

*Floor Grain*TM

Medium SHP4080-1

**Non-Slip & Anti-Noise
Polymer Powder Additive
for Structural Floor Paints & Coatings**

Extended Coating Life, Simple Process, Low Cost

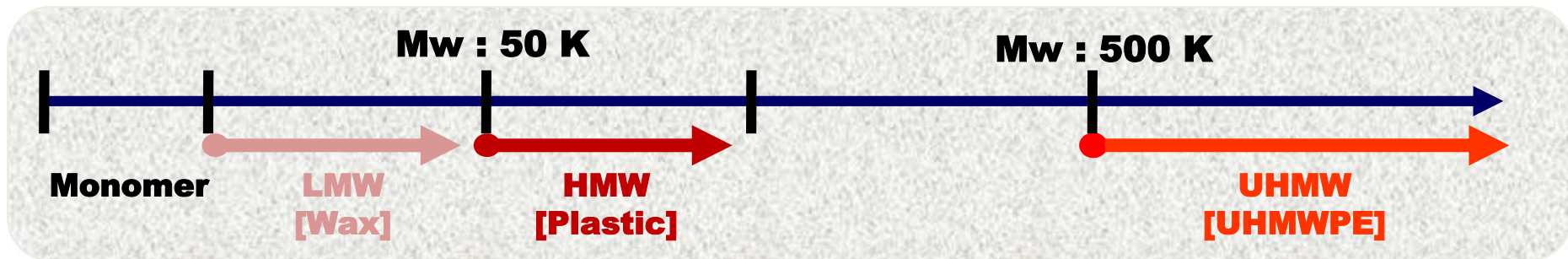


TWO H Chem Ltd.

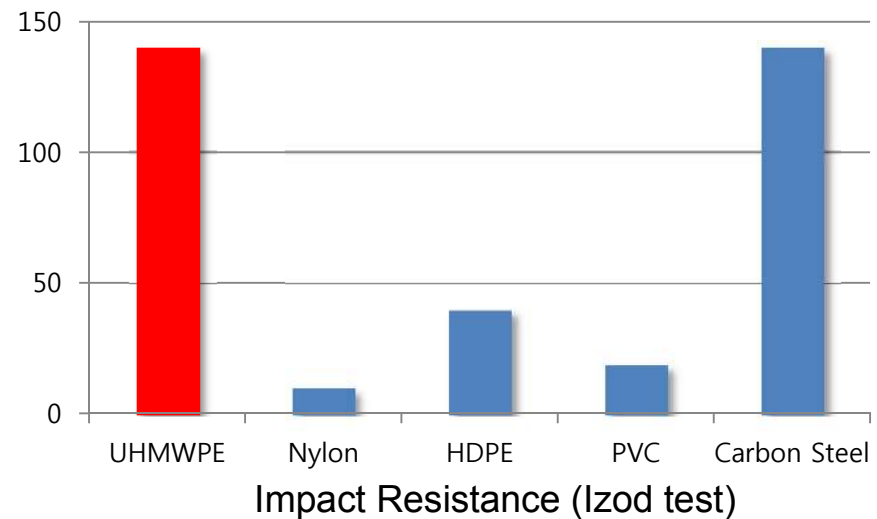
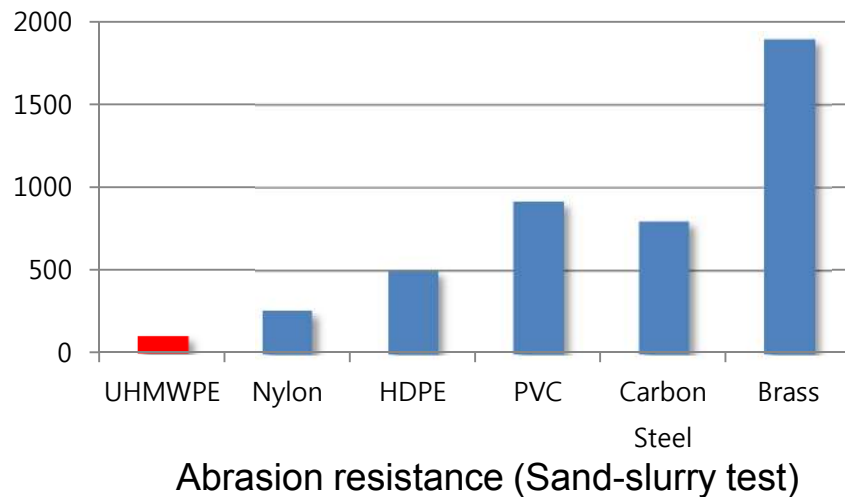
Why UHMWPE?

