

POWERED BY PRESSURE

PRESSURFECT™
SEAMLESS STAINLESS TUBE FOR GASOLINE DIRECT
INJECTION

Jari Ponsiluoma
Sandvik Materials Technology



WE ARE A CUTTING
EDGE TECHNOLOGY
ENGINEERING GROUP



WORLD LEADING POSITIONS

IN THE FOLLOWING AREAS



TOOLS AND TOOLING SYSTEMS

as well as components in cemented carbide and other hard materials



EQUIPMENT AND TOOLS FOR THE MINING AND CONSTRUCTION INDUSTRIES

as well as various types of
processing systems



HIGH VALUE-ADDED PRODUCTS IN ADVANCED STAINLESS STEELS

and special alloys and titanium
as well as metallic and ceramic resistance materials

46,000
EMPLOYEES

9 BILLION
EURO
INVOICED
SALES

60
R&D CENTERS
GLOBALLY

WE OPERATE IN OVER

150
COUNTRIES
AROUND THE GLOBE

300 MILLION EURO
INTO R&D
EACH YEAR

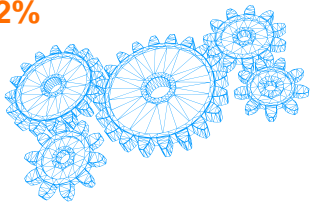
8,000
ACTIVE PATENTS



ENHANCING PRODUCTIVITY, PROFITABILITY AND SAFETY

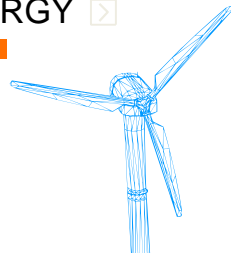
ENGINEERING >

22%



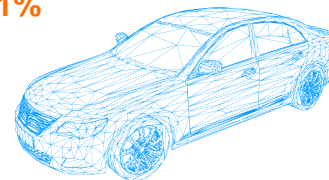
ENERGY >

14%



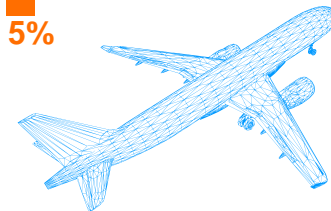
AUTOMOTIVE >

11%



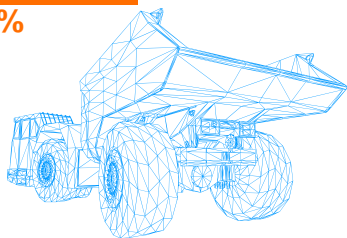
AEROSPACE >

5%



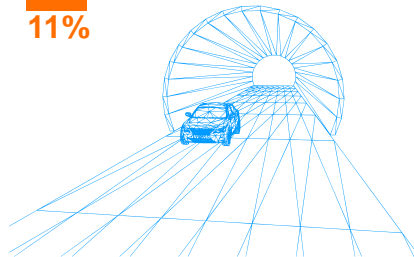
MINING >

32%



CONSTRUCTION >

11%



CONSUMER RELATED >

3%



OTHERS

2%

Share of the Group's 2014 total invoiced sales by customer segment



LEADING PRODUCTS FOR THE AUTOMOTIVE INDUSTRY

METAL-CUTTING
TOOLS



COMPRESSOR
VALVE STEEL



METAL POWDERS



GASOLINE DIRECT
INJECTION TUBES



WIRE FOR SPRINGS



METAL-CUTTING
TOOLS



OUR ROOTS GIVE US WINGS

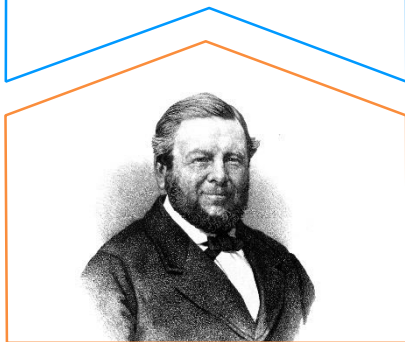
DRIVEN BY CUSTOMER VALUE FROM THE START

TODAY

CUSTOMER FOCUS
INNOVATION
FAIR PLAY
PASSION TO WIN



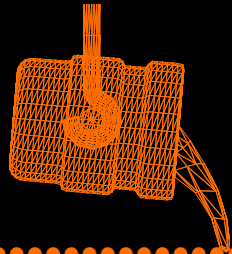
1862



HIGHLY INTEGRATED PRODUCTION AND WORLD LEADING METALLURGY

CONSUMABLES
RECYCLED
STEEL
ALLOYING
ELEMENTS

MELTING



RAW
MATERIAL
S



SPECIAL
METALLURGY



COMMON
FINISHING



SPECIFIC
FINISHING



CUSTOMER
SEGMENTS

TUBE

STEAM GENERATOR
TUBES
COILED TUBES

FINNED TUBES
UMBILICAL TUBES
COMPOSITE TUBES

STRIP

COATED STRIP STEEL FLAPPER
VALVE STEEL RAZOR BLADE
STEEL

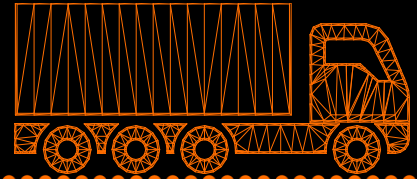
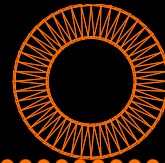
WIRE

