

Navigating Through Challenges. Together.

SynDeck™ Military Marine Underlayments and Deck Coatings by EPMAR Corporation





Since the 1980s, EPMAR® Corporation, a subsidiary of Quaker Houghton, has been developing and manufacturing the SynDeck™ line of specialized marine underlayment and protective deck coatings. The SynDeck™ line was developed specifically for the manufacture and repair of military, commercial, and private vessels, and are IMO, MIL-SPEC, ABS, U.K. Navy, and Transport Canada certified.

SynDeck[™] chemists, engineers, and industry experts are committed to continued improvement and work closely with our customers to meet their requirements, as well \as the evolving needs of the maritime industry.

Global in reach and local commitment

Example of Where to Use Our Systems







Markets Served

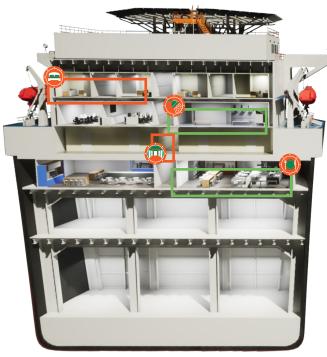
Cruise Ships

Ferries

Workboats

Yachts (Super and Mega)

Offshore Oil Rigs, and Drill Ships



Cabins

Wet Spaces/Showers

Passageways

(iii) Galley/Servery



Our Product Offerings

Quaker Houghton has a wide range of solutions for the marine industry along with our team of experts that work closely with clients to evaluate their needs and enhance their operational performance.

SynDeck™ has a wide range of coating options for the marine industry: primers, underlayments, top coats, and other coatings. Our high-performance products will withstand heavy foot traffic

siFCO ASC, a Quaker Houghton company and the global leader in selective electroplating, has completed critical repairs in the marine industry for over 50 years. The SIFCO Process® – an industry proven, portable method of electroplating localized areas without the use of an immersion tank – is approved by ABS, NAVSEA and meets MIL-STD-2197(SH).

Additionally, Quaker Houghton has a comprehensive range of fire-resistant hydraulic fluids, industrial lubricants, and greases for the marine industry that helps our customers improve their operations so they can run even more efficiently, even more effectively, whatever comes next.

Our Journey to a More Sustainable Future

Sustainability within the shipbuilding and ship repair industry has been a focus for many years. SynDeck™ is helping the shipbuilding and ship repair industry in the journey toward using more sustainable products. All SynDeck™ Navy underlayments consist of approximately 55% by weight (73% by volume) of sustainable material. Unlike other products such as perlite, pumice, expanded clay, or vermiculite, which natural resources have to be mined, SynDeck™ Navy underlayments rely on recycled glass. By using recycled glass, SynDeck™ products avoid using virgin raw materials preventing the abuse of the Earth's natural resources.



Using SynDeck™ Navy underlayments promotes reducing, reusing, and recycling of materials

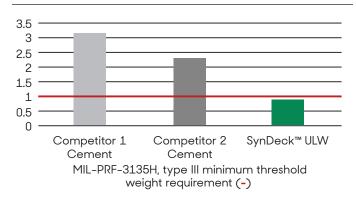


Working with SynDeck™ resin-based underlayment systems extends the life of steel decks and reduces weight resulting in the reduction of fuel consumption, further promoting general environmental sustainability

When Weight Matters as Much as Performance

The shipbuilding and ship repair industry is highly focused on the efficiencies that come from ultra lightweight and long-life corrosion protection materials. Our SynDeck™ ultra lightweight underlayment products give you the highest performance with the lightest possible weight, they weigh less than 1lb. per square foot at ¼ inch installed (below 5kgs per square meter at 6.4mm). The cost-of-use savings (based on material plus maintenance costs) can be significant for a large or small vessel.

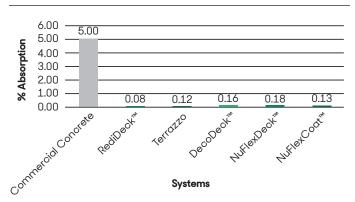
Weight Comparions (lbs/sq ft)



Moisture Absorption Solution

Resin-based flooring offers a significant advantage over concrete, not only when it comes to weight, but when it comes to moisture absorption. With the need for decks to be leveled and flat prior to final deck coverings, it is vital to reduce the risk of water coming in contact with the deck, hence underlaying steel substrate in particular. Resin-based flooring systems do not contain or absorb water therefore, they are an ideal choice for corrosion prevention. The chart quantitatively shows the very low moisture absorption of various SynDeck™ coating systems versus the minimum absorption of commercial concrete.

