

Engine Control Systems model	Part number	Dimension B mm	Dimension C mm	Dimension D mm	Dimension E mm	Inlet/Outlet Dimension A mm	Engine intake air flow (m <sup>3</sup> /h)	Exhaust restriction (mm water)
AZ26	A16-0023	154	338	168	204	51	255 - 350	175 - 275
	A16-0033					76	255 - 350	175 - 275
	A16-0047					89	255 - 365	175 - 250
	A16-0059					102	255 - 375	175 - 225
AZ27	A16-0032	201	516	345	204	76	340 - 545	135 - 250
	A16-0043					89	340 - 610	110 - 225
	A16-0056					102	340 - 610	90 - 200
AZ28	A16-0055	201	567	396	229	102	535 - 680	200 - 275
	A16-0101					114	535 - 815	175 - 250
AZ29	A16-0054	252	575	366	229	102	645 - 945	125 - 250
	A16-0064					114	780 - 1045	60 - 250
	A16-0071					127	780 - 1130	50 - 250
AZ30	A16-0057	277	575	366	229	102	935 - 1105	150 - 275
	A16-0066					114	985 - 1190	125 - 250
	A16-0070					127	1070 - 1275	125 - 250
AZ31	A16-0069	296	575	366	229	127	1240 - 1785	100 - 200
	A16-0077					152	1240 - 2050	50 - 150

### AZ performance

The AZ purifier has been tested according to the Buscyclus, Braunschweig and ISO 8178 by the Swedish Vehicles Test Authority and meets the stringent approval requirements for the Swedish market. The US EPA has also certified the AZ Purimuffler™ under the US urban bus retrofit/rebuild program.

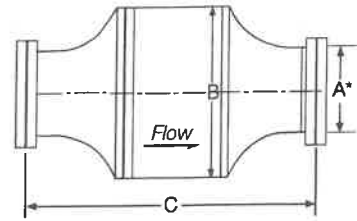
The graph shows the reductions measured after an AZ 29 purifier has been installed on a Mercedes 814D lorry with an OM 366 engine.



# AX purifiers

Model AX 230 W-AX 280 W catalyst are compact and of stainless steel all-welded construction.

The size often allows easy installation even where space is limited. The models are delivered with or without flanges for welding into exhaust systems.



## AX purifier dimension and sizing chart

Engine Control Systems model	Part number	Dimension A* mm	Dimension B mm	Dimension C mm	Engine intake air flow (m <sup>3</sup> /h)
AX 260 W	A16-0083	70	154	371	255 - 375
AX 270 W	A16-0017	102	204	356	340 - 544
AX 280 W	A16-0095	102	204	406	535 - 680

\* Other dimensions on request (by adding optional flanges)

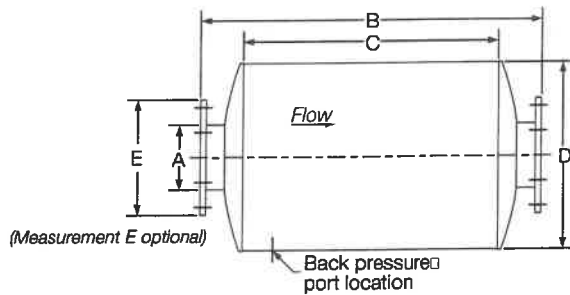
# AZ severe duty Purimufflers™

The AZ Severe Duty Purimuffler™ integrates an AZ catalyst and silencer in one rugged package, specially designed for use in mining and heavy industrial applications. AZ Severe Duty Purimufflers™ will afford 12-15 dB(A) sound reduction at exhaust back pressures less than 500 mm water.

The AZ Severe Duty Purimuffler™ features a double wall, heavy gauge (14 and 16 gauge), 304 series stainless steel, insulated muffler shell. The insulation serves to maximize catalyst performance while reducing muffler skin temperatures. The insulated skin also reduces heat radiation from the muffler, which can be particularly beneficial in equipment with vehicle electronic

control systems. AZ Severe Duty Purimufflers™ are available with standard slip fit inlet/outlet or with optional bolted inlet and outlet flanges.

