

WRM – “All-in-one” Repair Kit

Urethane Systems

June 2020

PUBLIC

Agenda

1. **About LANXESS**
2. Urethane Systems – Materials and applications
3. Urethane Systems – Expertise in mining
4. WRM product – Our solution for mining repairs
5. WRM product – Application guidance
6. WRM product – A large range of applications



LANXESS – A globally operating specialty chemicals company



Specialty chemicals company



- Spin-off from Bayer in 2004
- Specialty chemicals portfolio: chemical intermediates, additives, specialty chemicals and plastics

Global success story



- Approximately 14,300 employees in 33 countries
- Global sales of EUR 6.8 billion in 2019

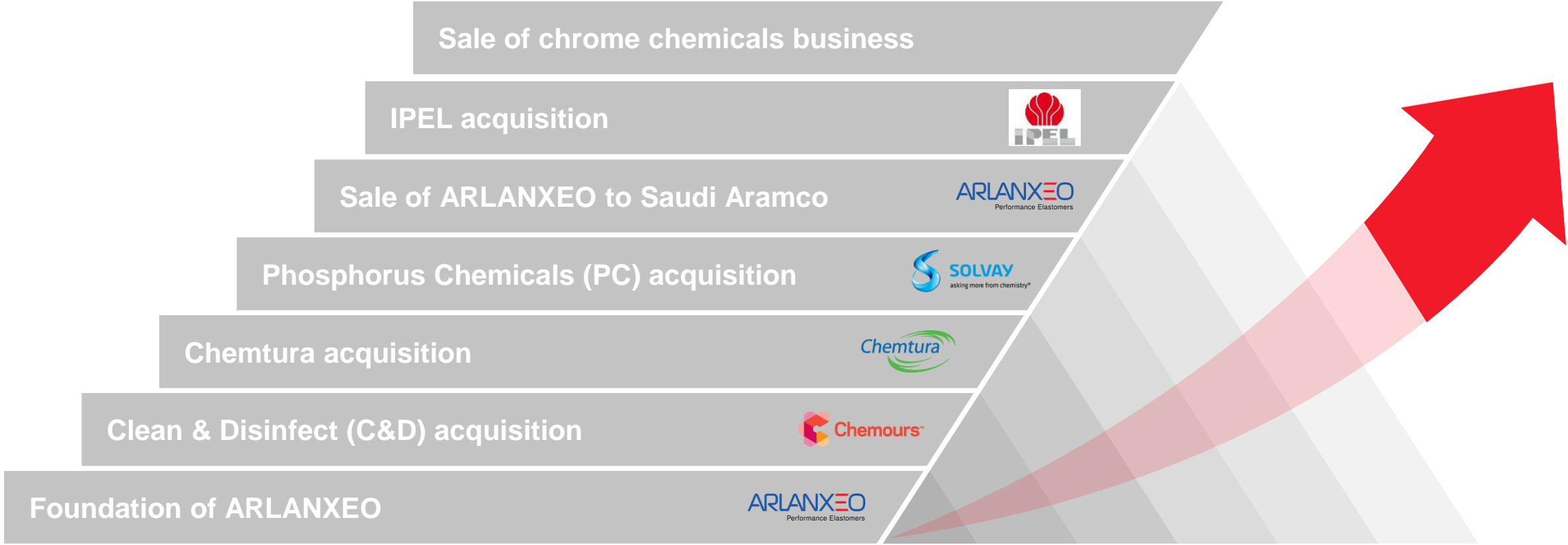
Strategy of profitability and resilience



- Strengthening of leading position in medium-sized markets
- Consolidation in Europe, expansion in USA and Asia

Our path towards the 'new' LANXESS

Milestones of transformation



LANXESS – a global specialty chemicals group

Advanced Intermediates



- Advanced Industrial Intermediates
- Inorganic Pigments

Specialty Additives



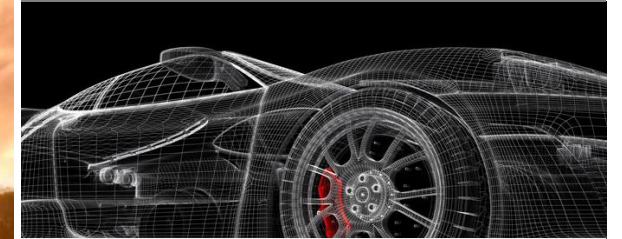
- Lubricant Additives Business
- Polymer Additives
- Rhein Chemie

