

NORSOK PPG systems guide

M-501 standard coating solutions

Our guide to choosing compliant protective coatings for offshore structures.



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We have published this brochure to guide you through the selection of PPG products and systems that comply with the surface preparation and protective coating standard, as described in NORSOK M-501.

NORSOK standards were developed in 1994 by the Norwegian petroleum industry and today serve as a global reference for ensuring the safety, added value and cost effectiveness of protective coatings used within challenging offshore environments.

NORSOK M-501 outlines the requirements for the selection of coating materials, surface preparation, application procedures and the inspection for paints, metallic coatings and passive fire protection. The aim of this standard is to obtain a coating system that ensures:

- Optimum protection of the installation with minimum need for maintenance
- Use of products that are application and maintenance friendly
- Health, safety, and environmental impacts are evaluated and documented

The tables published within this brochure highlight examples of PPG's protective offering for coating systems that have been tested to and comply with the pre-qualification requirements established by NORSOK. Recommended systems that satisfy the defined exposure conditions are also included.

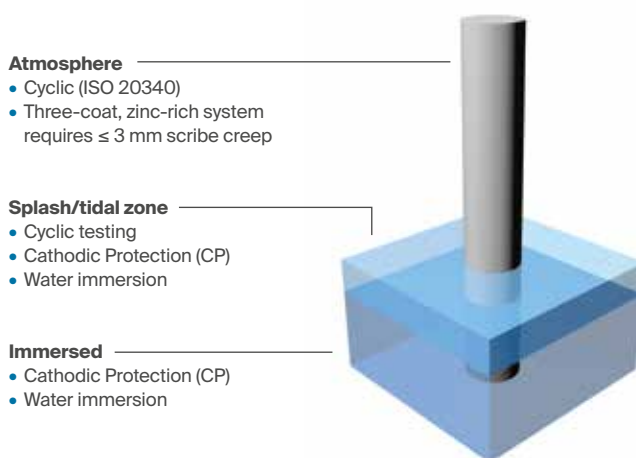
Please contact your local PPG Protective Coatings representative for further advice on coating recommendations.

NORSOK M-501 standard system classifications

Since NORSOK M-501 requires a surface preparation of Sa 21/2, all coatings systems listed may be assumed to be Sa 21/2 prepared. The latest versions of NORSOK (rev. 5 and 6) adopt ISO20340, where relevant, as the pre-qualification test standard for coating materials.

All recommended PPG systems have passed the rigorous laboratory testing described for each NORSOK system, where applicable.

Figure 1: Exposure Conditions





NORSOK Standard M-501 coating systems

Only pre-qualified systems require prior testing

System 1 (pre-qualified)	Carbon steel with maximum operating temperature < 120°C (248°F) <ul style="list-style-type: none"> • Structural steel • Exteriors of equipment, vessels, piping and valves (not insulated)
System 2	Carbon steel surfaces exposed to operating temperatures > 120°C (248°F)
System 3A-3G (System 3B pre-qualified)	Internal surface of carbon steel tanks
System 4 (pre-qualified)	Walkways, escape routes and lay down areas
System 5A (pre-qualified)	Epoxy-based fire protection
System 5B (pre-qualified)	Cement-based fire protection
System 6A	Uninsulated stainless steel when painting is required. Aluminum when painting is required
System 6B	Hot-dipped, galvanized steel when painting is required
System 6C	Insulated stainless steel piping and vessels at temperatures < 150°C (302°F)
System 7A (pre-qualified)	Carbon and stainless steel in the splash zone
System 7B (pre-qualified)	Submerged carbon and stainless steel ≤ 50°C (122°F)
System 7C (pre-qualified)	Submerged carbon and stainless steel > 50°C (122°F)
System 8	Structural carbon steel with maximum operating temperature ≤ 80°C (176°F) in internal and fully dry and ventilated areas
System 9	Bulk-supplied carbon steel valves with maximum operating temperature up to 150°C (302°F)

Reference PPG's Global Product Offering brochure for dual branding options available.

