



# Oil and gas

## Product guide

*Protective & Marine Coatings*

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# Oil and gas product guide

## Introduction



## Your needs

Stringent service demands, unforgiving environments, ever escalating safety and environmental concerns, mounting service temperatures and pressures, changing needs. This is the perfect storm your assets have to face every day, amidst increased regulatory pressure. Your needs are changing. You are increasingly aware of risk factors not duly considered in the past, such as corrosion under insulation, cryogenic spill risks or the corrosive impact of reduced maintenance. Processes are also becoming more aggressive; not forgetting that you want to build your assets faster than ever and operate them with minimal downtime. You want to do a better job protecting assets, faster and safer than ever, without harming the environment.

## Our answer

Our solutions to fight corrosion and other aggressions to your assets have been developed and adapted to meet your needs in a unique way. We offer a fully comprehensive product portfolio, from pragmatic and cost effective standard-matching solutions, to integrated state-of-the-art innovations that match your needs.

## Simple

Sherwin-Williams serve the Protective Coatings market with hundreds of products, able to respond to any specific need of the Oil & Gas industry, yet we understand the value of simplicity. From our available product solutions we have selected a focused portfolio to serve your needs as a specifier or applicator of Protective Coatings. The portfolio presented in this document is not exhaustive. Yet, it will cover most of your needs in a succinct and easy way, whilst assuring the advantage of a 'one stop shop' for protective coatings, passive fire protection and cryogenic spillage protection. Simple.



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## Zinc primer solutions

**Your need:** for new fabrication or full refurbishment projects you need top performance and user friendliness to join forces. This is particularly true with zinc rich primers, where the perfect outcome shall be expected but the application conditions need careful monitoring, to avoid deviations that may impact performance. Investing in new assets is also stringently regulated, and the regulations may differ by region. You need your products, namely the zinc rich primers that often provide the founding base of your protective systems, to be compliant in terms of performance and zinc content, whilst enabling a hassle free application.

**Our answer:** Sherwin-Williams zinc rich primers are available in a number of zinc loads to cover all types of regulations, from SSPC in the Americas to NORSOK M501 in Europe or ISO 20340 and ISO 12944 globally. Able to pass the most stringent testing criteria with a combination of different top coats, Sherwin-Williams' zinc rich ethyl silicate and zinc rich epoxy primers are formulated to enable easy application and fast drying, minimising the risks of misuse.

		Zinc-Clad II	Zinc-Clad IV
Characteristics	Solids volume %	62	68
	DFT range per coat (microns)	50-100	60-125
	Service temperature dry (max °C)	400	150
	Service temperature methanol (max °C)	40	-
Service	Atmospheric	✓	✓
	Immersion	*	-
	Under insulation > 60°C	-	-
	Under epoxy PFP	✓	✓
	High temperature	✓	-
Substrates	Carbon steel	✓	✓
	Stainless steel	-	-
	Non-ferrous	-	-
	Concrete	-	-
Application	Primer	✓	✓
	Sealer / tie coat	-	-
	Intermediate or lining	-	-
	Top coat (atmospheric)	-	-

\* Compatible with immersion in methanol.

### Zinc-Clad™ II

#### Zinc rich ethyl silicate primer

**Key Characteristics:** User friendliness and compliance. 85% zinc dust load in dry film for multiple compliance with SSPC Paint 20 Level 1 requirements and ISO 12944, ISO 20340 and NORSOK M501 definition of zinc rich primer. Part of approved systems meeting NORSOK M501, ISO 20340 and ISO 12944 pre-qualification criteria.

**Approvals:** NORSOK M501 Rev.5 System N.1.

### Zinc-Clad™ IV

#### Zinc rich epoxy primer

**Key Characteristics:** User friendliness and compliance. 85% and 80% zinc dust loads available for adaptive compliance with SSPC Paint 20 Level 1 and Level 2 respectively. The 80% zinc dust load meets the requirements of ISO 12944, ISO 20340 and NORSOK M501 for zinc rich primers. Part of approved systems meeting NORSOK M501, ISO 20340 and ISO 12944 pre-qualification criteria.

**Approvals:** NORSOK M501 Rev.5 System N.1.

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## Epoxy primer solutions

**Your needs:** a successful project depends on having the right tools. When it comes to blasting and painting, whether in new building or maintenance situations, 'invisible soldiers' may make the difference in the battle for better asset protection. Epoxy sealers and penetrating primers, either used as temporary protection or as part of the main coating system, are tools that you can not disregard. They are key to optimising the conditions for success by holding surface condition, sealing existing substrates or as definitive recoatable primers. You need this class of products to perform well in terms of corrosion protection, as much as you need user friendliness and extended recoatability to match your objective.