Floor Grain™ Medium
SHP4080-1

Molecular weight range



**UHMWPE has highest performances
in mechanical strength and chemical resistance**

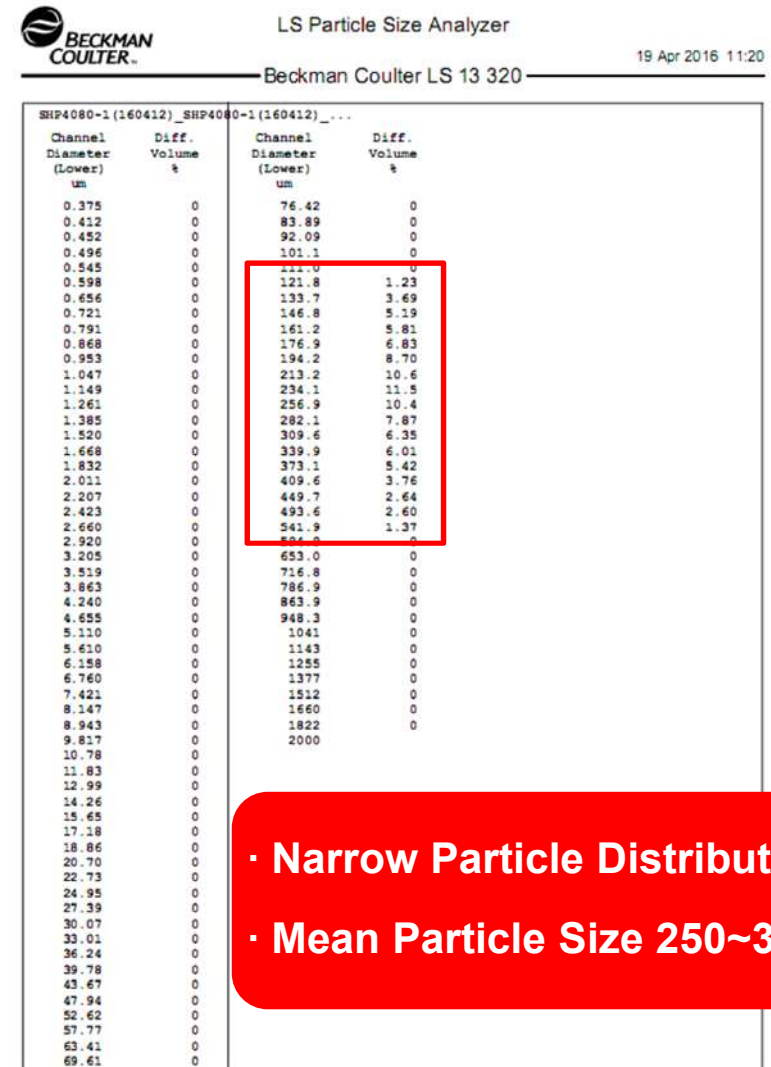
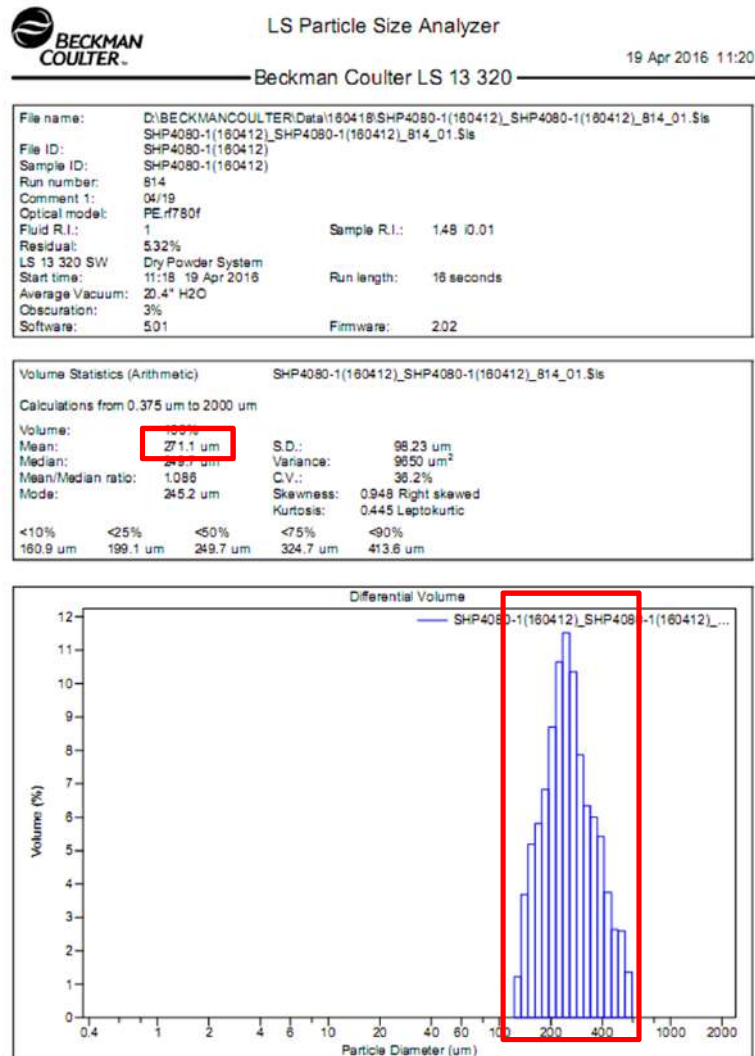