Moisture Absorption



SynDeck™ Products Key Benefits

- Seamless and corrosion resistant interior decking that can withstand the harshest environments
- Ultra lightweight compared to heavy conventional concrete floorings
- Excellent application, performance, and appearance properties
- Flexible adhesion to prevent cracks and delamination
- Reduced downtime from consistent repairs
- Slope to drains with options for various integral cove edge details



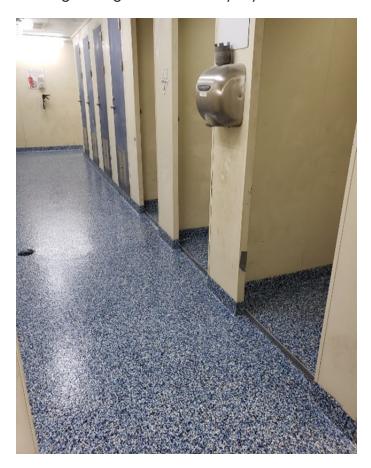
Our Core Product Offerings

Wet Spaces/Showers

The most continuously wet area within the interior of a Navy ship is the wet spaces or showers. Wet space deck leveling floorings typically have used ceramic tiles and other deck coverings with seams and joints. However, over time the tiles and grout can crack, allowing water to seep under and begin to alter the floor. Flooring needs to be waterproof,

SynDeck™ NuFlexDeck™

A decorative and seamless system that has high slip resistance; it can slope to drains, is waterproof, and have integral coving. Even though the system has the specified slip resistance, it is available in various color options, is cleanable, chemically resistant, and ultra lightweight. Additionally, SynDeck™ NuFlexDeck™ meets and exceeds ANSI standards.



Certifications;

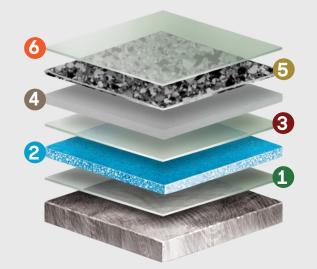
ABS

ANSI

IMO

UK Navy Def Standards

System Layers

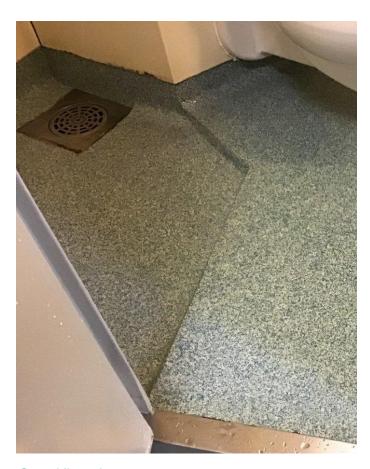


- 1. SynDeck™ Bond Coat SS1222
- SynDeck™ Ultra Lightweight Underlayment SS1290FC
- SynDeck™ Super Underlayment Sealer SS1259
- 4. SynDeck™ NuFlex Epoxy SS1286-XX
- 5. Color Flakes (optional)
- SynDeck™ IMO Clear Epoxy SS5000 / SynDeck™ Navy Epoxy Coating SS5300 (2 thin coats preferred)

slip-resistant, have a slope to drain to prevent standing water and be chemical resistant for cleaning chemicals. With wet spaces continuously having water on the ground, hygiene should be the top priority. SynDeck™ resin systems that meet those needs for wet spaces/shower floors are SynDeck™ NuFlexDeck™ and SynDeck™ Super Light Terrazzo Anti-Slip.

SynDeck™ Super Light Terrazzo Anti-Slip

Our quickest installed system that is decorative, provides great slip resistance, seamless, slopes to drains, waterproof, and can have integral coving. It comes in a wide range of color options, is cleanable, chemically resistant, and ultra lightweight.