**Our answer:** Sherwin-Williams has developed a set of epoxy primers and sealers which go beyond the usual expectations for this class of products. The development of high-performance zinc phosphate primers (e.g. Macropoxy C425V2, matching NORSOK M501 System 7 and System 1 performance criteria) brings our portfolio of recoatable and holding primers to a new level of excellence. Additionally, our unique zinc-free shop-primer (Euronavy PE31) is type approved and IMO PSPC compliant giving the option to replace zinc-based shop primers without impacting on welding speed or protection performance.

		Euronavy PE31	Macropoxy L425	Macropoxy C425V2	Macropoxy L574
Characteristics	Solids volume %	24	60	75	29
	DFT range per coat (microns)	15-25	75-125	100-250	25-40
	Service temperature dry (max °C)	-	120	120	120
	Service temperature water (max °C)	-	50	60	-
Service	Atmospheric	✓	✓	✓	✓
	Immersion	✓	✓	✓	✓
	Under insulation > 60°C	-	-	-	-
	Under epoxy PFP	✓	✓	✓	✓
	High temperature	-	-	-	-
Substrates	Carbon steel	✓	✓	✓	✓
	Stainless steel	-	✓	✓	✓
	Non-ferrous	-	✓	-	✓
	Concrete	-	-	-	-
Application	Primer	✓	✓	✓	✓
	Sealer / tie coat	-	-	-	✓
	Intermediate or lining	-	-	✓	-
	Top coat (atmospheric)	-	-	-	-

### Euronavy™ PE31

#### Weldable zinc-free organic shop primer

**Key Characteristics:** Unique compliance and fast output versatility.

A full approved weldable shop primer with unique IMO PSPC compliance. Tailored for extra fast drying at shot blasting and automatic painting chambers. Also compatible with manual spraying and fully compatible with welding. Its unique set of approvals brings the forgiveness and user friendliness of organic chemistry to fast output new building scenarios normally dominated by humidity range-limited inorganic shop primers.

**Approvals:** IMO Resolution MSC.215(82) (PSPC ballast tanks) approved as zinc free shop primer; Type Approved by Lloyds Register and DNV as weldable shop primer.

### Macropoxy™ L425

#### Zinc phosphate epoxy primer

**Key Characteristics:** Tolerance and recoatability.

A surface tolerant multi-substrate penetrating primer, suitable for use under appropriate coating systems for exposed or immersed conditions. Indefinitely overcoatable with epoxy systems.

**Approvals:** Complies with British Gas Standard PS PA9 Primer.

### Macropoxy™ C425V2

#### High build zinc phosphate epoxy primer

**Key Characteristics:** High build and recoatability.

A high build primer suitable for use under appropriate coating systems for exposed or immersed conditions. Indefinitely overcoatable with epoxy systems. Its high build and good barrier properties allow application of a single coat under aesthetic-oriented top coat where two coats of primer and intermediate were normally required, for moderate corrosive atmospheric service.

**Approvals:** NORSOK M501 Rev.5 System N.7; matches performance criteria of NORSOK Rev.5 System N.1.

### Macropoxy™ L574

#### Epoxy sealer and holding primer

**Key Characteristics:** Penetration and spray-ability.

A low viscosity epoxy primer that can be used as a holding primer, shop primer or sealer for TSA, TSZ or zinc rich primers. Indefinitely overcoatable with epoxy systems. A very good primer over stainless steel and non-ferrous substrates too.

**Approvals:** Newcastle Occupational Health Welding Health and Safety Report No. 7549/04; Complies with British Gas Standard PS PA9 Primer.

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## Epoxy multi-purpose solutions

**Your need:** to protect your assets you need to combine a number of different coating materials. These materials must provide a combination of easy application, good aesthetics, health & safety compliance, cost effectiveness and protection performance, for both immersion and atmospheric service, as well as withstanding abrasion, impact or chemical aggression. You need a simple coating system design, with the ideal combination of multi-purpose epoxies which are able to perform in any scenario.

**Our answer:** Sherwin-Williams is able to adapt to most service and substrate requirements with a clever set of multi-purpose epoxies. The best example is the Macropoxy line of workhorse epoxies covering the needs of versatility and top performance. It includes a portfolio of epoxies ranging from tolerant polyamide technology, to fabrication aimed amine cured pure epoxy technology for multi-service and abrasion resistance.

		Macropoxy 646	Macropoxy M922	Macropoxy K267
Characteristics	Solids volume %	72	83	66
	DFT range per coat (microns)	125-250	200-1000	75-150
	Service temperature dry (max °C)	120	120	120
	Service temperature water (max °C)	60	60	-
	Service temperature crude (max °C)	-	60	-
Service	Atmospheric	✓	✓	✓
	Immersion	✓	✓	-
	Under insulation > 60°C	-	-	-
	Under epoxy PFP	✓	✓	*
	High temperature	-	-	-
Substrates	Carbon steel	✓	✓	-
	Stainless steel	✓	✓	-
	Non-ferrous	✓	-	✓
	Concrete	-	-	-
Application	Primer	✓	✓	✓
	Sealer / tie coat	✓	-	-
	Intermediate or lining	✓	✓	✓
	Top coat (atmospheric)	✓	✓	-

\* When used as a primer for galvanized steel.