● **UHMWPE : Ultra High Molecular Weight Polyethylene**

Particle Size

Floor Grain™ Medium
SHP4080-1

Highly uniformed particle size



• **Narrow Particle Distribution**
 • **Mean Particle Size 250~300 μm**

Very safe & harmless material



Test Report No. F690101/LF-CTSAYAA16-24204R1

Issued Date : 2016. 04. 22

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Sample No. : AYAA16-24204R1.001
 Sample Description : SHP4080-1
 Item No./Part No. : N/A
 Materials : Plastic powder

Heavy Metals

| Test Items | Unit | Test Method | MDL | Results |
|-----------------------------|-------|---|-----|---------|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321-6:2013 (Determination of Cadmium by ICP-OES) | 0.4 | N.D. |
| Lead (Pb) | mg/kg | With reference to IEC 62321-6:2013 (Determination of Lead by ICP-OES) | 5 | N.D. |
| Mercury (Hg) | mg/kg | With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES) | 2 | N.D. |
| Hexavalent Chromium (Cr VI) | mg/kg | With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis) | 1 | N.D. |

Flame Retardants-PBBs/PBDEs

| Test Items | Unit | Test Method | MDL | Results |
|--------------------------|-------|---|-----|---------|
| Monobromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |

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F401 Version2

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Test Report No. F690101/LF-CTSAYAA16-24204R1

Issued Date : 2016. 04. 22

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Sample No. : AYAA16-24204R1.001
 Sample Description : SHP4080-1
 Item No./Part No. : N/A
 Materials : Plastic powder

Flame Retardants-PBBs/PBDEs

| Test Items | Unit | Test Method | MDL | Results |
|--------------------------|-------|---|-----|---------|
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |

NOTE: (1) N.D. = Not detected, (<MDL)
 (2) mg/kg = ppm
 (3) MDL = Method Detection Limit
 (4) - = No regulation
 (5) Negative = Undetectable / Positive = Detectable
 (6) ** = Qualitative analysis (No Unit)
 (7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI.
 b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating.
 c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination.

