

PIPE EXPANSION LUBRICANTS

SEE THE DIFFERENCE



Master Fluid
SOLUTIONS™





Master Fluid
SOLUTIONS™

SEE THE DIFFERENCE

Since our founding in 1951, we have strived for continuous excellence and improvement in everything we do, thereby helping to expand the opportunities available to our customers and business partners. Get in touch with our experts and **SEE THE DIFFERENCE** in working with us and our outstanding solutions.



WEDOLiT® - PIPE EXPANSION LUBRICANTS

Since the acquisition of WEDOLiT® by Master Fluid Solutions in 2019, we have strengthened our commitment to innovation and quality through the establishment of our Technology Center with dedicated R&D in Düsseldorf— a hub for advancing high-performance metal-forming solutions. With more than 80 years of experience, WEDOLiT® has been a trusted name in the metal forming and corrosion protection industry.

With our line of products and our unrivaled innovations we specialize in forming and protecting metal to help maximize your operational performance.



Our solutions are engineered to provide:

- **Enhanced efficiency:** Reduce downtime, minimize tool wear, and optimize your manufacturing processes.
- **Consistent quality:** Deliver superior, stable, and long-term performance including excellent corrosion protection.
- **Expert partnering:** We work hand-in-hand with engineers and plant managers, addressing real-world challenges with hands-on expertise.

We are your partner for forming and protecting metal.
SEE THE DIFFERENCE – with WEDOLiT®.



« ... carefully chosen expander oil, paired with an optimised effluent treatment strategy, can deliver tangible operational, environmental, and financial gains. »

Ismael Tarruell
Global Business Development Manager
for Forming Fluids, Master Fluid Solutions



MEETING THE CHALLENGES OF PIPE EXPANSION

Modern pipe manufacturing, especially for thick-walled, small-diameter applications, demands processes that maximize productivity, reliability, and final product quality. The expansion process, integral to the production of pipelines for the energy, petrochemical, and construction sectors, presents a range of technical challenges:

- High **mechanical and hydraulic stresses** can lead to temperature peaks and inconsistent pressures, risking damage to equipment.
- Stick-slip effects threaten **dimensional accuracy**, and operational stability.
- Lubrication must be maintained even under **extreme expansion forces** – to support longevity of tools.
- **Environmental considerations** are increasingly critical: manufacturers must reduce consumption of chemicals, splitting agents, and fresh water, while optimizing water recovery and minimizing process waste.
- Ease of **post-process cleaning** is essential for efficient, cost-effective production and to avoid quality problems in subsequent processes (e.g. coating).

Through decades of experience, WEDOLiT® understands these challenges and offers solutions designed to meet the most demanding technical requirements.

WEDOLiT® products in the LSAW process with mechanical expansion



Forming

WEDOLiT® lubricants ensure smooth shaping of the plate with reduced friction and tool wear. They provide excellent metal surface protection and enable consistent dimensional accuracy even under high pressure.

Expanding

WEDOLiT® expansion lubricants provide exceptional lubrication and cooling during pipe expansion. They reduce surface defects, minimize friction forces, and prolong tool life.

Cleaning

WEDOLiT® products feature excellent washability, allowing easy and sticky residue-free removal of lubricants after forming and welding. This ensures clean surfaces and optimal preparation for subsequent process steps.

Leakage testing

Our water-based testing solutions support precise and residue-free leak detection. They safeguard product integrity and comply with industrial quality standards.

WEDOLiT® testing media offer a long sump life thus reducing water consumption and improving the environmental footprint.

Life of testing equipment seals is considerably extended with WEDOLiT® testing media.

Collaboration with Expander Head OEMs Ensures Trusted Lubrication Technology

A critical aspect of successful tube expansion is the use of lubrication technology that is fully trusted and approved by expander head original equipment manufacturers (OEMs). Close collaboration with OEM suppliers ensures that WEDOLiT® expander oils meet the stringent requirements dictated by the mechanical design and operational parameters of the expander heads.

This collaboration guarantees optimum lubricant film formation under high pressure and temperature conditions, preventing equipment wear and failure and optimal material compatibility. By aligning our fluid formulations with OEM standards, we deliver not only superior process performance but also enhanced equipment reliability and longevity, providing customers with a comprehensive, trust-based solution proven in demanding industrial environments.

