

# Coating Stabilizers

## Long-lasting protection against degradation caused by light and heat

Used in a wide number of industries, coatings not only provide countless items with color and texture, but also enhance their appearance and prolong their life.

In order to protect coatings against the harmful effects of light and heat, SONGWON offers a comprehensive range of high-value, high-performance coating stabilizers for numerous substrates, including steel, wood, ceramics, special composites, plastic films and plastic parts used in the inks, automotive and transportation, decorative and architectural, furniture and flooring, industrial and agricultural industries among others.

# 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 thioesters and phosphites.

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

SONGWON secondary AOs exhibit synergistic effects with primary antioxidants. SONGWON offers blends of primary and secondary AOs such as SONGNOX® CS 147B, SONGNOX® CS 41B, and many other primary and secondary AOs that can be mixed in different ratios, depending on requirements.

For applications that require 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.

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 hindered amine light stabilizers (HALS) is preferred, due to the cyclic nature of their reaction.

## UV Absorbers (UVAs)

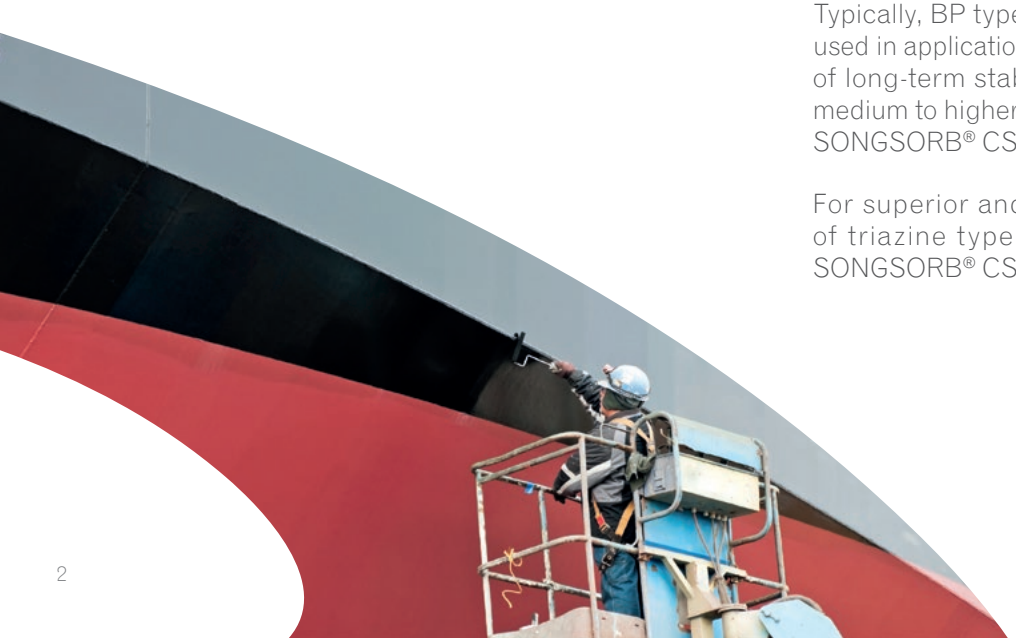
UVAs prevent the degradation of coating systems by converting the absorbed light into heat. There are several well-known chemical classes of UVA broadly used in coatings, inks and adhesives: 2-hydroxyphenyl-benzophenone or BP type (for example SONGSORB® CS 81), 2-(2-hydroxyphenyl)-benzotriazole or BTZ type (for example SONGSORB® CS 1130 and SONGSORB® CS 928), 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. 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 UVA 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.

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 928, are needed.

For superior and outstanding performance, the use of triazine type UVA, like SONGSORB® CS 400 or SONGSORB® CS 1577 is highly recommended.





# Hindered Amine Light Stabilizers (HALS)

HALS are radical scavengers: they trap radicals formed in the coating layer during exposure to light. Since this mechanism is independent of film thickness, HALS are particularly suitable for the surface of a coating, where UVAs offers 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.

