

## Coating Stabilizers

Long-lasting protection against  
degradation caused by light and heat

Used in a wide number of industries, coatings provide countless items with color and texture, enhancing their appearance and allowing wide scope for design.

In order to counter the harmful effects of light and heat on coatings, adhesives and sealants, SONGWON offers a comprehensive range of high-value, high-performance stabilizers for numerous materials, including metals, wood, ceramics, special composites, plastic films and plastic parts used in the inks, automotive and transportation, decorative and architectural, furniture and flooring, building and construction, industrial and agricultural industries among others.

It's all about **the chemistry®**

 **SONGWON**

# SONGWON offers a broad range of coating stabilizers

## Antioxidants (AOs)

AOs prevent thermally induced degradation of polymers in coatings, adhesives and inks during high-temperature processing, curing and stoving as well as in end use.

Under the brand name SONGNOX® CS, SONGWON offers a wide and diversified portfolio of AOs, ranging from primary (sterically hindered) phenolic products to secondary thioether and phosphites.

SONGNOX® CS 1010 and SONGNOX® CS 1076, the most commonly used primary AOs, guard against thermal degradation over a broad range of temperatures in numerous different coatings, plastics, adhesives and sealants applications.

Primary AOs based on arylamines, such as SONGNOX® CS 5057, react more readily with oxygen-centered radicals than hindered phenols. In combination, they have a synergistic effect, thereby providing exceptionally high protection against discoloration in polyurethane systems.

For applications that call for heat stabilization during mixing, extrusion or curing, and for paints that are cured or stoved at high temperatures, as required for powder and coil coatings for example, SONGNOX® CS 6260, SONGNOX® CS 1680 and SONGNOX® CS PQ phosphite AOs are the products of choice.

In addition to phosphites, SONGWON offers a range of thioether that act as secondary AOs in combination with SONGNOX® CS hindered phenol primary antioxidants. Thioether are label-free and available in forms with different melt characteristics, such as liquid (SONGNOX® CS DTDTP) or solid (SONGNOX® CS DSTDP and SONGNOX® CS DLTDP).

SONGWON secondary AOs exhibit synergistic effects with primary AOs. SONGWON offers blends of primary and secondary AOs, as well as many other individual products that can be mixed in different ratios, depending on requirements.

AOs are non-regenerative: both primary and secondary types are consumed during the reaction and left ineffective afterwards. For longer-term effects, the use of certain HALS is preferred, due to the cyclic nature of their reaction.

For further information on synergistic combinations of AO's, please consult our technical leaflet on SONGWON smart solutions, SONGNOX® and SONGSORB® CS B blends

## UV Absorbers (UVAs)

UVAs prevent the degradation of coating systems by converting the absorbed light into heat. There are several well-known chemical classes of UVA broadly used in coatings, adhesives and sealants: 2-hydroxyphenylbenzophenone or BP type (for example SONGSORB® CS 81), 2-(2-hydroxyphenyl)-benzotriazole or BTZ type (for example SONGSORB® CS 1130 and SONGSORB® CS 171), and 2-hydroxyphenyl-triazine or HPT type (for example SONGSORB® CS 400). SONGWON's range also includes an oxanilide-type UVA, SONGSORB® CS 312, which is suitable for solvent-borne and powder coatings.

Every UVA has its own specific photo-physical primary and secondary properties. Filter efficiency, for example, varies, depending on the product's extinction coefficient, chemical class and molecular weight. The filter effect of a coating, expressed as absorbance A, is influenced by film thickness and UVA concentration. The thinner the coating, the higher the amount of UVA required. Another important criterion for selection of the right UVA for the final application is its photo-permanence, which is basically a measure of the resistance of the UVA to degradation. Products vary in their tendency to chemical loss and migration out of the coating matrix. Typically, BP types such as SONGSORB® CS 81 can be used in applications with moderate requirements in terms of long-term stability, while for applications requiring medium to higher long-term stability, BTZ types, such as SONGSORB® CS 171, are needed.



SONGWON also offers UV absorbers that can help to minimize yellowing in sensitive systems such as epoxy-based coatings. SONGSORB® CS UV 1, for example, can reduce discoloration caused by UV light in epoxy-based systems.

For superior and outstanding performance, the use of triazine-type UVAs such as SONGSORB® CS 400, SONGSORB® CS 1164 or SONGSORB® CS 1577 is highly recommended.

To cater for customer-specific filtering needs, SONGWON offers a broad range of UVAs that can be used alone or in combination with other products such as SONGSORB® CS HALS or SONGNOX® CS AOs.

The synergistic effect of UVAs and HALS is particularly beneficial for outdoor conditions, where UVAs alone cannot efficiently provide adequate protection, being unable to prevent discoloration and other detrimental effects on coatings.

For further information on synergistic combinations of UVAs and HALS, please consult our technical leaflet on SONGWON smart solutions, SONGNOX® and SONGSORB® CS B blends.

## Hindered Amine Light Stabilizers (HALS)

HALS are radical scavengers that trap radicals formed in the coating or sealant layer during exposure to light. Since this mechanism is independent of film thickness, HALS are particularly suitable for the surface of a product, where UVAs offer less protection. In addition, HALS provide protection against surface defects such as cracking and water permeability. SONGWON offers liquid difunctional HALS such as SONGSORB® CS 292, one of the most frequently used products on the market, and SONGSORB® CS 5100, which is non-interacting and has lower basicity.