AZ Severe Duty purimuffler™ shown with optional flanges



## AZ severe duty purimuffler dimension and sizing chart

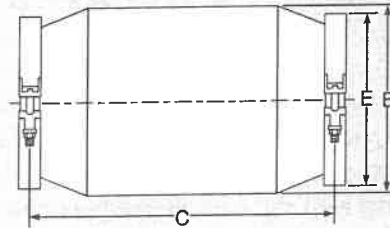
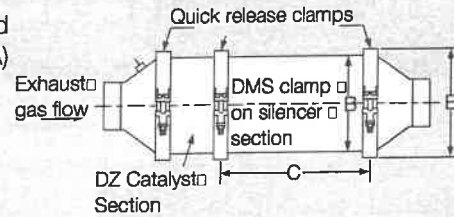
Engine Control Systems model	Part number	Dimension B mm	Dimension C mm	Dimension D mm	Dimension E (optional) mm	Inlet/Outlet Dimension A mm	Engine intake air flow (m <sup>3</sup> /h)
AZ27M-3S	A17-0313	709	528	229		76	340-610
AZ27M-3F	A17-0312	711	528	229	191	76	340-610
AZ28M-4S	A17-0307	734	554	229		102	535-765
AZ28M-4F	A17-0306	737	554	229	229	102	535-765
AZ29M-4S	A17-0301	734	538	279		102	680-1020
AZ29M-4F	A17-0300	737	538	279	229	102	680-1020
AZ29M-5S	A17-0325	734	538	279		127	680-1130
AZ29M-5F	A17-0326	734	538	279	254	127	680-1130
AZ30M-5S	A17-0327	785	570	326		127	935-1275
AZ30M-5F	A17-0328	787	570	326	254	127	935-1275
AZ31M-5S	A17-0303	785	570	326		127	1240-1785
AZ31M-5F	A17-0302	787	570	326	254	127	1240-1785

# CDTi DMS and DMXS-II add-on silencers

CDTi also offers a range of DMS and DMXS-II clamp-on silencers that can be combined readily with DZ and AZ purifiers to provide a compact purifier/silencer system with known back pressure characteristics. Both DMS and DMXS-II silencers conveniently fit between the purifier centerbody and outlet cone.

DMS silencers are designed to typically provide 10 dB(A) noise reduction. DMXS-II silencers are designed to typically provide 15 dB(A) noise reduction.

Add-on silencers are furnished with a clamp and gasket to allow combination with AZ or DZ quick release purifiers.



DMXS-11 add-on silencer section

## DMS and DMXS-II dimensional and sizing data

Engine Control Systems model	Part number	Dimension B mm	Dimension C mm	Dimension E mm	Maximum engine intake air flow (m <sup>3</sup> /h) @ 250 mm water exhaust restriction	Maximum engine intake air flow (m <sup>3</sup> /h) @ 375 mm water exhaust restriction
5DMS	A42-0012	124	314	153	430	585
6DMS	A42-0001	149	314	178	635	850
7DMS	A42-0002	162	314	203	750	1000
8DMS	A42-0011	200	314	229	1140	1520
10DMS	A42-0013	200	314	229	1445	1930
12DMS	A42-0006	200	314	229	1785	2400
14DMS	A42-0014	200	314	229	2165	2900
16DMS	A42-0015	200	314	229	2585	3460
5DMXS-II	A44-0008	193	406	153	280	375
6DMXS-II	A44-0001	219	406	178	355	475
7DMXS-II	A44-0002	260	406	203	500	670
10DMXS-II	A44-0007	295	406	229	645	865
12DMXS-II	A44-0003	356	406	229	935	1260
14DMXS-II	A44-0004	375	406	229	1035	1395
16DMXS-II	A44-0005	392	406	229	1145	1540

Note: Please refer to the second page of the brochure to find instructions for product sizing





# CATTRAPS

Diesel Particulate Filter (DPF)



Engine Control Systems  
A World Leader in Clean Air Technology

## How does the Cattrap work?

The cordierite filter substrate is formed in a honeycomb design; alternating inlet cells are open on one end and plugged at the outlet end. As the exhaust flow enters the open inlet cells, it is forced to pass through the micro-porous walls to the outlet cells, filtering the diesel particulate from the exhaust.