Experience and Collaboration

- We are trusted partners to our customers around the world, who together operate many LSAW lines (Longitudinal Submerged Arc Welded).
- Approved by leading expander head manufacturers and collaborating continuously with OEMs on product innovation.
- Recognized for strategic investment and forward-looking product development for future expansion needs.
- Collaboration with manufacturers of industrial wastewater treatment systems, to enhance the splitting process to recover the water from the emulsion



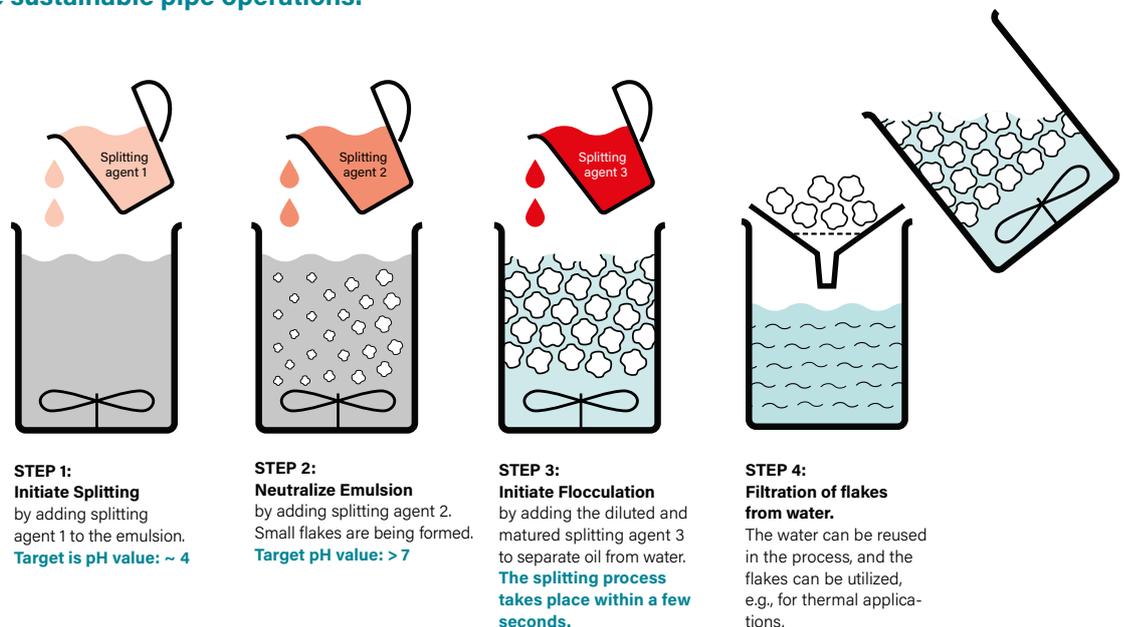
SETTING NEW INDUSTRY STANDARDS WITH EASY SPLITTING™ TECHNOLOGY

WEDOLiT® Expander Oils bring the latest technological advances to pipe expansion fluids, designed to meet the specialized needs of large pipe manufacturers. Our Easy-splitting™ Technology is a distinct, innovative feature embedded in WEDOLiT® Expander Oils that adds crucial benefits primarily related to fluid recovery, cleaning, and sustainability of WEDOLiT® expander fluids.

WEDOLiT® Expander Oils Process and Performance benefits:

- **Superior Lubrication:** Minimizes stick-slip effects, ensuring smooth mechanical expansion, and improved dimensional accuracy.
- **Thermal Stability:** Reduces temperature peaks in the expander head, protecting equipment and maintaining process stability.
- **Stable Hydraulic Pressures:** Ensures consistent expansion forces for reliable and reproducible pipe expansion.
- **Optimized Dosage:** Efficient lubrication achieved at minimal fluid volumes for cost savings and process control.
- **Enhanced Productivity:** By improving slip-stick avoidance and hydraulic stability, these oils enable longer pipe lengths per day and reduce downtime.

The three step WEDOLiT® Easy-splitting™ Technology enables efficient water reuse, reducing chemical use, and supporting more sustainable pipe operations.