Special-feature HALS such as SONGSORB® CS 144 and SONGSORB® CS 119 have triboelectric charging properties and are the products of choice for powder coatings.

The cyclic nature of the stabilization mechanism of HALS means that they typically show higher and longer-term protection than other stabilizers. While HALS are usually not effective in preventing thermal degradation (for which SONGWON antioxidants are the products of choice), they are powerful light stabilizers and thanks to their regenerative nature they function over much longer time scales.



Oligofunctional HALS, however, such as SONGSORB® CS 622 can also effectively act as long-term heat stabilizers under moderate thermal exposure.

For the fast-growing waterborne coatings market, we recommend the use of SONGSORB® CS AQ01, a unique, fully water-compatible HALS that can be used for environmentally friendly and zero-VOC applications.

### Further information



- For more details of our comprehensive product range, please consult our technical leaflets on blends and water-based products.
- See also our adhesives & sealants application matrix.

# Product range selection guide

|                     |                   | Automotive | Inks | Industrial | Wood | Construction | Solventborne | Waterborne | UV curing | Powder |
|---------------------|-------------------|------------|------|------------|------|--------------|--------------|------------|-----------|--------|
| <b>Antioxidants</b> | SONGNOX® CS 1010  | ■          |      | ■          |      | ■            | ■            |            |           |        |
|                     | SONGNOX® CS 1076  | ■          |      | ■          |      | ■            | ■            |            |           |        |
|                     | SONGNOX® CS 2450  | ■          |      | ■          |      | ■            | ■            |            |           |        |
|                     | SONGNOX® CS 1035  |            |      | ■          |      |              | ■            |            |           |        |
|                     | SONGNOX® CS 1135  | ■          |      | ■          |      |              | ■            |            |           |        |
|                     | SONGNOX® CS 565   | ■          |      | ■          | ■    |              | ■            |            |           |        |
|                     | SONGNOX® CS 3114  | ■          |      | ■          |      |              | ■            |            |           | ■      |
|                     | SONGNOX® CS 1330  |            |      | ■          |      |              | ■            |            |           |        |
|                     | SONGNOX® CS 1024  | ■          |      | ■          |      |              | ■            |            |           |        |
|                     | SONGNOX® CS 1680  | ■          |      | ■          |      |              | ■            |            |           | ■      |
|                     | SONGNOX® CS 6260  | ■          |      | ■          |      |              | ■            |            |           | ■      |
|                     | SONGNOX® CS PQ    | ■          |      | ■          |      | ■            | ■            |            |           | ■      |
|                     | SONGNOX® CS DTDTP | ■          |      | ■          |      |              | ■            |            |           |        |
|                     | SONGNOX® CS DLTDP | ■          |      | ■          |      |              | ■            |            |           | ■      |
|                     | SONGNOX® CS DSTDP | ■          |      | ■          |      |              | ■            |            |           | ■      |
|                     | SONGNOX® CS 5057  |            |      |            |      |              | ■            |            |           |        |

Please ask the expert about additional antioxidants and blends.

## UV Absorbers (UVAs)

|                    |   |   |   |   |   |   |   |   |  |   |
|--------------------|---|---|---|---|---|---|---|---|--|---|
| SONGSORB® CS 1130  | ■ | ■ | ■ | ■ |   | ■ | ■ |   |  |   |
| SONGSORB® CS 928   | ■ |   | ■ | ■ | ■ | ■ |   |   |  | ■ |
| SONGSORB® CS 328*  |   | ■ | ■ |   |   | ■ |   |   |  |   |
| SONGSORB® CS 326   | ■ |   | ■ | ■ | ■ | ■ | ■ |   |  |   |
| SONGSORB® CS 384-2 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |  |   |
| SONGSORB® CS 900   | ■ | ■ | ■ |   |   | ■ | ■ |   |  | ■ |
| SONGSORB® CS 1000  | ■ |   | ■ | ■ | ■ | ■ | ■ |   |  |   |
| SONGSORB® CS 171   | ■ |   | ■ | ■ |   | ■ | ■ |   |  |   |
| SONGSORB® CS 81    |   |   | ■ |   |   | ■ | ■ |   |  |   |
| SONGSORB® CS 312   | ■ |   | ■ |   |   | ■ | ■ |   |  | ■ |
| SONGSORB® CS UV1   | ■ |   | ■ |   |   | ■ | ■ |   |  |   |
| SONGSORB® CS 3035  | ■ |   | ■ | ■ | ■ | ■ | ■ |   |  |   |
| SONGSORB® CS 3039  | ■ |   | ■ | ■ | ■ | ■ | ■ |   |  |   |
| SONGSORB® CS 1164  | ■ |   | ■ |   |   | ■ | ■ |   |  | ■ |
| SONGSORB® CS 1577  | ■ |   | ■ |   |   | ■ | ■ |   |  | ■ |
| SONGSORB® CS 400   | ■ |   | ■ | ■ | ■ | ■ | ■ | ■ |  |   |
| SONGSORB® CS 405   | ■ |   | ■ |   |   | ■ | ■ |   |  | ■ |
| SONGSORB® CS 477   | ■ |   | ■ |   |   | ■ | ■ |   |  |   |