SONGWON also offers special-feature HALS such SONGSORB® CS 144 and SONGSORB® CS 119, which 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 efficiency. While HALS are usually not effective in preventing thermal degradation (for which SONGWON antioxidants are the products of choice), they are well suited as light stabilizers and thanks to their regenerative nature they function over much longer time scales.

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

For the fast growing market of waterborne coatings, we recommend the use of SONGSORB® CS AQ01, a unique HALS fully compatible with water that can be used for environmental friendly and no VOC applications.

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# Product range selection guide

## Antioxidants

| | Automotive | Inks | Industrial | Wood | Construction | Solventborne | Waterborne | UV curing | Powder |
|---|---|---|---|---|---|---|---|---|---|
| SONGNOX® CS 1010 | ■ | | ■ | | ■ | ■ | | | |
| SONGNOX® CS 1076 | ■ | | ■ | | ■ | ■ | | | |
| SONGNOX® CS 2450 | ■ | | ■ | | ▪ | ■ | | | |
| SONGNOX® CS 1035 | | | ■ | | | ■ | | | |
| SONGNOX® CS 1135 | ■ | | ■ | | | ■ | | | |
| SONGNOX® CS 4425 | ■ | | ■ | | | ■ | | | |
| SONGNOX® CS 565 | ■ | | ■ | ▪ | | ■ | | | |
| SONGNOX® CS 1680 | ■ | | ■ | | | ■ | | | ■ |
| SONGNOX® CS 6260 | ■ | | ■ | | | ■ | | | ■ |
| SONGNOX® CS PQ | ■ | | ■ | | ■ | ■ | | | ■ |

Please ask the expert about additional antioxidants and blends.

## UV Absorbers (UVAs)

| | Automotive | Inks | Industrial | Wood | Construction | Solventborne | Waterborne | UV curing | Powder |
|---|---|---|---|---|---|---|---|---|---|
| SONGSORB® CS 1130 | ■ | ■ | ■ | ■ | | ■ | ■ | | |
| SONGSORB® CS 928 | ■ | | ■ | ■ | ■ | ■ | | | ■ |
| SONGSORB® CS 329 | ■ | | ■ | ■ | ■ | ■ | | | |
| SONGSORB® CS 328* | | ■ | ■ | | | ■ | | | |
| SONGSORB® CS 326 | ■ | | ■ | ■ | ■ | ■ | | | |
| SONGSORB® CS 384-2 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| SONGSORB® CS 900 | ■ | ■ | ■ | | | ■ | | | ■ |
| SONGSORB® CS 81 | | | ■ | | ■ | ■ | | ■ | |
| SONGSORB® CS 312 | ■ | | ■ | | ■ | ■ | | | ■ |
| SONGSORB® CS UV1 | ■ | | ■ | | ■ | ■ | | | |
| SONGSORB® CS 3035 | ■ | | ■ | ■ | ■ | ■ | ■ | | |
| SONGSORB® CS 1577 | ■ | | ■ | | ■ | ■ | | ■ | |
| SONGSORB® CS 400 | ■ | | ■ | ■ | ■ | ■ | ■ | | |

* Not available in Europe

■ Recommended

▪ Suitable

## Hindered Amine Light Stabilizers (HALS)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SONGSORB® CS 292 | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| SONGSORB® CS 770 | | | ■ | | | ■ | | | |
| SONGSORB® CS 622 | | | ■ | | | ■ | | | ■ |
| SONGSORB® CS 119 | ■ | | ■ | | | ■ | | | ■ |
| SONGSORB® CS 944 | ■ | | ■ | | | ■ | | | ■ |
| SONGSORB® CS 144 | ■ | | ■ | | | ■ | | | ■ |
| SONGSORB® CS 5100 | | | ■ | ■ | ■ | ■ | | | |
| SONGSORB® CS AQ01 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |

## Blends

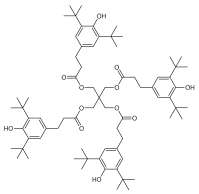
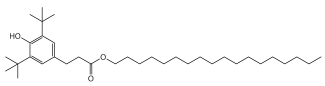
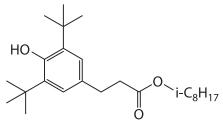
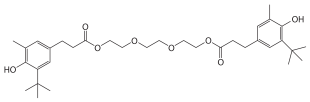
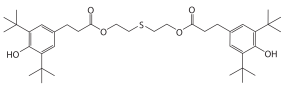
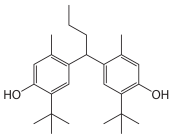
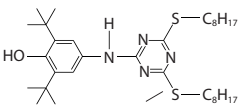
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|---|---|---|---|---|---|---|---|---|---|
| SONGSORB® CS 111 | ■ | | ■ | | | ■ | | | ■ |
| SONGSORB® CS B5050 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| SONGSORB® CS B5151 | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| SONGSORB® CS B5248 | ■ | | ■ | ■ | ■ | ■ | ■ | | |
| SONGSORB® CS B5866* | ■ | | ■ | | ■ | ■ | | | ■ |

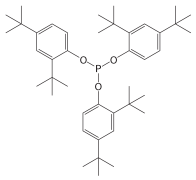
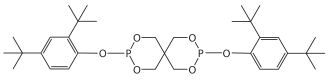
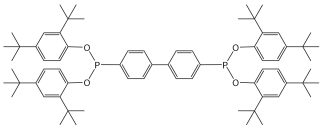
*Notice: Use of SONGSORB® CS B5866 may be restricted through valid US-Patent, EP-Patent and/or corresponding patents and patent applications in other countries.



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# Antioxidants

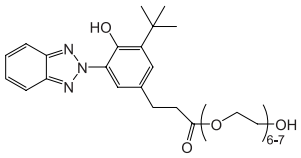
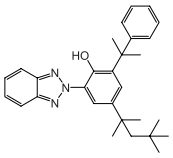
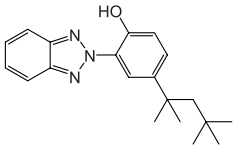
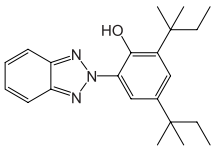
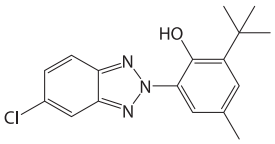
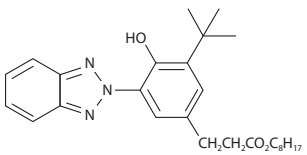
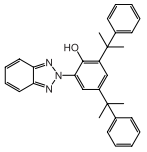
| | | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C) |
|---|---|---|---|---|
| **SONGNOX® CS 1010**<br>Tetrakis[methylene-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate]methane<br>CAS NO. 6683-19-8<br>SL |  | 1178 | 110.0 ~ 125.0 | n-Butanol < 0.05<br>n-Butyl acetate > 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 |
| **SONGNOX® CS 1076**<br>Octadecyl-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate<br>CAS NO. 2082-79-3<br>SL |  | 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 |
| **SONGNOX® CS 1135**<br>Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, C7-9-branched alkyl esters<br>CAS NO. 125643-61-0<br>LQ |  | 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 |
| **SONGNOX® CS 2450**<br>Triethylene glycol-bis-3-(3-tert-butyl-4-hydroxy-5-methylphenyl)propionate<br>CAS NO. 36443-68-2<br>SL |  | 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 |
| **SONGNOX® CS 1035**<br>Thiodiethylene bis[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate]<br>CAS NO. 41484-35-9<br>SL |  | 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 |
| **SONGNOX® CS 4425**<br>4,4'-Butylidenebis(6-tert-3-methylphenol)<br>CAS NO. 85-60-9<br>SL |  | 383 | 208.0 ~ 214.0 | n-Butanol 26,2<br>n-Butyl acetate 0,1<br>MIBK > 50<br>2-Butoxyethanol (butyl cellosolve) 16,5<br>Solvesso 100 < 0.05<br>Solvesso 150 < 0.05<br>Distilled water < 0.05<br>Xylene < 0.1<br>Toluene 1,0<br>n-Hexane < 0.1 |
| **SONGNOX® CS 565**<br>2,6-Di-t-butyl-4-[4,6-bis(octylthio)-1,3,5-triazin-2-ylamino] phenol<br>CAS NO. 991-84-4<br>PW |  | 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 |