Easy-splitting™ Technology (ES) - Enhanced Process and Environmental Benefits

Easy-splitting™ Technology is a distinct, innovative feature embedded in WEDOLiT® Expander Oils that adds crucial benefits related to fluid recovery, cleaning, and sustainability:

- **Rapid Oil-Water Separation:**

The ES formulation promotes very efficient phase separation, significantly speeding up post-expansion emulsification and splitting processes.

- **Reduced Additive Consumption:**

More than 30% fewer splitting agents are required during water treatment compared to conventional expander oils, reducing operational costs.

- **Optimized Water Recovery & Reuse:**

Cleaner separation allows recycling of wash water in production, lowering fresh water consumption and environmental impact.

- **Simplified Post-Process Cleaning:**

Improved oil removal means pipes are easier to clean internally — vital for excellent coating adhesion and quality.

- **Ease of expander head cleaning:**

Easy washability facilitates cleaning of the expander head after each pipe has been manufactured.

- **Lower Chemical Usage & Waste:**

Overall chemical footprint and process residues are minimized thanks to enhanced demulsification.



In the third process step the added splitting agent matures for up to 24 h to start flocculation and separate the flakes from the water.

How They Work Together - Bundled Concept:

WEDOLiT® Expander Oils and Easy-splitting™ Technology are designed as an integrated system:

- The expander oils ensure optimal mechanical and thermal performance during pipe expansion, enabling high productivity, process stability, and product quality.
- Meanwhile, the Easy-splitting™ Technology tailored to these oils addresses critical downstream challenges, ensuring that the oils can be efficiently separated from process water, dramatically improving sustainability, and total cost of ownership.

Together, they form a comprehensive solution that not only advances the expansion process itself but also optimizes fluid management — resulting in higher throughput, reduced operating costs, and a more sustainable manufacturing footprint.



SUSTAINABLE WATER MANAGEMENT FOR PIPE EXPANSION PROCESSES

During pipe expansion, large volumes of water are required to clean the pipes and remove residues. This step is essential for quality, but it can also lead to considerable water consumption and contaminated wash water. To help our customers operate more efficiently and responsibly, we work with specialized water-treatment experts in Germany and Spain who deliver solutions tailored to the needs of pipe manufacturers.

Our partners bring extensive international project experience and provide treatment systems designed specifically for industrial wash water containing oil traces, fine particles, and metallic residues. Their technologies enable significant reductions in freshwater usage and ensure that process water meets environmental requirements before reuse or discharge.

By combining our Easy-Splitting-Technology with reliable water-treatment solutions, we support pipe manufacturers in achieving high production standards while considerably strengthening their sustainability performance.

Together, they form a comprehensive solution that not only advances the expansion process itself but also optimizes fluid management — resulting in higher throughput, reduced operating costs, and a more sustainable manufacturing footprint.



WEDOLiT® FW 3500 - MAXIMIZE BATH LIFE - HIGH-PERFORMANCE FLUID FOR HYDROTESTING

WEDOLiT® FW 3500 is specifically formulated for hydrotesting processes. This product is approved by "FF Fluid Forming" and designed to maximize bath life and process reliability.

Key Features:

- Prolonged bath life
- Good corrosion protection
- Outstanding operational stability under demanding conditions
- Almost foam-free formulation for smooth process control
- Good skin compatibility for operator safety
- Increases the seals' life of testing equipment

Recommended Concentrations:

- Hydrotesting: 5 - 6%

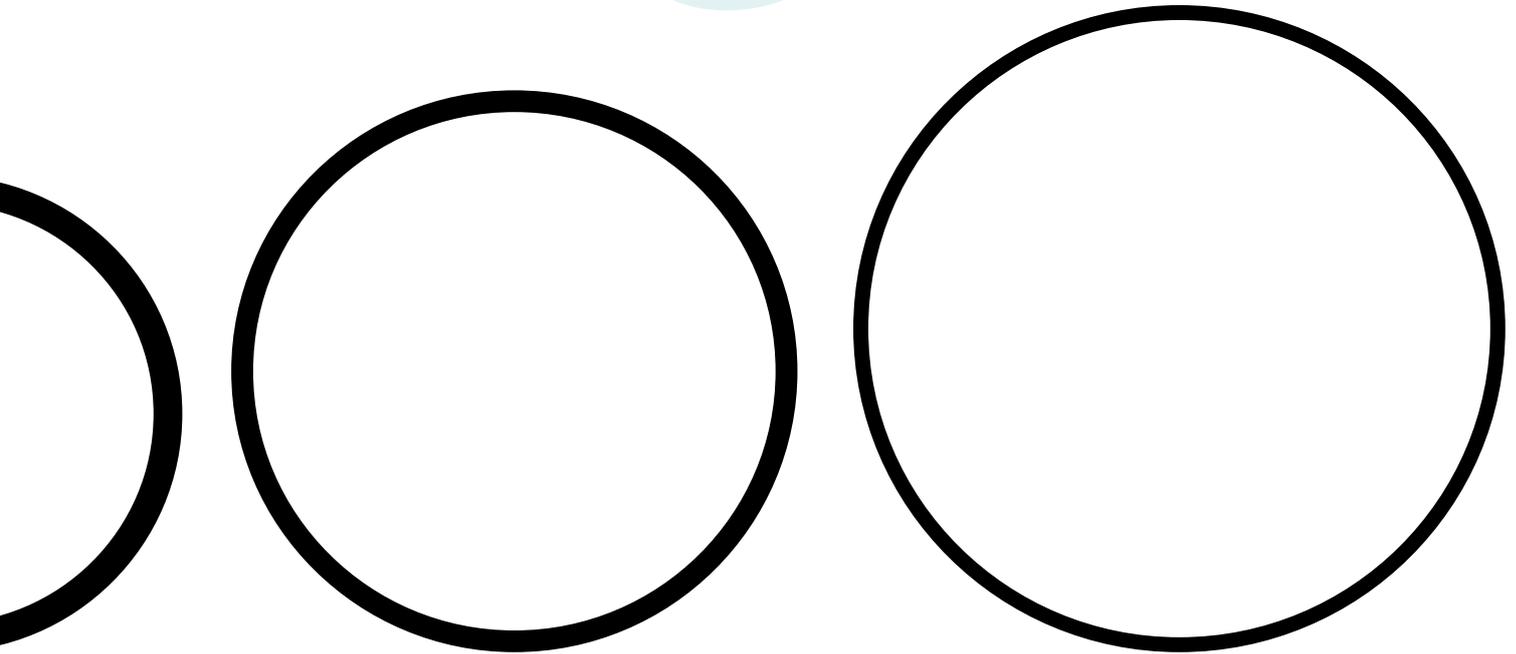
WEDOLiT® FW 3500 helps manufacturers achieve both quality and efficiency.



EXPANSION LUBRICANTS BASED ON PIPE DIAMETER AND THICKNESS



ester based products		WEDOLiT® EP 760-E
		<ul style="list-style-type: none"> ▪ Germany ▪ VKA value 6000 N
		<i>For pipes with small diameters and large wall thicknesses</i>
mineral oil based products	WEDOLiT® EP 1090	WEDOLiT® EP 760
	<ul style="list-style-type: none"> ▪ India ▪ VKA value 9000 N 	<ul style="list-style-type: none"> ▪ India, Lithuania ▪ VKA value 6000 N
	<i>For pipes with small diameters and large wall thicknesses</i>	<i>For pipes with medium diameters and medium to high wall thicknesses</i>
mineral oil based products <i>Easy-splitting™ Technology</i>		WEDOLiT® EP 760-ES
		<ul style="list-style-type: none"> ▪ Germany ▪ VKA value 6000 N
		<i>For pipes with medium diameters and medium to high wall thicknesses</i>



WEDOLiT® EP 435-E		WEDOLiT® EP 320-E	
<ul style="list-style-type: none"> • Emirates, India, Germany, Malaysia, Korea, Vietnam, Saudi Arabia • VKA value 3400 N 		<ul style="list-style-type: none"> • Germany, Turkey • VKA value 2400 N 	
<i>For pipes with large diameters and thin to medium wall thicknesses</i>		<i>For pipes with large diameters and thin to medium wall thicknesses</i>	
WEDOLiT® EP 540			
<ul style="list-style-type: none"> • Germany, Lithuania, China • VKA value 4000 N 			
<i>For pipes with large diameters and thin to medium thicknesses</i>			
WEDOLiT® EP 540-ES		WEDOLiT® EP 430-ES	
<ul style="list-style-type: none"> • Greece, UK • VKA value 4000 N 		<ul style="list-style-type: none"> • VKA value 3200 N 	
<i>For pipes with large diameters and small to medium wall thicknesses</i>		<i>For pipes with large diameters and thin wall thicknesses</i>	