### Macropoxy™ 646

#### Multi-purpose tolerant epoxy

**Key Characteristics:** Versatility and performance.

A versatile polyamide cured epoxy that has become a symbol of performance, user friendliness and surface tolerance. Serves a number of different industries in many ways for both new building and maintenance, atmospheric or immersion services. Its 1:1 mix ratio, excellent penetration features, fast drying and outstanding film forming rheology makes Macropoxy 646 the product of choice for airless and conventional spraying as much as for roller and brush application. Full colour range available.

**Approvals:** NORSOK M501 Rev.5 System N.1 & N.7.

### Macropoxy™ M922

#### Ultra high build glass flake epoxy

**Key Characteristics:** Versatility for splash zone protection.

A perfectly balanced formula providing ultra high film building and excellent impact and abrasion resistance while still enabling good film forming at lower thickness. This unique formula reflects decades of field experience in the harsh North Sea offshore environment. Joining special pigments and micronized glass flakes is the secret for unparalleled performance. Good film forming enhances its use beyond the traditional scope of application as a splash zone coating. Allows early immersion after application.

**Note:** For high build brush application use M922M.

**Approvals:** NORSOK M501 Rev.5 System N.7, BS5493:1977 - Table 4K -Type KP1A, Def Stan 80-97 Treatment of Fuel Tanks.

### Macropoxy™ K267

#### Epoxy MIO intermediate and galvanized steel primer

**Key Characteristics:** adhesion to galvanized surfaces and versatility.

A MIO-pigmented epoxy mid coat that excels as a barrier as much as when applied as a primer over galvanized surfaces. Compatible with a broad spectrum of Sherwin-Williams top coats.

**Approvals:** Complies with British Gas Standard PS PA9 Undercoat. BS476 Part 7 - Surface Spread of Flame.

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## Tolerant epoxy solutions

**Your need:** Achieving high durability in areas subjected to the harsher service types and environments is not an easy task.

Deck areas and helidecks in offshore service or splash zones in offshore and coastal steel structures, that are exposed to wave and tidal erosion and good examples of such challenges. Maintenance or repair work will also face the same challenges during application. You need solutions that endure the service, quick to install and tolerant to application conditions.

**Our answer:** from unique humidity and surface tolerant technology, to innovative glass-filled epoxy solutions Sherwin-Williams' brings you tougher, quicker and more tolerant materials which meet your maintenance, refurbishment or even new construction needs. The portfolio of tolerant materials stretches from modern epoxy polyamide tolerant technology to game-changing ultra-tolerant solutions like Dura-Plate 301 or Macropoxy M922M. All scenarios are covered, from single-coat high build brush and roller application to airless spraying. And services from atmospheric to immersion, including products with early immersion capabilities after application, for splash zone maintenance.

		Dura-Plate 301	Macropoxy M922M	Macropoxy C88	Macropoxy M902
Characteristics	Solids volume %	97	83	79	75
	DFT range per coat (microns)	100-300	200-1000	125-250	75-125
	Service temperature dry (max °C)	120	120	120	120
	Service temperature water (max °C)	60	60	60	-
	Service temperature crude (max °C)	60	60	-	-
Service	Atmospheric	✓	✓	✓	✓
	Immersion	✓	✓	✓	-
	Under insulation > 60°C	-	-	-	-
	Under epoxy PFP	✓	✓	✓	✓
	High temperature	-	-	-	-
Substrates	Carbon steel	✓	✓	✓	✓
	Stainless steel	✓	✓	✓	✓
	Non-ferrous	-	-	✓	-
	Concrete	✓	-	-	-
Application	Primer	✓	✓	✓	✓
	Sealer / tie coat	-	-	✓	✓
	Intermediate or lining	✓	✓	✓	*
	Top coat (atmospheric)	-	✓	✓	-

### Dura-Plate™ 301

#### Surface and humidity tolerant solvent-free epoxy

**Key Characteristics:** Performance and humidity tolerance.

Delivering very high performance over UHP water jetted surfaces, low profile roughness, flash rust or damp surfaces, Dura-Plate 301 defined a class of its own coping with situations where common technologies fail to deliver. Unparalleled track record of more than 15 million m<sup>2</sup> of steel surfaces protected within the last decade, 301 technology helped cut down time, save costs and adapt to environmental challenges like no other solution serving the Oil & Gas market today. Dura-Plate 301W version now available for cold curing temperatures down to 0°C. Allows early immersion in splash zone after application. Summer (301K) and winter (301W) grades available.

**Approvals:** NORSOK M501 Rev.6 System N.3B (301K, 301S) & Rev.5 System N.7 (301K); IMO Res. MSC.215(82) (PSPC ballast tanks - 301K, 301S) over UHP, AB, & shop primer; IMO Res MSC.287(87) (PSPC crude oil tanks - 301W) Meets MIL-PRF-23236, Type VII, Class 7, 15b and 17 (301K, 301L, 301S).