Consumer Protection



- Liquid Purification Technologies
- Material Protection Products
- Saltigo

Engineering Materials



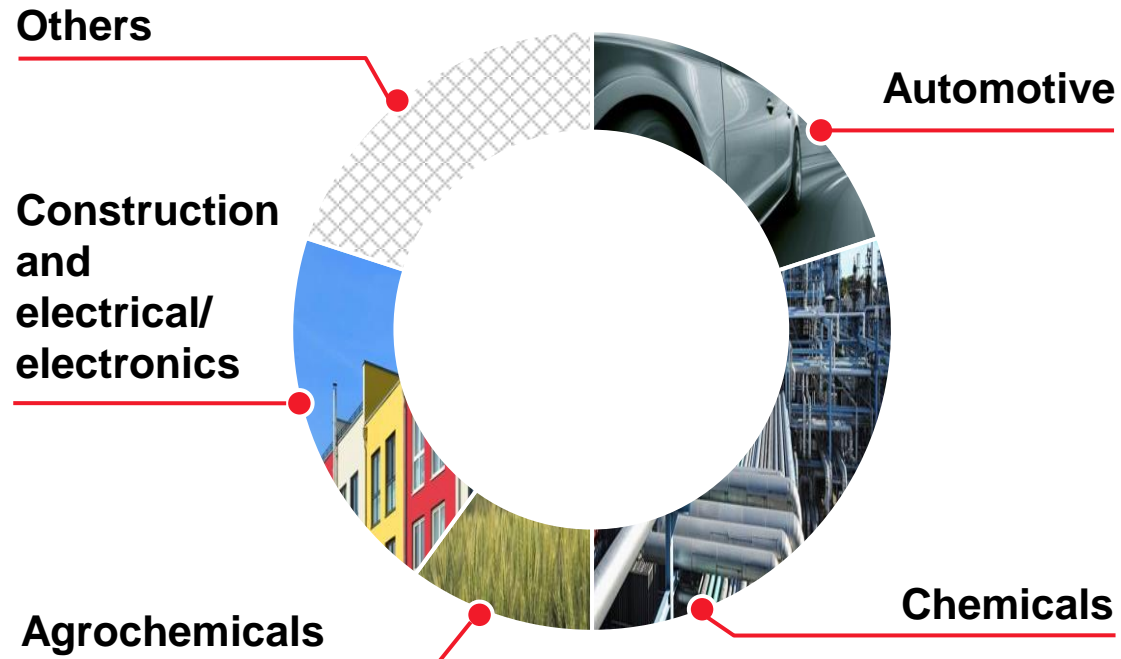
- High Performance Materials
- Urethane Systems

Group Functions and countries

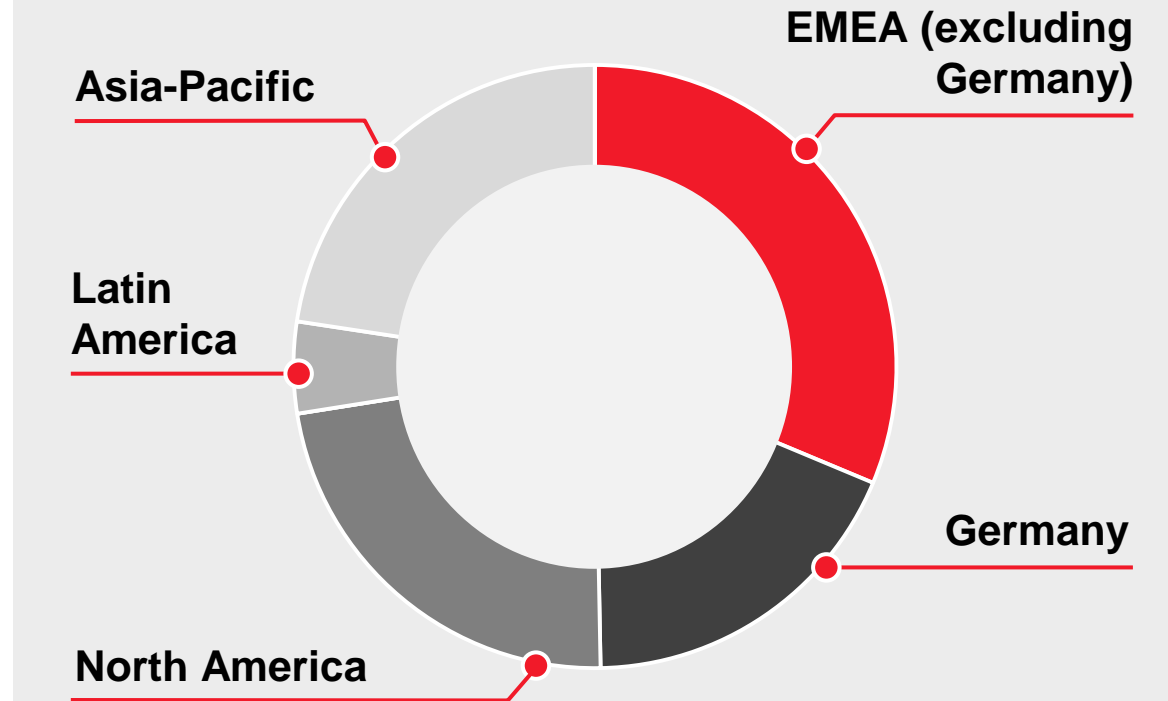
Business unit set up fosters dedication and entrepreneurship

LANXESS well diversified

LANXESS group – Sales by industry sector*



Sales by region*



* Numbers as of 2019

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Urethane Systems benefits from a global footprint, technology leadership and a broad customer base