Case Study

ENHANCING PRODUCT STABILITY AND WASH- ABILITY AT JINDAL GROUP



Background

Jindal Group is one of the world's leading manufacturers of large-diameter steel pipes, supplying critical infrastructure projects across the global energy and construction sectors. In late 2024, Jindal faced a significant production challenge caused by oily residues inside pipes after post-washing — an issue linked to the WEDOLiT® expander lubricant used in their LSAW (Longitudinal Submerged Arc Welded) pipe lines.

Problem Identification

In close collaboration with Jindal's engineering and quality assurance teams, Master Fluid Solutions (MFS) conducted a comprehensive analytical review. Retained laboratory reference samples were compared with product samples collected from Jindal's site to isolate the source of the issue.

The investigation revealed the following:

- Reduced washability in the Jindal production samples compared to retained references.
- Retained samples were still within specification.
- High-temperature stress during transportation and storage was the root cause of the problem.

These insights ruled out formulation changes and confirmed that thermal degradation of the product during the transportation and high-temperature storage condition — rather than a change in composition — was driving the performance drop.

« This project showed the value of true technical partnership. The Master Fluid Solutions team supported us from laboratory analysis to full-scale production, helping us overcome a critical quality issue that had impacted our operations. The new WEDOLiT® EP 438-E formulation is performing exceptionally well — clean pipes, stable lubrication, and peace of mind for our customers. »

Head of Production & Manufacturing, Jindal Group



The production of large-diameter steel pipes is a complex process that places very high demands on all process steps.

Solution Development: WEDOLiT EP 438-E

Solution Development: WEDOLiT® EP 438-E

To resolve the issue and future-proof the process, the MFS R&D team developed an upgraded version lubricant: WEDOLiT® EP 438-E.

This upgraded formulation introduced several key improvements:

- The initial formula was developed for moderate European temperature conditions, while the improved formulation offers excellent stability at elevated storage and operating temperatures. Furthermore, the product exhibits improved storage stability, ensuring reliable performance even after extended overseas transportation.
- Superior washability, ensuring complete residue removal after post-wash.



ALL PRODUCTION LINES WERE SWITCHED TO WEDOLiT® EP-438-E



« WEDOLiT® EP 438-E proved that by improving fluid chemistry and stability, we can eliminate downstream process risks without altering the equipment or production parameters. Its washability and high-temperature resistance make it perfectly suited for demanding LSAW pipe manufacturing. »

Ismael Tarruell

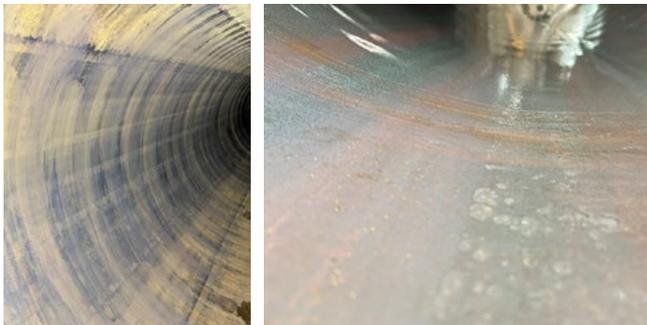
Global Business Development Manager for Forming Fluids,
Master Fluid Solutions

Trial Implementation

Starting in April 2025, Jindal implemented WEDOLiT® EP 438-E in production on their most demanding applications, including:

- LSAW pipes with 40-inch diameter and 2-inch wall thickness, expanded in a single pass.
- 1% expanding conditions, representing one of the most challenging forming operations in the global pipe industry.

To date, extensive tests have been conducted, with consistent performance and quality observed across all production runs.



Left: Dry oily residues after post-washing with "old" technology;
Right: Very clean residue-free pipes right after the cleaning process
with new WEDOLiT® EP 438-E



CONCLUSION

The close cooperation between Jindal Group and Master Fluid Solutions led to the successful development and industrial validation of WEDOLiT® EP 438-E – an upgraded version of the expander oil offering improved washability, higher temperature stability, and maintaining the superior performance consistency.

