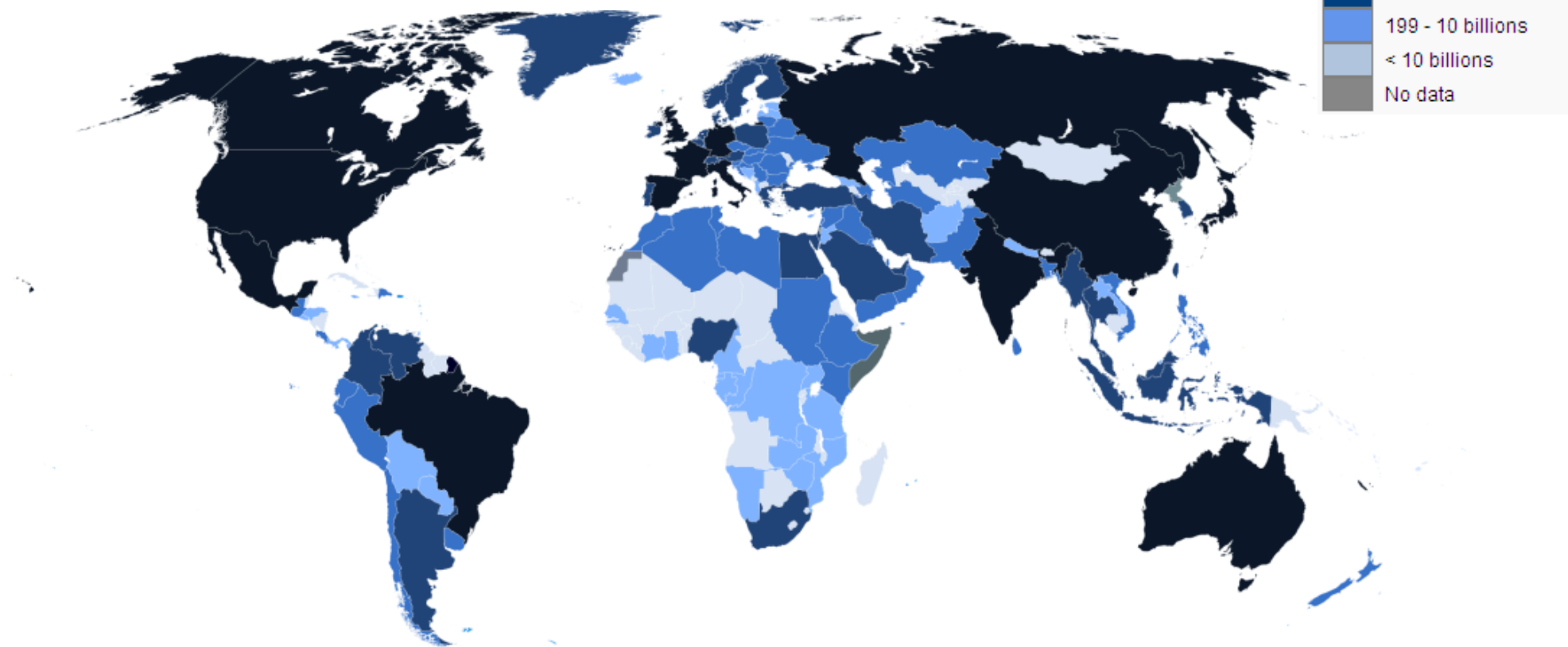


THE ADVANCED
Jotamastic
RANGE



World Nominal GDP 2010



**For most industrialized
nations, the average corrosion cost is 3.5–4.5% of the GDP**

Source:

Now is the Time by George F. Hays, PE
Director General
World Corrosion Organization



Estimated cost of corrosion
1,8 trillion USD globally pr year

The challenge of good surface preparation

- The reality is that down time is costly, budgets may be tight and structures are complicated with difficult to reach areas. These and other restraints can mean blast cleaning is not an option
- The Jotamastic range offers a range of tailored surface tolerant solutions without compromising on the durability of the system

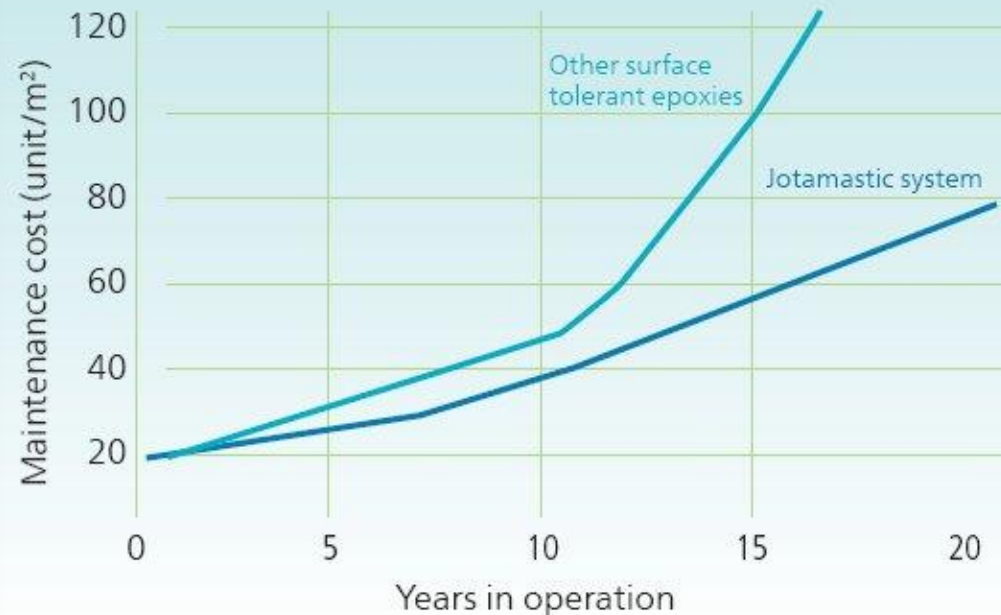


Elements of maintenance cost

Elements in the
 m^2 cost



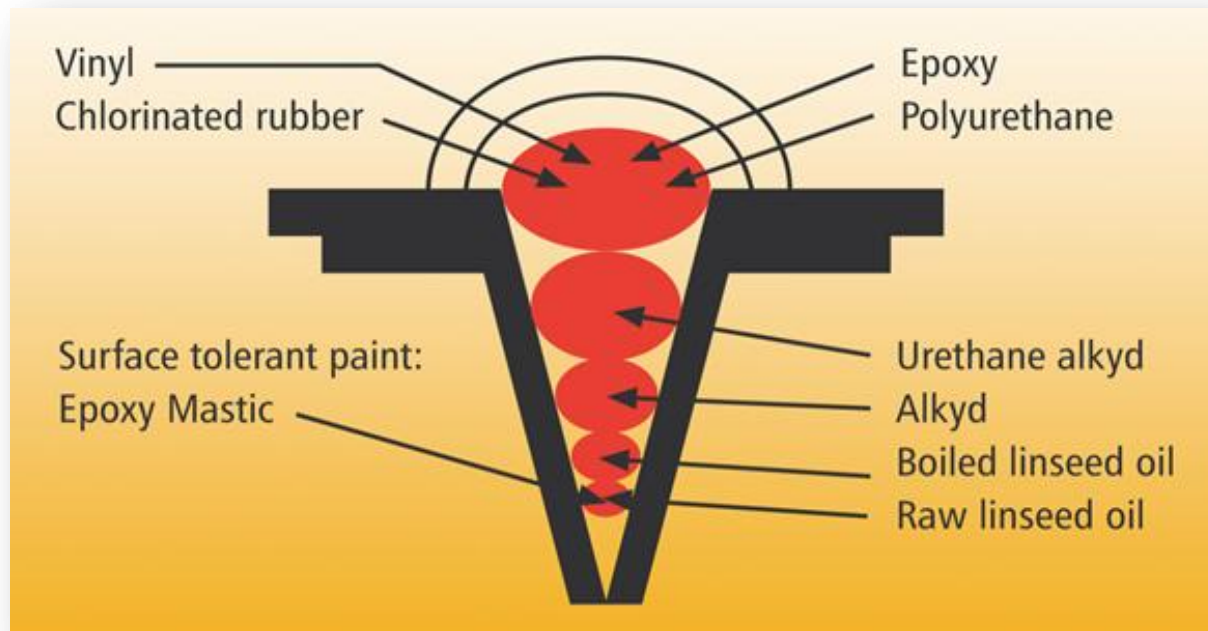
Expected cost development for a
typical maintenance system