Technology leader
in Low Free (LF)
isocyanate
technology



>60 years
of experience
in urethane
chemistry



A leading supplier
of cast urethane
systems globally



6 production
plants globally



7 application
development
centers globally



1 world-class R&D
center in the USA



>500 products
to serve
customers' needs



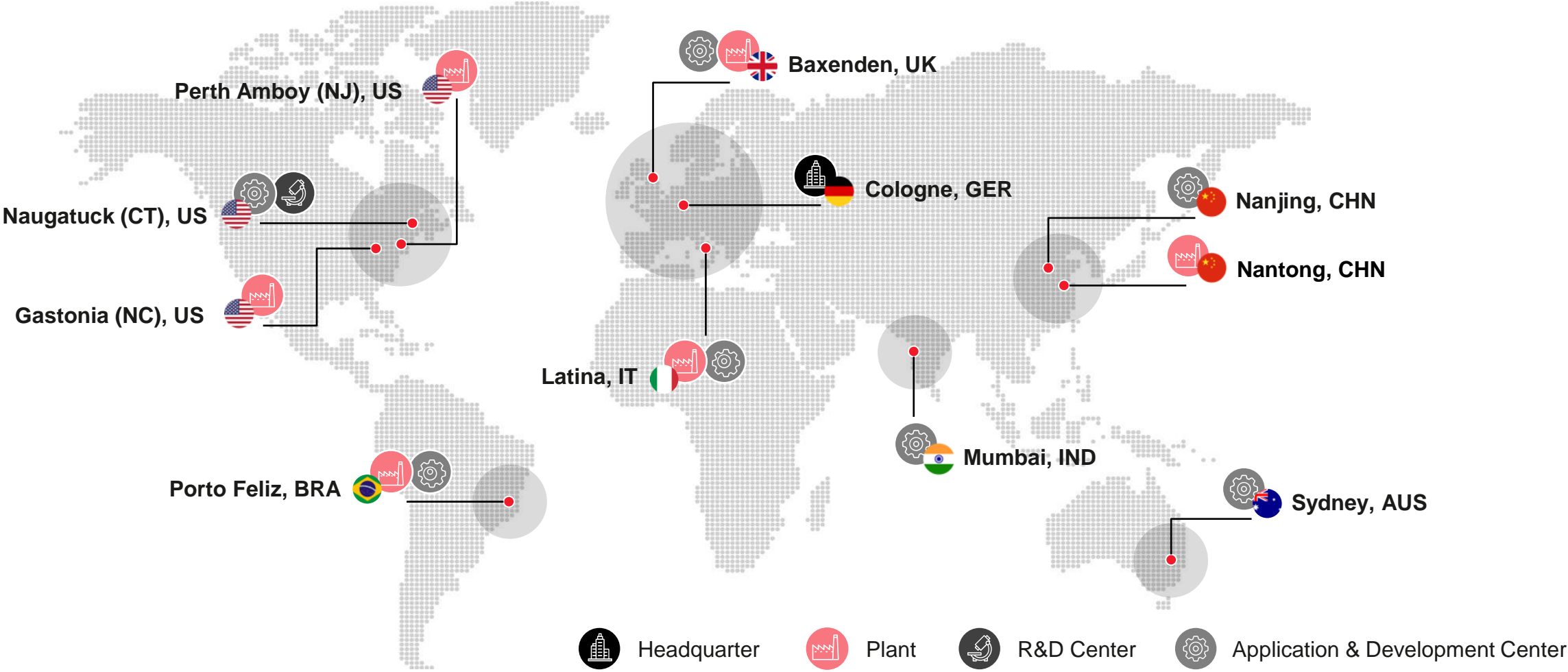
>250 m€ sales
in 62 countries







~400 employees
globally

LANXESS Urethane Systems

Global coverage for its customers



Four product groups provide high-quality solutions for a wide range of applications