\* Not available in Europe

## Hindered Amine Light Stabilizers (HALS)

|                   |  | Automotive | Inks | Industrial | Wood | Construction | Solventborne | Waterborne | UV curing | Powder |
|-------------------|--|------------|------|------------|------|--------------|--------------|------------|-----------|--------|
| SONGSORB® CS 292  |  | ■          | ■    | ■          | ■    | ■            | ■            |            |           |        |
| SONGSORB® CS 770  |  |            |      | ■          |      |              | ■            |            |           |        |
| SONGSORB® CS 622  |  |            |      | ■          |      |              | ■            |            |           | ■      |
| SONGSORB® CS 119  |  | ■          |      | ■          |      |              | ■            |            |           | ■      |
| SONGSORB® CS 944  |  | ■          |      | ■          |      |              | ■            |            |           | ■      |
| SONGSORB® CS 144  |  | ■          |      | ■          |      |              | ■            |            |           | ■      |
| SONGSORB® CS 5100 |  |            |      | ■          | ■    | ■            | ■            |            |           |        |
| SONGSORB® CS AQ01 |  | ■          | ■    | ■          | ■    | ■            | ■            | ■          |           |        |
| SONGSORB® CS 945  |  | ■          |      | ■          |      |              | ■            |            |           |        |

■ Recommended ■ Suitable

## Light and heat stabilization formulations guide

|                    | Antioxidants (AOs)  | UV Absorbers (UVAs)                            | Hindered Amine Light Stabilizers (HALS)  |
|--------------------|---|--|--|
| <b>Mechanism</b>   | Deactivate free radicals                                    | Convert UV into heat                           | Deactivate free radicals   |
| <b>Application</b> | Interior / Exterior   | Interior / Exterior                            | Exterior   |
| <b>Protection</b>  | Thermal oxidation   | Photo oxidation and degradation                | Photo degradation  |
| <b>Prevention</b>  | Yellowing<br>Loss of mechanical properties<br>Embrittlement | Yellowing<br>Loss of adhesion<br>Blistering    | Loss of mechanical properties<br>Surface defects<br>Pigment fading<br>Loss of water impermeability |
| <b>Field</b>       | Coatings, adhesives, sealants                               | Underneath substrate<br>Deeper material layers | Coating or sealant surface<br>Pigments for coatings  |

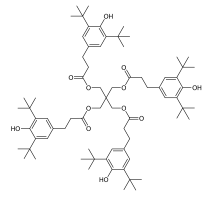
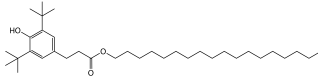
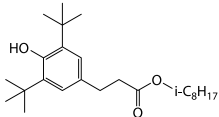
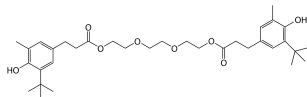
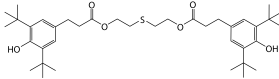
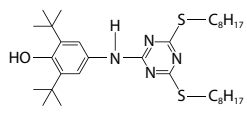
| Film Thickness | UVA     | Pigmentation     | HALS          | UVA (*)       |
|----------------|---------|------------------|---------------|---------------|
| 10 ~ 20 μm     | 8 ~ 4 % | opaque           | 1.0 % ~ 2.0 % | 0.0 % ~ 0.5 % |
| 20 ~ 40 μm     | 4 ~ 2 % | semi-transparent | 0.5 % ~ 1.5 % | 0.5 %         |
| 40 ~ 80 μm     | 2 ~ 1 % | clear            | 0.5 % ~ 1.0 % | 1.0 % ~ 1.5 % |

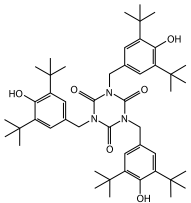
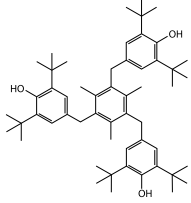
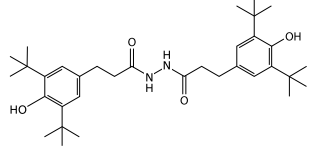
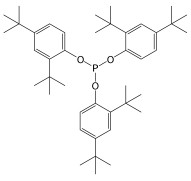
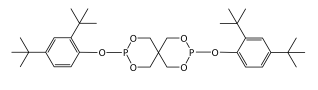
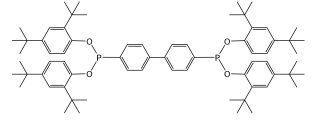
% of binder solid

(\*) % UVA based on dry film thickness of 40 μm

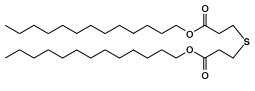
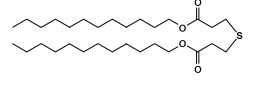
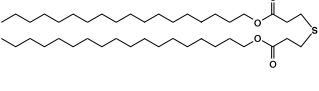
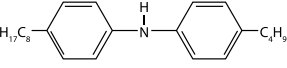
% UVA depends on the pigments used

