# STARFON™

PRODUCT DATA SHEET

**Trade Name**

Starfon™ Monotone Range

**Manufacturer**

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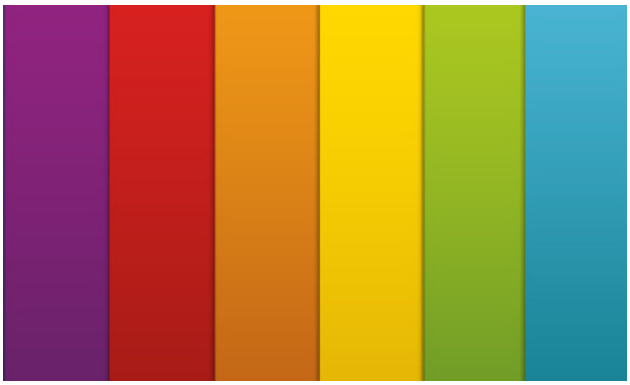
## Summary

Color is the most important element in the design world. The choice of color is a subjective one,based on emotions, memories and associations. Our color charts are intended to give a taste of the vast range that is available in each particular color and the variety can be drawn out for inspiration.

## Detailed Description

**Starfon™ Montone Range**

Color is the most important element in the design world. It is also the most malleable, the most exciting, the most immediately noticeable and the least expensive element in decorating. Designers and architects can use different combinations of colors to alter emotional levels. Different color can make the same room with welcoming or impersonal feelings, warm or cool feelings, restful or stimulating effects and harmonious or jarring effects. Starfon™ monotone range is launched to help them meet their requirements.



The choice of color is a subjective one, mainly based on emotions, memories and associations. Our color charts are intended to give a taste of the vast range that is available in each particular color and the variety can be drawn out for inspiration. Designers and architects can use these colors to turn everything, even the unsightly, into a visual pleasure. In addition, they can show how color works magic too, by visually stretching or shrinking space and raising or lowering ceiling. For instance, using pale monotone color as ceiling can increase the sense of space.

In certain situations, color also has symbolic connotations as well as psychological significance, although the symbolism varies according to the country in question. For white color, it stands for purity at wedding in western countries while widowhood at India. The following table summarizes the general symbolic connotations of colors.

| **Colors** | **Interpretations** |
|---|---|
| Black | Color of power, authority, elegance, formality and mystery |
| Blue | Color of stability, wisdom, loyalty, confidence and intelligence |
| Red | Color of excitement, energy, passion, love, desire and courageous |
| Yellow | Color of sunshine, joy, happiness, optimism and idealism |
| Orange | Color of enthusiasm, fascination and creativity |
| Green | Color of nature, ecology, fertility and safety |
| Brown | Color of home and reliability |
| Grey | Color of modesty, maturity, conservative, sadness, and boring |
| White | Color of purity, birth, simplicity and cleanliness |
| Gold | Color of strength, wealth and grandeur |
| Purple | Color of nobility, luxury and ambition |

## Technical Data

Below is the list of standard for the substrate.

**BS EN 12467:2004**
Dimension Variations
Density
Bending Strength
Water Impermeability
Water Permeability
Warm Water
Soak-dry
Freeze-thaw
Heat Rain
Reaction to Fire
Release of Dangerous Substance

**ASTM C1185-08**
Flexural Strength (Section 5)
Density (Section 6)
Dimension and Tolerances (Section 7)
Moisture Movement (Section 8)
Water Absorption (Section 9)
Moisture Content (Section 10)

Refer to the following standards for the coating tests on **Starfon™ Board**.

BS 3900: Part E6: 1992 Cross-cut Test of Paints
ASTM D 3363 – 05 Determination of Film Hardness by Pencil Test
BS EN ISO 2813: 2000 Determination of Specular Gloss of Paints
BS EN ISO 11507:2007 & BS3900-F16:2007 Accelerated Weathering Test of Paints
JIS K 5400-1900 clause 8.19 Water Resistance Test of Paint
JIS K 5400-1900 clause 8.22 Acid Resistance Test of Paints
JIS K 5400-1900 clause 8.21 Alkali Resistance Test of Paints
BS EN ISO 4628-2:2003 & BS 3900-H2: 2003 Examination of Degree of Blistering of Paint Film
BS EN ISO 4628-4:2003 & BS 3900-H4:2003 Examination of Degree of Cracking of Paint Film
BS EN ISO 4628-7:2003 & BS 3900-H7:2003 Examination of Degree of Chalking by Velvet Method of Paint Film
BS EN ISO 4628-5: 2003 & BS 3900-H5: 2003 Examination of Degree of Flaking of Paint Film
ASTM D2486 – 96 Determination of Scrub Resistance of Paints
ASTM D4060-10 Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM C1028-07 Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

