

Tier 4 PR24B [RE]powered Locomotive

The PR24B is an EMD GP-style locomotive powered by a Cat® 3512C HD engine and Kato alternator. Designed with flexibility in mind, this unit allows customers to choose options without extensive engineering. The PR24B utilizes rebuilt GP-style trucks with rebuilt D78 traction motors and has been constructed with a new crashworthy underframe, cab and fuel tank.

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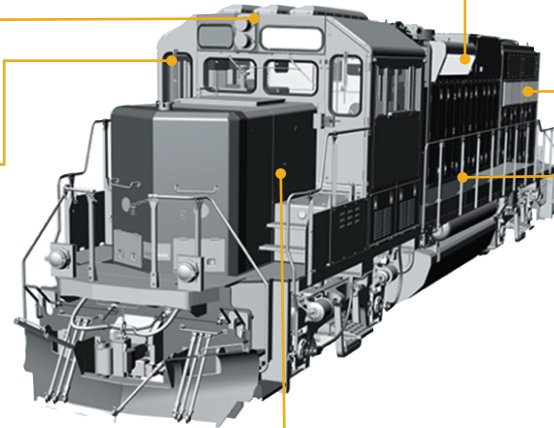
- ▶ Reliable and fuel efficient Cat® 3512C HD 2000 HP engine
- ▶ New HVC with Zeit SAL V locomotive control system
- ▶ New Atlas Copco rotary screw air compressor
- ▶ New Progress Rail PowerView event recorder with LDVR
- ▶ Offered with a 2-year warranty for new content

Locomotive Model	PR24B Repower
Engine Model	Cat® 3512C HD
Brake Horsepower	2,100
No. of Cylinders	12
Low Idle Speed RPM	600
Full Speed RPM	1,800
Exhaust Aftertreatment Type	SCR and DPF
Emissions Certification	Tier 4 switch
Radiators	Mech. bonded
Traction Alternator	Kato – 1,530 kW
Companion Alternator	Kato – 250 kW
Air Compressor	Atlas Copco GAR 37

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PR24B [RE]powered Locomotive

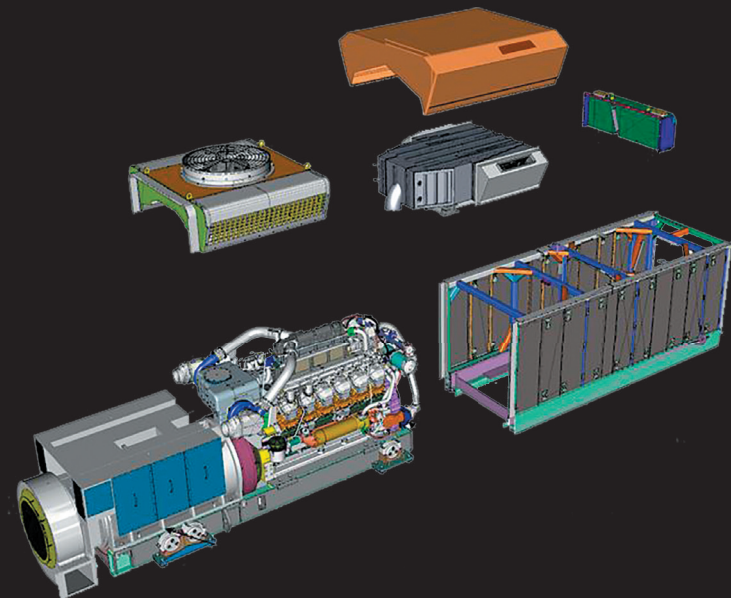
- Zeit SAL V control system provides increased adhesion over the conventional Dash 2 control system
- Filter change intervals increased from 92 days to 184 or 368 days, see specifications below
- Equipped with electric operated handbrake
Set and release signals are provided to the control system for increased AESS shutdown when the handbrake is set



- Can be equipped with extended range dynamic braking and self load capability
- Isolation-mounted engine for reduced noise and vibration, as well as improved ride quality
- Anti-freeze protection is provided in the new cooling system and increases AESS shutdown time
- Configured for switch duty cycle Tier 4 emissions with a new, state-of-the-art aftertreatment device, which includes SCR, DOC, and DPF technology

Cat® 3512C HD Engine

- ▶ Caterpillar has produced over 170,000 of its 3500 series engines since 1980
- ▶ Decrease in fuel consumption of up to 15% from a typical GP38-2
- ▶ Oil change interval can be extended to 368 days from 184 days with proper oil sampling
- ▶ Fully integrated engine and aftertreatment protection by Zeit SAL V control system and the ECM
- ▶ Demonstrated engine system reliability (includes engine and aftertreatment)
- ▶ Supported by Progress Rail and your Local Cat® Dealer.





LOCOMOTIVES



710 ECO™ REPOWER

710ECO™ Repowers extend locomotive life for up to 40 years and lower life cycle costs by equipping older models with EMD 710 engines.