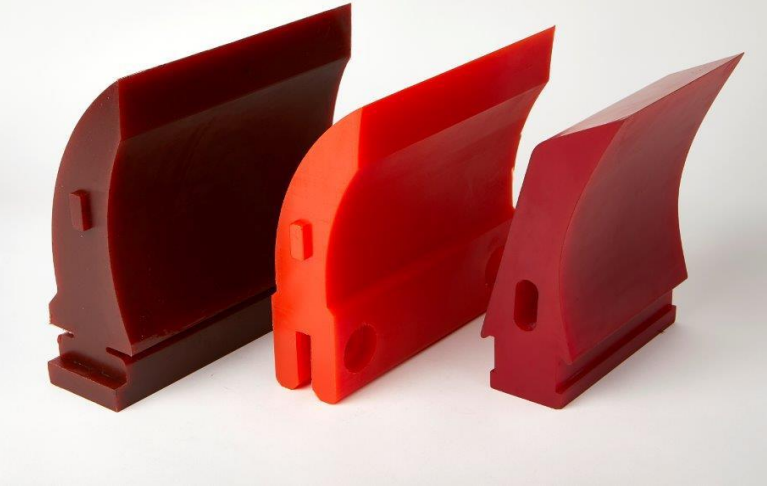
	Elastomers	Coatings	Adhesives & Sealants	Polyester Polyols
Products	<ul style="list-style-type: none"> Adiprene® LF Vibrathane® Adiprene® Vibracure® Duracure® Vibracat® Ultralast® 	<ul style="list-style-type: none"> Trixene® Witcoflex® Witcobond® Quasilan® 	<ul style="list-style-type: none"> Trixene® Witcobond® Adiprene® LF 	<ul style="list-style-type: none"> Fomrez®
Applications	<ul style="list-style-type: none"> Oil & Gas Mining Wheels & Tires Paper & Printing Industrial 	<ul style="list-style-type: none"> Leather & Textile Glass fiber sizing Breathable coatings Automotive coatings Protective coatings 	<ul style="list-style-type: none"> Field applied ambient cured adhesives & sealants Factory applied heat cured adhesives & sealants 	<ul style="list-style-type: none"> PU foam, TPU, and elastomer production Adhesives for metals, paper and wood Protective coatings 

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WRM Product Line – The result of LANXESS' deep expertise in the mining market



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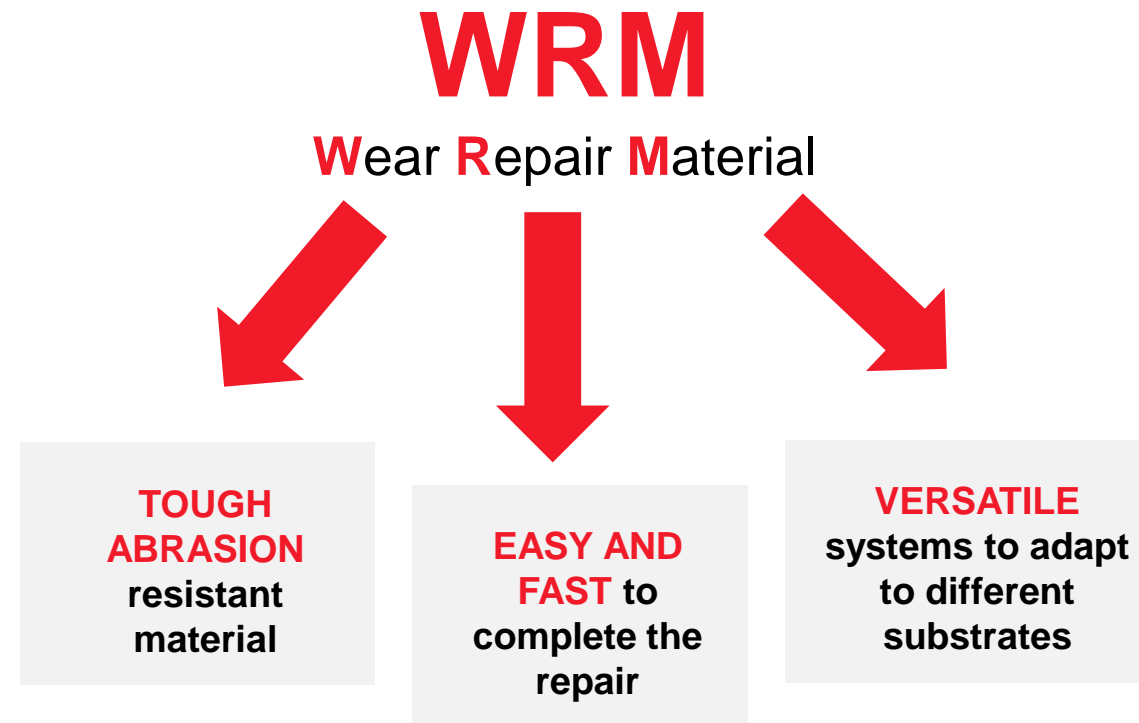
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LANXESS offers a complete line of on-site repairing kits for high wear applications

“All-in-one” repair kit perfect for damaged mining equipment

- WRM repairing kit
 - WRM 80T
 - WRM Premium 80T
 - WRM Premium 65T
- WRM Primers
 - WRM Primer Metal
 - WRM Primer Urethane
 - WRM Primer Rubber



LANXESS WRM 80T *

A proven repair solution for more than 40 years



Kit available in **1kg and 4kg size**



Back to service in **24 hours**



Excellent abrasion resistance compared to harder brittle epoxy repair products



Easy handling for consistent high performance results



Suitable for **inclined or vertical surface**



Properties	Standard	Value
		WRM 80T*
Hardness	ASTM D2240	80 Shore A
Working time (25°C)	–	30-40 min
Elongation at break	ASTM D412	540 %
Back to service Time	–	18 hrs
Tear Strength (Die C)	ASTM D624	63.0 kN/m
Tear Strength (Split)	ASTM D470	16.0 kN/m
Stress at Break	ASTM D412	13.0 MPa
Abrasion Loss	DIN 4649	117 mm ³
Shrinkage (@30°C)	–	<0.5%

