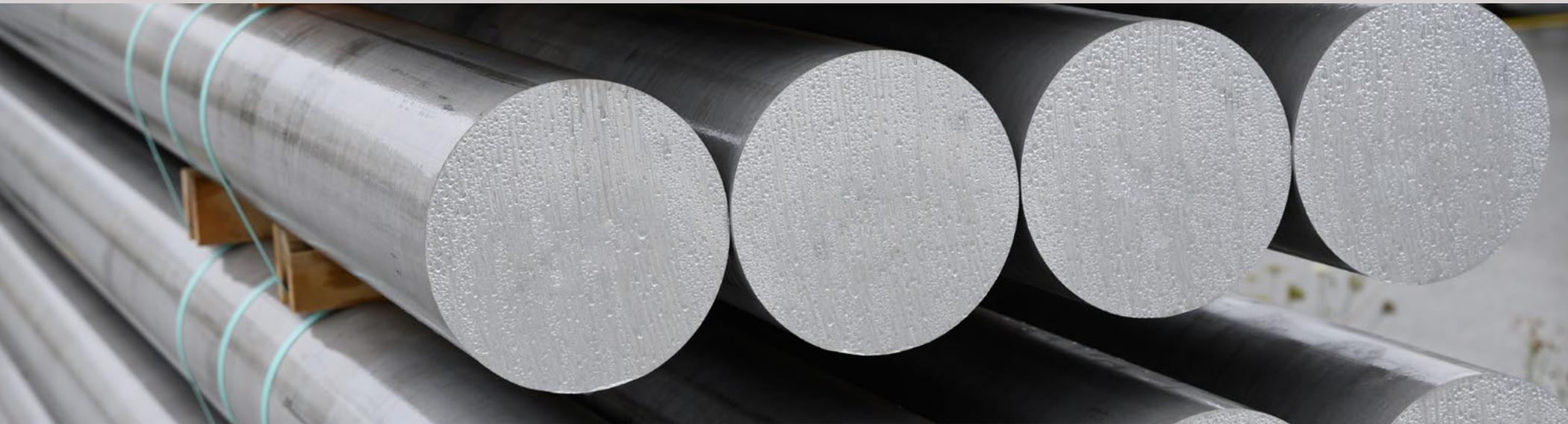


BONDERITE®

HENKEL BONDERITE PULS PROCESS

ENABLING EFFICIENT AND SUSTAINABLE COLD FORMING



Henkel

Henkel Adhesive Technologies



COLD FORMING

Often known as cold roll forming - cold forming is a forging technique used to shape metal materials at near room temperature to retain or enhance the tensile strength and hardness of the material, while still allowing high levels of manipulation.

While heavily used in automotive component processing, traditional cold forming can result in high energy consumption and phosphate sludge generation. Additionally, the process is lengthy, involving up to 10 individual steps.

Henkel's BONDERITE PULS* Process uses a polymer-based cold forming lubricant, which simplifies the process to 3 steps, while enabling benefits related to energy savings, waste reduction and water use.

*Parker Ultimate Lubrication System Licensed Technology from Nihon Parkerizing, Japan

Process Simplification

The multitude of steps in traditional cold forming includes initial degreasing, pickling, activation, zinc phosphating, neutralization, soap and frequent, intermediate rinsing.

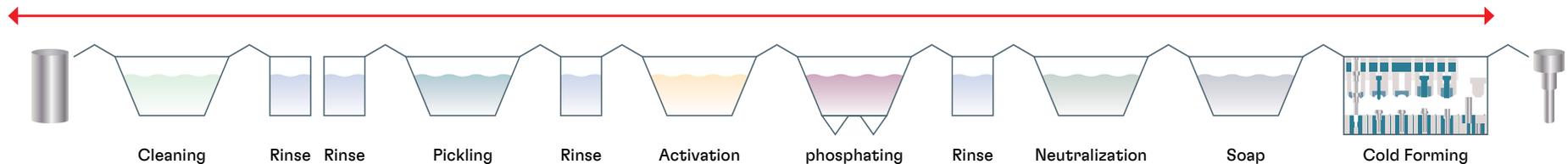
In the **BONDERITE PULS Process**, Henkel's polymeric cold forming lubricant reduces processing steps by combining the three traditional layers that make up the coating - the non-reacted soap, reacted soap and phosphate.