For more than 90 years we have produced the most durable, reliable and sustainable locomotive products and services in the rail industry. We design and manufacture diesel-electric locomotives for all commercial rail applications, with 65,000 EMD-powered locomotives delivered to more than 75 countries. Our technology leadership and superior performance drive our reputation for exceptional quality, service and innovation.

Repower locomotives available from Progress Rail provide the greatest flexibility of any provider in the marketplace. By replacing old, inefficient engines, and antiquated control systems with new, state-of-the-art, clean technology, the next generation of single-engine locomotives are ready to provide reliable service for decades to come. Packages can be tailored to provide kits for customer installation or as complete turnkey solutions, both using the latest generation of EMD or Cat engines meeting the latest emissions standards along with a choice of control systems.

710 ECO™ REPOWER Features and Benefits

- ▶ Low emissions
- ▶ Fuel savings up to 25%
- ▶ Lube oil savings over 50%
- ▶ Increased all-weather adhesion
- ▶ 90% parts commonality with existing fleet
- ▶ Predictable 184-day maintenance intervals
- ▶ 30 years of demonstrated 710 engine reliability
- ▶ Available as a kit or repowered locomotive

EM2000™ Microprocessor Control System

- ▶ Excitation and load control
- ▶ Adhesion control
- ▶ Engine control
- ▶ Diagnostic system
- ▶ Archived unit history data

710ECO™ Repower Kit Contents

- ▶ 8 or 12-cylinder 710 engine
- ▶ AR10 / CA6 alternator
- ▶ Separate loop aftercooling system
- ▶ EM2000™ Microprocessor Control System
- ▶ Automatic Engine Start Stop (AESS™)

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Typical Improvement with a REpower

	EXISTING LOCOMOTIVE	REPOWER LOCOMOTIVE
Control System	Manual Control by Operator	EMD Microprocessor
Emissions	Unregulated	Up to US EPA Tier 3
NOx	Baseline	Over 50% NOx Reduction
Particulate Matter	Baseline	Over 70% PM Reduction
Nominal Traction Power	1,119 kW / 1,500 hp	1,491 kW / 2,000 hp
Starting Tractive Effort	274 kN / 61,500 lbf	390 kN / 87,500 lbf
Adhesion	Baseline	30% Improvement
Fuel Consumption	Baseline	25%+ Reduction

710ECO™ REPOWER TECHNICAL DETAILS

Engine Model	8-710G3A-T3 / 12-710G3A-T3
Engine Type	Two Cycle - 45° Vee
Brake Power	2,320 hp / 3,150 hp
Number of Cylinders	8 / 12
Displacement Per Cylinder	710 cu. in.
Compression Ratio	18:1
Bore and Stroke	9.06 x 11 in.
Fuel Injectors	Electronic Unit Injection
Charge Air	Single Turbocharger
Low Idle Speed	200 rpm
Full Speed	904 rpm
Emissions Certification	US EPA Tier 3 and EU Stage III A
Alternator	AR10
Companion Alternator	CA6



EMD 8-710 Engine



EMD 12-710 Engine

CERTIFIED EMISSIONS KITS FOR EMD LOCOMOTIVES



Progress Rail provides emissions solutions for EMD engines and continues to lead the industry in emissions compliance. One of the EPA's guiding principles for the 40 CFR Part 1033 rule was to achieve sizable reductions in emissions as early as possible. Progress Rail's skilled emissions research team met this challenge using extensive analysis and testing to develop the most advanced emissions solutions for locomotive applications for EMD 710 and 645 engines.

Systems Integration

Progress Rail's complete OEM systems knowledge allows for the most reliable and fuel efficient emission kits. Meeting emissions is not a piece-part activity, but a finely-tuned balance between emissions compliance and fuel efficiency for a locomotive system. Reverse engineered parts lack the proven reliability, locomotive systems integration, and support that only Progress Rail as the OEM can provide.

EPA Compliance

EPA 40 CFR Part 1033 requires locomotive engines, including all EMD models originally manufactured in 1973 or later, to meet stringent particulate matter and NOx standards when overhauled. Installing an EPA certified EMD emissions kit ensures full regulatory compliance with Part 1033 requirements throughout a locomotive's useful life.

EMD Emissions Kit Contents

- UL Power Assemblies
- OEM Emissions Specification Fuel Injectors
- Aftercoolers and Plumbing (as needed)
- Software Upgrade (as required)
- Oil Separator and Fittings (as needed)
- Engine Emissions Label
- Locomotive Emissions Label
- Installation Instructions
- Kit Registration Card

EMD Emissions Kit Benefits

- OEM engineered, designed, and tested upgrades, providing particulate matter and NOx reductions throughout the locomotive's useful life
- Significantly cuts lube oil consumption
- Reduces or maintains previous fuel consumption levels
- Application of the kits per the Engineering Test Instructions and Maintenance Instructions achieves full compliance with EPA regulations per 40 CFR Part 1033

EMD Emissions Kit Availability

Kits are available for all EMD Model 710 and 645 locomotive engines.

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800-476-8769

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