# Antioxidants

|  |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)   |
|--|---|------------------|--------------------|--|
| <b>SONGNOX® CS 1010</b><br>Tetrakis[methylene-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate]methane<br>CAS NO. 6683-19-8<br>Solid<br>Phenolic                  |    | 1178             | 110.0 ~ 125.0      | n-Butanol < 0.05<br>n-Butyl acetate > 50<br>MIBK 45.0<br>2-Butoxyethanol (butyl cellosolve) 2.0<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene 24.2<br>Toluene 48.0<br>n-Hexane < 0.1 |
| <b>SONGNOX® CS 1076</b><br>Octadecyl-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate<br>CAS NO. 2082-79-3<br>Solid<br>Phenolic                                   |    | 531              | 50.0 ~ 55.0        | n-Butanol 7.5<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 4.5<br>Solvesso 100 17.0<br>Solvesso 150 10.5<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50         |
| <b>SONGNOX® CS 1135</b><br>Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, C7-9-branched alkyl esters<br>CAS NO. 125643-61-0<br>Liquid<br>Phenolic |    | 390              | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50       |
| <b>SONGNOX® CS 2450</b><br>Triethylene glycol-bis-3-(3-tert-butyl-4-hydroxy-5-methylphenyl)propionate<br>CAS NO. 36443-68-2<br>Solid<br>Phenolic                 |  | 587              | 76.0 ~ 80.0        | n-Butanol 3.8<br>n-Butyl acetate 18.0<br>MIBK 30.0<br>2-Butoxyethanol (butyl cellosolve) 16.2<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene 0.5<br>Toluene 10.0<br>n-Hexane < 0.1    |
| <b>SONGNOX® CS 1035</b><br>Thiodiethylene bis[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate]<br>CAS NO. 41484-35-9<br>Solid<br>Phenolic                        |  | 643              | > 65.0             | n-Butanol < 0.05<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 17.5<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane 0.8  |
| <b>SONGNOX® CS 565</b><br>2,6-Di-tert-butyl-4-[4,6-bis(octylthio)-1,3,5-triazin-2-ylamino]phenol<br>CAS NO. 991-84-4<br>Solid<br>Phenolic                        |  | 589              | 91 ~ 96            | n-Butanol 0.5<br>n-Butyl acetate 1.5<br>MIBK 0.2<br>2-Butoxyethanol (butyl cellosolve) 0.5<br>Solvesso 100 0.5<br>Solvesso 150 0.5<br>Distilled water < 0.05<br>Xylene 0.5<br>Toluene 0.5<br>n-Hexane 0.5                |

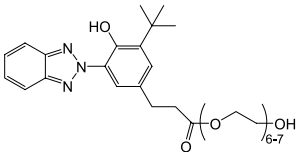
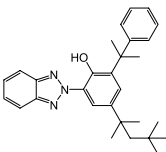
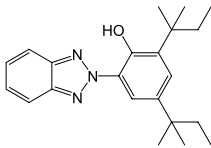
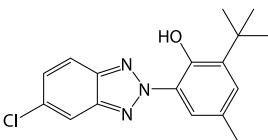
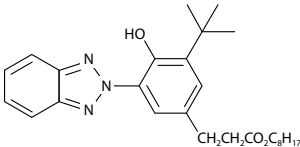
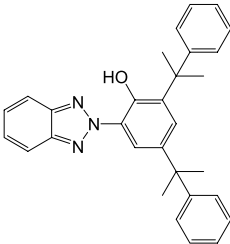
|  |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)  |
|--|---|------------------|--------------------|---|
| <b>SONGNOX® CS 3114</b><br>Tris-(3,5-di-tert-butylhydroxybenzyl) isocyanurate<br>CAS NO. 27676-62-6<br>Solid<br>Phenolic   |    | 784              | 218.0 ~ 223.0      | n-Butanol 0.05<br>n-Butyl acetate 25.0<br>MIBK 13.0<br>2-Butoxyethanol (butyl cellosolve) 3.0<br>Solvesso 100 6.0<br>Solvesso 150 8.0<br>Distilled water < 0.05<br>Xylene 21.0<br>Toluene 22.0<br>n-Hexane 0.1      |
| <b>SONGNOX® CS 1330</b><br>1,3,5-Trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxybenzyl) benzene<br>CAS NO. 1709-70-2<br>Solid<br>Phenolic                                 |    | 775              | 241.0 ~ 247.0      | n-Butanol 0.05<br>n-Butyl acetate 27.0<br>MIBK 18.0<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 12.0<br>Solvesso 150 15.0<br>Distilled water < 0.05<br>Xylene 22.0<br>Toluene 30.0<br>n-Hexane 0.1    |
| <b>SONGNOX® CS 1024</b><br>2',3-bis[[3-[3,5-di-tert-butyl-4-hydroxyphenyl] propionyl]] propionohydrazide<br>CAS NO. 32687-78-8<br>Solid<br>Phenolic                        |    | 553              | 221 ~ 232          | n-Butanol 1.0<br>n-Butyl acetate 1.0<br>MIBK 1.0<br>2-Butoxyethanol (butyl cellosolve) 3.0<br>Solvesso 100 0.1<br>Solvesso 150 0.1<br>Distilled water < 0.1<br>Xylene 0.1<br>Toluene 0.1<br>n-Hexane < 0.1          |
| <b>SONGNOX® CS 1680</b><br>Tris(2,4-di-tert-butylphenyl) phosphite<br>CAS NO. 31570-04-4<br>Solid<br>Phosphite   |  | 647              | 181.0 ~ 187.0      | n-Butanol < 0.05<br>n-Butyl acetate 4.8<br>MIBK 5.0<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 10.0<br>Solvesso 150 8.0<br>Distilled water < 0.05<br>Xylene 24.0<br>Toluene 25.0<br>n-Hexane 10.0 |
| <b>SONGNOX® CS 6260</b><br>Bis(2,4-di-tert-butylphenyl) pentaerythritol diphosphite<br>CAS NO. 26741-53-7<br>Solid<br>Phosphite  |  | 605              | 170.0 ~ 180.0      | n-Butanol < 0.05<br>n-Butyl acetate 14.5<br>MIBK 2.0<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 0.5<br>Solvesso 150 0.5<br>Distilled water < 0.05<br>Xylene 17.0<br>Toluene 25.0<br>n-Hexane 2.0  |
| <b>SONGNOX® CS PQ</b><br>Phosphorous trichloride, reaction products with 1,1'-biphenyl and 2,4-bis(1,1-dimethyl-ethyl) phenol<br>CAS NO. 119345-01-6<br>Solid<br>Phosphite |  | 1035             | 75.0 ~ 100.0       | n-Butanol 45<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 4.7<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50     |