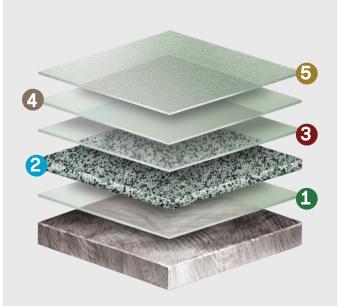


Certifications:

- ABS
- IMO
- ANSI

- US Navy MIL-SPEC
- UK Navy Def Standards

System Layers



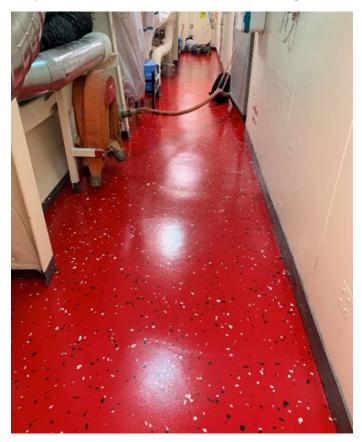
- **1.** SynDeck™ Bond Coat SS1222
- 2. SynDeck™ Ultra Lightweight Terrazzo SS1290FCT
- SynDeck™ Super Underlayment Sealer SS1259
- **4.** SynDeck™ IMO Clear Epoxy SS5000
- 5. SynDeck™ IMO Clear Epoxy SS5000 (with slip-resistant additive)

Passageways (P-Ways)

Crew members must walk through a passageway to get from room to room or level to level on a ship. A ship's passageway should be slip-resistant to reduce trips and falls, have a high chemical resistance when the area needs cleaning, and be waterproof with a seamless application. Additionally, ease of maintenance for these high foot trafficked areas and the

SynDeck™ DecoDeck™

Our trusted and most specified system offering optimum corrosion protection when leveling the decks while still being ultra lightweight and seamless. It has passed the required fire testing with full and partial flake coverage to give infinite decorative options. Also available is SynDeck DecoCoat™ overcoating/resurfacing system for PRC (Paint & ReCoat) requirements, which has the same high chemical resistance and slip resistance.



Certifications:

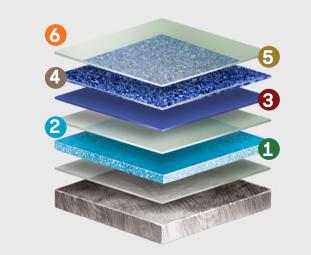
ABS

• US Navy MIL-SPEC

IMO

UK Navy Def Standards

System Layers

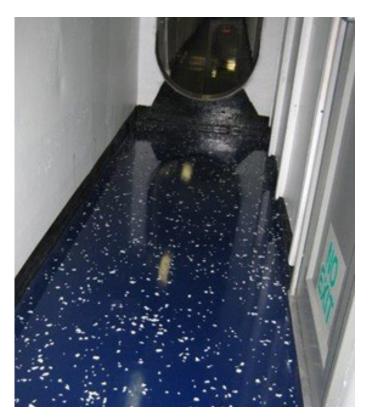


- 1. SynDeck™ Bond Coat SS1222
- 2. SynDeck™ Ultra Lightweight Underlayment SS1290FC
- 3. SynDeck™ Super Underlayment Sealer SS1259
- 4. SynDeck™ IMO Color Epoxy SS50XX
- 5. Decorative Color Flakes (optional)
- 6. SynDeck™ IMO Clear Epoxy SS5000(2 thin coats are often preferred

ability to prepare and recoat (PRC) should be top of mind when selecting the flooring, as downtime can increase if using concrete with vinyl or tiles. If desiring a decorative finish, SynDeck has epoxy resin systems to meet the needs of any vessel with our SynDeck™ DecoCoat™, SynDeck™ NuFlexDeck™, SynDeck™ NuFlexCoat™, or SynDeck™ Super Light Terrazzo Anti-Slip.

SynDeck™ NuFlexDeck™ (and NuFlexDeckM™)

Our 100% solids (Polyurethane free) high-build epoxy system that is decorative and seamless. It offers the most flexibility for the most trafficked areas onboard the ship. The cement and latex-free deck-leveling system is waterproof and provides corrosion protection. It is available in various color options and slip-resistance specifications. Our SynDeck NuFlexDeckM system has a satin matte final appearance and meets IMO and UK Def Standards. Additionally, SynDeck™ NuFlexDeck™ and SynDeck™ NuFlexDeckM™ meets and exceeds ANSI standards.