### Macropoxy™ M922M

#### Ultra high build brushable mastic

**Key Characteristics:** Surface tolerance and high build brush application.

An aluminium-pigmented version of Macropoxy M922 glass flake epoxy fine tuned for maintenance applications. While providing the same excellent impact & abrasion resistance of M922, it also assures excellent single coat film building by brush (surpassing 500 microns DFT) and very good wetting of the substrate. Like Macropoxy M922, the M922M aluminium brings the use of glass filled epoxies beyond the traditional scope of its application. Allows early immersion in splash zone after application.

**Approvals:** NORSOK M501 Rev.5 System N.7.

### Macropoxy™ C88

#### Multi-purpose tolerant epoxy

**Key Characteristics:** User friendliness and 1:1 easy mix ratio.

The polyamide epoxy technology brought to next the level, with higher solids volume content and enhanced brush, roller and spray application properties. With a versatile formula for both atmospheric or immersion services, Macropoxy C88 is a modern and preferable way to serve maintenance needs, alternatively to heavily modified conventional epoxy mastics. Keeps the Macropoxy 646 1:1 mix ratio and full colour range availability.

**Approvals:** M501 Rev.5 System N.1; Meets the requirements of ISO 12944 for high durability under C5 environment.

### Macropoxy™ M902

#### Fast dry epoxy aluminium mastic

**Key Characteristics:** Fast recoatability and 1:1 smart mix ratio.

A phenalkamine cured epoxy aluminium that allows curing down to 0°C. A workhorse for maintenance in harsh, cold environments by spray, brush or roller application. Rapid overcoating and faster handling times in applications where temperatures are low.



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## Heavy duty deck solutions

**Your needs:** the unforgiving offshore environment calls for heavy duty protection for all types of service. In the particular case of deck service you will need ultra heavy duty materials, adding extreme mechanical resistance (impact, abrasion) and anti-slip properties to the obligation of providing effective substrate adhesion and a good protective barrier as a means to avoid corrosion.

**Our answer:** meeting the stringent requirements of the offshore industry, our deck coatings include a NORSOK M501 System 4-approved 3mm thick anti-slip deck protection for the most demanding areas (Epidek M153 for walkways, escape routes and lay down areas).

We also offer a deck system with huge success in flight decks application as well as in other areas where high profile anti-slip surface is needed (3-pack Epidek M339 system).

		Epidek M153	Epidek M339
Characteristics	Solids volume %	95	71
	DFT range per coat (microns)	2000-3000	200-400
	Service temperature dry (max °C)	120	120
	Service temperature water (max °C)	-	-
	Service temperature crude (max °C)	-	-
Service	Atmospheric	✓	✓
	Immersion	-	-
	Under insulation > 60°C	-	-
	Under epoxy PFP	-	-
	High temperature	-	-
Substrates	Carbon steel	-	-
	Stainless steel	-	-
	Non-ferrous	-	-
	Concrete	-	-
Application	Primer	-	-
	Sealer / tie coat	-	-
	Intermediate or lining	-	-
	Top coat (atmospheric)	✓	✓

### Epidek™ M153

#### Ultra heavy duty deck coating

**Key Characteristics:** Mechanical resistance and film build.

A best in class aggregate dressed anti-slip coating that can be applied up to 3 mm dry film thickness. For the protection of deck surfaces subject to the most extreme of operational conditions requiring a high degree of impact and abrasion resistance, where a high level of anti-slip properties need to be retained under conditions of severe crude oil and hydrocarbon contamination. With extensive North Sea offshore track record, M153 is now globally available.

NORSOK M501 Rev. 5 System N.4. CAA Regulation CAP 437 (dry and wet).

### Epidek™ M339

#### 3 Pack high build deck coating

**Key Characteristics:** Mechanical resistance and anti-slip surface.

Designed for spray application using suitable equipment as a high profile anti-slip deck paint. Its excellent abrasion and weathering resistance together with its British MoD approvals made it a solution of choice for helidecks.

**Approvals:** UK MoD/DRA to DEF STAN 80-134 Type 2: Rough texture; BS476 Part 7 – Surface Spread of Flame Material.

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## Top coat solutions

**Your needs:** aesthetics is not only a matter of good taste.

In the Oil & Gas industry colour and gloss need to be present and retained during the life of the asset for a number of reasons from safety identification to heat reflection. Another important requirement is the need for well kept clean and visible surfaces, enabling quick and easy inspection to monitor the health of your asset's steel structures. For this you need top coats with good colour and gloss retention that can be simultaneously applied to a number of different coating materials within a range of dry film thickness, whilst providing good opacity and matching the right colour with a single coat application.

**Our answer:** Sherwin-Williams matches the need for a high quality, diversified top coat portfolio with a range of polyurethane, polyaspartic and isocyanate free finishes providing the Oil & Gas industry with the right product whatever the circumstances. Application friendliness, performance excellence and cutting downtime are the main delivered benefits. Isocyanate-free Acrolon 1850 enables single coat, high opacity finish for both brush or spray application in maintenance or steel fabrication. Acrolon 7300 offers excellent UV resistance and application properties with one of the highest volume solids in the market place for polyurethane top coats.

