Directory

Rolling Stock

Mattei Group

The Importance of Compressed Air in Rail: Mattei's Century of Innovation and Reliability

By Graham S. Leach, Business Development Director, Mattei Rail & Transportation Division

Together with electricity and diesel, compressed air is one of the most critical energy sources in rolling stock.

It powers braking systems, pantographs, doors and even suspension in some passenger vehicles, directly influencing safety, punctuality and passenger comfort. In demanding climatic conditions – whether high-altitude cold or desert heat – compressed air ensures that trains continue to run reliably and smoothly.

Its importance is often overlooked by passengers, who may take for granted the reliability of systems operating in the background. Yet for operators, the stakes are high. If compressed air systems fail, brakes may lose performance, doors can jam, or auxiliary functions risk becoming unreliable. This makes air quality and compressor technology vital to modern railway operations.

Why Clean Air Matters

Raw compressed air is never clean. During the compression process, water vapour, dirt, wear particles and hydrocarbons mix to form a corrosive sludge often referred to as 'mayonnaise'. Left untreated, this contamination can damage sensitive pneumatic equipment, accelerate corrosion and shorten system lifespans.

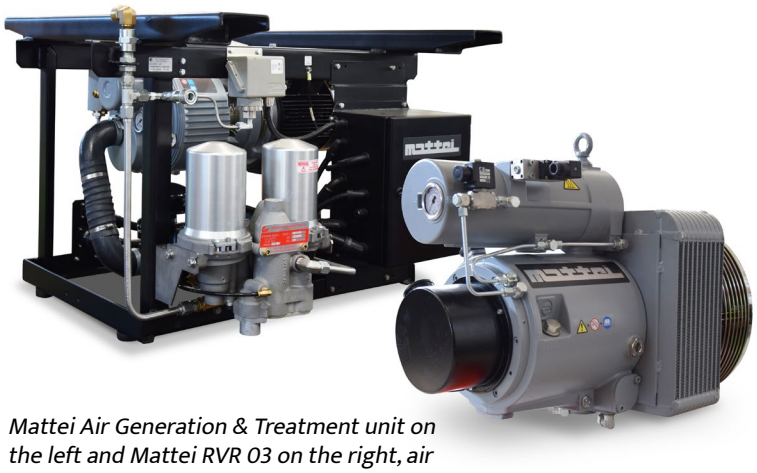
International standards such as ISO 4975:2022 (railway applications – braking system air quality) and ISO 8573.1 (testing methods for contaminants) highlight just how crucial it is to guarantee air quality. Meeting these standards is non-negotiable, not only for compliance but for operational safety and long-term asset protection.

Historically, debates have centred around oil-free versus lubricated compressors. Oil-free systems are marketed as cleaner, but they can be less efficient and more expensive to service. By contrast, lubricated compressors traditionally raised concerns about oil contamination and leakage despite being more efficient, smaller and easier to service on-vehicle.

Mattei's Sustainable Solution

Mattei Rail & Transportation, a division of the Mattei Group, has developed a specially formulated eco-friendly biodegradable lubricant for its rotary vane compressors. This lubricant is derived from renewable raw materials and supports reduced CO2 emissions, aligning with the railway sector's growing focus on sustainability and environmental stewardship.

New RVT integrated compressor, designed for both rail and road applications



Mattei Air Generation & Treatment unit on the left and Mattei RVR 03 on the right, air compressors for on board applications

Unlike traditional lubricants, Mattei's formulation maintains effectiveness across a wide temperature range, making it suitable for both hot and cold climates. It can be used in new compressors or retrofitted into existing fleets, giving operators flexibility in how they adopt greener technology.

The innovation challenges the perception that oil-free compressors are the only environmentally responsible choice. With the right downstream air treatment and Mattei's biodegradable lubricant, rail operators can achieve both efficiency and sustainability without compromise.

Over 100 Years of Research and Reliability

Founded in 1919, Ing. Enea Mattei SpA has spent more than a century pioneering compressed air technology. Today, it stands as a global leader in the design and manufacture of rotary vane compressors – a technology it has refined and perfected across generations.

Rotary vane compressors differ from screw or piston types by using a rotor mounted eccentrically within a stator. Vanes slide in and out of the rotor slots, riding on a thin film of lubricant that forms a perfect seal against the stator wall. This simple but highly effective design minimises wear, reduces frictional losses and results in exceptional energy efficiency. Operators benefit from longer service intervals, lower lifecycle costs and dependable performance – key requirements in the demanding rail industry.

Mattei's vision has always been to anticipate change. Continuous investment in research and development has allowed the company to design compressors that are lighter, quieter and more energy efficient. Its rail-focused product lines – such as the RVR, RVM and RVT Series – embody this philosophy of delivering tomorrow's products today.

Building a Greener Future for Rail

The rail industry is under increasing pressure to cut emissions and adopt greener practices. Compressed air systems, while often overlooked, play a central role in this transformation. By adopting biodegradable lubricants and energy-efficient compressors, operators reduce environmental impact across the entire lifecycle of their fleets.

This not only reduces operating costs but also improves reliability – helping rail networks meet rising expectations for punctual, sustainable and safe transport.

Looking Ahead

Mattei's introduction of a biodegradable lubricant is more than just a technical development—it signals a paradigm shift. It proves that sustainability and high performance can coexist in rail applications. For operators, it provides a pathway to reduce carbon footprint without sacrificing efficiency or reliability.

BIODEGRADABLE LUBE

With over a century of expertise, Mattei continues to shape the future of compressed air in transportation. Its blend of tradition, innovation and sustainability ensures that rail operators have the tools they need to meet tomorrow's challenges – today.

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