NORSOK System 1 (pre-qualified)

Carbon steel with maximum operating temperature < 120°C (248°F)

Zinc Epoxy Systems

System #	PPG Coating System	DFT µm	DFT Mils
1.1	PPG SIGMAZINC 68 SP	60	2
	PPG SIGMACOVER 410	140	6
	PPG SIGMADUR 550 H or PPG PSX 700	80	3
		280	11
1.2	PPG SIGMAZINC 68 SP	60	2
	PPG SIGMACOVER 410	170	7
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550	50	2
		280	11
1.3	PPG DIMETCOTE 9 / PPG SIGMAZINC 9	60	2
	PPG SIGMACOVER 410	170	7
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550	50	2
		280	11
1.4	PPG DIMETCOTE 9 / PPG SIGMAZINC 9	60	2
	PPG SIGMACOVER 410	140	6
	PPG SIGMADUR 550 H or PPG PSX 700	80	3
		280	11
1.5	PPG AMERCOAT 68 HS	60	2
	PPG AMERCOAT 370	160	6
	PPG AMERCOAT 450 H	60	3
		280	11

NORSOK System 2A

Carbon steel surfaces

Thermally sprayed aluminum or alloys of aluminum

< 120°C (248°F)

System #	PPG Coating System	DFT µm	DFT Mils
2A.1	THERMALLY SPRAYED ALUMINIUM	200	8
	PPG SIGMACOVER 522	25	1
		225	9

> 120°C (248°F)

System #	PPG Coating System	DFT µm	DFT Mils
2A.2	THERMALLY SPRAYED ALUMINIUM	200	8
	PPG SIGMATHERM 540	25	1
		225	9

NORSOK System 2B

Carbon steel surfaces

Thermally sprayed zinc or alloys of zinc

< 120°C (248°F) - Not for use under insulation

System #	PPG Coating System	DFT µm	DFT Mils
2B.1	THERMALLY SPRAYED ZINC	100	4
	PPG SIGMACOVER 522	25	1
	PPG SIGMACOVER 410	125	5
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H	75	3
		325	13
2B.2	THERMALLY SPRAYED ZINC	100	4
	PPG SIGMACOVER 522	25	1
	PPG SIGMAFAST 278	125	5
	PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H	75	3
		325	13

NORSOK System 3A

Potable Water Tanks

System #	PPG Coating System	DFT µm	DFT Mils
3A.1	PPG SIGMAGUARD CSF 585	300	12
		300	12

Please consult your PPG Protective Coatings representative for further advice and coating recommendations.

NORSOK 3B (pre-qualified)

Ballast water tanks/internal seawater-filled compartments based on IMO-PSPC testing

System #	PPG Coating System	DFT µm	DFT Mils
3B.1	PPG SIGMAPRIME 700	160	6
	PPG SIGMAPRIME 700	160	6
		320	12
3B.2	PPG SIGMAPRIME 200	160	6
	PPG SIGMAPRIME 200	160	6
		320	12
3B.3	PPG SIGMACOVER 240	160	6
	PPG SIGMACOVER 240	160	6
		320	12
3B.4	PPG SIGMACOVER 380	160	6
	PPG SIGMACOVER 380	160	6
		320	12

All systems were tested with and without shopprimer.

NORSOK System 3C

Tanks for stabilized crude, diesel and condensate

< 60°C (140°F)

System #	PPG Coating System	DFT µm	DFT Mils
3C.1	PPG SIGMAGUARD CSF 650	300	12
		300	12

> 60°C (140°F)

System #	PPG Coating System	DFT µm	DFT Mils
3C.2	PPG NOVAGUARD 840	300	12
		300	12

Please consult your PPG Protective Coatings representative with full details of the cargo and operating conditions to ensure the correct specification is used.

NORSOK System 3D

Process vessels < 0,3 MPa < 75°C (167°F)

System #	PPG Coating System	DFT µm	DFT Mils
3D.1	PPG NOVAGUARD 260	75	3
	PPG NOVAGUARD 840	300	12
		375	15

Please consult your PPG Protective Coatings representative with full details of the cargo and operating conditions to ensure the correct specification is used.