		Acrolon 1850	Acrolon 7300
Characteristics	Solids volume %	59	68
	DFT range per coat (microns)	50-200	50-100
	Service temperature dry (max °C)	120	120
	Service temperature water (max °C)	-	-
	Service temperature crude (max °C)	-	-
Service	Atmospheric	✓	✓
	Immersion	-	-
	Under insulation > 60°C	-	-
	Under epoxy PFP	-	-
	High temperature	-	-
Substrates	Carbon steel	-	-
	Stainless steel	-	-
	Non-ferrous	-	-
	Concrete	-	-
Application	Primer	-	-
	Sealer / tie coat	-	-
	Intermediate or lining	-	-
	Top coat (atmospheric)	✓	✓

### Acrolon™ 1850

#### High opacity isocyanate free finish

**Key Characteristics:** Single coat brush coverage and water spotting resistance.

Inaugurating a new generation of isocyanate free epoxy acrylic technology, Acrolon 1850 brings unique features hard to combine in a single product. It provides superb brush application features for maintenance, enabling proper opacity in a single coat, while easily adapting to spray application for smooth glossy finish. All this with good early water spotting resistance, unlike expected from other epoxy acrylic products.

### Acrolon™ 7300

#### High solids polyurethane

**Key Characteristics:** User friendliness at higher solids.

A polyurethane tuned to maximise volume solids while keeping smooth application properties, namely by airless spray. Excellent high gloss and colour retention are brand marks of Sherwin-Williams' finishes and it now has lower VOC content.

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## Heat resistant solutions

**Your need:** as Oil & Gas processes head for higher service temperatures, the need for effective and efficient coating solutions which cope with higher temperatures increases.

This requires the ability to provide a resistant coating film at the fabrication stage to endure installation. And solutions that can be applied under unconventional conditions, like in-service hot surfaces or over mechanically treated surfaces. All this, of course, while providing excellent protection for both atmospheric and under insulation exposure.

**Our answer:** Sherwin-Williams has been the chief-innovator in the field of high temperature and under insulation protective coatings materials. We pioneered the use of a new breed of inert multipolymeric matrix materials for corrosion under insulation (CUI) control ten years ago. This leadership has now entered a new phase after the successful launch of the second generation of this technology (the Heat-Flex 1200). The portfolio is completed with a range of compatible top coats for atmospheric use and complemented with a line of high temperature silicone and aluminium-pigmented high temperature coatings covering all your needs for high temperature service.

		Heat-Flex 3500	Heat-Flex 1200	Heat-Flex 1000	Heat-Flex 500	Heat-Flex M505
Characteristics	Solids volume %	83	57	53-56	38-41	31
	DFT range per coat (microns)	381-508	125-150	40-50	50-60	20-25
	Service temperature dry (max °C)	177	650	540	260	600
	Service temperature water (max °C)	-	-	-	-	-
Service	Atmospheric	✓	✓	✓	✓	✓
	Immersion	-	-	-	-	-
	Under insulation > 60°C	✓	✓	-	-	-
	Under epoxy PFP	-	-	-	-	-
	High temperature	✓	✓	✓	✓	✓
Substrates	Carbon steel	*	✓	-	-	-
	Stainless steel	✓	✓	✓	✓	✓
	Non-ferrous	-	-	-	-	-
	Concrete	-	-	-	-	-
Application	Primer	-	✓	✓	✓	✓
	Sealer / tie coat	-	-	-	-	-
	Intermediate or lining	✓	✓	-	-	-
	Top coat (atmospheric)	-	-	✓	✓	✓

\* With primer Heatflex Hi-Temp 1200 or Zinc Clad II

### Heat-Flex™ 3500

#### Thermal insulation coating

**Key Characteristics:** Protection of personnel and optimises thermal properties.

Effectively insulates dangerously hot surfaces without the need for conventional cladding therefore avoiding any possibility of CUI.

Heat-Flex 3500 is a single component coating that can be applied to ambient or hot surfaces up to 177°C (350°F) and is suitable for substrates operating between -63°C (-80°F) and 177°C (350°F). Heat-Flex 3500 is flexible enough to perform under cyclic thermal shock conditions.

### Heat-Flex™ Hi-Temp 1200

#### Inert multipolymeric matrix CUI coating

**Key Characteristics:** Under insulation protection and mechanical resistance.

The next generation coating for corrosion under insulation (CUI), outperforming alternatives for under insulation and high heat service. Can be applied in service up to 260°C over blasted or mechanically treated steel and stainless steel surfaces, with no maximum recoat time. Heat-Flex 1200 beats previous performance benchmarks for protection under insulation. Improved abrasion and impact resistance after ambient temperature curing, compared with first generation materials, decisively contributes to make it an universal solution for high heat protection.