Technology

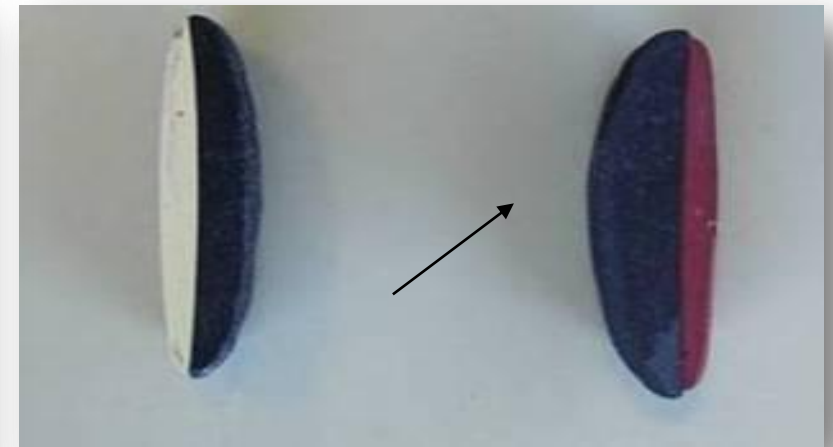
Jotamastic technology

- Pigmented epoxy binder which has been enhanced with **hydrocarbon resin** and cured with an amine based curing agent



Penetration

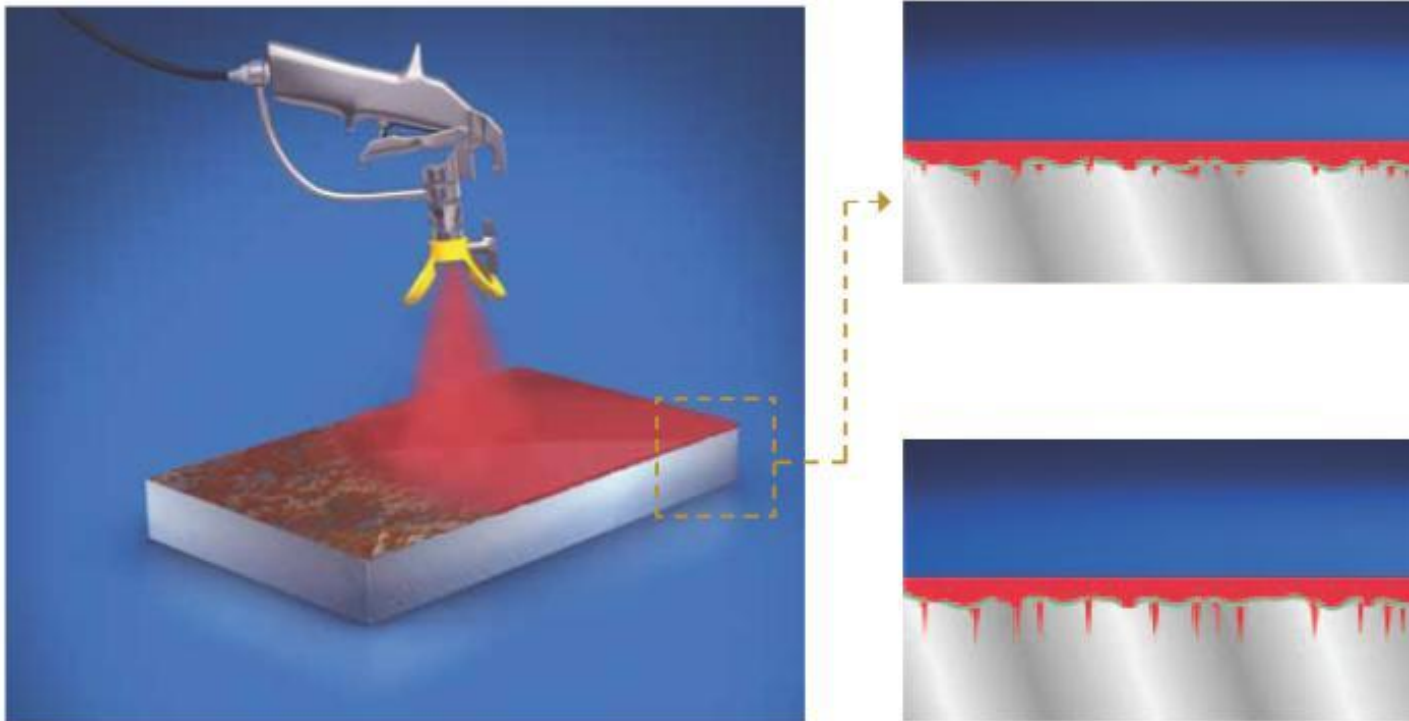
- Superior wetting properties result in good adhesion and durability



Pure epoxy coating,
containing no
hydrocarbon resin

Modified epoxy coating,
containing hydrocarbon
resin

Technology – (Enhanced epoxy)

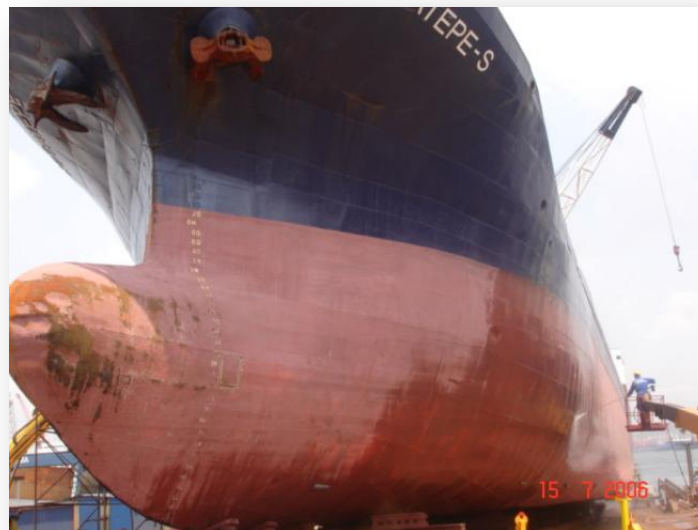


Ultra High Water Jetting

- Many yards use UHWJ
- Jotamastic offer no compromise in lifetime



Vessel prepared with UHWJ



Condition after years in operation

Summary - Technology

- Jotamastic is the optimal solution where optimum surface preparation is not possible or desirable, saving time and money
- Jotamastic requires no blast cleaning
- 25 years of experience and more than 1.2 billion square meters protected