WIRE - ROUND, FLAT
AND SHAPED WELDING
PRODUCTS

RESISTANCE
MATERIALS

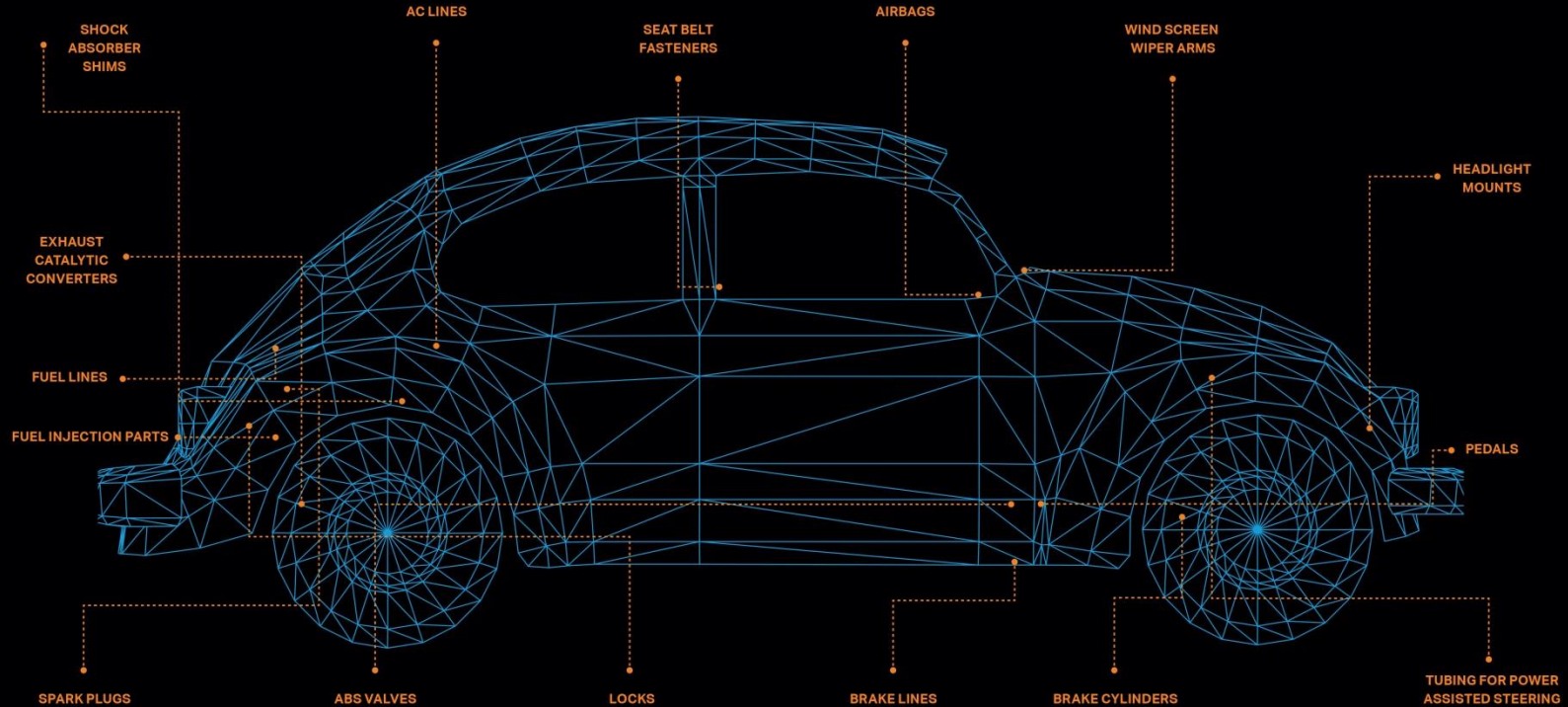
HEATING ELEMENTS
ND SYSTEMS

BAR, BILLETS, HOLLOW
DRILL STEEL



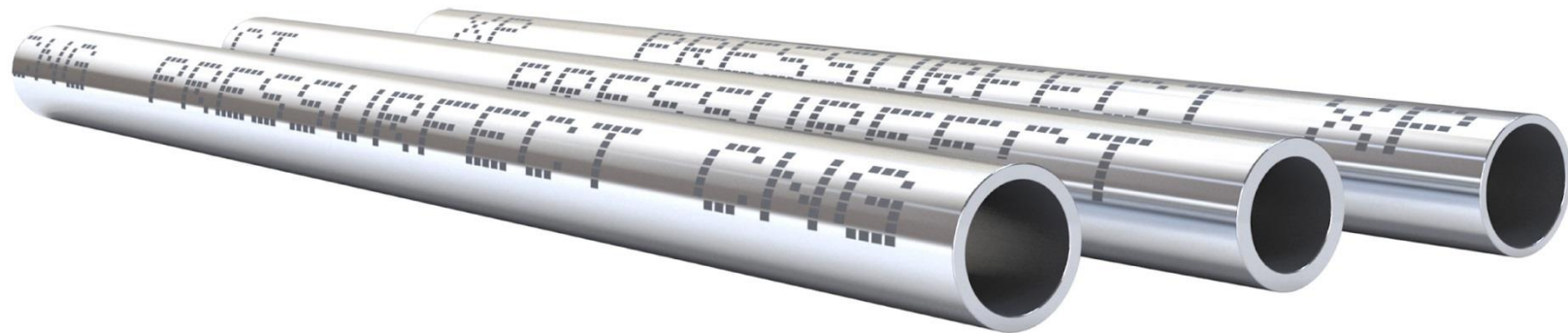
ENERGY
AUTOMOTIVE
CONSUMER
ELECTRONICS
CHEMICAL
MINING
CONSTRUCTION
MEDICAL

HOW CAN 70 YEARS OF HISTORY TAKE YOU FORWARD?



WHICH TUBE WILL SECURE YOUR FUTURE
GDI POWERTRAIN ROADMAP?