# Antioxidants

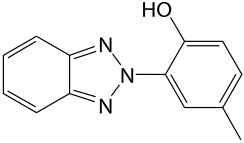
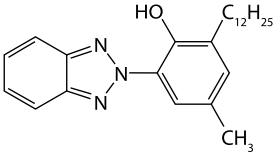
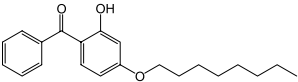
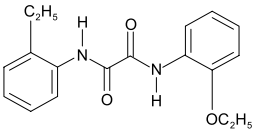
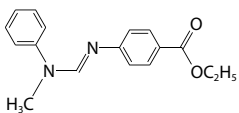
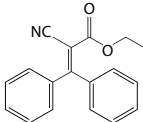
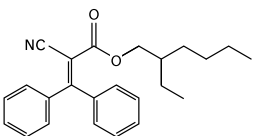
|  |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)   |
|--|---|------------------|--------------------|--|
| <b>SONGNOX® CS DTDTP</b><br>Ditridecyl thiodipropionate<br>CAS NO. 10595-72-9<br>Liquid<br>Thioether                 |    | 543              | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50 |
| <b>SONGNOX® CS DLTPD</b><br>Dilauryl thiodipropionate<br>CAS NO. 123-28-4<br>Solid<br>Thioether                      |    | 515              | 38.0 ~ 41.0        | n-Butanol 7.0<br>n-Butyl acetate > 50<br>MIBK 46.0<br>2-Butoxyethanol (butyl cellosolve) 7.2<br>Solvesso 100 18.0<br>Solvesso 150 12.0<br>Distilled water < 0.05<br>Xylene 45.0<br>Toluene > 50<br>n-Hexane > 50   |
| <b>SONGNOX® CS DSTDP</b><br>Distearyl thiodipropionate<br>CAS NO. 693-36-7<br>Solid<br>Thioether                     |    | 683              | 63.5 ~ 68.5        | n-Butanol < 0.05<br>n-Butyl acetate 0.1<br>MIBK 0.1<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 3.0<br>Solvesso 150 4.0<br>Distilled water < 0.05<br>Xylene 4.0<br>Toluene 4.0<br>n-Hexane 0.1    |
| <b>SONGNOX® CS 5057</b><br>Mixture of: octylated & butylated diphenyl-amine<br>CAS NO. 68411-46-1<br>Solid<br>Aminic |  | Mix              | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50 |



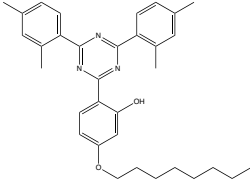
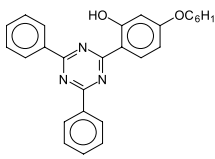
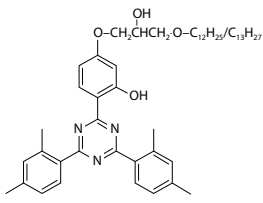
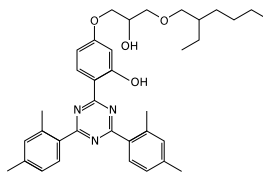
# UV Absorbers (UVAs)