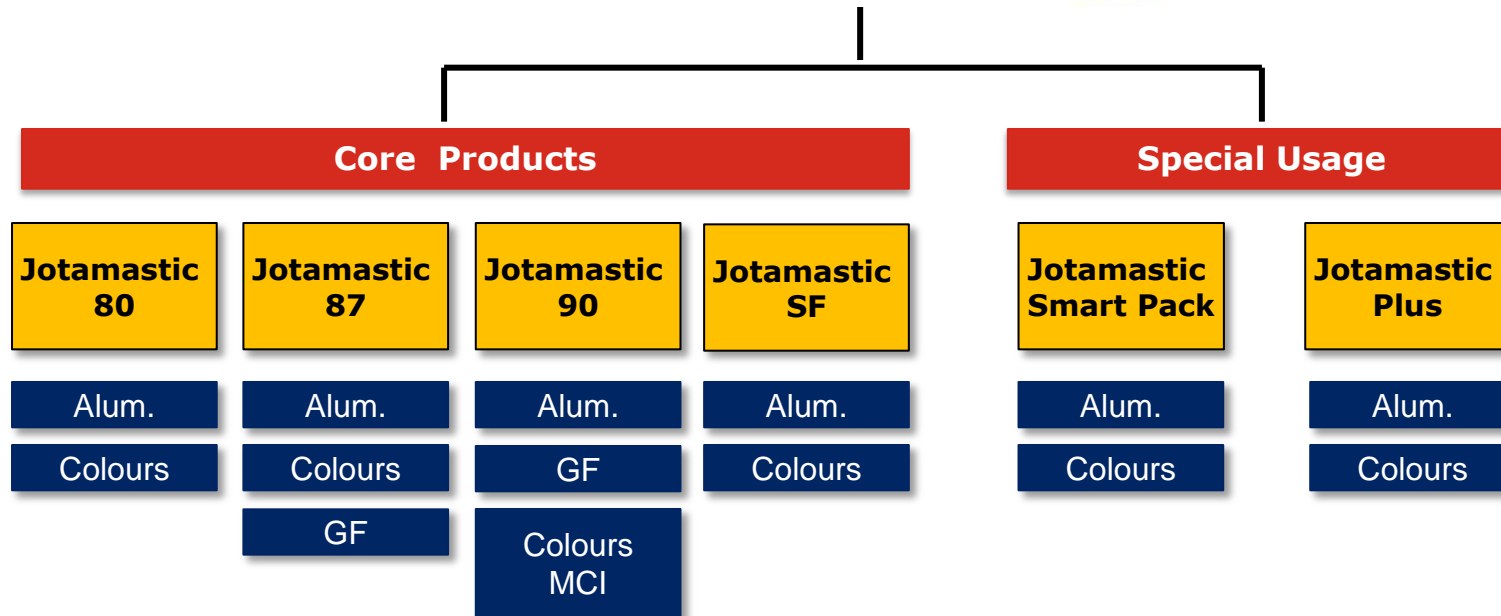
The Advanced Jotamastic Range

Tailored solutions for different needs

- The Jotamastic range has been engineered to meet specific usage situations and environmental conditions

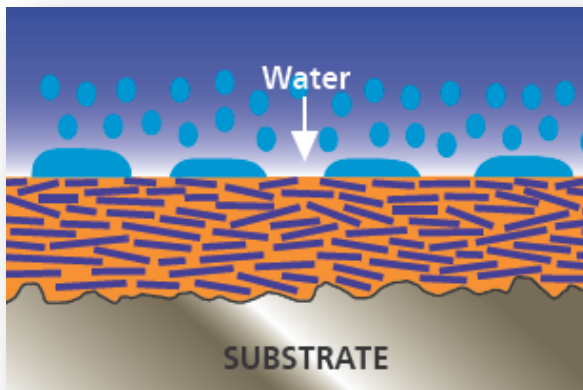


THE ADVANCED
Jotamastic
RANGE



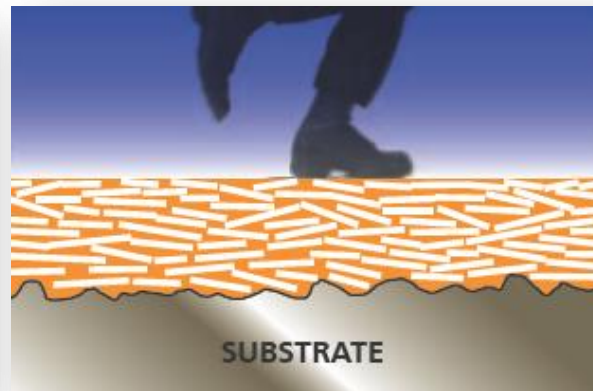
Special usage

Aluminium



EXTRA PROTECTION IN EXTREME ENVIRONMENTS

Glass Flakes



FOR THE TOUGHEST WEAR & TEAR SURFACES

Jotamastic Smart Pack



FOR BRUSH AND ROLLER APPLICATION

Jotamastic | 80

Relevant protection for less severe environments

- Relevant protection at reduced cost (75 – 200µm)
- Excellent flow levelling and coverage provides good finish at low DFT



Durable solution in severe environments

- Revolutionised the maintenance business when introduced more than 25 years ago
- Unprecedented track record
- Provides long lasting protecting in severe environments



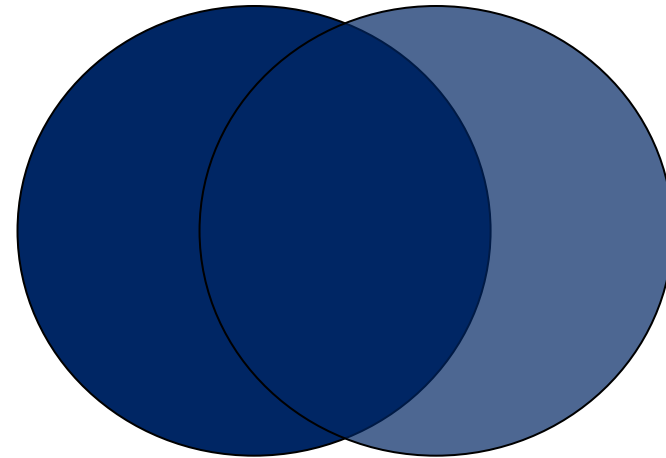
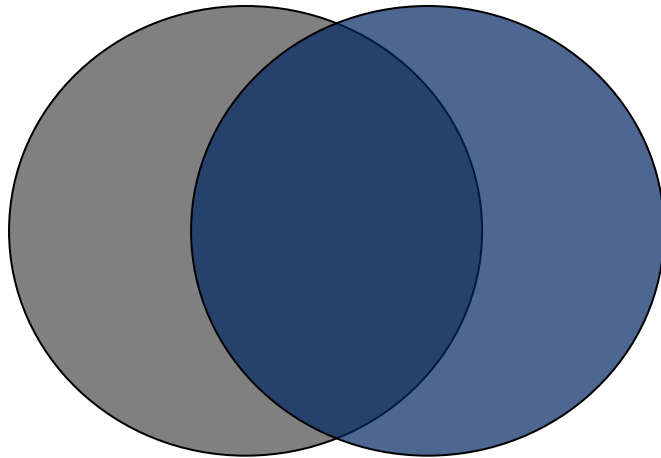
Jotamastic | 90

Tintable primer, offering the ultimate flexibility and durability in harsh environments

- Tintable, offering increased colour flexibility
- Short overcoating intervals, improving productivity
- Robust and user friendly, offering safe application