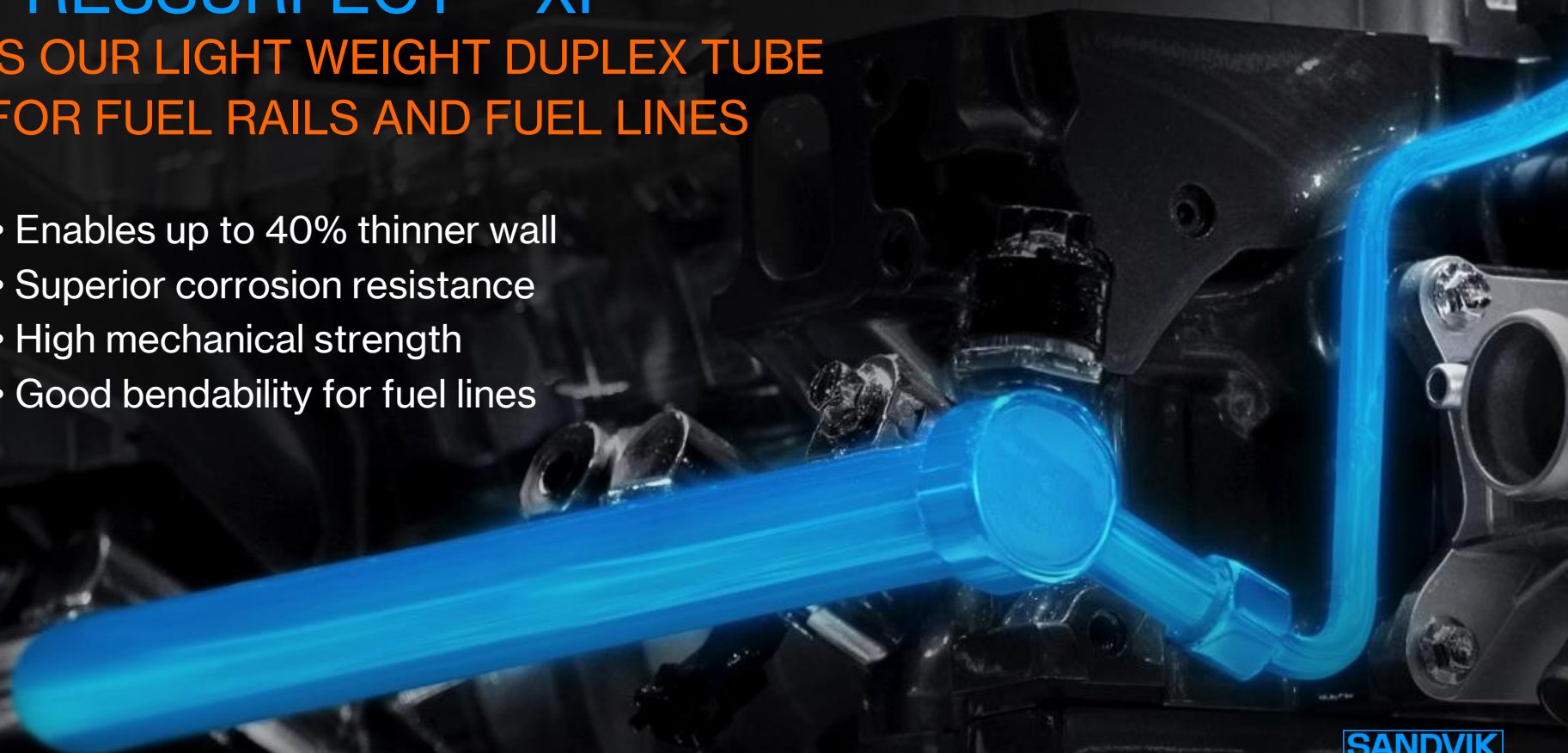
PRESSURFECT™
PRESSURFECT™ XP
PRESSURFECT™ CNG



PRESSURFECT™ XP

IS OUR LIGHT WEIGHT DUPLEX TUBE
FOR FUEL RAILS AND FUEL LINES

- Enables up to 40% thinner wall
- Superior corrosion resistance
- High mechanical strength
- Good bendability for fuel lines



PRE – PITTING RESISTANCE EQUIVALENT

Always at the high
end of the standard

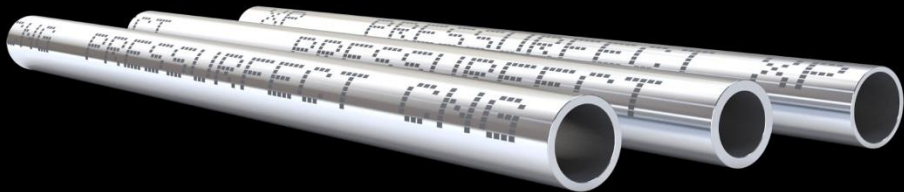
Superior corrosion
resistance

Adding to the safety
margin

Chemical composition (nominal). %

Grade	UNS	%≤C	%Cr	%Ni	%Mo	%N	PRE* Minimum
Pressurfect™	S30403	0.03	18.5	10	-	-	18
Pressurfect™ XP	S32304	0.03	23	4.5	0.3	0.1	24
Pressurfect™ CNG	S31603	0.03	17.5	13	2.6	-	26