in accordance with EU RoHS regulation

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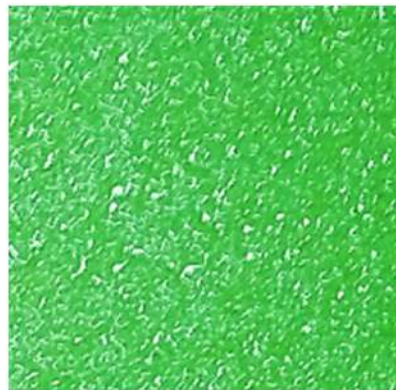
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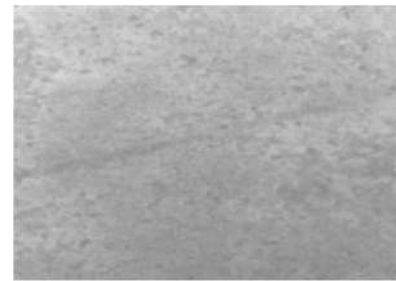
Semi-transparent clear white that can be used in all paint colors



with Color Epoxy and Urethane

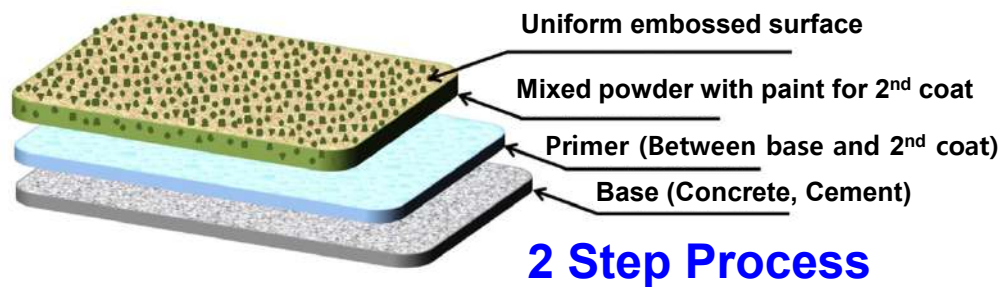


with Transparent Epoxy and Urethane

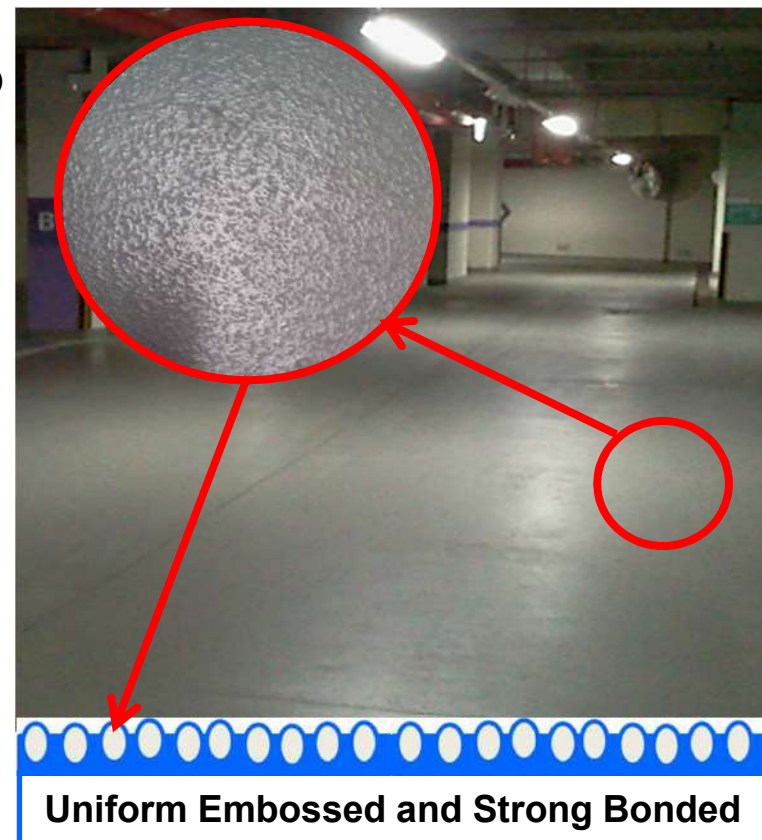