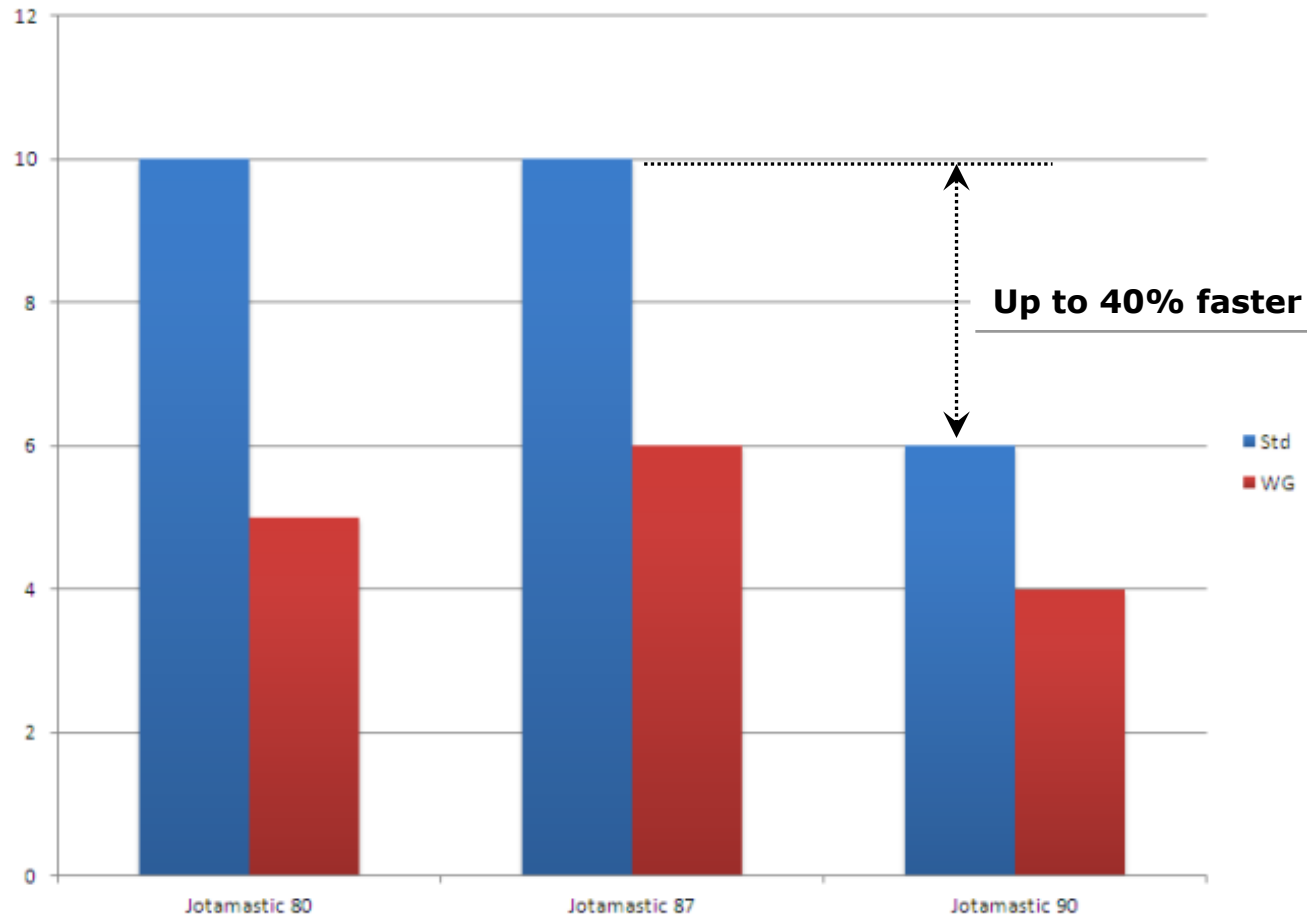
Jotamastic | 90 - Tintable



Improved hiding power and accurate final colour in fewer coats

Jotamastic | 90 - Shorter overcoating intervals

Hours



Jotamastic | 90 - Robust and user friendly



- The rheology of Jotamastic 90 ensures a good result even with old equipment and hoses
- Good application properties with brush and roller
- Low application pressure resulting in less spray dust and lower paint consumption

Jotamastic | 90 - Excellent flow levelling



Corrosion test on St 2 panels – thin films



New construction epoxy primer



Jotamastic 87

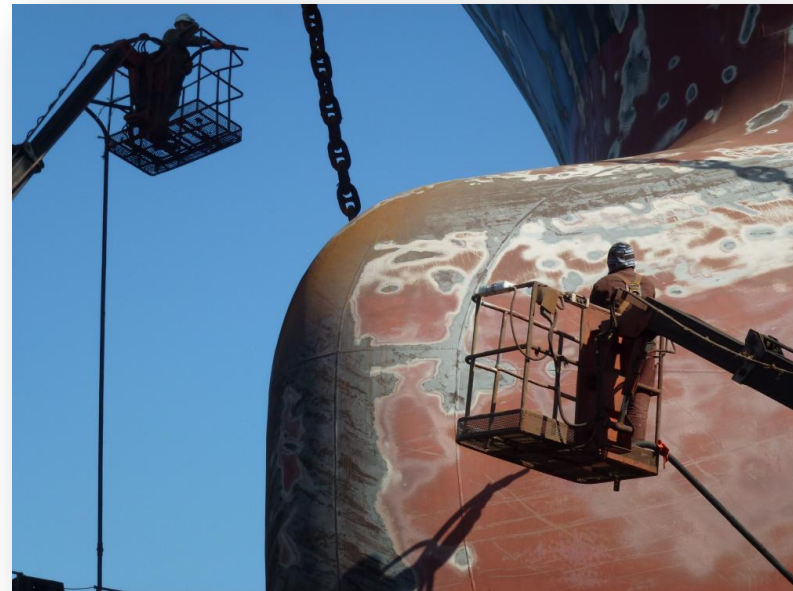


Jotamastic 90

Jotamastic | SF

Solvent Free Jotamastic

- High solids and low VOC
- Excellent edge retention
- Early water immersion resistant



Jotamastic | SF - Edge covering

- Good edge covering is important in complex structures
- Sharp edges are more exposed to mechanical damage. Jotamastic SF offers impact and abrasion resistance



Pictures illustrate the difference in performance when proper rounding of edges and stripe coating has been done. left hand side show proper preparation and right hand side show insufficient.

Jotamastic | SF - Edge covering retention

Requirement: Min 70% of measured DFT

Type of aluminium bar	Measurements % edge retention	Average % edge retention
Sharp edge	64	73
	72	
	82	
Rounded edge R ~2mm	80	95
	96	
	107	



Jotamastic | SF - Early water resistance

Fully cured *1h* *2,5h* *5h*



Jotamastic SF:

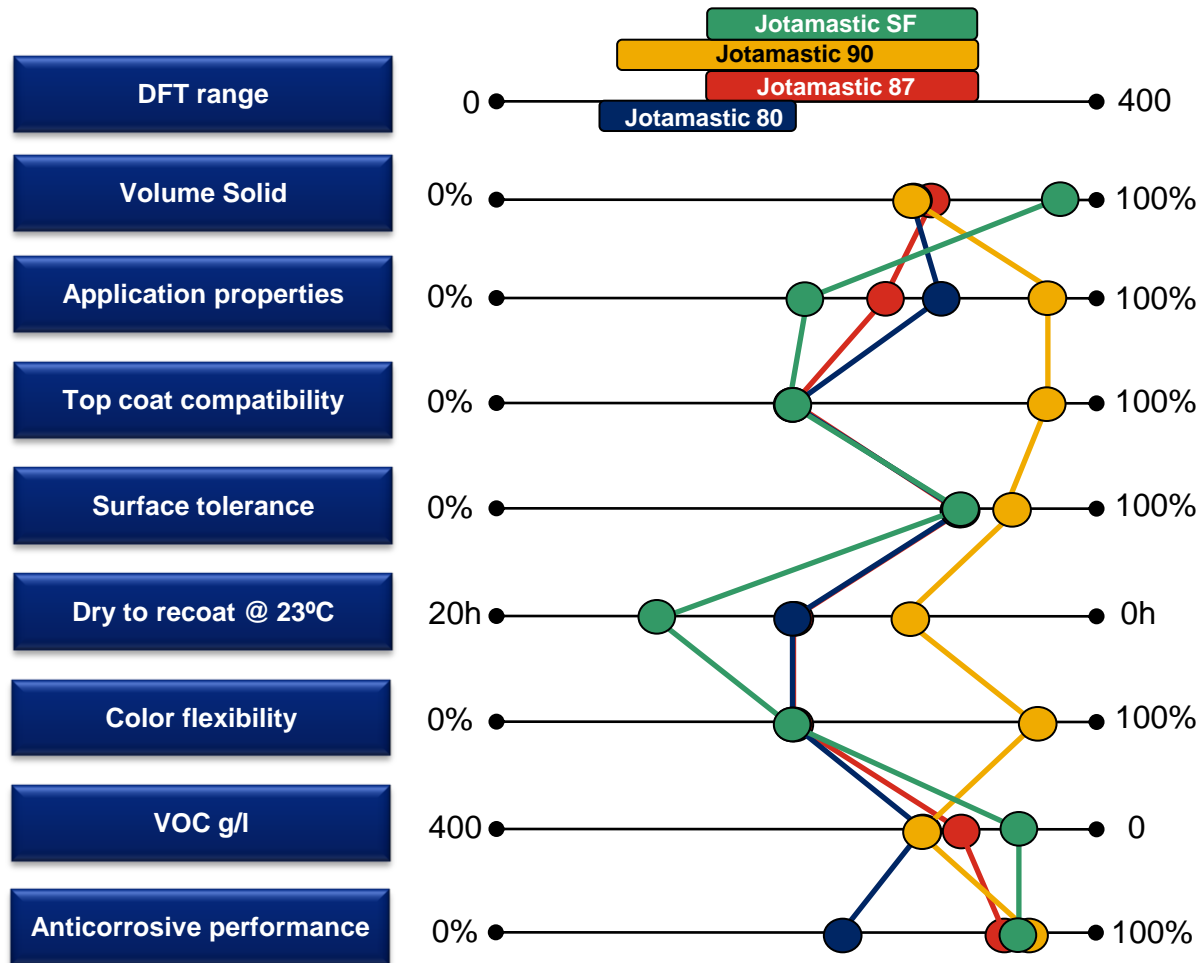
- Colour deviation 0
- Swelling 0



Reference product:

- Colour deviation 4 (heavy)
- Swelling + 4 to 5 %

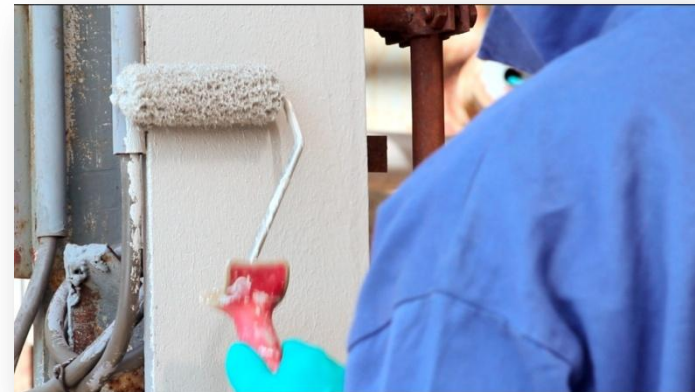
Key features comparison Jotamastic range



Jotamastic | SMART PACK

Specially engineered for brush and roller application

- Engineered for brush and roller application
- 1:1 mixing ratio – Giving less waste, easy to handle, easy storage
- Longer maintenance intervals – reducing paint consumption



Jotamastic | SMART PACK - Improved flow properties



Competitor product

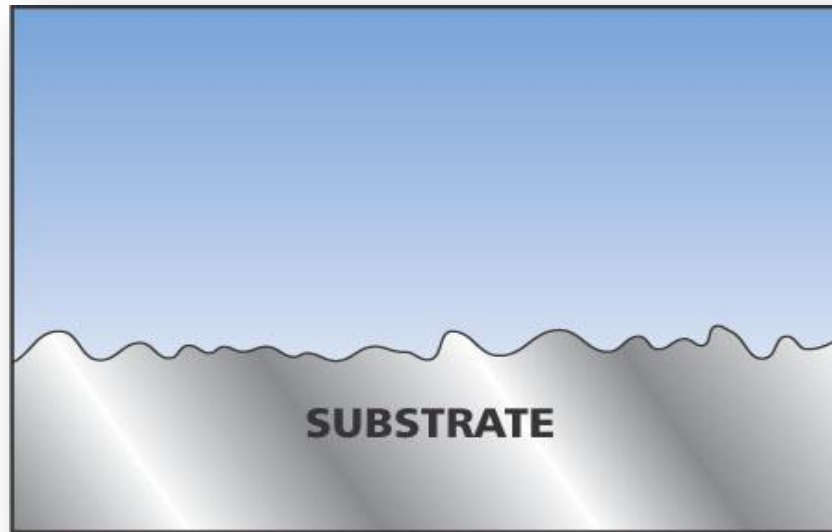


Jotamastic Smart Pack

Smother, better protective film when using brush or roller

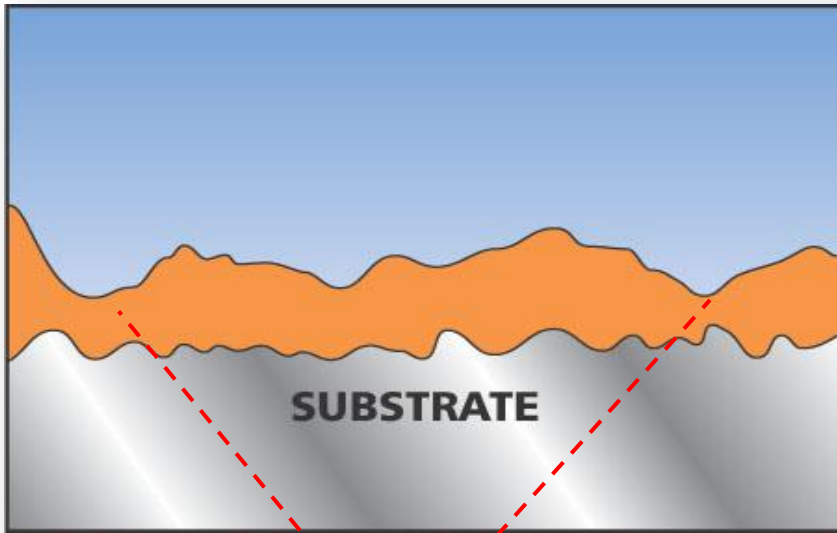
Jotamastic | SMART PACK - Improved flow properties

Improved film consistency helps to achieve the required film thickness and optimum protection