*PRE (Pitting Resistance Equivalent) = %Cr + 3.3 x Mo + 16 x %N

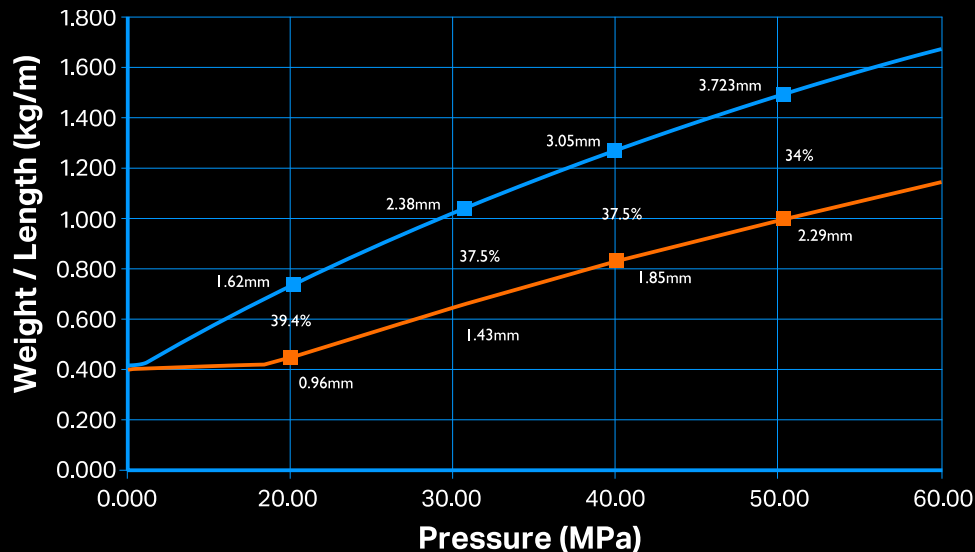


WEIGHT TO PRESSURE RATIO COMPARISON

Cost efficiency

Pressurfect XP™

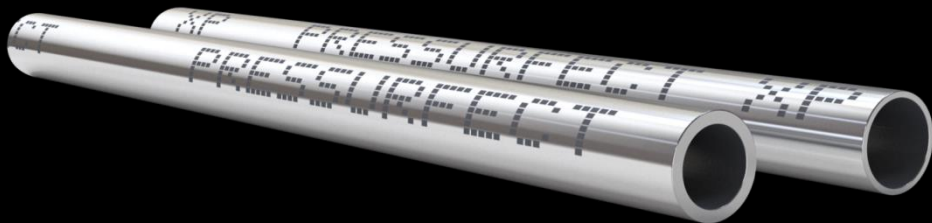
Fuel rail weights for desired design pressures (20mm OD fuel rail)
Pressures calculated according to ASTM B31.3



■ Pressurfect™

■ Pressurfect™ XP

Values in mm are required minimum wall thickness at given pressures
Percentages are difference in tube weight at given pressures



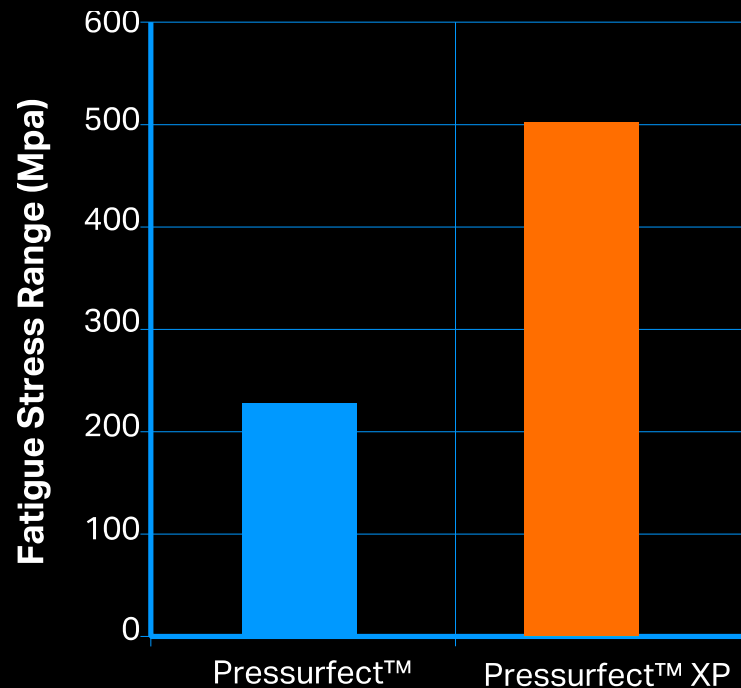
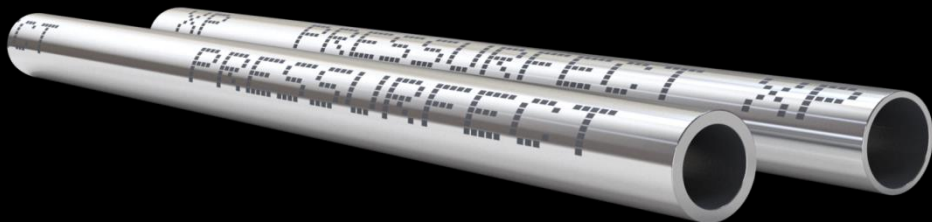
HARDNESS

Low tolerances in hardness allows for automation and even quality when machining and working with the tube.