|   |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)   |
|---|---|------------------|--------------------|--|
| <b>SONGSORB® CS 1130</b><br>Mixture of $\alpha$ -3-(3-(2H-benzotriazole-2-yl)-5-tert-butyl-4-hydroxyphenyl)-1-oxopropyl- $\omega$ -hydroxy poly(oxyethylene) and $\alpha$ -3-(3-(2H-benzotriazole-2-yl)-5-tert-butyl-4-hydroxy phenyl)-1-oxopropyl- $\omega$ -3-(3-(2H-benzotriazole-2-yl)-5-tert-butyl-4-hydroxyphenyl)-1-oxopropoxy poly(oxyethylene) and polyethyleneglycol<br>CAS NO. 104810-48-2 / 104810-47-1 / 25322-68-3<br>Liquid<br>Benzotriazole |    | Mix              | —                  | n-Butanol 0.1<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.1 |
| <b>SONGSORB® CS 928</b><br>2-hydroxy-3-(1,1-dimethylbenzyl)-5-(1,1,3,3-tetramethylbutyl)phenyl]-2Hbenzotriazole<br>CAS NO. 73936-91-1<br>Solid<br>Benzotriazole   |    | 442              | 110.0 ~ 113.0      | n-Butanol 2.0<br>n-Butyl acetate 42.5<br>MIBK 28.5<br>2-Butoxyethanol (butyl cellosolve) 7.5<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane 12.0   |
| <b>SONGSORB® CS 328</b><br>2-(2'-hydroxy-3',5'-di-t-amylphenyl) benzotriazole<br>CAS NO. 25973-55-1<br>Solid<br>Benzotriazole   |   | 352              | 80.0 ~ 88.0        | n-Butanol 0.2<br>n-Butyl acetate 34.5<br>MIBK 17.5<br>2-Butoxyethanol (butyl cellosolve) 0.2<br>Solvesso 100 20.0<br>Solvesso 150 18.0<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane 20.0   |
| <b>SONGSORB® CS 326</b><br>2-(2'-hydroxy-3'-tert-butyl-5'-methylphenyl)-5-chlorobenzotriazole<br>CAS NO. 3896-11-5<br>Solid<br>Cl-benzotriazole   |  | 316              | 138.0 ~ 141.0      | n-Butanol 0.35<br>n-Butyl acetate 2.0<br>MIBK 0.1<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 2.0<br>Solvesso 150 1.0<br>Distilled water < 0.05<br>Xylene 11.5<br>Toluene 10.4<br>n-Hexane 1.5       |
| <b>SONGSORB® CS 384-2</b><br>Benzenepropanoic acid, 3-(2H-benzotriazol-2-yl)-5-(1,1dimethylethyl)-4-hydroxy-, C7-9branched and linear alkyl esters with 4-7% 1-methoxy-2-propyl acetate<br>CAS No. 127519-17-9<br>Liquid<br>Benzotriazole   |  | 451.6            | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50 |
| <b>SONGSORB® CS 900</b><br>2-[2-hydroxy-3,5-di(1,1-dimethylbenzyl)phenyl]-2H-benzotriazole<br>CAS NO. 70321-86-7<br>Solid<br>Benzotriazole  |  | 448              | 138.0 ~ 142.0      | n-Butanol < 0.05<br>n-Butyl acetate 2.0<br>MIBK 0.1<br>2-Butoxyethanol (butyl cellosolve) 0.05<br>Solvesso 100 0.2<br>Solvesso 150 2.0<br>Distilled water < 0.05<br>Xylene 12.5<br>Toluene 18.0<br>n-Hexane 2.0    |

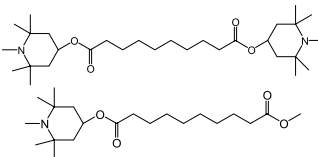
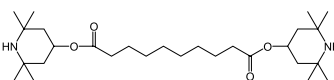
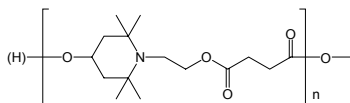
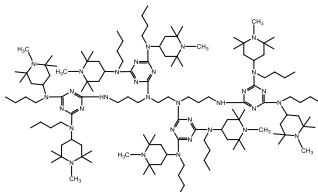
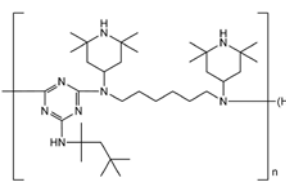
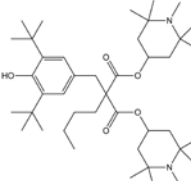
# UV Absorbers (UVAs)

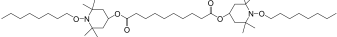
|   |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)  |
|---|---|------------------|--------------------|---|
| <b>SONGSORB® CS 1000</b><br>2-(2'-Hydroxy-5'-methylphenyl) benzotriazole<br>CAS NO. 2440-22-4<br>Solid<br>Benzotriazole   |    | 225              | 128.0 ~ 132.0      | n-Butanol 0.05<br>n-Butyl acetate 4.0<br>MIBK 4.0<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 5.0<br>Solvesso 150 6.0<br>Distilled water < 0.05<br>Xylene 6.0<br>Toluene 7.0<br>n-Hexane 0.1            |
| <b>SONGSORB® CS 171</b><br>mixture of: isomers of 2-(2 H-benzotriazol-2-yl)-4- methyl-(n)-dodecylphenol; isomers of 2-(2 H-benzotriazol-2-yl)-4-methyl-(n)-tetracosylphenol; isomers of 2-(2 H- benzotriazol-2-yl)-4-methyl-5,6- didodecyl-phenol. n = 5 or 6<br>CAS NO. 125304-04-3<br>Liquid<br>Benzotriazole |    | Mix              | -                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50    |
| <b>SONGSORB® CS 81</b><br>2-hydroxy-4-n-octoxybenzophenone<br>CAS NO. 1843-05-6<br>Solid<br>Benzophenone  |    | 326              | > 47.0             | n-Butanol 0.15<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 0.9<br>Solvesso 100 7.0<br>Solvesso 150 5.5<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane 18.0       |
| <b>SONGSORB® CS 312</b><br>N-(2-ethoxyphenyl)-N'-(2-ethylphenyl) ethanediamide<br>CAS NO. 23949-66-8<br>Solid<br>Oxanilide  |  | 312              | 124.0 ~ 128.0      | n-Butanol < 0.05<br>n-Butyl acetate 2.0<br>MIBK 1.7<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 0.5<br>Solvesso 150 0.5<br>Distilled water < 0.05<br>Xylene 5.0<br>Toluene 7.5<br>n-Hexane < 0.1        |
| <b>SONGSORB® CS UV1</b><br>Ethyl 4-[[[(methylphenylamino)methylene]amino] benzoate<br>CAS NO. 57834-33-0<br>Liquid<br>Formamidine   |  | 282              | 26.0 ~ 28.0        | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.05  |
| <b>SONGSORB® CS 3035</b><br>2-Propenoic acid, 2-cyano-3,3-diphenyl-, ethyl ester<br>CAS NO. 5232-99-5<br>Solid<br>Cyanoacrylate   |  | 277              | 95.0 ~ 100.0       | n-Butanol < 0.05<br>n-Butyl acetate 16.5<br>MIBK 0.2<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 < 0.1<br>Solvesso 150 < 0.1<br>Distilled water < 0.05<br>Xylene 15.0<br>Toluene 29.5<br>n-Hexane < 0.1 |
| <b>SONGSORB® CS 3039</b><br>2-Propenoic acid, 2-cyano-3,3-diphenyl-, 2-ethylhexyl ester<br>CAS NO. 6197-30-4<br>Liquid<br>Cyanoacrylate   |  | 361              | -                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.1<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50     |