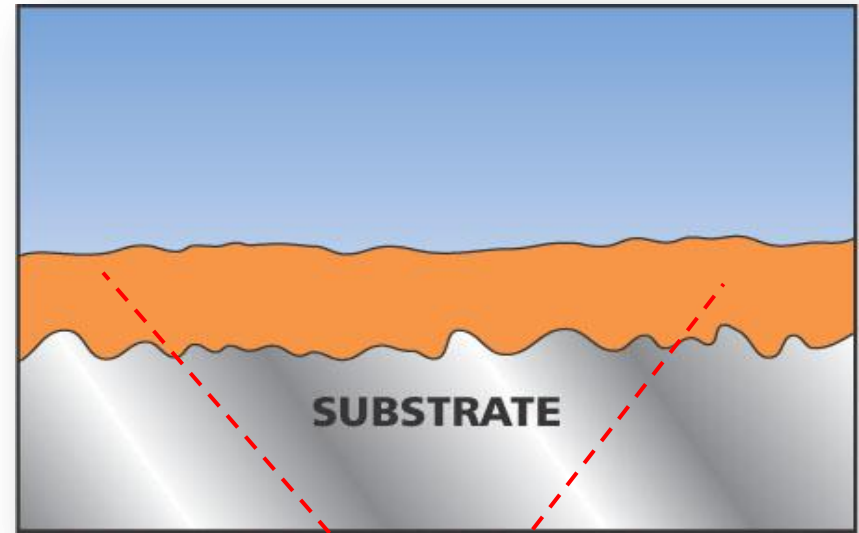
1 Substrate

Most other
epoxy primers



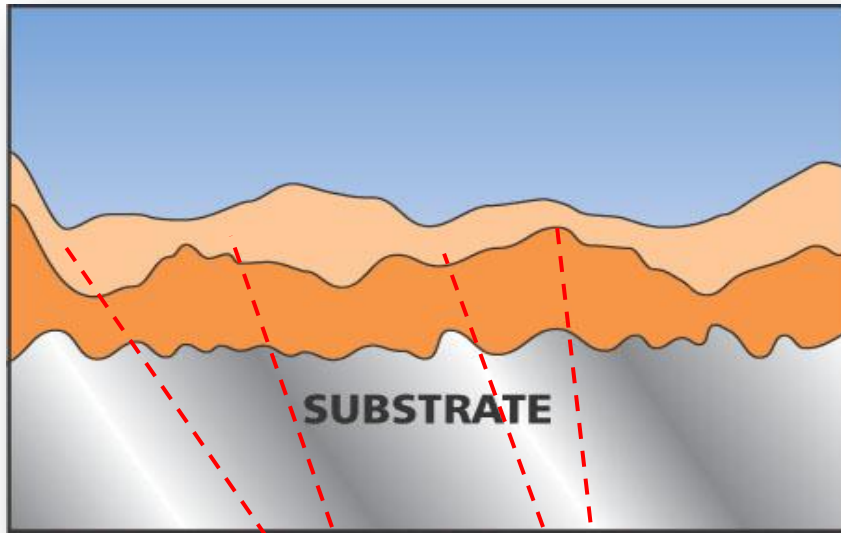
2 After first primer coat film thickness is too low in places.

Jotamastic
Smart Pack



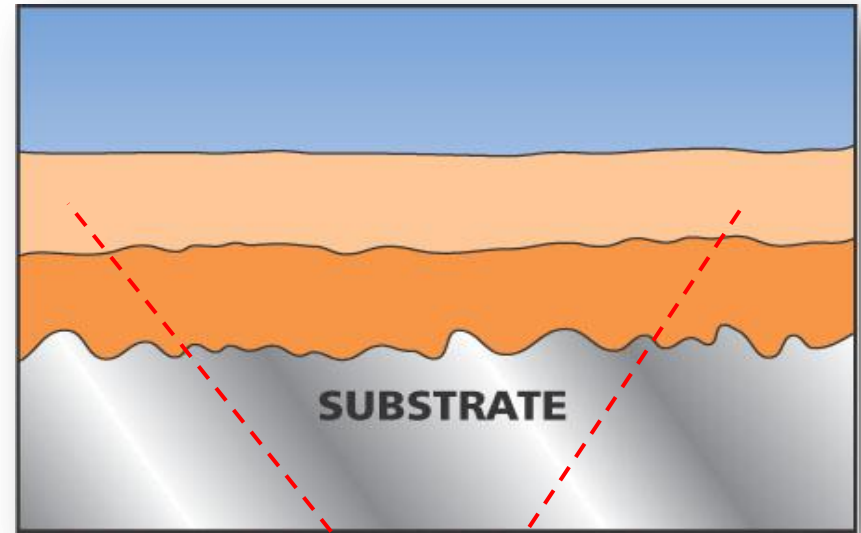
2 First primer coat – flows consistently to even out the surface

