Johnson Matthey

CRT®
Particulate Filter System

Johnson Matthey Sets the Standard for Stationary Diesel Engine PM Emissions Control

Filter module.

Johnson Matthey CRT®, Continuously Regenerating Technology

The **CRT®** (Continuously Regenerating Technology) Particulate Filter is Johnson Matthey's patented technology for the control of emissions from diesel engines. It is the first PM control technology that has been verified by the California Air Resources Board (CARB) for application to all stationary diesel engines, including:

- Emergency Back-Up Power
- Prime Power
- Pumping

This advanced passive regenerating diesel particulate filter system not only reduces particulate matter (PM) by 90%, it also reduces hydrocarbon (HC) and carbon monoxide (CO) by 90% or more, which exceeds CARB requirements.

Engineering Innovation Makes the CRT® Uniquely Superior

Based on a number of unique design factors, the Johnson Matthey **CRT** is engineered to ensure optimum effectiveness. While other

BENEFITS

- Reduces PM, HC and CO by over 90%
- Verified by CARB for emergency backup power, prime power and pumping
- Multiple-filter design enables the CRT to be used on all engine sizes
- Modular design for ease of installation, routine service and easy maintenance
- Self-cleaning for convenience and ease-of-use
- No supplemental heat or fuel required
- For optimal performance, operates with Ultra Low 15ppm Sulfur diesel, which is now widely available nationally
- Each unit is equipped with the CRTdm diagnostic module, with data-logging, alarm capability and computer interface
- Housed in stainless steel for strength and durability
- PM collection/filtration begins when engine starts and continues for the entire run time

JM
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Stationary Source Emissions Control

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FILTER TECHNOLOGIES

Comparison of CARB verified particulate filter technologies for stationary diesel engines

	JOHNSON MATTHEY CRT® FILTER SYSTEM	OTHER FILTER SYSTEMS
Filter technology	Catalyst + ceramic filter	Catalyzed ceramic filter or Burner and SiC filter
Regeneration technology and temperature	Passive: @ 240°C for 40% of duty cycle, or 5 hours @ 300°C after every 200 consecutive hours < 240°C	Passive: @ 300°C for 30% of duty cycle or 2 hours, whichever is longer Active regeneration required: 0.1 PM : < 375°C 0.2 PM : < 405°C 0.3 PM : < 420°C 0.4 PM : < 435°C
NOx / PM Ratio	15 @ > 300°C 20 @ < 300°C	
Full CARB verification	• Emergency backup • Prime	• Emergency backup
Conditional CARB verification	• Pumping	• Pumping
Diesel engine family applicability	≤ 0.4 g/bhp-hr PM	Passive: ≤ 0.1 g/bhp-hr PM Active: ≤ 0.4 g/bhp-hr PM
Verification level	3 (> 85% PM reduction)	3 (> 85% PM reduction)
Maximum consecutive minutes at idle	720	Passive 240 Active 720
# of cold starts idle time after each cold start	24 30 minutes	12 to 24 10 to 30 minutes
Max. hours before filter cleaning	5000 project specific	2000 to 5000 project specific

filter systems may require an external heat source or a catalyst coating on the filter, Johnson Matthey employs a novel two-component design in which the catalyst is separate from the filter. This allows for maximum catalyst and filter performance. The catalyst is positioned before the filter to convert NO into NO_2. The NO_2 then oxidizes the soot that is collected on the filter to regenerate the filter. The soot is combusted at a much lower temperature than is normally required. In fact, the **CRT** enables the filter to be regenerated at a temperature that is 20% lower than other filters on the market. NO_2 generation is the key to the oxidation of soot collected by the wall flow filter and is the heart of the Johnson Matthey patent. The catalyst also converts CO and HC into CO_2 and water.

The significantly lower operating temperature of the Johnson Matthey **CRT** is compatible with typical diesel exhaust temperatures, so no supplemental heat is required. Using a "flow-through" platinum coated catalyst, the soot travels directly through the catalyst and is captured on the filter. As a result, the catalyst is kept free of soot, ensuring that it performs at the highest level possible. Soot is trapped on the filter where it's then destroyed by the NO_2 produced by the catalyst. This coordinated operation between the catalyst and filter makes the **CRT** highly efficient and effective.

What's more, the Johnson Matthey **CRT** utilizes passive regeneration during which soot trapped on the filter is automatically burned off to clean the filter. This is in contrast to active regeneration employed with other filters, during which diesel fuel or an electrical current is used to heat up the filter. This active approach has the dangerous potential to cause a fire.

Proven Success

For 40 years, Johnson Matthey has been the global leader in the emissions control industry. When it comes to performance, Johnson Matthey's **CRT** System has proven to be the superior solution for mobile heavy-duty diesel engines, with over a 120,000 **CRT** systems installed worldwide. Now, the **CRT** is also proving to be the best choice for PM emissions control in stationary diesel engines. The leader—Johnson Matthey—continues to be the best choice for all engine emissions control applications.

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