## Physical and Mechanical Properties

Starfon™ is a composite of high strength cement reinforced with hardwood fiber and PVA fiber. The substrate is compliance with ASTM and BS EN standard. The montone panels are protected by colorless coating to ensure proper aging characteristics. In addition, it is precision ground to ensure optimum product size and color. Throughout the manufacturing process, our products are subjected to strict inspections and testing to guarantee its high level of quality.

| | |
|---|---|
| Category | Floor/Wall |
| Product Code: | SF-01 (P) |
| Density: | 1850 -1890kg/$m^3$ |
| Length: | 300-2400mm |
| Dimension: | 300-2400mm |
| Thickness: | 12-25mm |
| Gloss | High Gloss/ Matt |
| Finish | Anti-scratch top coat |

Testing Results of Substrate BS EN 12467:2004

| **Standard** | **Results** |
|---|---|
| Dimension Variations | Within the tolerances |
| Density | 1.85 g/$cm^3$ |
| Bending Strength | 18MPa [ Class 4 ] |
| Water Impermeability | No visual formation |
| Warm Water | $R_L$ = 0.86 |
| Soak-Dry | $R_L$ = 0.86 |
| Freeze-thaw | Complied |
| Heat Rain | -No visual cracks , delamination, warping, bowing or other defects<br>- No visual formation |
| Reaction to fire | A1 |
| Release of dangerous substance | SVHC ≤ 0.1 % |

Testing Results of Substrate ASTM C1185-08

| **Standard** | **Results** |
|---|---|
| Flexural Strength (Section 5) | 24.5MPa [Grade IV] |
| Density (Section 6) | 1.89g/$cm^2$ |
| Dimension and Tolerances (Section 7) | Within the tolerances |
| Moisture Movement (Section 8) | 0% |
| Water Absorption (Section 9) | 0.2% |
| Moisture Content (Section 10) | 0.77% |
| Water Tightness (Section 11) | No visual formation of water droplets |
| Warm Water Resistance (Section 13) | No visual cracks or structural alternation |
| Heat Rain Resistance (Section 14) | No visual cracks or structural alternation and frame assembly |

Testing Results of Coating on **Starfon™ Board**

| **Standard** | **Results** |
|---|---|
| Cross-cut Test of Paints | ≤ 15% |
| Film Hardness (1B – 6H) | >6H |
| Specular Gloss | GU($60^o$) = 78.4 |
| Accelerated Weathering Test of Paints | No cracking or blistering of paint |
| Water Resistance Test of Paints | No observable change |
| Acid Resistance Test of Paints | No observable change |
| Alkali Resistance Test of Paints | No observable change |
| Examination of Degree of Blistering of Paint Film | Degree of Blistering 3(S2) |
| Examination of Degree of Cracking of Paint Film | Degree of Cracking **0 (S0)** |
| Examination of Degree of Chalking by Velvet Method of Paint Film | Degree of Chalking **0** |
| Examination of Degree of Flaking of Paint Film | Degree of Flaking **0 (S0)** |
| Determination of Scrub Resistance of Paints | No defects after 1500 cycles |
| Abrasion Resistance of Organic Coatings by the Taber Abraser | No observable changes after 1000 cycles |
| The Determination of The Static Coefficient of Friction for Ceramic Tiles and Other Flooring Surfaces | Dry Condition: 0.86<br>Wet Condition: 0.81 |

## Classification and Approval

In accordance to BS EN 12467:2004, ASTM C1185-08 and all coating tests, our products prove that they have good mechanical properties, good durability, resistance to fire, chemical and dangerous substance.

**Mechanical Properties:**

Conducting flexural/bending test is to ensure the integrity and safety of our products. In addition, our products scores at highest in the film hardness by pencil test. Scratch hardness is used for measuring how resistant of our products are to fracture due to friction from different sharpness of pencils. Except scratch, scrub and abrasion are another important undesirable effect for normal use. Scrub test and abrasive test are respectively used to examine any properties that affect the stain resistance of coatings and measure the wear resistance of a material from sliding contact. After the tests, there are no defects and changes on coating surface.

**Resistance to Chemical and Dangerous Substances:**

Our products are controlled and pose no threat to human life and the environment.

**Resistance to Fire:**

Testing the fire resistance of a building element involves determining its behavior when exposed to a particular temperature. Starfon™ is classified as “A1” in accordance to the European Standard EN 13501-1. A1 is the highest classification that it is non-combustible material. Starfon™ will not contribute in any stage of the fire including the fully developed fire.

**Durability Test:**

Our products scores at highest in the cross-cut test, best rated in degree of blistering, cracking and flaking examination and proven be to water, acid, alkaline and corrosion resistance without visual changes before and after tests. After exposed to UV light for 500 hours, mean values of specular gloss reading was 19. It retains average of 99% of gloss.