Certifications:

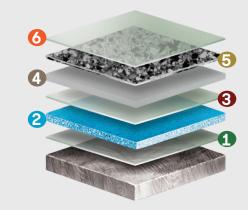
ABS

ANSI

• IMO

UK Navy Def Standards

System Layers



- 1. SynDeck™ Bond Coat SS1222
- 2. SynDeck™ Ultra Lightweight Underlayment SS1290FC
- SynDeck™ Super Underlayment Sealer SS1259
- 4. SynDeck™ NuFlex Epoxy SS1286-XX
- Color Flakes (optional)
- SynDeck™ IMO Clear Epoxy SS5000 / SynDeck™ Navy Epoxy Coating SS5300 (2 thin coats preferred)

Galley/Servery

An area where every crew member comes for a hot meal, the galley/servery, can have oils or greases on the ground and if the flooring doesn't have any anti-slip elements, injuries can occur. Cement and ceramic tiles have long been used throughout many galley/serveries making the floors easy to clean, but tiles cannot prevent a slip or trip, nor can they stop water ingress resulting in the cement altering. Moving from cement to seamless resin underlayments

SynDeck™ GalleyDeckQ™

Our best-performing quartz-topped system for continuously wet and contaminated areas. It provides slip resistance properties, levels the deck, is seamless, and can slope to drains with integral coving up the bulkheads. The system is waterproof, lightweight, cleanable, and available in various color options with excellent chemical resistance.



Certifications:

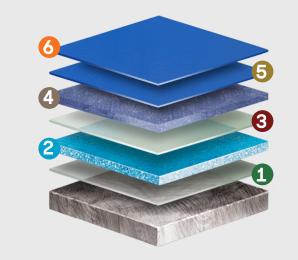
ABS

• US Navy MIL-SPEC

IMO

UK Navy Def Standards

System Layers



- 1. SynDeck™ Bond Coat SS1222
- 2. SynDeck™ Ultra Lightweight Underlayment SS1290FC
- 3. SynDeck™ Super Underlayment Sealer SS1259
- SynDeck™ NuFlex Epoxy SS1286-XX with Quartz
- 5. SynDeck™ IMO Color Epoxy SS50XX
- 6. SynDeck™ IMO Color Epoxy SS50XX

can make the ship's galley/servery area completely waterproof. Replacing ceramic tiles with either VCT tiles or a colored epoxy topcoat will stop water ingress, further preventing failed floors. SynDeck™ provides unrivaled underlayment and epoxy systems with SynDeck™ GalleyDeckQ™ and SynDeck™ RediDeck™.

SynDeck™ RediDeck™

Our RediDeck™ system with Epoxy Adhesive SS5501 and a final deck covering like EPDM, VCT, or other wear-resistant tiles, offers a complete waterproofing system. The deck leveling underlayment is entirely seamless for ultimate corrosion protection.



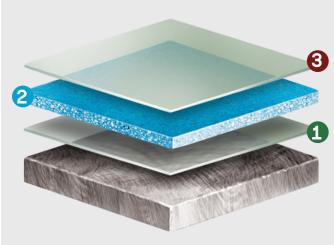
Certifications;

ABS

UK Navy Def Standards

IMO

System Layers



- 1. SynDeck™ Bond Coat SS1222
- SynDeck™ Ultra Lightweight Underlayment SS1290FC
- SynDeck™ Super Underlayment Sealer SS1259



Cabins are personal space areas meant to feel like home. They need to be durable, have a high-quality leveled underlayment or concrete with a comfortable final deck covering that remains dry throughout its life. For the crew, there is a need for cabin areas to be fully waterproof. Using concrete as the substrate can compromise the structural integrity of the flooring due to concrete breaking down over time from repeatedly being wet. One way to solve this issue is to change from concrete substrate to a more seamless resin-based underlayment option and then cover it with the desired final deck covering (Carpet, tile, rubber). SynDeck™ underlayments have the solution for cabin areas with the lightweight resin system SynDeck™ RediDeck™.

SynDeck™ RediDeck™

A deck leveling system perfect for all final deck coverings, applied flat, level, and smooth for the addition of specified adhesives before carpets, VCT, EPDM sheets, ceramic tiles, and decorative resin systems. The simple two-stage system is waterproof and creates a long-term corrosion protection layer but is still repairable when the final deck covering is updated or renewed, providing the longest possible service life compared to water-based types of cement and latex.