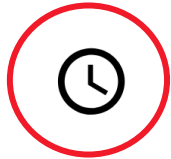
WRM 80T can be used on urethane, rubber, plastic or steel parts

Newly launched WRM Premium

Improved performance and productivity



Great **abrasion resistance**
Perfect for the most **challenging applications** (hot & wet)
Better **color retention**



Quickly back to service for **decreasing downtime**



Safe to use
Improved EH&S conditions



Packaging enabling **easy in-can mixing**
Kit available in **0.75kg and 1.5kg size**
Available in **2 hardnesses**



Suitable for **inclined or vertical surface**

Properties	Standard	Value	
		WRM Premium 80T	WRM Premium 65T
Hardness	ASTM D2240	80 Shore A	65 Shore A
Working time (25°C)	–	6-7 min	6-7 min
Elongation at break	ASTM D412	400 %	700 %
Back to service	–	2-4 hrs	2-4 hrs
Tear Strength (Die C)	ASTM D624	62.0 kN/m	44.0 kN/m
Tear Strength (Split)	ASTM D470	16.0 kN/m	10.5 kN/m
Stress at Break	ASTM D412	12.0 MPa	12.0 MPa
Abrasion Loss	DIN 4649	87 mm ³	165 mm ³
Shrinkage (30°C)	–	< 0.5%	< 0.5%

WRM Premium can be used on urethane, rubber, plastic or steel parts

WRM Premium – Products line offers improved processing conditions for a quick return to service



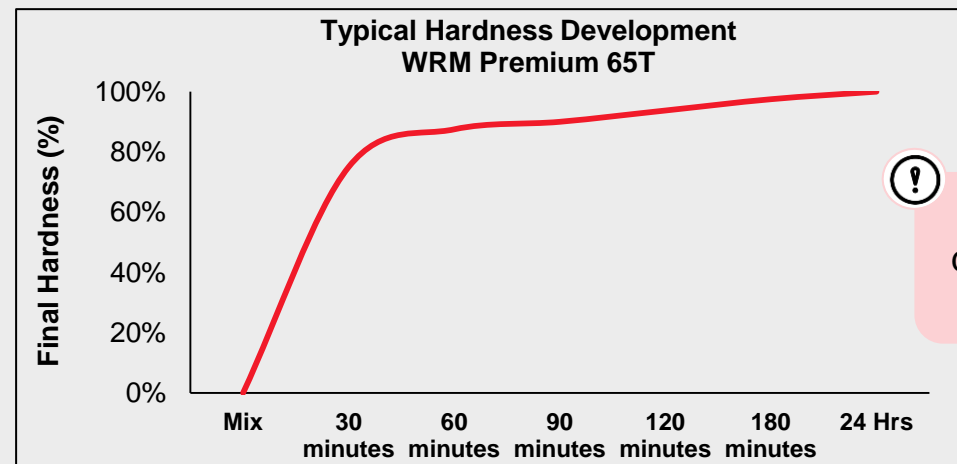
Improved EH&S conditions

- Part A contains < 0.08 % free isocyanate
- Non-hazardous curative system
- No mercury based catalyst



Great quality consistency & productivity

- Part B is specially formulated to promote a uniform reaction rate ensuring **one single application & avoiding rework**
- WRM Premium offers a **quick hardness and toughness build up** allowing a faster return to service



80% of the hardness develops in first 60-90 minutes

WRM Premium – Products line offers outstanding physical properties...

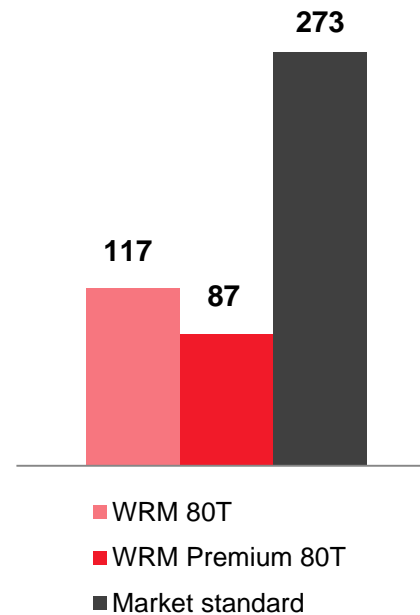
...for a longer lifetime in challenging environment