As a result, just three steps are needed, including:

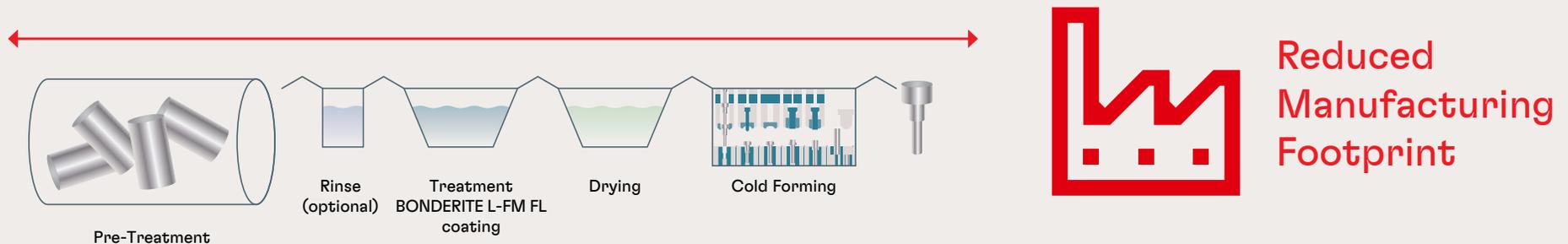
1. Pre-treatment (Shot-blasting or Pickling)
2. Treatment using Henkel's BONDERITE L-FM FL coating
3. Drying

Due to the reduction in processing steps, the BONDERITE PULS Process can reduce cycle time by more than 20%.