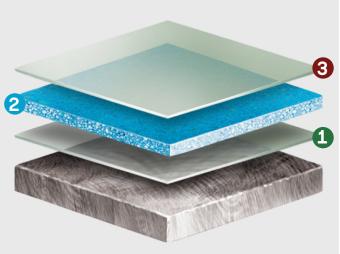
Certifications:

ABS

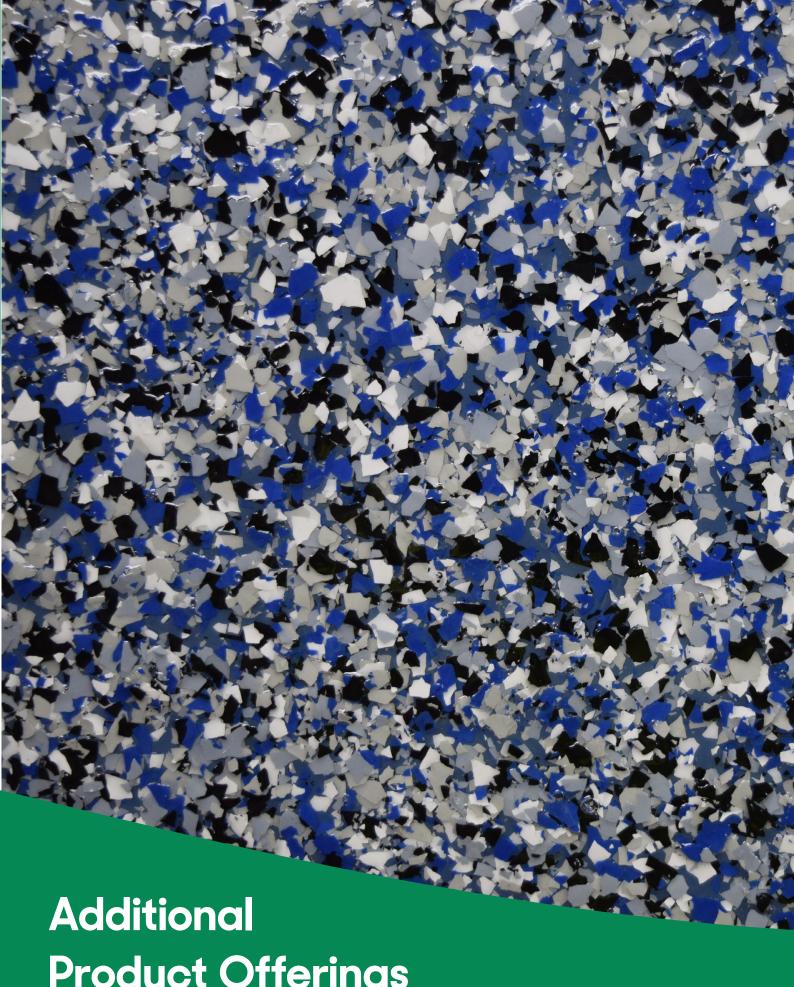
• UK Navy Def Standards.

• IMO

System Layers



- SynDeck™ Bond Coat SS1222 (Optional)
- SynDeck™ Ultra Lightweight Underlayment SS1290FC
- **3.** SynDeck[™] Super Underlayment Sealer SS1259



Product Offerings

Additives For SynDeck™ Systems

SynDeck™ Slip Resistant Additive SD5220/SD5250:

A lightweight marine anti-slip additive for resin flooring. This lightweight, polymeric aggregate is designed to impart various levels of roughness to an epoxy or polyurethane floor coating.

Our slip resistant additives are part of a system and can create a wide range of textures and roughness profiles. Our suggested ratios and coverage rates are theoretical. Substrates, application techniques, and final specifications are the responsibility of the customer and any local authority. Health and safety guidelines must also be taken into consideration, in respect of the management of slips, trips, and falls.

SynDeck™ Thicken It SD5200:

A marine coating anti-sag thickener. A much improved alternative to fumed silica, Thicken It is a synthetic urethane and epoxy blend. It is an excellent complement to epoxy and urethane systems when extra body is needed, such as in coving or edging applications. It is also mildew and UV resistant and withstands exposure to oxidizing agents.