Key benefits

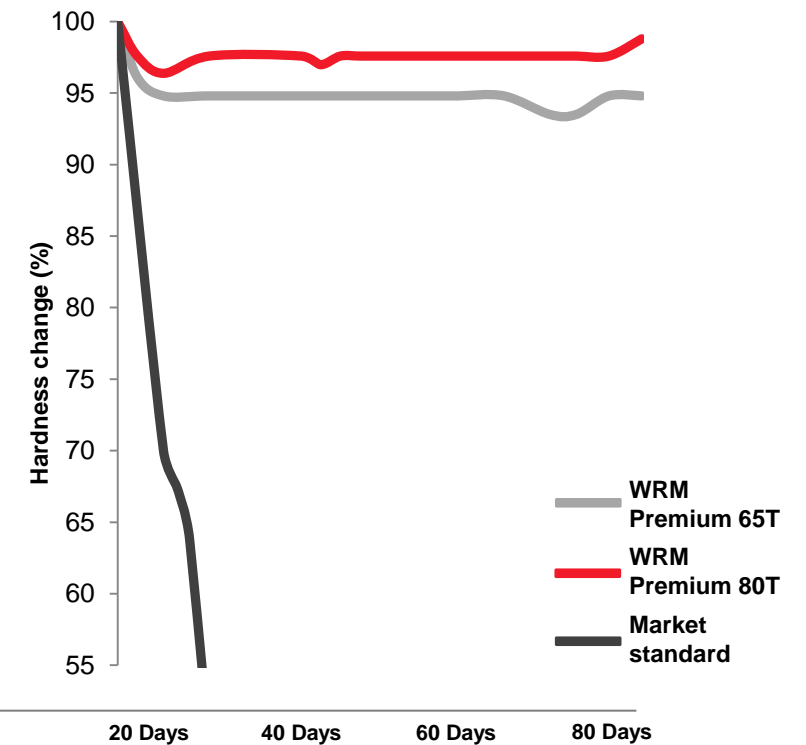
Compared to industry standard, WRM Premium line offers

- **Improved sliding wear resistance**
- Up to **double abrasion resistance** due to higher rebound
- Excellent **property retention in hot & wet, acid and alkaline environments**

Abrasion Loss (mm³)



Hydrolytic Resistance 80°C immersion



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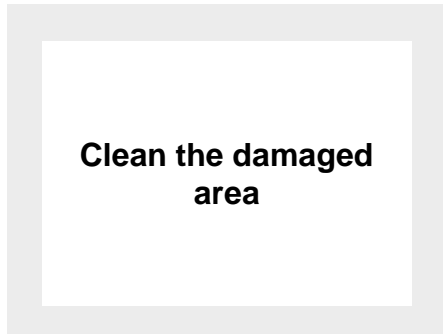
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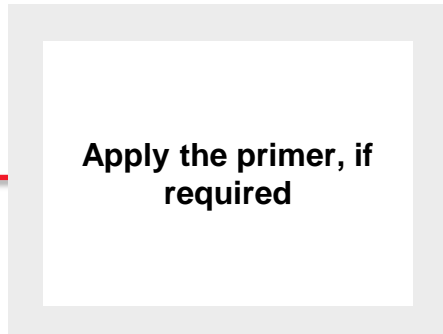
WRM application requires few easy steps

https://www.youtube.com/watch?v=0U_ZTX0oYoQ

I



II



Pour Part B into Part A
Mix for 3 minutes



The pourable liquid produced when mixing parts A & B may be used for simple casting jobs



The material will completely cure in 24 at rom temperature



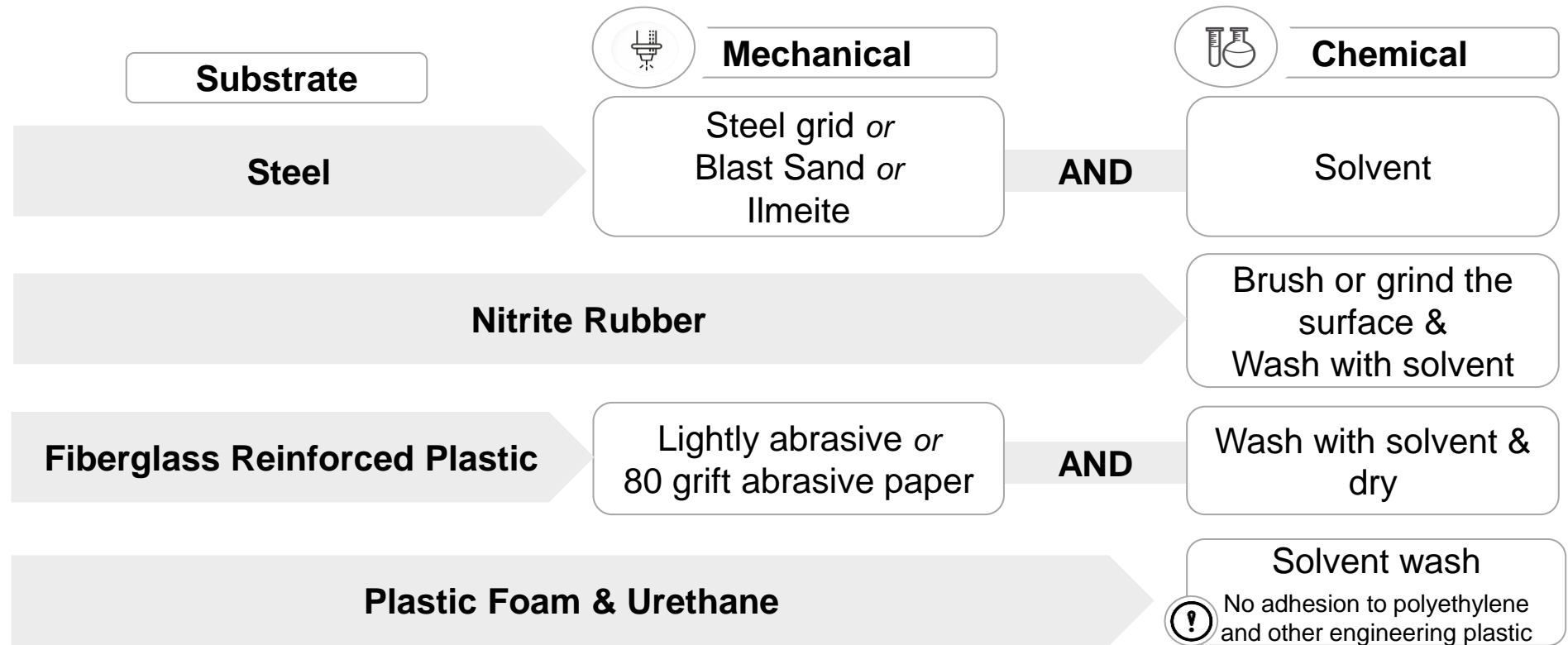
Add Part C only if thixotropic properties are desired