Substrate colors

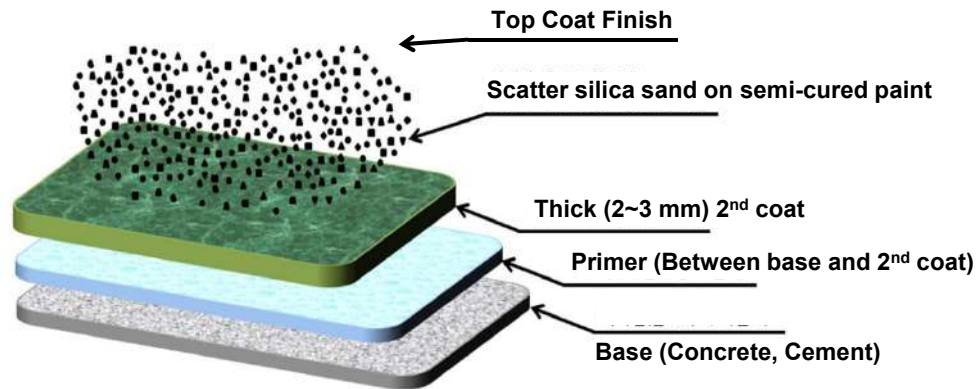
Non-Slip Powder Non-slip Coating Process



- 2. 2nd Coat with Powder Mixed **“2 Layers Coat”**
- 1. Primer Coat (Top clear coat can be applied optionally)



Silica Sand Non-Slip Coating Process



5 Step Process

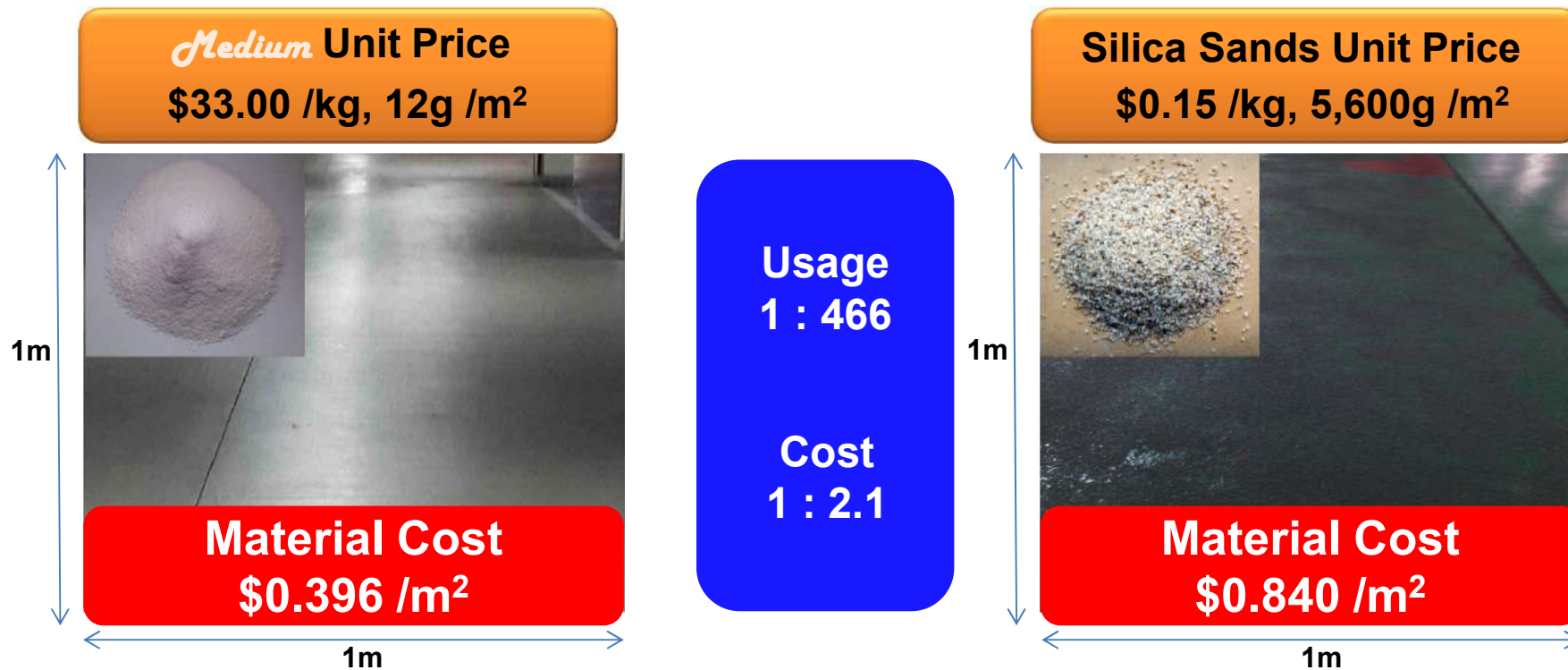
1. Primer Coat
2. 2~3mm 2nd Coat
3. Scatter Silica Sands manually
4. Remove Non-bonded Silica Sand
5. Top Coat (Inevitable)