NORSOK System 3E

Process vessels < 7,0 MPa < 80°C (176°F)

System #	PPG Coating System	DFT µm	DFT Mils
3E.1	PPG NOVAGUARD 260	75	3
	PPG NOVAGUARD 840	300	12
		375	15

Please consult your PPG Protective Coatings representative with full details of the cargo and operating conditions to ensure the correct specification is used.

NORSOK System 3F

Process vessels < 3,0 MPa < 130°C (266°F)

System #	PPG Coating System	DFT μm	DFT Mils
3F.1	PPG NOVAGUARD 4801	600	24
	PPG NOVAGUARD 4801	600	24
		1200	48

Please consult your PPG Protective Coatings representative with full details of the cargo and operating conditions to ensure the correct specification is used.

NORSOK System 3G

Vessels for storage of methanol, mono ethyl glycol etc

System #	PPG Coating System	DFT μm	DFT Mils
3G.1	PPG SIGMAGUARD 750	75	3
		75	3

Please consult your PPG Protective Coatings representative with full details of the cargo and operating conditions to ensure the correct specification is used.

NORSOK System 4 (pre-qualified)

Walkways, escape routes and lay down areas

Medium to Heavy Duty

System #	PPG Coating System	DFT ¹ μm	DFT ¹ Mils
4.1	PPG SIGMASHIELD 880	800	32
	ANTI-SLIP AGGREGATE	-	-
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG PSX 700	75	3
		875	35
4.2	PPG SIGMASHIELD 880 GF	800	32
	ANTI-SLIP AGGREGATE	-	-
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG PSX 700	75	3
		875	35

Heavy Duty

System #	PPG Coating System	DFT ¹ μm	DFT ¹ Mils
4.3	PPG SIGMAPRIME 200	75	3
	ANTI-SLIP AGGREGATE	-	-
	PPG SIGMASHIELD 1090	3,000	120
		3,075	123

¹ DFT excludes non-slip aggregate.

NORSOK System 5A, 5B (both pre-qualified)

Epoxy-based fire protection (System 5A)

Please contact your local PPG representative for more details on epoxy-based fire protection.

NORSOK System 6A

Un-insulated stainless steel when painting is required

System #	PPG Coating System	DFT µm	DFT MILS
6A.1	PPG SIGMAPRIME 200 or PPG SIGMAPRIME 700	75	3
	PPG SIGMAPRIME 200 or PPG SIGMAPRIME 700	100	4
	PPG SIGMADUR 540 or PPG SIGMADUR 550	50	2
		225	9
6A.2	PPG SIGMACOVER 280	50	2
	PPG SIGMAFAST 278	100	4
	PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H or PPG PSX 700	75	3
		225	9
6A.3	PPG SIGMACOVER 280	50	2
	PPG SIGMACOVER 410	100	4
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H or PPG PSX 700	75	3
		225	9
6A.4	PPG AMERLOCK 2/400 SERIES	50	2
	PPG AMERLOCK 2/400 SERIES	100	4
	PPG AMERCOAT 450 or PPG AMERCOAT 550 H	75	3
		225	9

NORSOK System 6B

Hot-dipped, galvanized steel when painting is required*

System #	PPG Coating System	DFT µm	DFT MILS
6B.1	PPG SIGMAPRIME 200 or PPG SIGMAPRIME 700	75	3
	PPG SIGMAPRIME 200 or PPG SIGMAPRIME 700	100	4
	PPG SIGMADUR 540 or PPG SIGMADUR 550	50	2
		225	9
6B.2	PPG SIGMACOVER 280	50	2
	PPG SIGMAFAST 278	100	4
	PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H or PPG PSX 700	75	3
		225	9
6B.3	PPG SIGMACOVER 280	50	2
	PPG SIGMACOVER 410	100	4
	PPG SIGMADUR 520 or PPG SIGMADUR 540 or PPG SIGMADUR 550 or PPG SIGMADUR 550 H or PPG PSX 700	75	3
		225	9
6B.4	AMERLOCK 2/400 SERIES	50	2
	AMERLOCK 2/400 SERIES	100	4
	AMERCOAT 450 or AMERCOAT 550 H	75	3
		225	9

* Sweep blasting of the substrate is required prior to application.