Traditional Cold Forming: Up to 10 steps

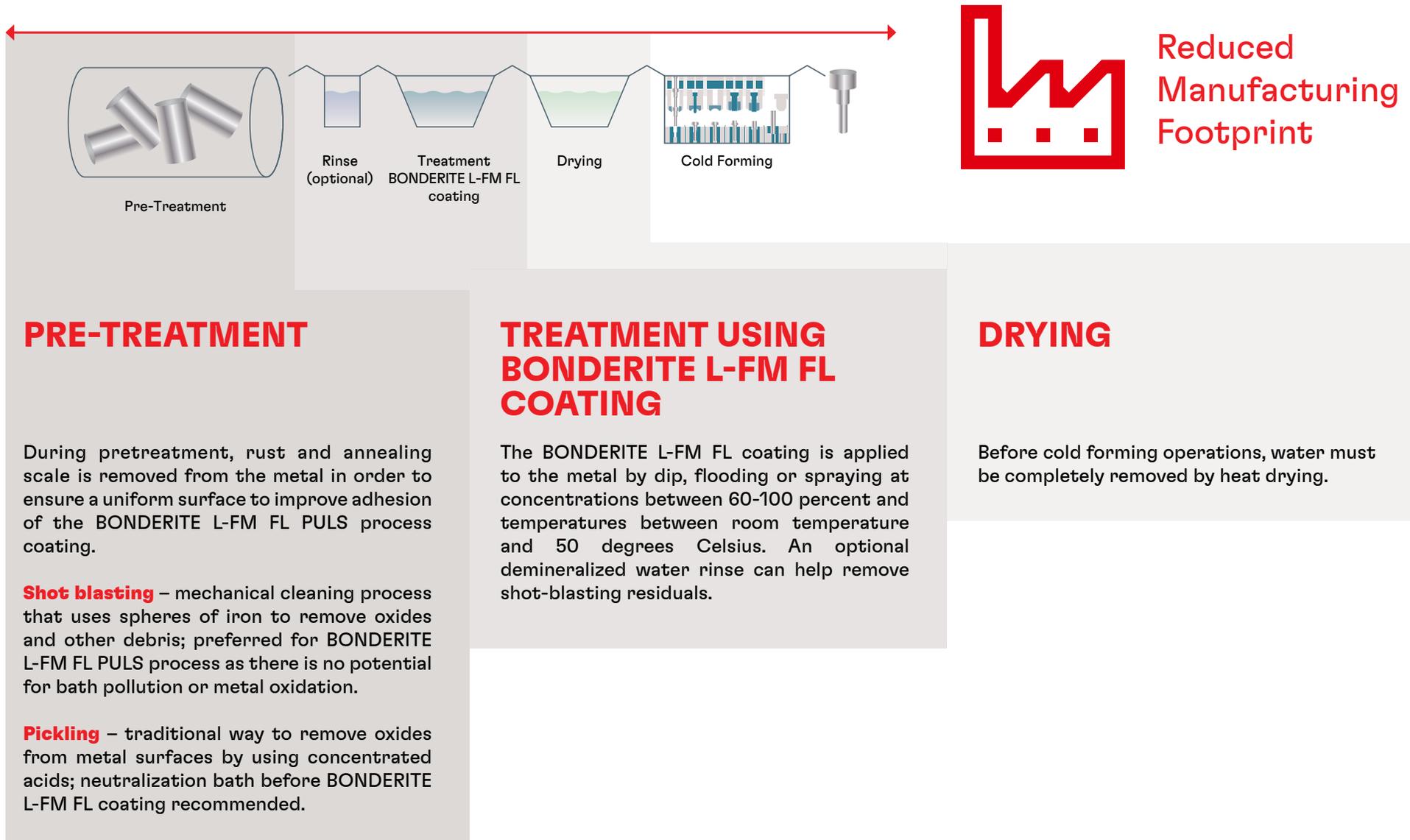


BONDERITE PULS Process: From 10 to 3 steps



3 Steps of the BONDERITE PULS Process

BONDERITE PULS Process: From 10 to 3 steps



Environmental Impact

Water Use

BONDERITE L-FM FL COATING is a non-reactive, water-based polymeric coating. Since the coating adheres to the surface physically without any reaction, the only evaporates produced in the subsequent drying step prior to cold deformation are aqueous. As a result, no rinsing steps are required as part of the BONDERITE PULS Process - saving water and reducing energy demand.

BONDERITE L-FM FL PULS

Optional Rinse

More than **90% less**
water consumption

Up to **25.000 m³**
in water savings per year



in water savings
per year



Energy Savings

Standard cold forming processes require heating. Henkel's BONDERITE PULS Process operates at ambient or reduced heating of 50 degrees Celsius. As a result, heating efforts and pump power are greatly reduced, enabling customers to save up to 35,000 Euros per 50 cubic meters in energy savings per year.

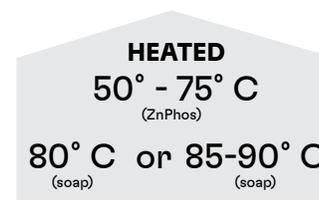
Waste Reduction

The make up of the BONDERITE PULS Process eliminates up to 6 tons of sludge per year and 10-12 m³ of soap disposal per tank per year. As a result, customers can save 40,000 to 100,000 Euros in cleaner and disposal savings per year, while reducing required labor, cleaning and maintenance – typically required 6 times a year.

NO SLUDGE

No soap disposal

€40K - 100K
cleaner & disposal savings
per year



STANDARD COLD FORMING

BONDERITE PULS PROCESS

Ambient or heated
RT -50° C

Up to €35K
per 50 cubic meters
in energy savings

BONDERITE PULS Process

With Polymer-based Cold Forming Lubricant

Product	Cold Forming Performance	Boron	Zinc Phosphate	Applications	Easy to Remove
BONDERITE® L-FM FL 744™	Medium	Yes	Yes	Bolts, Powertrain, Wire, Bars	Yes
BONDERITE® L-FM FL 755™ ACHESON	Medium	Yes	No	Powertrain, Bolts, Bars, Coining	Yes
BONDERITE® L-FM FL 735™	High	Yes	Yes	Bolts, Wire, Bars	Yes
BONDERITE® L-FM FL 835™	High	Yes	Yes	Powertrain, Bars	Yes
BONDERITE® L-FM FL 623™	High	No	No	Tubes, Fittings, Galvanized Wire	No
BONDERITE® L-FM FL 2020™	High	No	Yes	Fasteners	Yes
BONDERITE® L-FM FL 2120™	High	No	Yes	Powertrain, Bars	Yes

Henkel's Surface Treatment and Cleaners & Lubricants business for automotive components offers process solutions across the value chain, from liquid metal to final part. Our robust process expertise is available globally, enabling customers around the world to effectively use our products with stable, quality results.

BONDERITE®

SHAPE, DEFINE, PROTECT

THE FUTURE OF SUSTAINABILITY

Automotive Component Processing Solutions



VISIT US ONLINE



GET IN TOUCH WITH US

EUROPE

GERMANY

Henkel AG & Co. KGaA
(Headquarters)
Henkelstraße 67
40589 Düsseldorf

AMERICA

USA

Henkel Corporation
Madison Heights
32100 Stephenson Highway
Madison Heights, MI 48071

ASIA-PACIFIC

CHINA

Henkel (China) Investment
Co., Ltd.
Building 7 & Building 6 (5F-6F),
The Springs Center
No.99 Jiang Wan Cheng Road
Yang Pu District, Shanghai
200438

JAPAN

Henkel Japan Ltd. 27-7,
Shin Isogo-cho
Isogo-ku Yokohama,
235-0017

KOREA

Henkel Korea Co.,Ltd
8th Floor, Henkel Tower Building,
41, Mapo-daero 4da-gil,
Mapo-gu, Seoul

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