Note : Primer may be required depending on substrate chemistry or adhesion required

Surface preparation is key to reach great coating performance

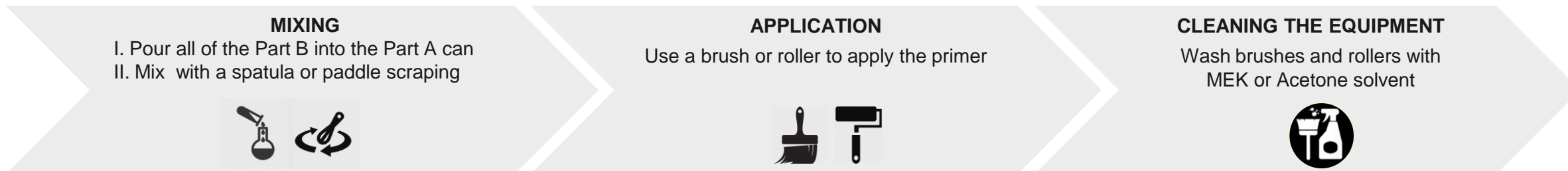
I Efficient cleaning of the surface can be achieved by mechanical or/and chemical treatment



For further information, refer to LANXESS “surface preparation guide”

LANXESS developed a complete range of primers for different substrates

II Few easy steps for efficient primer application



Great coverage



Available in different packaging sizes



A solution for each substrate

	WRM Primer Urethane	WRM Primer Metal	WRM Primer Rubber
Substrate	Urethane, PVC & RFP	Metal	Natural & some synthetic rubber
Coverage ¹ of 1kg	6-8 m ²	10 m ²	4m ²
Working time	1h	20 min	1h
Drying Time	30-45 min	20 min	5-45 min

¹ Coverage will vary depending on the surface texture of the part

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WRM – A perfect system to repair highly worn and damaged areas

CONVEYOR BELTS

- **Conveyor belts** are one of the most critical pieces of mining infrastructure and constantly exposed to **high impact and sliding wear**
- WRM advantages
 - **Good chemical & water resistance**
 - Very good **impact & abrasion resistance** compared to harder epoxy repair products
 - **Easy handling** – No need for high temperature and pressures required for rubber vulcanizing processes



WRM – A proven solution to decrease maintenance costs

VIBRATORY BOWL FEEDER LINER

- **Vibratory bowl feeders** are made from **aluminum** and used to feed individual component parts in a production line – parts were coated with WRM 80T
- Results
 - **Higher wear and tear resistance**
 - **Better hydrolytic and oil stability**
 - **Very good shock and noise absorption**
- WRM advantages
 - **Easy handling** as no oven nor heating required
 - **Cost and downtime savings** as repairing can be done in-site