**Approvals:** Matches NACE SP 0198-2010 performance criteria as inert multipolymeric matrix CUI protective system.

### Heat-Flex™ 1000\*

#### High heat acrylic silicone finish

**Key Characteristics:** Colour stability and heat resistance.

A specially engineered silicon hybrid resin enabling it to withstand temperatures from 260°C to 540°C continuous service as well as severe thermal cycling with spikes up to 650°C. A single pack product that can be used direct to stainless steel or as a topcoat over Heat-Flex 1200 while providing outstanding corrosion protection.

### Heat-Flex™ 500\*

#### High heat acrylic silicone finish

**Key Characteristics:** Colour stability and heat resistance.

A specially engineered silicon hybrid resin enabling it to withstand temperatures up to 260°C continuous service including severe thermal cycling. A single pack product that can be used direct to stainless steel or as a topcoat over Heat-Flex 1200 while providing outstanding corrosion protection. Ideal solution as top coat for stacks, furnaces, piping, boilers, heat exchangers, etc.

### Heat-Flex™ M505

#### High heat silicone aluminium

**Key Characteristics:** Heat resistant and reflective.

A heat cured air drying pure silicone resin pigmented with aluminium flakes. Applicable by brush, roll, or spray. Can be used as sealer over Thermal Sprayed Aluminium (TSA). Colour stable (aluminium) up to 600°C. Available also in black or white and other colours upon request (to avoid discolouration, maximum service temperatures apply for these colours). Can be used as a top coat over Hi-Temp Heat-Flex 1200.

\* Available US supply only.



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## Lining solutions

**Your need:** managing tank storage facilities in terminals or refineries has become harder. Volatile market conditions and higher process temperatures and pressures (HTHP scenario) contribute to a more challenging and unpredictable service. In this environment at a process level, your vessels face chemical, temperature and decompression challenges that need an adequate lining response. Typically you look for durable multi-service linings that can adapt to most of the content and service temperatures you expect at your assets. And you need it to be installed and ready for service as fast as possible. Simultaneously, health and safety and environmental regulations have increased interest in the adoption of solvent-free materials with less impact in terms of VOC emissions and reduced safety concerns.

**Our answer:** Sherwin-Williams lead the transition of tank linings from the conventional multi-coat solvent-borne materials to state-of-the-art solvent-free epoxy technologies, enabling the use of fast curing single coat systems. Our portfolio of tank linings excels in covering all types of service. This assortment of global products provides the basic tools needed to face industry challenges, from novolac specialties to the latest ultra fast curing technology, enabling return to service in 24hrs or less with optically active pigmentation (Opti-Check) technology for faster and more efficient inspection. On the HTHP front, we bring to you state of art novolac and ceramic filled novolac systems that deliver the ultimate solutions in extreme situations including crude immersion up to 150°C and high temperature in subsea service up to 180°C."

		Dura-Plate UHS	Fast-Clad ER	Nova-Plate UHS	Nova-Plate 325
Characteristics	Solids volume %	98	98	98	98
	DFT range per coat (microns)	450-1000	450-1000	250-400	500-1000
	Service temperature dry (max °C)	*	*	*	*
	Service temperature water (max °C)	*	*	*	*
	Service temperature crude (max °C)	*	*	*	*
Service	Atmospheric	✓	✓	✓	✓
	Immersion	✓	✓	✓	✓
	Under insulation > 60°C	-	-	✓	✓
	Under epoxy PFP	-	-	-	-
	High temperature	-	-	✓	✓
Substrates	Carbon steel	✓	✓	✓	✓
	Stainless steel	✓	✓	-	-
	Non-ferrous	-	-	-	-
	Concrete	✓	✓	-	-
Application	Primer	✓	✓	✓	✓
	Sealer / tie coat	-	-	-	-
	Intermediate or lining	✓	✓	✓	✓
	Top coat (atmospheric)	✓	-	-	-

\*Please contact Sherwin-Williams Technical team.

### Dura-Plate™ UHS with Opti-Check™ Technology Fast curing ultra high solids epoxy lining

**Key Characteristics:** User friendliness and single coat application.

The rapid return to service and high build, edge retentive properties of this superior tank lining provides superb protection compared to conventional approaches or alternative products. Able to be applied by conventional airless pumps in a single coat, Dura-Plate UHS is the user friendly solution that matches the need for fast curing top performance for use in tanks containing a wide range of cargoes from crude to potable water or ethanol.

**Approvals:** Meets MIL-PRF-23236, Type VII, Class 5, 7, 9 and 11, Grade C; NSF approved to Standard 61 for potable water.

### Fast-Clad™ ER with Opti-Check™ Technology Ultra fast curing and single coat application

Fast-Clad ER pioneered the transition of solvent-free epoxy technology to the next level in terms of performance and fast return to service. Adding superior flexibility and ultra fast curing to the excellent edge retention, film forming and high build properties of the Sherwin-Williams ultra high solids epoxy product line, Fast-Clad ER inaugurated the era of epoxy lining solutions with return to service of 24 hours or less.