Most other
epoxy primers

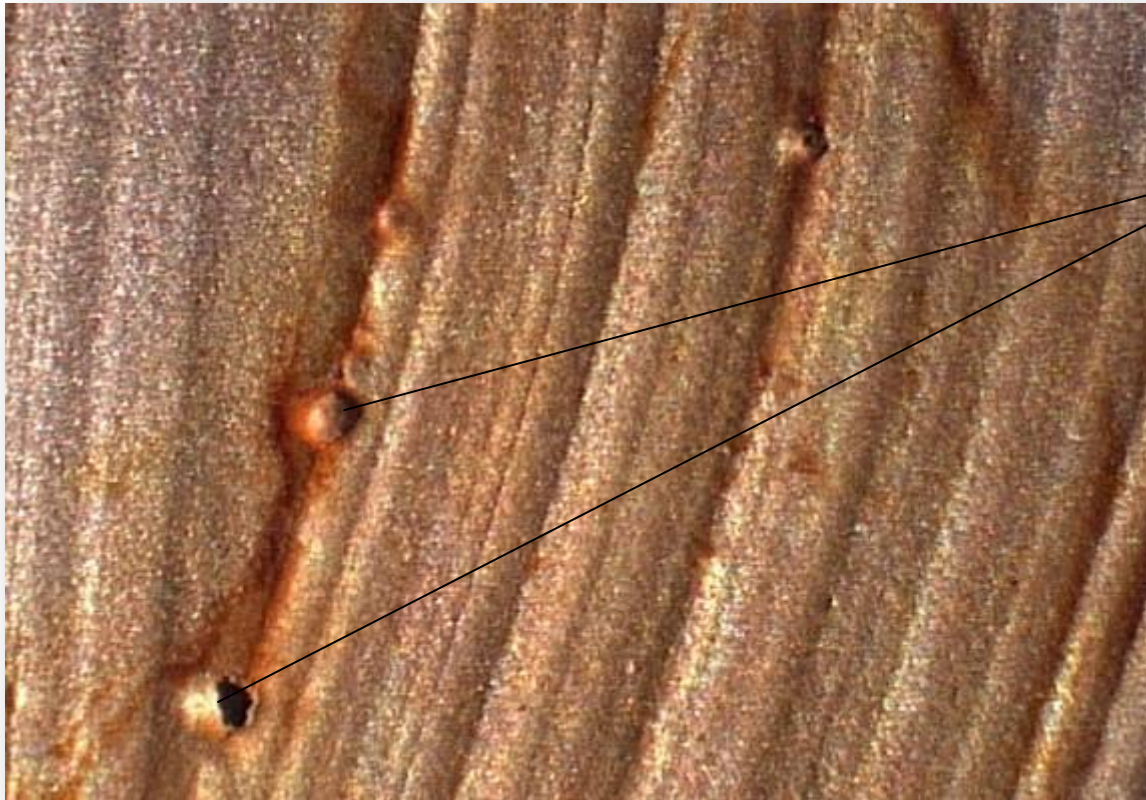


3 Second primer coat fails to achieve required film thickness in places – trouble ahead

Jotamastic
Smart Pack

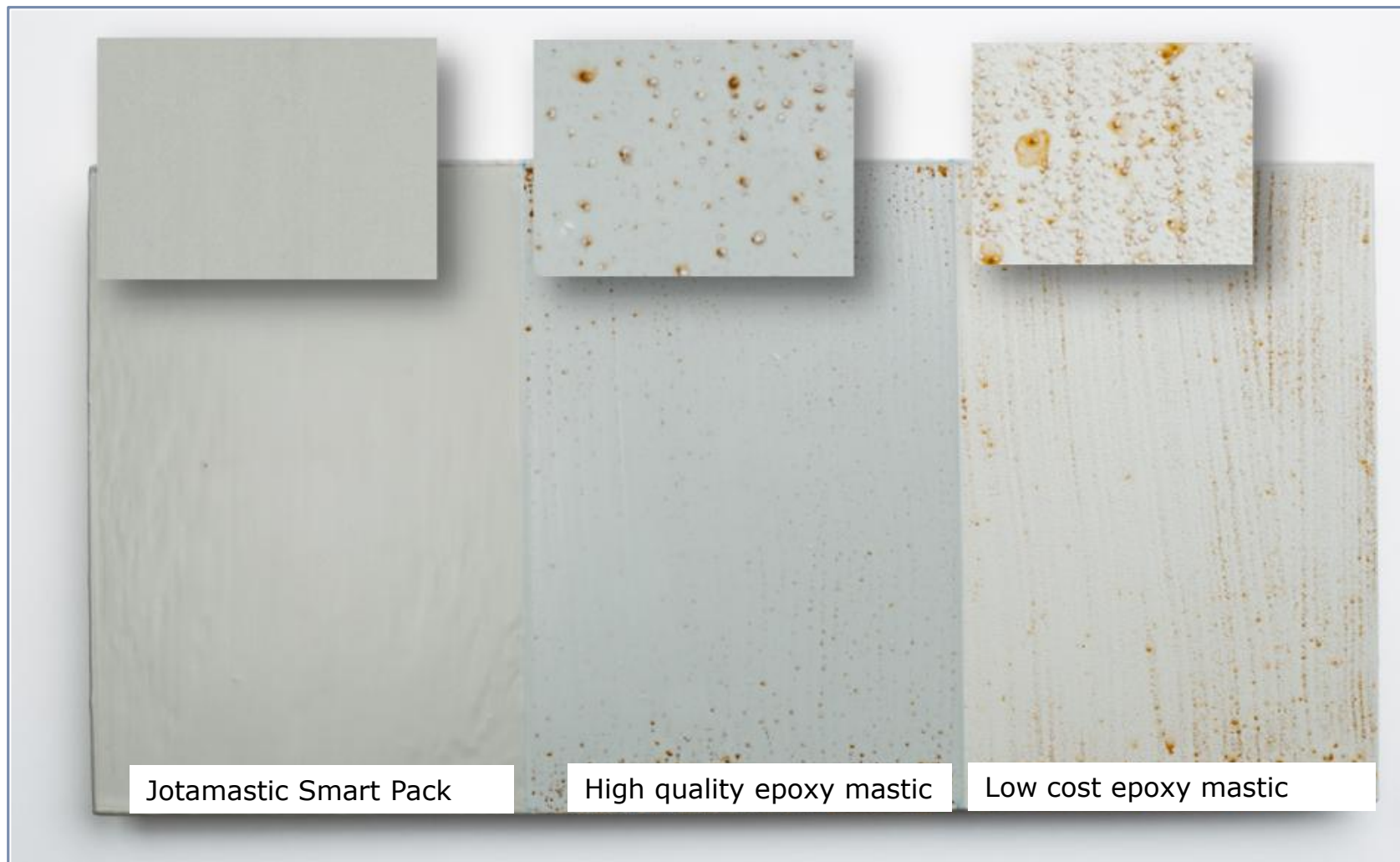


3 Second primer coat – flows evenly – starts building consistent protection

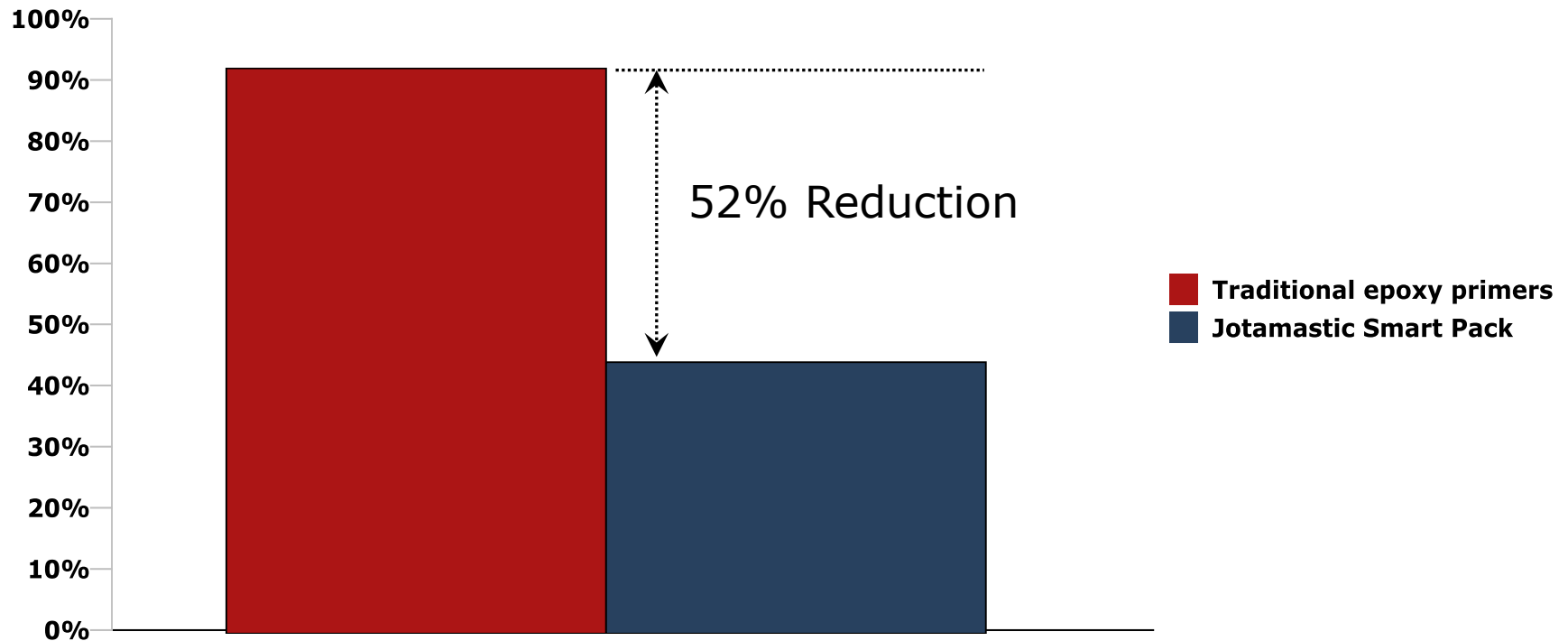


Blisters beginning to breakdown in the valleys of the brush strokes

Competitor epoxy primer after 2 weeks salt spray testing



Jotamastic Smart Pack users consume 50% less volume of paint



- 40-50% reduction on volume consumption
- 20-30% cost save on paint consumption

Analysis is conducted on Jotun's total SeaStock sales for 2010

Summary – Jotamastic range

Jotamastic | 80

Relevant protection for less severe environments

Jotamastic | 87

Durable solution in severe environments

Jotamastic | 90

Tintable, offering the ultimate flexibility and durability

Jotamastic | SF

Solvent Free Jotamastic

Jotamastic | SMART PACK

Specially engineered for brush and roller application

Usage areas and typical systems

Typical **Offshore** maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
<ul style="list-style-type: none"> Carbon steel with operating temperature < 120°C Structural Steel Exteriors equipment, vessels, piping and valves 	2 x 1 x	125 60	Jotamastic 90 Hardtop XP
<ul style="list-style-type: none"> Structural carbon steel with operating temperature ≤ 80°C in internal and fully dry and ventilated areas 	1 x 1 x	150 60	Jotamastic 90 Hardtop XP
<ul style="list-style-type: none"> Helicopter deck 	1 x 1x	200 1000	Jotamastic 90 Jota Armour
<ul style="list-style-type: none"> Pipes and Valves 	2 x 1 x	125 60	Jotamastic 90 Hardtop XP
<ul style="list-style-type: none"> Submerged carbon steel and carbon steel in the splash zone 	2 x	200	Jotamastic SF
<ul style="list-style-type: none"> Walkways, escape routes and lay down areas 	2 x 1 x	200 60	Jotamastic 90 GF Hardtop XP
<ul style="list-style-type: none"> Brush/Roller application 	Jotamastic Smart Pack number of coats required to reach specified DFT 1 x Hardtop XP		