Complementary Products For SynDeck™ Systems

SynDeck™ Epoxy Adhesive SS5501:

Is a trowelable marine epoxy flooring adhesive. It is a high strength, marine epoxy flooring adhesive that is specifically designed to be applied over a variety of primed or underlayment surfaces.

SynDeck™ Epoxy Combo Grout SS1241:

Is a superior marine interior tile adhesive, featuring outstanding chemical resistance and thermal cycling capacity. This two component marine epoxy grout is combined with specially selected filler sand to produce a quality ceramic tile adhesive and setting material.

SynDeck[™] Waterproof Membrane SS2102:

Is an ANSI approved waterproof marine resin for protecting and preparing steel decks and other substrates. It has excellent moisture and chemical resistance, making this resin a good choice to apply as a waterproof coat over sealed wood, composite and steel decks in marine environments.

We offer a range of services to help the world's most forward-looking shipbuilders and national defense companies run even more efficiently and effectively.



Hard Samples



Technical Services



Training Services



Installation and Survey Solutions



Additional Resources

SynDeck™ Product and System Certifications

CERTIFICATION	SPECIFICATION NUMBER	PRODUCT/SYSTEM
	UK NAVY	
Fire Charaoteristics	DEF. STAN. 07-247	Bond Coat SS1222
	DEF. STAN. 07-247	1.5 IMO Underlayment SS1295
	DEF. STAN. 07-247	Super Underlayment Sealer SS1259
	DEF. STAN. 07-247	Underlayment Sealer SS1257
	DEF. STAN. 07-247	NuFlex Epoxy SS1286
	DEF. STAN. 07-247	Navy Epoxy SS5300
	DEF. STAN. 07-247	IMO Epoxy SS5000
	DEF. STAN. 07-247	Ultra Lightweight Underlayment SS1290FC
	MIL-SPEC	
MIL-PRF-32584 Deck Covering	MIL-PRF-32584 Type IV, Class 1 & 2, Grade A, Composition E	Bond Coat SS1222 (Deco System)
	MIL-PRF-32584 Type IV, Class 2, Grade A, Composition E	Bond Coat SS1222 (Terrazzo System)
	MIL-PRF-32584 Type V, Class 1 & 2, Grade A, Composition E	Bond Coat SS1222 (Terrazzo System)
	MIL-PRF-32584 Type V, Class 1 & 2, Grade A, Composition E	Ultra Lightweight Terrazzo SS1290FCT (Terrazzo System)
	MIL-PRF-32584 Type IV, Class 1 & 2, Grade A, Composition E	Ultra Lightweight Underlayment SS1290FC (Deco System)
Materials	MIL-PRF-32584 Type IV, Class 1 & 2, Grade A, Composition E	Super Underlayment Sealer SS1259 (Deco System)
Monolithio	MIL-PRF-32584 Type IV, Class 2, Grade A, Composition E	Super Underlayment Sealer SS1259 (Terrazzo System)
	MIL-PRF-32584 Type V, Class 1 & 2, Grade A, Composition E	Super Underlayment Sealer SS1259 (Terrazzo System)
	MIL-PRF-32584 Type IV, Class 1 & 2, Grade A, Composition E	IMO Epoxy SS5000 (Deco System)
	MIL-PRF-32584 Type IV, Class 2, Grade A, Composition E	IMO Epoxy SS5000 (Terrazzo System)
	MIL-PRF-32584 Type V, Class 1 & 2, Grade A, Composition E	IMO Epoxy SS5000 (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade A & B	Bond Coat SS1222 (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade B	Bond Coat SS1222 (Deco System)
MIL-PRF-24613A (SH) Deok Covering Materials, Interior, Cosmetic Polymer	MIL-PRF-24613A Type V, Class 2, Grade A & B	Bond Coat SS1222 (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade A & B	Ultra Lightweight Terrazzo SS1290FCT (Terrazzo System)
	MIL-PRF-24613A Type V, Class 2, Grade A & B	Ultra Lightweight Terrazzo SS1290FCT (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade B	Ultra Lightweight Underlayment SS1290FC (Deco System)
	MIL-PRF-24613A Type I, Class 2, Grade A & B	Super Underlayment Sealer SS1259 (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade B	Super Underlayment Sealer SS1259 (Deco System)
	MIL-PRF-24613A Type V, Class 2, Grade A & B	Super Underlayment Sealer SS1259 (Terrazzo System)
	MIL-PRF-24613A Type I, Class 2, Grade B	IMO Epoxy SS5000 (Deco System)
	MIL-PRF-24613A Type I, Class 2, Grade A & B	IMO Epoxy SS5000 (Terrazzo System)
	MIL-PRF-24613A Type V, Class 2, Grade A & B	IMO Epoxy SS5000 (Terrazzo System)
MIL-PRF-3135H Deck Covering Underlay Materials	MIL-PRF-3135H Type III, Class 2, Grade A	Bond Coat SS1222 (Deco System)
	MIL-PRF-3135H Type I, II, III, Class 2, Grade B	Bond Coat SS1222 (Deco System)
	MIL-PRF-3135H Type I, II, Class 2, Grade B	Bond Coat SS1222 (Terrazzo System)
	MIL-PRF-3135H Type I, II, Class 2, Grade B	Ultra Lightweight Terrazzo SS1290FCT (Terrazzo System)
	MIL-PRF-3135H Type III, Class 2, Grade A	Ultra Lightweight Underlayment SS1290FC (Deco System)
	MIL-PRF-3135H Type I, II, III, Class 2, Grade B	Ultra Lightweight Underlayment SS1290FC (Deco System)
	MIL-PRF-3135H Type III, Class 2, Grade A	Super Underlayment Sealer SS1259 (Deco System)
	MIL-PRF-3135H Type I, II, III, Class 2, Grade B	Super Underlayment Sealer SS1259 (Deco System)