# UV Absorbers (UVAs)

|  |   | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)   |
|--|---|------------------|--------------------|--|
| <b>SONGSORB® CS 1164</b><br>2-[4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol<br>CAS NO. 2725-22-6<br>PW  |    | 509              | 88.0 ~ 93.0        | n-Butanol < 0.1<br>n-Butyl acetate 3.0<br>MIBK 3.0<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 17<br>Solvesso 150 16<br>Distilled water < 0.1<br>Xylene 21<br>Toluene 27<br>n-Hexane 0.1             |
| <b>SONGSORB® CS 1577</b><br>2-(4,6-diphenyl-1,3,5-triazine-2-yl)-5-hexyloxy phenol<br>CAS NO. 147315-50-2<br>Solid<br>Triazine   |    | 425              | 147.0 ~ 151.0      | n-Butanol < 0.05<br>n-Butyl acetate < 0.1<br>MIBK 0.9<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 0.2<br>Solvesso 150 0.2<br>Distilled water < 0.05<br>Xylene 5.5<br>Toluene 6.0<br>n-Hexane < 0.1   |
| <b>SONGSORB® CS 400</b><br><b>SONGSORB® CS 400 MPA</b><br>Mixture of 2-[4-[(2-Hydroxy-3-dodecyloxypropyl)oxy]-2-hydroxyphenyl]-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine<br>CAS No. 153519-44-9<br>Liquid<br>Triazine |    | 646              | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50 |
| <b>SONGSORB® CS 405</b><br>2-(4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl)-5-(3-((2-ethylhexyl)oxy)-2-hydroxypropoxy) phenol<br>CAS NO. 137658-79-8<br>Solid<br>Triazine  |  | 584              | 74 ~ 80            | n-Butanol 1.0<br>n-Butyl acetate 35.0<br>MIBK 29.0<br>2-Butoxyethanol (butyl cellosolve) < 0.1<br>Solvesso 100 > 35<br>Solvesso 150 > 39<br>Distilled water < 0.1<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.1 |
| <b>SONGSORB® CS 477</b><br>Hydroxy-phenyl-s-triazine with 18-20% 1-methoxy-2-propyl-acetate<br>CAS NO.<br>Liquid<br>Triazine   | —   | —                | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.1<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50  |

# Hindered Amine Light Stabilizers (HALS)

|  |   | Molecular Weight | Melting Range (°C)       | Solubility (g/100 g solvent at 25°C)   |
|--|---|------------------|--------------------------|--|
| <b>SONGSORB® CS 292</b><br>Mixture of bis (1,2,2,6,6-pentamethyl-4-piperidiny)-sebacate and 1-(methyl)-8-(1,2,2,6,6-pentamethyl-4-piperidiny)-sebacate<br>CAS NO. 41556-26-7 / 82919-37-7<br>Liquid<br>N-alkyl HALS  |    | 509/370          | —                        | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50         |
| <b>SONGSORB® CS 770</b><br>Bis(2,2,6,6-tetramethyl-4-piperidiny) sebacate<br>CAS NO. 52829-07-9<br>Solid<br>N-H HALS   |    | 481              | 81.0 ~ 85.0              | n-Butanol > 50<br>n-Butyl acetate 42.5<br>MIBK 21.5<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene 49.0<br>Toluene > 50<br>n-Hexane < 0.1  |
| <b>SONGSORB® CS 622</b><br>Polymer of dimethyl succinate and 4-hydroxy-2,2,6,6-tetramethyl-1-piperidine ethanol<br>CAS NO. 65447-77-0<br>Solid<br>N-alkyl HALS   |  | 3100 ~ 4000      | > 55.0 (softening point) | n-Butanol < 0.05<br>n-Butyl acetate 0.3<br>MIBK 18.0<br>2-Butoxyethanol (butyl cellosolve) 0.1<br>Solvesso 100 0.5<br>Solvesso 150 0.5<br>Distilled water < 0.05<br>Xylene 35.0<br>Toluene 7.1<br>n-Hexane < 0.1           |
| <b>SONGSORB® CS 119</b><br>1,3,5-triazine-2,4,6-triamine, N2,N2'-1,2-ethanediylbis [N2-[3-[[4,6-bis[butyl (1,2,2,6,6-pentamethyl-4-piperidiny)amino]-1,3,5-triazin-2-yl] amino]propyl]-N',N"-dibutyl-N',N"-bis (1,2,2,6,6-pentamethyl-4-piperidiny)-CAS NO. 106990-43-6<br>Solid<br>N-alkyl HALS |  | 2286             | 115.0 ~ 150.0            | n-Butanol < 0.05<br>n-Butyl acetate 0.3<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 14.0<br>Solvesso 150 12.0<br>Distilled water < 0.05<br>Xylene 24.0<br>Toluene 25.0<br>n-Hexane < 0.1     |
| <b>SONGSORB® CS 944</b><br>1,6-Hexanediamine, N,N' -bis(2,2,6,6-tetramethyl-4- piperidiny)-, polymer with 2,4,6-trichloro-1,3,5-triazine, reaction products with 2,4,4-trimethyl-2- pentanamine"<br>CAS NO. 71878-19-8<br>Solid<br>N-H HALS  |  | 2000-3100        | 100.0 ~ 135.0            | n-Butanol 0,85<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 0,1<br>Solvesso 100 0,3<br>Solvesso 150 0,2<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane 6,0             |
| <b>SONGSORB® CS 144</b><br>Bis (1,2,2,6,6-pentamethyl-4-piperidiny)-[[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylmalonate<br>CAS NO. 63843-89-0<br>Solid<br>N-alkyl HALS   |  | 685              | 146.0 ~ 150.0            | n-Butanol < 0.05<br>n-Butyl acetate 6,5<br>MIBK 7,0<br>2-Butoxyethanol (butyl cellosolve) < 0.05<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.05 |