NORSOK System 6C

Insulated stainless steel piping and vessels at temperatures < 150°C (302°F)

System #	PPG Coating System	DFT μm	DFT Mils
6C.1	PPG SIGMAGUARD 730	125	5
	PPG SIGMAGUARD 730	125	5
		250	10
6C.2	PPG SIGMATHERM 230	125	5
	PPG SIGMATHERM 230	125	5
		250	10

NORSOK System 7A (pre-qualified)

Carbon steel and stainless steel in splash zone

System #	PPG Coating System	DFT μm	DFT Mils
7A.1	PPG SIGMAPRIME 200	100	4
	PPG SIGMASHIELD 880 GF	500	20
		600	24
7A.2	PPG SIGMASHIELD 1200	400	16
	PPG SIGMASHIELD 1200	400	16
		800	32
7A.3	PPG NOVAGUARD 4801	600	24
	PPG NOVAGUARD 4801	600	24
		1200	48

NORSOK System 7B (pre-qualified)

Submerged carbon and stainless steel $\leq 50^\circ\text{C}$ (122°F)

System #	PPG Coating System*	DFT μm	DFT Mils
7B.1	PPG SIGMAPRIME 700	175	7
	PPG SIGMAPRIME 700	175	7
		350	14
7B.2	PPG SIGMASHIELD 880	300	12
	PPG SIGMASHIELD 880	300	12
		600	24
7B.3	PPG AMERLOCK 2	175	7
	PPG AMERLOCK 2	175	7
		350	14
7B.4	PPG AMERCOAT 385	200	8
	PPG AMERCOAT 385	150	6
		350	14

* Approvals based on revision 5.

NORSOK System 7C (pre-qualified)

Submerged carbon and stainless steel > 50°C (122°F)

Up to 150°C (302°F)

System #	PPG Coating System	DFT μm	DFT Mils
7C.1	PPG PHENGUARD 930	100	4
	PPG PHENGUARD 935	125	5
	PPG PHENGUARD SUBSEA 780 (PPG SIGMALINE 780)	125	5
		350	14

Up to 180°C (356°F)

System #	PPG Coating System	DFT μm	DFT Mils
7C.2	PPG PHENGUARD SUBSEA 610	175	7
	PPG PHENGUARD SUBSEA 780	175	7
		350	14

NORSOK System 8A

Structural carbon steel with maximum operating temperature \leq 80°C (176°F)
in fully dry and ventilated areas

System #	PPG Coating System	DFT μm	DFT Mils
8A.1	PPG SIGMAPRIME 200 or PPG SIGMAPRIME 700	150	6
		150	6
8A.2	PPG AMERLOCK 2/400 SERIES	150	6
		150	6

NORSOK System 8B

Structural carbon steel with maximum operating temperature \leq 80°C (176°F)
in fully dry and ventilated areas

System #	PPG Coating System	DFT μm	DFT Mils
8B.1	PPG SIGMAZINC 68 SP	60	2
	PPG SIGMACOVER 522	25	1
		85	3
8B.2	PPG SIGMAZINC 68 SP	75	3
	PPG AMERLOCK 2/400 SERIES	100	4
		175	7

NORSOK System 9

Bulk-supplied carbon steel valves with maximum operating temperature up to 150°C (302°F)

System #	PPG Coating System	DFT μm	DFT Mils
9.1	PPG SIGMAGUARD 730	150	6
	PPG SIGMAGUARD 730	150	6
		300	12
9.2	PPG SIGMATHERM 230	150	6
	PPG SIGMATHERM 230	150	6
		300	12

More PPG coating systems are available

Please contact your local PPG representative for more information.



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