HARDNESS COMPARISON

Pressurfect™: ~200 HV

Pressurfect™ XP: ~290 HV



Fatigue strength at 2×10^6 cycles at room temperature

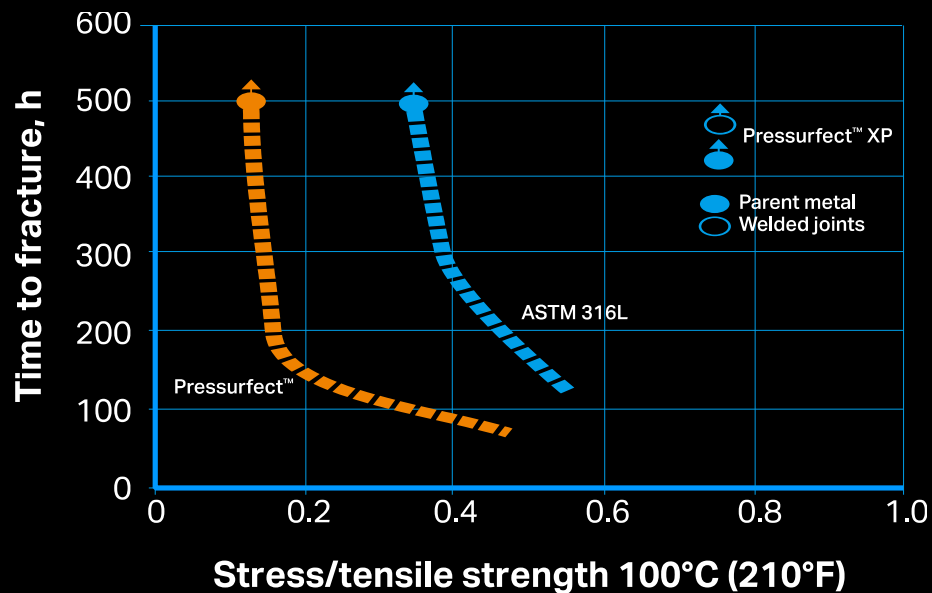
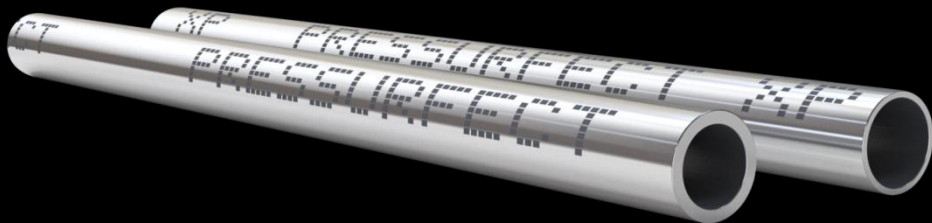
TENSILE STRENGTH

Documented tensile strength for safe operation during the parts full life cycle

TENSILE STRENGTH COMPARISON

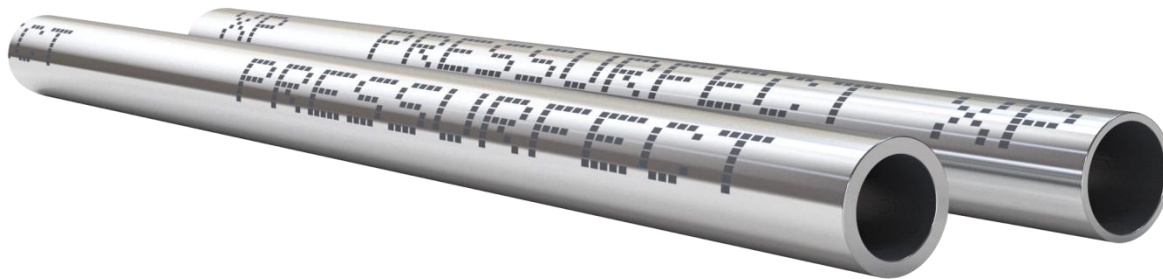
Pressurfect™: 515 – 680 MPa

Pressurfect™ XP: 630 – 820 MPa



Results of SCC tests with constant load on Sandvik Pressurfect™ XP, Pressurfect™ and AISI 316L in 40% CaCl₂, pH = 6.5, at 100°C (210°F) with aerated test solution