**Approvals:** Meets MIL-PRF-23236 Type VII, Class 5, 7, 5/18, 7/18, 13/18, 17, 17/18 Grade C requirements for single and multi-coat seawater, fuel, bilges, and CHT tanks.

### Nova-Plate™ UHS Ultra high solids epoxy novolac lining

**Key Characteristics:** chemical resistance and single coat application.

A versatile lining that thanks to its robust chemical resistant formulation can adapt to most storage requirements, including crude, refined oil products, MTBE, hi-aromatic gasolines, ethanol, methanol or ether/fuel blends. Also suitable for use under insulation.

**Approvals:** Meets MIL-PRF-23236, Type VII, Class 5, 7, 13, 19, Grade C. Norsok M501 System 7C (140°C)

### Nova-Plate™ 325 High temperature high pressure tank lining

**Key Characteristics:** Extreme temperature resistance and single coat fast return to service application.

A glass and ceramic filled ultra-high solids tank lining that utilizes advanced novolac technology. It is engineered to protect storage steel tanks and vessel interiors from aggressive chemicals handled and processed at high temperatures and high pressures (HTHP). Withstands continuous operating immersion service up to 150°C. Allows single coat application from 500 to 1000 microns DFT and subsea service to 180°C.

**Approvals:** Norsok M501 System 7C (180°C)

# Oil and gas product guide

## Lining solutions continued

		Phenicon HS	Epo-Phen FF	Magnalux 41V
Characteristics	Solids volume %	75	70	85
	DFT range per coat (microns)	125-150	125-225	500-750
	Service temperature dry (max °C)	*	*	*
	Service temperature water (max °C)	*	*	*
	Service temperature crude (max °C)	*	*	*
Service	Atmospheric	✓	✓	✓
	Immersion	✓	✓	✓
	Under insulation > 60°C	✓	✓	✓
	Under epoxy PFP	✓	-	-
	High temperature	-	✓	-
Substrates	Carbon steel	✓	✓	✓
	Stainless steel	✓	✓	✓
	Non-ferrous	-	-	-
	Concrete	✓	✓	✓
Application	Primer	✓	✓	✓
	Sealer / tie coat	-	-	-
	Intermediate or lining	✓	✓	✓
	Top coat (atmospheric)	✓	✓	✓

\*Please contact Sherwin-Williams Technical team.

### Phenicon™ HS with Opti-Check™ Technology Epoxy phenolic lining

**Key Characteristics:** Chemical resistance and cargo versatility.

An epoxy novolac phenolic coating formulated for use as an internal lining for tanks used to hold crude oil and most refined petroleum products including unleaded gasoline, MTBE, aromatic solvents, and most octane booster blending stocks. Also recommended for jet fuel, ethanol and methanol storage.

**Approvals:** Please refer to the Chemical Resistance Guide.

### Epo-Phen™ FF Epoxy novolac lining and high temperature coating

**Key Characteristics:** Dual chemical and temperature resistance.

Epo-Phen FF joins special MIO pigmentation to its amine cured epoxy phenolic novolac formulation, bringing best in class versatility to cope with both high temperature and chemical aggression. Its unique formula allows its use under thermal insulation at elevated or cryogenic temperatures as much as for immersion service in water up to 99°C and hydrocarbons such as crude (up to 104°C), gasoline, fuel oil, diesel, ethanol or methanol.

**Approvals:** Norsok M501 System 7C (99°C)

### Magnalux™ 41V Glass flake vinyl ester lining

**Key Characteristics:** Chemical and abrasion resistance.

Novolac modified vinyl ester technology. Superior grade vessel lining offering exceptional protection against a wide range of aggressive chemicals, abrasion and elevated temperatures.

**Approvals:** Please refer to the Chemical Resistance Guide.

# Oil and gas product guide

## Passive fire protection and insulation solutions

**Your need:** to protect your assets you need to select appropriate coating systems. In the case of fire and cryogenic spillage, protection materials must provide a combination of easy application, good aesthetics, health & safety compliance, certification/type approval requirements, cost effectiveness, low applied weight and protection performance in the demanding conditions encountered in up -, mid - and downstream oil and gas installations.

**Our answer:** Sherwin-Williams' developed the FIRETEX range of materials providing a difficult to match combination of protection against corrosion, hydrocarbon pool and jet fire, and cryogenic spill with optimised loadings, therefore minimising protection costs. FIRETEX technology has been serving our clients well for more than two decades and is continually evolving to meet the market needs. Through exhaustive research and development the latest generation of the FIRETEX Hydrocarbon Fire Protection Series can provide up to 4 hours protection from hydrocarbon pool fire, 3½ hours protection from jet fire, resist a 2 bar over pressure blast and protect your structure from cold induced brittle fracture for 2 hours in the event of contact with cryogenic liquid. This performance is delivered while assuring long term effectiveness for over 20 years service in the harshest industrial and offshore environments, as proven by the NORSOK M-501 and UL1709 successful testing.