CERTIFICATION	SPECIFICATION NUMBER	PRODUCT/SYSTEM
MIL-PRF-3135H Deck Covering Underlay Materials	MIL-PRF-3135H Type I, II, Class 2, Grade B	Super Underlayment Sealer SS1259 (Terrazzo System)
	MIL-PRF-3135H Type III, Class 2, Grade A	IMO Epoxy SS5000 (Deco System)
	MIL-PRF-3135H Type I, II, III, Class 2, Grade B	IMO Epoxy SS5000 (Deco System)
	MIL-PRF-3135H Type I, II, Class 2, Grade B	IMO Epoxy SS5000 (Terrazzo System)
	IM	0
Primary Deok Coverings	164.106/43/0	1.5 IMO Underlayment SS1295
	164.106/40/0	Ultra Lightweight Terrazzo SS1290FCT
	164.106/39/0	Ultra Lightweight Underlayment SS1290FC
	164.106/59/0	Super Underlayment Sealer SS1259
	164.106/44/0	Flex IMO SS1285
	164.106/58/0	Water Base Polyurethane Matte SS2450F
	164.106/57/0	Polyaspartic High Solids Coating SS3950
	164.117/41/0	1.5 IMO Underlayment SS1295
	164.117/63/0	NuFlex Epoxy SS1286
	164.117/59/0	Super Underlayment Sealer SS1259
	164.117/47/0	Underlayment Sealer SS1257
Floor Finishes	164.117/46/0	IMO Epoxy SS5000
	164.117/42/0	Flex IMO SS1285
	164.117/64/0	Navy Epoxy SS5300
	164.117/58/0	Water Base Polyurethane Matte SS2450F
	164.117/57/0	Polyaspartic High Solids Coating SS3950
	AE	ss .
Primary Deck Coverings	20-HS1937715-PDA	Ultra Lightweight Underlayment SS1290FC with Bond Coat SS1222
	19-HS1889431-PDA	Super Underlayment Sealer SS1259
	19-HS1916500-PDA	IMO Epoxy SS5000
	19-HS1910919-PDA	Water base Polyurethane Matte SS2450F
Floor Coverings	20-HS1937715-PDA	Ultra Lightweight Underlayment SS1290FC with Bond Coat SS1222
	19-HS1889431-PDA	Super Underlayment Sealer SS1259
	19-HS1916500-PDA	IMO Epoxy SS5000
	22-2250156-PDA	NuFlex Epoxy SS1286
	19-HS1916501-PDA	Flex IMO SS1285
	19-HS1910919-PDA	Water Base Polyurethane Matte SS2450F
	TRANSPOR	
	20-HS1937715-PDA	Ultra Lightweight Underlayment SS1290FC with Bond Coat SS1222
	19-HS1889431-PDA	Super Underlayment Sealer SS1259
Primary Deck Coverings	19-HS1916500-PDA	IMO Epoxy SS5000
Coverings	19-HS1910919-PDA	Water base Polyurethane Matte SS2450F
	19-HS1931753-PDA	Polyaspartic High Solids Coating SS3950
	22-2250157-PDA	Ultra Lightweight Terrazzo SS1290FCT
Floor Coverings	20-HS1937715-PDA	Ultra Lightweight Underlayment SS1290FC with Bond Coat SS1222
	19-HS1889431-PDA	Super Underlayment Sealer SS1259
	19-HS1916500-PDA	IMO Epoxy SS5000
	19-HS1916501-PDA	Flex IMO SS1285
	19-HS1910919-PDA	Water Base Polyurethane Matte SS2450F
	22-2250156-PDA	NuFlex Epoxy SS1286
	19-HS1931753-PDA	Polyaspartio High Solids Coating SS3950
	22-2250157-PDA	Ultra Lightweight Terrazzo SS1290FCT