The filter substrate is coated with a proprietary catalytic layer to reduce soot combustion temperatures to a level within the normal temperature range. Cattrap displays regeneration balance points between 380°C and 425°C varying with both vehicle engine and application. Continuous passive filter regeneration occurs during a vehicle duty cycle when the exhaust temperatures are above 400°C for more than 25% of the time.



## Why Cordierite?

The ECS Cattrap features a Corning EX-80 filter. Cordierite filter substrates have a lower thermal conductivity than other ceramics. This provides a perfect match for the base metal catalyst which requires higher temperatures to regenerate. The low thermal conductivity allows the soot to be oxidized at the location of its build up; spontaneous, uncontrolled regeneration is limited.

## Why Base Metal?

The Cattrap features an advanced base metal soot ignition catalyst. Unlike other catalysts, base metal does not produce NO<sub>2</sub> emissions during passive regeneration. This is essential to areas with limited ventilation.

## Designed for Your Application

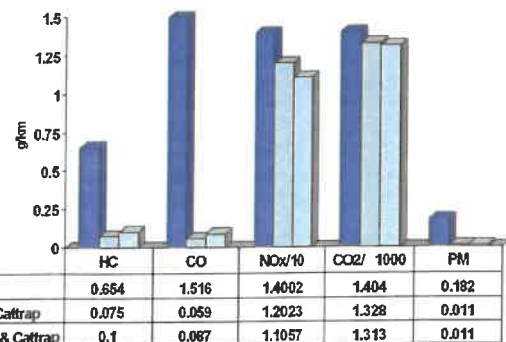
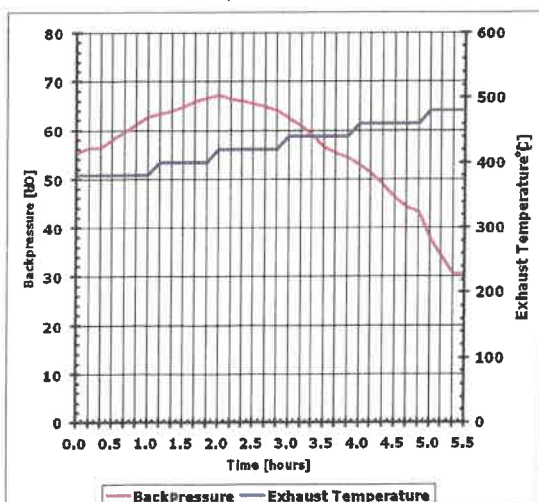
Cattrap models are available in 5 different particulate filter muffler types. The modular design allows for 360° rotation of the muffler inlet and outlet sections to provide the greatest range of fit. A backpressure monitor kit is provided with each Cattrap. The Cattrap can be installed as single or dual units, and either vertical or horizontal.



## Cattrap Performance

The ECS Cattrap is a catalyzed diesel particulate filter which typically reduces diesel particulate (PM) by > 85%.

Cattrap Balance Point





## Mining Vehicles

The ECS Cattrap goes where other DPF's can't. The ECS Cattrap was specifically developed for the needs of mining operations in 1990. MSHA has recognized the Cattrap as the only catalyzed diesel particulate filter that does not promote NO<sub>2</sub> formation. See table 1 of the MSHA website for full results:

[www.msha.gov/01-995/coal/DPM-FilterEfflist.pdf](http://www.msha.gov/01-995/coal/DPM-FilterEfflist.pdf)

## Field Durability

The ECS Cattrap has proven field durability. Below: A dual CT23 Cattrap installed on an ST-8B AC Wagner Scoop-tram, powered by DDC S60 325hp at Brunswick mine. The filters have been evaluated under DEEP DPF program for 4000 hours without any problems. The filters were evaluated by CANMET Labs and given an excellent review.