KEY BENEFITS



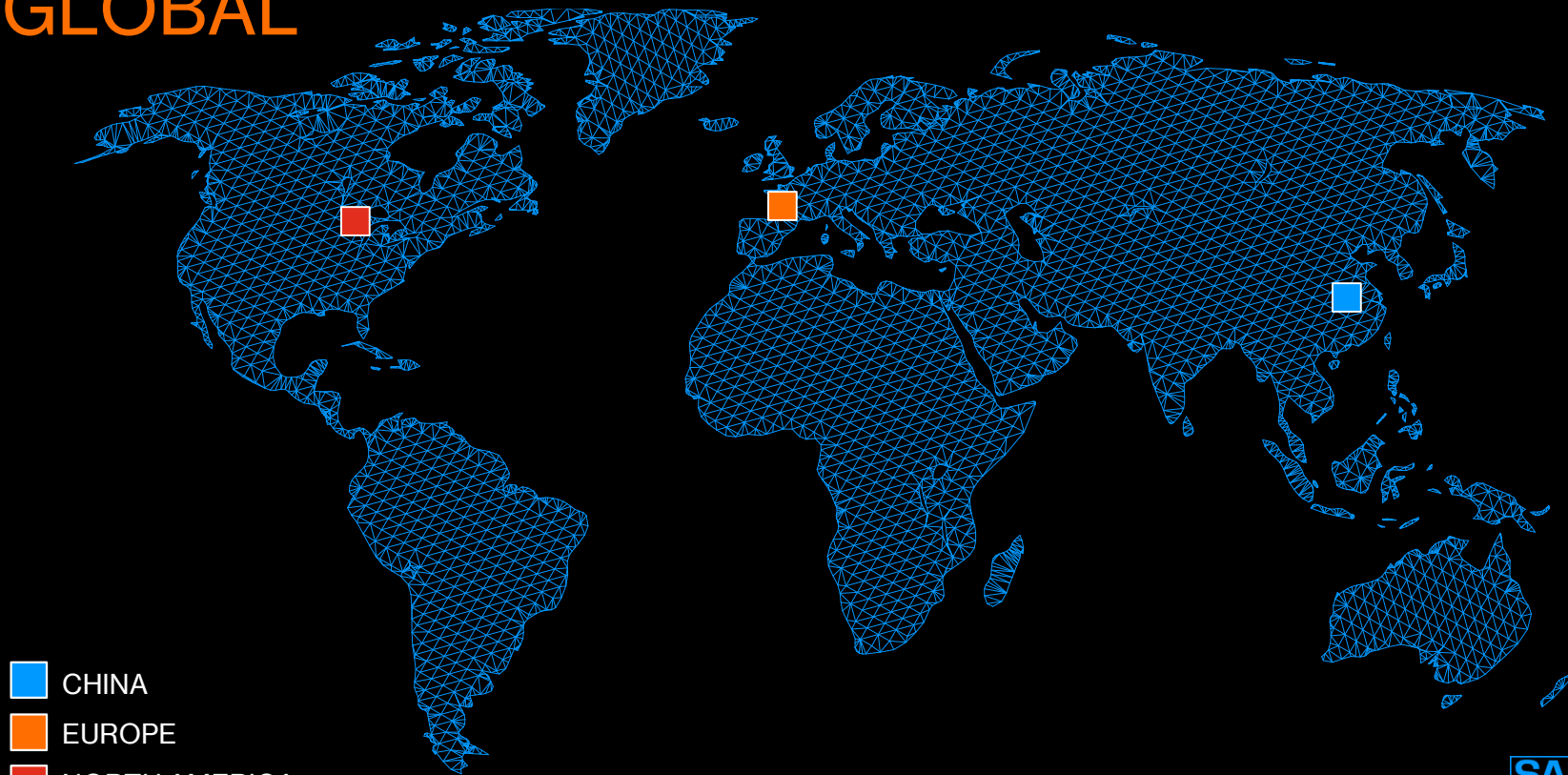
PRESSURFECT™

- High mechanical strength
- Favorable machinability
- Good corrosion resistance
- Excellent bendability for fuel lines

PRESSURFECT™ XP

- Enables up to 40% thinner wall
- Superior corrosion resistance
- Higher mechanical strength
- Excellent bendability for fuel lines

LOCALLY GLOBAL



-  CHINA
-  EUROPE
-  NORTH AMERICA



SMT.SANDVIK.COM/PRESSURFECT