IMO Epoxy SS5000 - Standard Color Options



Additional Systems

DecoDeck[™]
DecoCoat[™]
GalleyDeckQ[™]

Colors shown are approximate representations. Actual results will vary.

NuFlex Epoxy SS1286 - Standard Color Options



NuFlex Epoxy SS1286 - Special and Custom Colors



Additional Systems

- GalleyDeckQ™
- NuFlexDeckM™
- NuFlexCoatM™

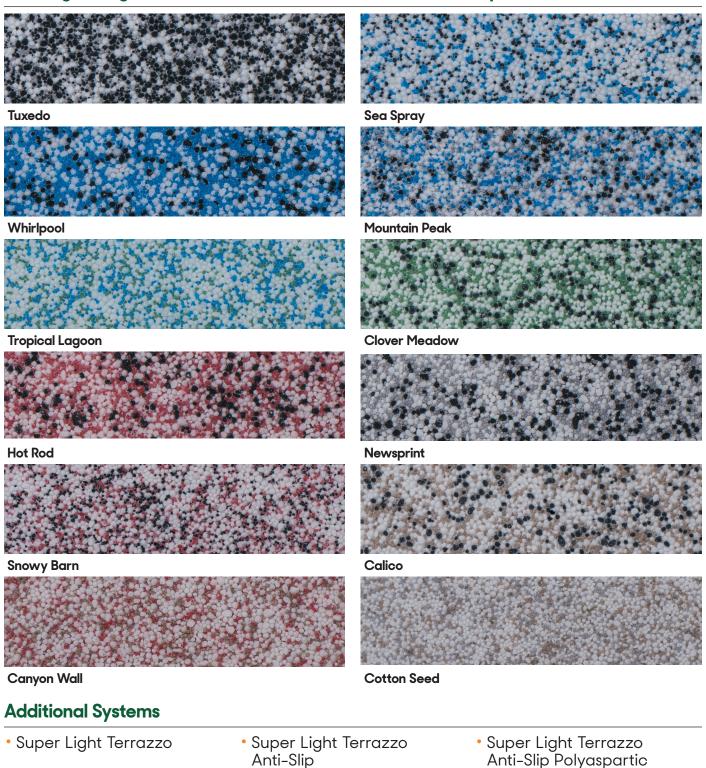
NuFlexDeck™

NuFlexCoat™

FlexDeckLW™

Colors shown are approximate representations. Actual results will vary.

Ultra Lightweight Terrazzo SS1290FCT - Standard Color Options



Colors shown are approximate representations. Actual results will vary.

Epoxy Combo Grout SS1241 - Standard Color Options



Additional Systems

RediDeck™ with Marine Deck Coverings

${\bf Colors\ shown\ are\ approximate\ representations.\ Actual\ results\ will\ vary.}$

Global Headquarters

Quaker Houghton 901 E. Hector Street Conshohocken, PA 19428-2380 U.S.A. +1.610.832.4000 **EPMAR Headquarters**

9930 Painter Ave Whittier, CA 90605-3254 U.S.A. +1 562.946.8781

syndeckmarine.com