## Maintaining your Cattrap

Cattraps are virtually maintenance free when the minimum duty cycle conditions are met. However, residual ash and engine wear metals can build up with use. The Cattrap requires ash removal once every 50,000km (~30,000 miles), 12 months, or every 1000 hours, whichever occurs sooner. ECS recommends the use of the CombiClean™ to maintain your filter.

## Does your product supplier/distributor do this?

ECS and its distributors are committed to ensure the following services to support your fleet:

Fleet Inspection - ECS and its distributors perform a full fleet inspection and evaluation. We ensure the right equipment, for the right vehicle, the first time.

Vehicle Datalogging – ECS and its distributors will datalog your vehicles to ensure they comply with the duty cycle requirement for the application.

Opacity Testing and engine condition inspection– ECS and its distributors will check that your engine is free of obvious fuel system, turbocharger or other defects which may impair operation.

Documentation – ECS and its distributors will register your warranty and provide you with a copy of all warranty statements and your Cattrap product manual.

Support and Service (After the Sale) - ECS offers a dedicated customer service 800 support line as well as both technical service and customer service email accounts allowing for a quick and prompt response.

Advanced Backpressure Monitor and Logger system - The Backpressure Monitor and Logger will record vehicle duty cycle information for up to two years.

### WORLD HEADQUARTERS

Engine Control Systems Limited  
83 Commerce Valley Drive East,  
Thornhill, ON, L3T 7T3  
Phone: 1 (905) 707-7746  
Toll Free: 1 (800) 661-9963  
Fax: 1 (905) 707-7686  
E-Mail: [ecs@enginecontrolsystems.com](mailto:ecs@enginecontrolsystems.com)

### U.S.A.

Engine Control Systems Limited  
4910 Longley Lane, Suite 103,  
Reno, NV 89502  
Telephone: 1 (775) 827-3400  
Toll Free: 1 (800) 331-9247  
Fax: 1 (775) 827-1670

[enginecontrolsystems.com](http://enginecontrolsystems.com)



**Engine Control Systems**  
A World Leader in Clean Air Technology



### **Consider the quality of the product you purchase**

The varying quality of exhaust aftertreatment products in the marketplace is influenced by numerous factors:

- catalyst technology
- design and manufacturing processes
- facilities
- people.

CDTi's products are designed to offer ease of installation, peak performance and long life and have a long, proven service history under the most severe operating conditions. Each product is constructed of 300 series stainless steel and manufactured in an ISO 9001 or 9002 approved facility.

### **Your dealer**

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### **The right parts and accessories**

A complete range of replacement clamps, gaskets, inlet and outlet cones as well as other accessories are available. Contact your local CDTi distributor.

Help is a phone call away. A wide range of diesel particulate filter systems, fume diluters and products for spark-ignited engines are available. Contact your local distributor for more information.

### **Warranty policy**

CDTi's products are warranted for workmanship and defects of material for a period of 12 months, maximum 2000 hours of operation. The obligation of this warranty is limited to the replacement of the product.

The provisions of this warranty do not apply to the product incorrectly chosen, or installed or operated, nor to any product that has been subjected to damage or negligence.

CDTi shall not be liable for any incidental or consequential damages or for breach of any express or implied warranty.

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#### **CDTi Sweden AB**

Tel. +46 (0)40 6701550, Fax +46 (0)40 210335 E-mail [infoeu@cdti.com](mailto:infoeu@cdti.com)  
[www.ecseurope.se](http://www.ecseurope.se), [www.cdti.com](http://www.cdti.com)