		FIRETEX M90/02	FIRETEX M93/02	FIRETEX M89/02
Characteristics	Solids volume %	100	100	100
	DFT range per coat (mm)	0.5-7	0.5-7	0.5-20
	Service temperature dry (max °C)	80	80	150
	Service temperature water (max °C)	-	-	-
	Service temperature crude (max °C)	-	-	-
Service	Atmospheric	✓	✓	✓
	Immersion	✓	✓	✓
	Under insulation > 60°C	-	-	-
	Under epoxy PFP	-	-	✓
	High temperature	-	-	✓
Substrates	Carbon steel	✓	✓	✓
	Stainless steel	✓	✓	✓
	Non-ferrous	-	-	-
	Concrete	-	-	-
Application	Primer	-	-	-
	Sealer / tie coat	-	-	-
	Intermediate or lining	✓	✓	✓
	Top coat (atmospheric)	-	-	-

### FIRETEX® M90/02

#### Epoxy intumescent coating

**Key Characteristics:** Highly durable, with market leading loadings for hydrocarbon pool and jet fire protection.

This 100% solids epoxy intumescent product is the latest generation of the proven FIRETEX M90 series. It can protect a wider range of steel for longer periods with lower applied thickness than its predecessors, making it the most cost effective epoxy passive fire protection (PFP) material available.

As users would expect from the FIRETEX range, M90/02 has excellent application characteristics whether using a plural component PFP pump, a single component pump or applying the material manually.

Testing has been carried out to show that in conjunction with FIRETEX M89/02, M90/02 can be used to protect steel from cold induced brittle fracture for up to 2 hours contact with cryogenic liquid and from the effects of a subsequent fire. This duplex system has also been subjected to a 2.0 bar blast with no detrimental effects.

**Approvals:** Lloyd's Register, Det Norske Veritas and American Bureau of Shipping type approval for hydrocarbon pool and jet fire protection of structural steel and divisions; NORSOK M-501 rev. 6, System 5a; UL1709; BS EN 13501-2; ETA13/0676; ASTM E84

### FIRETEX® M93/02

#### Epoxy intumescent coating

**Key Characteristics:** Highly durable, cost effective solution for hydrocarbon pool fire protection.

Designed for the onshore/downstream/UL1709 market FIRETEX M93/02 offers a cost effective, durable solution for PFP. The dominant PFP solution for this market currently would be concrete or cementitious products due to their low upfront costs. With its ease and speed of application, superior durability, substrate corrosion protection characteristics, lower maintenance requirements and costs, FIRETEX M93/02 represents a more cost effective solution. For new construction, FIRETEX M93/02 works excellently for in-shop application, allowing the PFP application process to be removed from the project's critical path, resulting in a more cost effective solution for providing PFP for the life of an asset.

As users would expect from the FIRETEX range, M93/02 has excellent application characteristics whether using a plural component PFP pump or applying the material manually.

Testing has been carried out to show that in conjunction with FIRETEX M89/02 it can be used to protect steel from cold induced brittle fracture for up to 2 hours contact with cryogenic liquid and from the effects of a subsequent fire.

**Approvals:** UL1709; ASTM E84

### FIRETEX® M89/02

#### Syntactic epoxy insulation

**Key Characteristics:** Highly durable, thermally efficient material for insulation and cryogenic spill protection.

A 100% solids syntactic epoxy material for thermal insulation of hot and cold surfaces, and protection of steelwork which could come into contact with cryogenic liquids, this durable product offers the ideal solution. It can be easily applied either manually or using a plural component PFP pump.

FIRETEX M89/02 has industry leading thermal insulation properties for wet applied insulation, offering a joint free solution with a thermal conductivity (K-value) of 0.088W/m.K.

**Approvals:** NORSOK M-501 rev.6 System 5a (with FIRETEX M90/02)







**SW Oil & Gas App** allows you to explore the best Sherwin-Williams coating for each area of an oil refinery, shale drilling or offshore site. From tanks to piping, cooling towers to rail tank cars, Sherwin-Williams has your coatings needs covered. With comprehensive coating specifications for every aspect of your equipment, the SW Oil & Gas App is interactive, fast and easy to use.

A complete line of products.  
Market expertise.  
On time distribution.

### **What else would you expect from a world leader in protective coatings, linings, and fire protection?**

It starts with a complete line of time tested, high performance products and some of the most innovative and greenest technologies in the coatings industry. We know that it takes more than product alone to be a world leader in protective coatings and linings, and so do the customers that rely on us every day as we help them protect their business.

That's where over 150 years of coatings industry experience comes in. Add to that a NACE trained workforce with vast experience in corrosion control and the market specific knowledge that our experts provide to evaluate, recommend and deliver the highest performance coatings and linings that protect our customers' assets.

Leave nothing to chance. Your single source of supply. Sherwin-Williams.



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