



AKILA® Sealing System

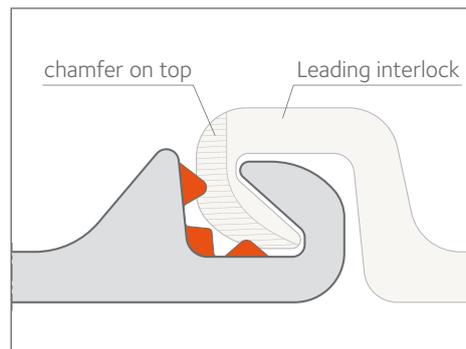
Product properties

AKILA® is a new **environmentally friendly high performance sealing system** for ArcelorMittal sheet piles. The system is based on three sealing 'lips' – consisting of a product called MSP-1 – mechanically extruded into the interlocks of single sheet piles, or the free interlocks of double sheet piles. In the case of double piles, the intermediary (paired) interlock is sealed with a second product MSP-2.

MSP-1 and MSP-2 both belong to the family of **silane modified polymers** (also called MS-Polymers), and are single component elastic sealants with a density of 1.41 g/cm³ and 1.48 g/cm³, respectively. They are UV-stable and have an **excellent adhesion to primerless steel**.

Both products are resistant to humidity, weathering and temperatures between -40°C and +90°C (even up to 120°C for short periods). They have an elongation at break of at least 380%, a Shore A hardness after complete polymerization of 58 for

MSP-1 and 44 (after 14 days) for MSP-2, and are durable in contact with freshwater, seawater, as well as various hydrocarbons, bases and acids (depending on concentration, a complete list is available on request).



MSP-1 product extruded into the interlock

Watertightness performance

A series of in situ tests were carried out in stiff clays near Mittersheim (FR) and in soft sandy soil near Zeebrugge (BE), in order to determine the inverse joint resistance ρ_m .

Single sheet piles and crimped double piles fitted out with the AKILA® system were driven into the ground using an impact hammer as well as a vibratory hammer. In case of vibrodriving, sheet piles were driven continuously at a minimum rate of 20 seconds per meter. After installation, watertightness was tested at water pressures of 2 and 3 bar, according to a procedure developed by Deltares and ArcelorMittal.

The average inverse joint resistance values ρ_m were determined according to EN 12063.

Testing and results were witnessed and certified by an independent third party ('Germanischer Lloyd').

The results for single and double piles are listed below:

	ρ_m (m/s) for water pressure of	
	2 bar	3 bar
Single piles (MSP-1)	$4.9 \cdot 10^{-11}$	$8.6 \cdot 10^{-11}$
Double piles (MSP-1 & MSP-2)	$3.3 \cdot 10^{-11}$	$4.7 \cdot 10^{-11}$



Certified test report

Environmental certification

MS-Polymers are considered environmentally friendly as they are solvent free and – unlike polyurethanes – do not contain isocyanates.

AKILA® is certified by the 'Hygiene-Institut des Ruhrgebiets' as suitable for use in contact with groundwater.



Test report MSP-1

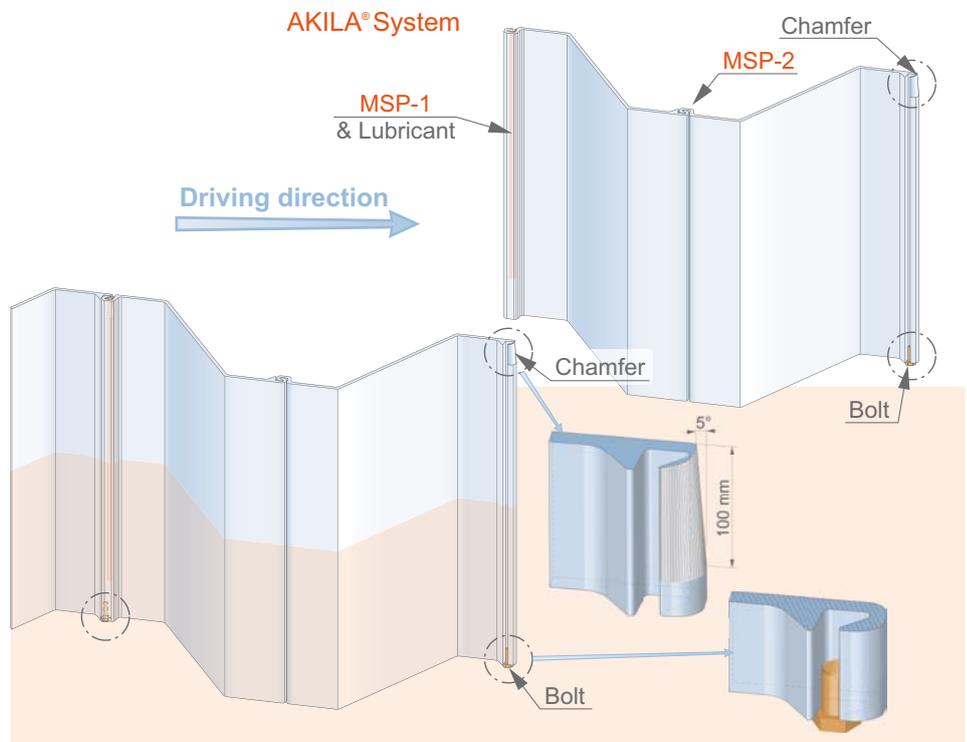
“Considering the fact that [MSP-1] remains effectively embedded within the sheet pile interlocks for typical applications, we believe that an appreciable impact on water in contact with the structure can be ruled out.”

Excerpt from test report of HY (free translation)

Driving recommendations

The above mentioned inverse joint resistance ρ_m values for the AKILA® system were determined through driving tests using the impact hammer and vibratory hammer. In the latter case, the driving rate must be faster than 20 seconds per meter. We recommend prior consultation of ArcelorMittal's technical department in case the press-in method is to be used. An environmentally friendly lubricant must be applied to the sealant in the interlocks prior to driving.

During driving, the “empty” interlock must be the leading interlock (see sketch). The leading interlocks are chamfered on the top, and the filling of the free interlock with soil during driving can be prevented by fixing a bolt to the bottom of the interlock (or similar solution). Ambient temperature during installation must be above 0°C.



Installation recommendations (driving direction, chamfer, etc.)

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