|  |   | Molecular Weight                  | Melting Range (°C) | Solubility (g/100 g solvent at 25°C)   |
|--|---|-----------------------------------|--------------------|--|
| <b>SONGSORB® CS 5100</b><br>Decanedioic acid, bis(2,2,6,6-tetramethyl-1-(octyloxy)-4-piperidinyloxy)ester, reaction products with 1,1-dimethylethyl-hydroperoxide and octane<br>CAS NO. 129757-67-1<br>Liquid<br>N-OR HALS |  | 737                               | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water < 0.05<br>Xylene > 50<br>Toluene > 50<br>n-Hexane > 50 |
| <b>SONGSORB® CS AQ01</b><br>POE (n) 2,2,6,6-tetramethyl-4-piperidinol<br>CAS No. Proprietary<br>Liquid<br>N-Alkyl HALS   | Proprietary information   | Polymer, confidential information | —                  | n-Butanol > 50<br>n-Butyl acetate > 50<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) > 50<br>Solvesso 100 > 50<br>Solvesso 150 > 50<br>Distilled water > 50<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.1  |
| <b>SONGSORB® CS 945</b><br>35% active preparation of polymeric HALS in non-volatile carrier liquid<br>CAS NO.<br>Liquid<br>Polymeric HALS  | confidential  | confidential                      | —                  | —  |



# Key to Abbreviations of Physical Forms

- **BD:** Beads
- **CP:** Crystalline Powder
- **DW:** Dispersion
- **FF:** Free Flow
- **GR:** Granule
- **LQ:** Liquid or Molten
- **MB:** Micro Beads
- **PS:** Pastilles
- **PW:** Powder
- **SB:** Semi Bead
- **WB:** Water Based

## Standard Packaging

- **Antioxidants, Solids:** 25 kg Carton Box  
20 kg PE Bag (20 kg aluminum coated bags for SONGNOX® CS 6260, SONGNOX® CS PQ)
- **Antioxidants, Liquids:** 185 kg Steel Drum  
900 kg IBC
- **HALS, Solids:** 20 kg PE Bag  
25 kg Carton Box
- **HALS, Liquids:** 25 kg PE Drum  
180 kg Steel Drum  
200 kg Steel Drum  
900 kg IBC  
1000 kg IBC / IBC ATEX
- **UV Absorbers, Solids:** 15 kg PE Bag  
20 kg Carton Box  
25 kg Carton Box
- **UV Absorbers, Liquids:** 20 kg PE Drum  
25 kg PE Drum  
200 kg Steel Drum



## Transport and Storage

As a general guideline, we recommend storing the products mentioned in this brochure in their original sealed containers in a cold and dry place. For more detailed information on a specific product, please refer to the corresponding **Technical Data Sheet**.

By law, a number of chemical products must be labeled in respect of transport, storage and handling. Thus corresponding care is a prerequisite for their appropriate handling. Furthermore, local legal regulations may apply.

Detailed information is given in the respective **Safety Data Sheets**.

# About SONGWON Industrial Group

A leader in the development, production and supply of specialty chemicals, SONGWON's products touch your life every day, everywhere. Since 1965, we've been driving innovation, partnering for progress and paving the way for a better more sustainable tomorrow with 360° customized solutions.

Headquartered in South Korea, SONGWON is the 2<sup>nd</sup> largest manufacturer of polymer stabilizers worldwide. With Group companies and world-class manufacturing facilities across the globe, we are dedicated to providing customers in over 60 countries with high-performance products that meet their individual needs and the best levels of service.

For further information, please go to:

**[www.songwon.com](http://www.songwon.com)**





Check out our  
official website

For further information, please go to:

**[www.songwon.com](http://www.songwon.com)**

[coatings@songwon.com](mailto:coatings@songwon.com)

SONGWON provides customers with warranties and representations as to the chemical or technical specifications, compositions and/or the suitability for use for any particular purpose exclusively in individual written agreements.

The facts and figures contained herein have been carefully compiled to the best of SONGWON's knowledge but are essentially intended for informational purposes only.

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