By resolving a residue issue this project restored process reliability, strengthened product confidence, and showcased MFS's problem-solving and formulation expertise as a vital contributor to Jindal's production excellence.



Find **more information** about
the innovative WEDOLiT® Easy-splitting™
Technology

Results and Customer Feedback

After several months of continuous operation, Jindal reported excellent field results with the new product:

- Post-wash pipe surfaces were clean and residue-free, even under the most severe expansion conditions.
- Line stability improved, with smoother operation and reduced cleaning requirements.
- Visual inspections confirmed an excellent surface appearance, free from oily films or staining.



WEDOLiT®

PIPE EXPANSION SOLUTIONS

Products	Technology	Features
Easy-splitting™ Technology		
WEDOLiT® EP 430-ES	Easy-splitting™ Technology	<ul style="list-style-type: none"> • Excellent oil-water separation in expansion operations
WEDOLiT® EP 540-ES	Easy-splitting™ Technology	<ul style="list-style-type: none"> • Very high film stability; strong wear protection; easily removable with water; lower splitting-media consumption. • Excellent oil-water separation in expansion operations.
WEDOLiT® EP 760-ES	Easy-splitting™ Technology	<ul style="list-style-type: none"> • Excellent oil-water separation in expansion operations. • Very high film stability; strong adhesion; very efficient with minimal splitting media needed.
Expander oils		
WEDOLiT® EP 320-E	Expander oil	<ul style="list-style-type: none"> • Very high film stability • Good adhesion • Easily removable by water (spontaneous emulsification)
WEDOLiT® EP 435-E	Expander oil	<ul style="list-style-type: none"> • Very high film stability • Good adhesion on smooth surfaces • Wear protection • Easily removable with water
WEDOLiT® EP 438-E	Expander oil	<ul style="list-style-type: none"> • Excellent stability at temperature > 40 degrees • Good adhesion on smooth surfaces • Wear protection • Very good washability
WEDOLiT® EP 540	Expander oil	<ul style="list-style-type: none"> • Very high film stability, • Good adhesion; easily removable by water (spontaneous emulsification) • Prevents stick-slip via polar additives
WEDOLiT® EP 540-CM	Expander oil	<ul style="list-style-type: none"> • Very high film stability; good adhesion; easily removable with water.
WEDOLiT® EP 545-E	Expander oil	<ul style="list-style-type: none"> • Likely similar high-viscosity expander oil for pipe expansion with high film stability and wear protection.
WEDOLiT® EP 760	Expander oil	<ul style="list-style-type: none"> • Very high film stability, good adhesion; easily removable by water • Prevents stick-slip via polar additives
WEDOLiT® EP 760-E	Expander oil	<ul style="list-style-type: none"> • High film stability; good adhesion; supports water-removal cleaning (emulsification).
WEDOLiT® EP 760 CM	Expander oil	<ul style="list-style-type: none"> • High film strength and wear protection; designed for easy cleaning/emulsification.
WEDOLiT® EP 1090	Expander oil	<ul style="list-style-type: none"> • Very high film stability even under high pressure. • Can be used undiluted; prevents stick-slip via high polar additive content.

Type	Viscosity at 40°C (mm ² /s)	Pumpability at low temperature	EP Additives	4 Ball (N)	Washability (sec.)
Ester/Mineral oil	>380	++	+	3200	20
Ester/Mineral oil	>380	++	++	4200	20
Ester/Mineral oil	>380	++	+++	6000	25
Ester	>380	+++	++	2700	30
Ester	>380	+++	++	3400	30
Ester	>380	+++	+	3600	25
Mineral oil	>380	+	++	4400	25
Ester/Mineral oil	>380	++	++	4200	25
Ester	>380	+++	++	4200	30
Mineral oil	>380	+	++	6000	30
Ester	>380	+++	+++	6000	30
Ester/Mineral oil	>380	++	++	6000	30
Ester/Mineral oil	>380	+	+++	8500	30



GET IN TOUCH

Get in touch with our experts - **See the difference with WEDOLiT®**

Discover how partnering with WEDOLiT® can transform your pipe expansion process through technology-led lubrication, excellent washability, and water treatment solutions. Whether aiming to enhance productivity, reduce costs, improve cleanliness of the pipes or improve sustainability, our expert team is ready to tailor solutions that fit your production requirements.

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