Materials cost

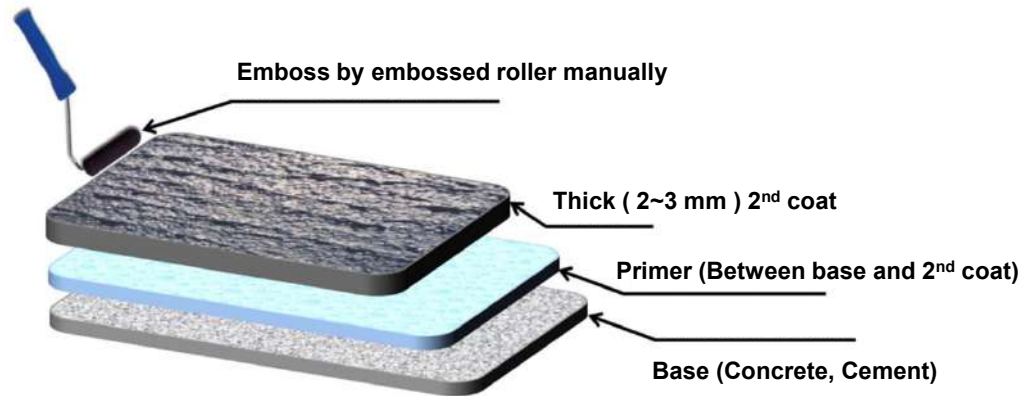
*FloorGrain*TM *Medium*
SHP4080-1

*FloorGrain*TM *Medium* is **53% Less Costly than Silica Sand**



*FloorGrain*TM *Medium* vs Silica Sand
Comparative Cost of Materials

Embossing Roller Non-Slip Coating Process



3 Step Process

Embossed Embossing Roller



3. Emboss by Embossed Roller Manually
2. 2~3mm 2nd Coat
1. Primer Coat



Large and Non-Uniform Embossed

Cost Comparison

FloorGrain™ Medium
SHP4080-1

Comparative Cost of Non-Slip Floor Coatings

| \$/m ² | | Silica-Sand on Epoxy Lining | <i>FloorGrain™ Medium</i> Coating on Epoxy Lining | Epoxy Coating on Primer Coating | <i>FloorGrain™ Medium</i> Coating on Primer Coating |
|---|---------------------------------------|--------------------------------|---|------------------------------------|---|
| Material Cost \$/ m ² | Epoxy Primer Coat | \$0.60 | \$0.60 | \$0.60 | \$0.60 |
| | Middle Coat (Top Coat) | \$6.40 (2.0 mm) | \$6.40 (2.0 mm) | \$0.96 (0.3 mm) | \$0.96 (0.3 mm) |
| | Finish Coat (Top Coat) | \$0.32 (0.1 mm) | \$0.32 (0.1 mm) | - | - |
| | Paint Thinner | \$0.04 | \$0.04 | \$0.04 | \$0.04 |
| | Silica Sand | \$0.84 | - | - | - |
| | <i>FloorGrain™</i> Non-Slip Powder | - | \$0.396★ | - | \$0.396★ |
| Materials Cost Sum per m² | | \$8.20 | \$7.756 | \$1.60 | \$1.996 |
| Labor Cost per m ² (Coat 1,000m ² Basis) | | \$5.00 | \$4.00 | \$2.00 | \$2.00 |
| Total Coating Cost | | \$13.20 | \$11.756 | \$3.60 | \$3.996 |
| Comparative Cost Percentage | | 100% | 89.1% | 27.3% | 30.3% |