Typical **Energy** maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
Hydro Power Station:			
• Penstock Internal IM	2 x	150	Jotamastic 90 Aluminium
• Penstock external C5-M	1 x 1 x	250 50	Jotamastic 90 Aluminium Hardtop XP
Thermal Power Plan:			
• Structural steel pipes, supports and components C3	1 x 1 x	80 80	Jotamastic 80 Penguard FC
• Structural steel pipes, supports and components C5	1 x 1 x 1 x	135 135 50	Jotamastic 90 Aluminium Jotamastic 90 Hardtop XP
Wind Turbine:			
• Tower external C5	1 x 1 x	100 60	
• Tower internal C3	1 x	200	Jotamastic 90
• General maintenance	2 x 1 x	200 60	Jotamastic 90 GF Hardtop XP
• Brush/Roller application	Brush/Roller application 1 x T/U Jotamastic Smart Pack		

Typical **HPI** maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
<ul style="list-style-type: none"> Structural steel with operating temperature < 120°C Exteriors of racks, vessels, piping and valves 	2 x	125	Jotamastic 80
	1 x	60	Hardtop XP
<ul style="list-style-type: none"> Tank exteriors 	2 x	125	Jotamastic 80
	1 x	60	Hardtop XP
<ul style="list-style-type: none"> Jetties, structural steel 	2 x	125	Jotamastic 90
	1 x	60	Hardtop XP
<ul style="list-style-type: none"> Jetties, piles 	2 x	250	Jotamastic 87 GF
<ul style="list-style-type: none"> Splash zone, confined spaces 	2 x	200	Jotamastic SF
<ul style="list-style-type: none"> Bush / Roller application 			Jotamastic Smart Pack, number of coats required to reach specified DFT
	1 x	60	Hardtop XP

Typical **Infrastructure** maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
• Steel Structures internal	1 x 1 x	100 60	Jotamastic 80 Hardtop XP
• Steel Structures external	2 x 1 x	100 60	Jotamastic 80 Hardtop XP
• Fuel tank exterior	2 x 1 x	125 60	Jotamastic 80 Hardtop XP
• Water tank interior	2 x	250	Jotamastic 90
• Bridge external steel structures	2 x 1 x	150 60	Jotamastic 90 Hardtop XP
• Bridge internal steel void spaces	2 x 1 x	150 60	Jotamastic 90 Hardtop XP
• Bridge steel piers and piles, external structures, splash zone	2 x	250	Jotamastic SF

Typical **Dry Dock** maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
• Underwater Hull	1 x 1 x	150 100	Jotamastic 90 Aluminium Safeguard Universal ES Antifouling or FRC as specified
• Topside	2 x 2 x	150 50	Jotamastic 90 Hardtop XP
• Decks	2 x 1 x	100 60	Jotamastic 80 Hardtop XP
• Superstructure	2 x 1 x	100 60	Jotamastic 80 Hardtop XP
• Cargo Holds	2 x	150	Jotamastic 80*

* For cargo hold repair we recommend the use of Jotaguard 600 series, especially engineered for cargo hold protection

Typical on board maintenance systems

Areas	Typical System		
	No. Coats	DFT µm	
• Topside	1 x	50	Jotamastic Smart Pack, number of coats required to build 200 µm Hardtop XP
	2 x	100	Jotamastic 80
	1 x	60	Hardtop XP
• Decks • Superstructure exterior	1 x	60	Jotamastic Smart Pack, number of coats required to build 200 µm Hardtop XP
	2 x	100	Jotamastic 80 or Jotamastic Smart Pack
	1 x	60	Hardtop XP
• Superstructure interior	1 x	100	Jotamastic 80
	1 x	60	Hardtop XP
• Cargo Holds	2 x	125	Jotamastic Smart Pack, number of coats required to build 250 µm Hardtop XP
• Water ballast tanks			Jotamastic Smart Pack, number of coats required to build 300 µm

Practical exampels



Jotamastic | 90

Object:

Fullham FC stand grade 2 listed opened 1896

Challenge:

Maintenance of old steel structure from

Customer feedback:

Contractors have given very favourable feed back. Sprays excellently and application by brush covers in a single coat

System:

1 x 120 µm, Grey



Jotamastic | 90

Object:

Transocean Drilling ship "Deep Water Frontier", trial application

Challenge:

Hydro jetted (WJ 2) surface with severe pitting.

Customer feedback:

Excellent flow, cover and cosmetic appearance. Very easy to work with compared to other similar products.

System:

2 x 150 µm

**Object:**

16 boilers with different sizes, for a oil recycling unit.

Challenge:

Productivity/Curing Speed and colored primer as finish coat

Customer feedback:

Customer very happy with finish and application properties.

System:

1 x Resist 78/Barrier ZEP - 80 µm
1 xJotamastic 90 RAL 5010 - 120 µm



Jotamastic | 90

Object:

Ship Type: Bulk carrier, Year Built: 2004
Length x Breadth: 289 m X 45 m
Gross Tonnage: 90085, DeadWeight: 180310 t

Challenge:

Reduce time in DD and provide long lasting protection

Customer feedback:

Good cosmetic appearance and application properties.
Fast cure.

System (typical):

1 x Jotamastic 90 WG, Red- 175 µm
1 x Safeguard Universal ES, Buff- 120 µm
1 x SeaMate antifouling - 70 µm

1 x Jotamastic 90 WG, Red- 135 µm
1 x Jotamastic 90 WG, Grey- 150 µm
1 x Hardtop XP, Blue- 45 µm

**Object:**

Waterworks Rail Bridge
Warton Road London 2012 Olympic Village

Challenge:

High pressure washing has removed around 10-20% of the existing coating. Very old steel bridge.

Customer feedback:

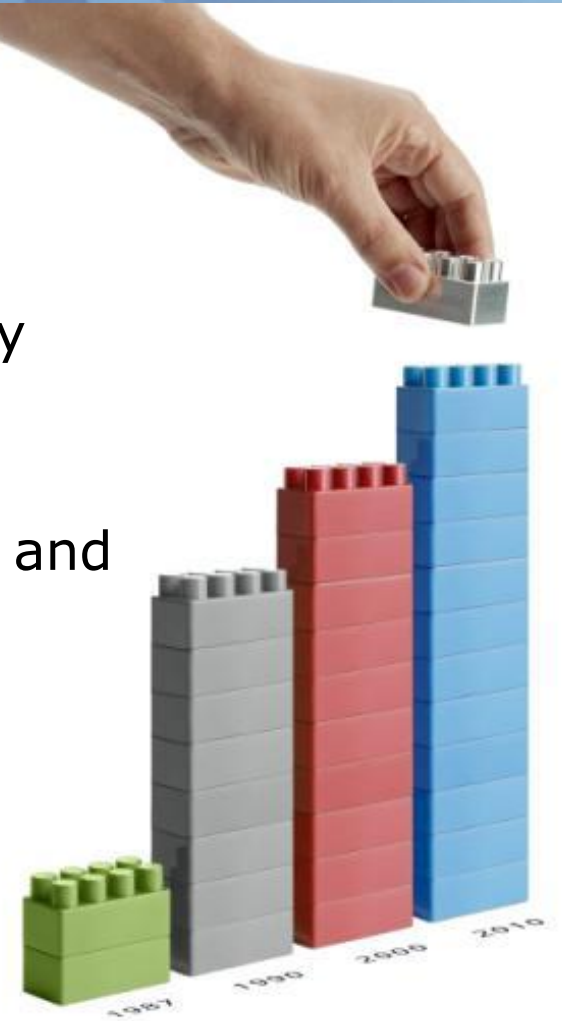
Customer very happy with finish, application properties and fast curing times.

System:

2 x 120 μ m Jotamastic 90 WG, Blue

Conclusion

- 25 year track record = well proven technology
- Jotamastic is the markets benchmark surface tolerant epoxy mastic coating– reducing time and cost with no compromise in protection
- A wide range of solutions to accommodate various needs in different usage situations



Questions?