Accelerated weather test uses aggravated conditions of heat, oxygen, sunlight and condensation in order to speed up the normal aging processes of our products. This test is used to help determine the long term effects of expected levels of color and outcomes within a shorter period.

In addition, our products are put into environmental chambers, such as conducting heat-rain, soak-dry and freeze-thaw tests. These tests are mainly demonstrated the extreme weather at outdoor environment. After conducting these cycling tests, flexural test is carried out for further analysis. It results in ensuring the products still have good mechanical properties even putting at extreme weathering in a period of times.

## Delivery, Storage and Handling

Although the Starfon™ boards are impact resistance, handle with care is highly recommended. Do not apply excessive weight on the top or impact force to the side of packing. If any damaged on the packaging is spotted, inspect immediately and further contact our sales representative.

The Starfon™ boards shall be protected from direct hail, tornado and job site damage. It also recommended keep the wrapping on and store in a clean and dry environment until installation.

## Preparatory Work

**Site conditions:**

Review the site conditions before installation. Any unsatisfactory conditions must be correct prior to installation, such as no hidden electrical wires and no gas/electric pipelines.

Field measurements are to be taken to verify the images and dimensions.

**Substrates:**

The wall structure must sufficient to handle the Starfon™ boards and supporting structure's weight and thick enough for their expanding bolts. The wall should be flat and no moisture/debris trap between substrates and supporting structure.

## Installation

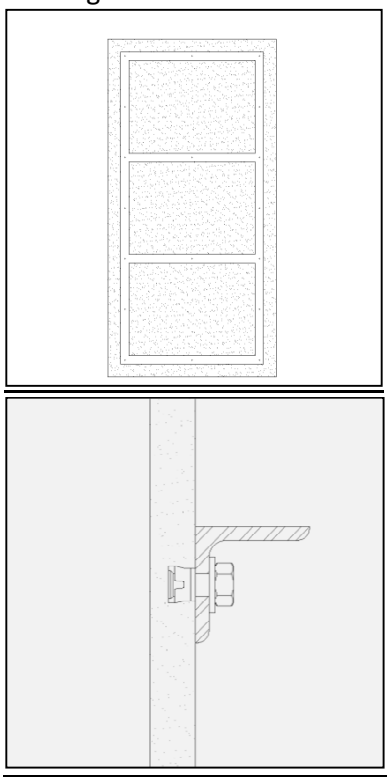
**Starfon™ Substrate**

**A. Wet Fix – Contact Adhesive Method**

- A continuous 4-5mm diameter "zig-zag" bead of Liquid Nails™ is applied along the length of the framing member.
- -Surfaces are immediately pressed together to ensure adequate "wetting out" or spreading of the adhesive.
- The two surfaces are then pulled apart and held apart for 2-5 minutes to allow the adhesive to become tacky.
- The joint will continue to gain strength for a further 2-3 days and must not be stressed until after this time.

**B. Dry Fix – Undercut Anchor**

- Drill hole on the rear face of Starfon™ for undercut anchor by drilling machine
- Undercut anchor is inserted into the hole
- Place and align the backing frame onto Starfon™
- Starfon™ is fixed onto the backing frame by tightening the undercut anchor to a positive fit using a screw



**Glass Substrate**

**A. Glazing Method for Alum. Window**

- All the glass will be checked to ensure no damage prior to installation.
- Make sure the window is in close position and locked.
- Take off aluminum glazing bead and place the cut size glass into the window, then clip-in back the glazing bead.
- Using rubber setting blocks and distance pieces to adjust the glass in right position and point the perimeter of glass with the approved glazing sealant.
- Leave the window un-touch after glazed for at least 8 hours to let skin dry.

**B. Glazing Method for Curtain Wall (Stick System)**

- Clean the surface of the aluminum members and make sure it is free of dirt and grease.
- Place the cut size glass panes onto position by double side adhesion tape.
- Fix the pressure bar into position.
- Ensure no contact is found between the aluminum members and the glass panes.
- Place the gasket properly to position along the perimeter of glass.
- Install the aluminum capping into position.

**C. Installation of Door Sash and Glazing**

- After the completion of the wet trades of the builder, coordinate with the builder the installation of the sliding door sash.
- Clean and remove all the dirt and debris inside the door tracks.
- Put the sliding door sash into position and check the smoothness of the operation of the sliding door.
- Take off aluminum glazing beads and place the cut size glass pane on the setting block.
- Using setting block to adjust the glass pane in right position.
- Ensure no contact is found between the aluminum frame and the glass pane. Then clip-in back the glazing bead.
- Place the gasket properly in position along the perimeter of glass.

## Applications

Starfon™ Monotone Range applications:



## Samples Available

Samples can be requested by e-mail to either your local Starfon™ representative.