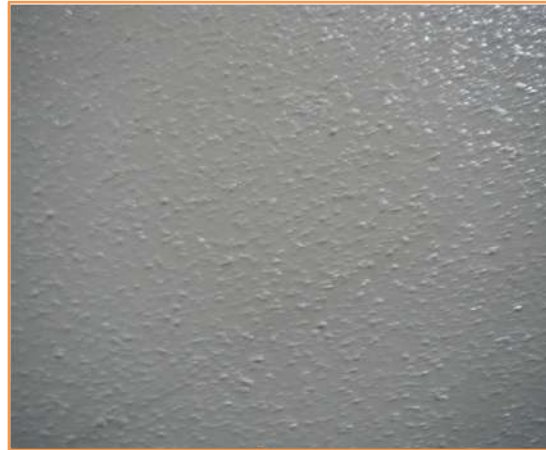
The above data are average values and are not to be construed as standards.

★ Add 5% Basis
FloorGrain™ Medium : \$33.00/kg

Reference I

*FloorGrain*TM *Medium*
SHP4080-1

Non-slip Coating with *FloorGrain*TM *Medium* in Parking Garage



Reference II

*FloorGrain*TM *Medium*
SHP4080-1

Non-Slip *FloorGrain*TM *Medium* coating on all floors and stairs in university swimming pool arena



Reference III

FloorGrain™ *Medium*
SHP4080-1



**Non-slip *FloorGrain™* *Medium*
Coating in 5 Floor Parking
Structure - 40,000m²**



Grades, Adding Ratio & Additional Clear Top Coat

| Grade | Mean Particle Size Range | Application Examples | Adding Ratio into Paint/Coating (main + hardner) | Clear Top Coat |
|--|--------------------------|--|--|----------------|
| <i>Fine</i> SHP8015-1 | 120~170 μ m | Bathroom Floor, Direct contact to bare foot or skin | 4~8 wt% | not necessary |
| <i>Medium</i> SHP4080-1 | 250~300 μ m | Parking lot, Side Walk | 4~8 wt% | not necessary |
| <i>Large</i> SHP1530-2 | 390~490 μ m | Oily Wetting floor | 7~9 wt% | recommend |
| <i>Extra Large</i> SHP1530-1 | 530~630 μ m | Heavy Oily Wetting floor & Deck | 9~11 wt% | recommend |

★The guide above is just a guideline. Users can easily find their own applications by simple test and experiences.

★ Particles may agglomerate when using FloorGrain or any other anti-slip particle with fast drying paints or rapid curing coatings. When using fast curing paints/coatings, a standard top coat containing FloorGrain with standard cure times is recommended.

Patents & Awards

Floor Grain™ Medium
SHP4080-1



**Korea Patent
No. 10-1438023
N0n-Slip Flooring
Material and Method
for Manufacturing
the Same**



**Korea Patent
No. 10-1439076
Method for
Constructing Floor
Using Non-Slip
Flooring Material**



**Silver Prize in Hyundai E&C Tech Contest
2013**



**Grand Prize in Korean Patent Contest
2014**

Contact us

*FloorGrain*TM *Medium*
SHP4080-1

*FloorGrain*TM

Non-slip, Anti-noise, Extended Coating Life, Simple Process, Low Cost

Videos on You Tube

Non-slip Coating Process with *FloorGrain*TM <https://youtu.be/9edqTGDC758>

Anti-noise Effect of *FloorGrain*TM <https://youtu.be/AIORfs0PX40>

TWO H Chem for **High** Quality and **High** Customer Satisfaction

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