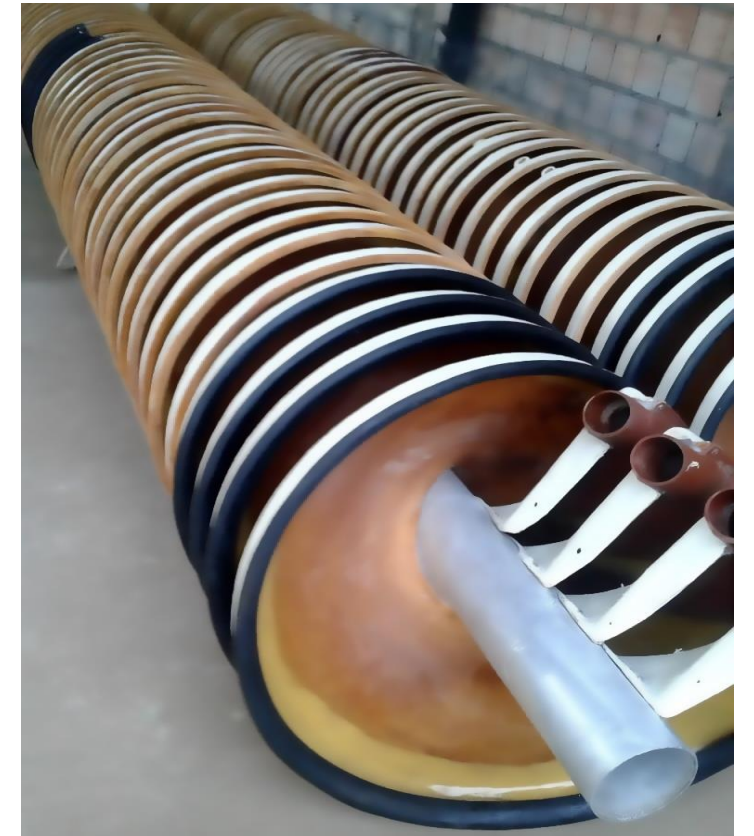


WRM – Extending lifetime is driving cost savings in the mining spiral separator applications...

CASE STUDY – BRAZIL (1/2)

SPIRAL SEPARATOR

- Using gravity separation techniques the spiral surface is constantly submitted to abrasive mineral slurries, resulting in **surface damage** and therefore flow changes
- Any change in the spiral profile **reduces yield and profits**
- Equipment made of epoxy and fiberglass



...by avoiding the purchase of new equipment

CASE STUDY – BRAZIL (2/2)

After 24 months operations



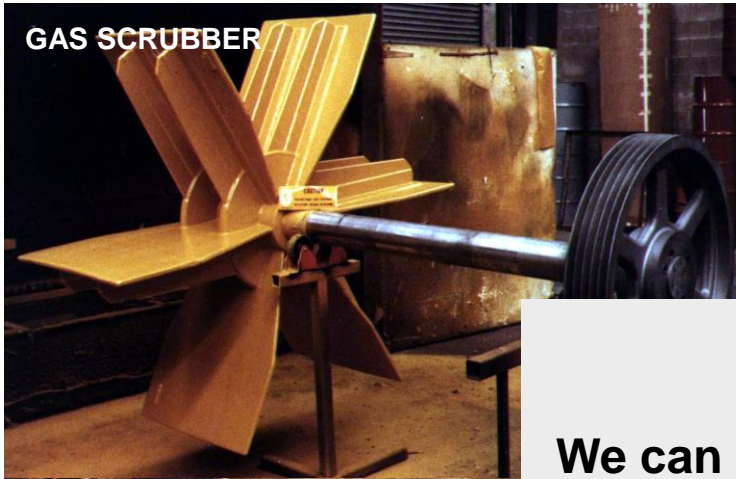
After repairing



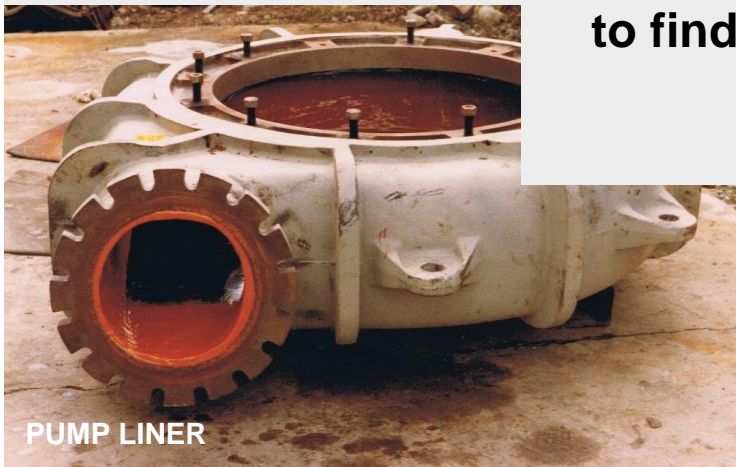
SPIRAL SEPARATOR

- WRM repairing kit allows **80% savings on new equipment**
 - When repaired with WRM, the spiral separator lifetime is similar to a new part (~18-24 months)
 - Over USD 10.000 savings for each part
 - > New line of spiral separator price is USD 15.000 in Brazil
 - > Repairing cost of a spiral separator is about USD 3.000 (material cost and manpower)
- **Delivering time** is also a benefit as the repairing part are delivered within weeks while time to deliver new equipment is about 4-6 months

WRM repairing kit can be used for a broad range of applications



We can help you
to find yours!



More applications

- Roll lagging
- Scrapers
- Impellers
- Mill lining
- Lifter bars
- Discharge shoot

QUALITY WORKS.

LANXESS

Energizing Chemistry

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Unless specified to the contrary, the values given have been established on standardized test specimens at room temperature. The figures should be regarded as guide values only and not as binding minimum values. Kindly note that the results refer exclusively to the specimens tested. Under certain conditions, the test results established can be affected to a considerable extent by the processing conditions and manufacturing process.