

User report
General Dynamics European Land Systems-MOWAG

Application Report

General Dynamics European Land Systems–Mowag

“ONE SYSTEM FOR ALL APPLICATIONS”

High Technical Requirements Met by an Innovative Solution

Lehmann-UMT developed a new central filtration system to address a complex application in the metalworking industry. The objective was to implement a compact, high-performance central filtration system without the use of filter aids, capable of supplying a large number of grinding machines under exceptionally constrained spatial conditions.

The customer, General Dynamics European Land Systems–Mowag, is an internationally active manufacturer of military land vehicles and their components. At its Swiss production site, the company manufactures high-precision transmission components for armoured vehicles. The facility had previously relied on an ageing centrifuge system that provided neither the required filtration fineness nor the necessary temperature stability of the water-based metalworking fluid. Furthermore, the basement area designated for installation of the new system could only be accessed through a narrow opening measuring approximately 1.3 × 2.0 m.

The installation of a significantly larger and higher-capacity treatment system therefore represented an additional engineering challenge. The Lehmann-UMT system consists of several functional assemblies, including StingR fine filtration, tank and filter units, as well as the associated pumping and control technology. These assemblies had to be precisely coordinated with respect to their weight, geometry and sensitive components. Since the installation site could only be accessed through the existing basement opening, all assemblies had to be designed and prepared as transportable modules that could be safely introduced and positioned under controlled conditions.

During the design and planning phase, Lehmann-UMT therefore determined the maximum permissible component dimensions and established the sequence in which the individual modules would have to be transported into and positioned within the basement. In addition to the geometric constraints, particular consideration was given to suitable lifting points, load distribution among the assemblies, and sufficient clearance for installation, operation and subsequent maintenance at the final installation site.



The objective was to enable efficient installation and final assembly despite the restricted spatial conditions while avoiding extensive modification work at the customer's site.

Factory Pre-Assembly at Lehmann-UMT – Minimising Production Downtime

The customer had initially anticipated that the new system would have to be assembled and welded on site, which would have resulted in several weeks of production downtime. Lehmann-UMT instead developed a concept based on complete pre-assembly at its own manufacturing facility.

The system was fully assembled and commissioned at Lehmann-UMT, where it was also tested for functionality. It was subsequently dismantled into manageable assembly modules so that the individual units could be transported through the narrow access opening. This approach reduced the production interruption at General Dynamics European Land Systems–Mowag to only a few days.

Multi-Stage Filtration for High-Performance Applications

From a technical perspective, the system is based on a four-stage filtration process that operates without the use of filter aids:

1. **Stage 1:** Two large continuous belt filters for coarse particle separation.
2. **Stage 2:** Magnetic filtration for the removal of fine metallic particles.
3. **Stage 3:** A sedimentation tank equipped with a scraper conveyor for the removal of settled particles.
4. **Stage 4:** Fine filtration using StingR-Dome elements with automatic cleaning.



*With a flow rate of **1,000 L/min** and a tank capacity of approximately **10,000 L**, the system supplies up to twelve grinding machines. Despite a high contaminant load of approximately **20 kg/h**, the system achieves a filtration fineness of **5–10 µm**, substantially exceeding the originally specified filtration requirement of 15–25 µm.*

Lehmann-UMT specifies a combination of efficient filtration and precise temperature control that extends the service life of the metalworking fluid to at least one year. Previously, the coolant had to be replaced after only two to three months. The extended service life reduces production interruptions, labour requirements associated with draining and refilling the system, disposal costs, and the costs of preparing and supplying fresh coolant.

Reliability and Low Maintenance Requirements as Key Advantages

In addition to improved process reliability, the system is characterised by largely maintenance-free operation. Residues from all filtration stages are directed to a central discharge point, while the filtered liquid is automatically returned to the system.

Redundant system components ensure continuous operation, including three-shift production. This is an important requirement for the highly utilised transmission-component manufacturing operation at General Dynamics European Land Systems–Mowag.

Project Implementation and Customer Response

*The project was implemented in cooperation with Riemann AG, a Swiss sales partner of Lehmann-UMT. During the factory acceptance inspection, the customer was initially impressed by the physical dimensions of the system, commenting spontaneously: “**That will never fit in there!**”*

The system is now operating reliably, with low energy consumption and minimal service requirements, and has demonstrated its suitability under the demanding continuous operating conditions of General Dynamics European Land Systems–Mowag’s transmission-component production.

Conclusion

The central filtration system developed by Lehmann-UMT demonstrates how intelligent planning, modular system architecture and carefully engineered filtration technology can be combined to deliver high-performance solutions even under severely constrained spatial conditions.

*For the customer, the resulting system provides stable process conditions, reduced operating costs and high filtration performance—**one system for all applications.***