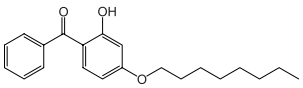
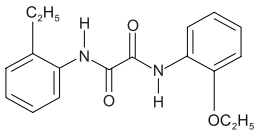
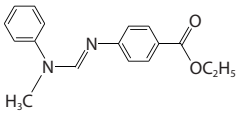
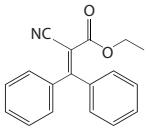
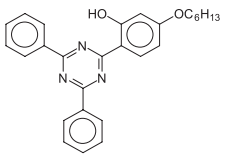
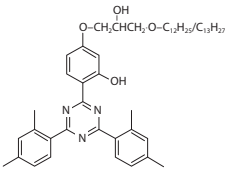
| | | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C) |
|---|---|---|---|---|
| **SONGNOX® CS 1680**<br>Tris(2,4-di-tert-butylphenyl) phosphite<br>CAS NO. 31570-04-4<br>SL |  | 647 | 181.0 ~ 187.0 | n-Butanol < 0.05<br>n-Butyl acetate 4,8<br>MIBK 5,0<br>2-Butoxyethanol (butyl 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 |
| **SONGNOX® CS 6260**<br>Bis(2,4-di-tert-butylphenyl) pentaerythritol diphosphite<br>CAS NO. 26741-53-7<br>SL |  | 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 |
| **SONGNOX® CS PQ**<br>Phosphorous trichloride, reaction products with 1,1'-biphenyl and 2,4-bis(1,1-dimethyle-thyl) phenol<br>CAS NO. 119345-01-6<br>SL |  | 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 |



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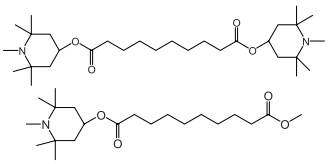
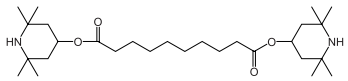
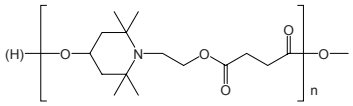
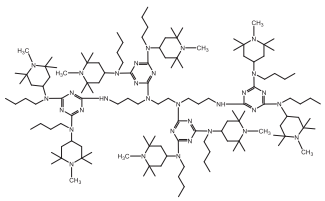
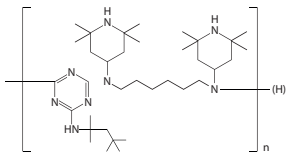
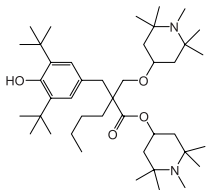
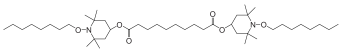
# UV Absorbers (UVAs)

| | | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C) |
|---|---|---|---|---|
| **SONGSORB® CS 1130**<br>Mixture of α-3-(3-(2H-benzotriazole-2-yl)-5-tert-butyl-4-hydroxyphenyl)-1-oxopropyl-ω-hydroxy poly(oxyethylene) and α-3-(3-(2H-benzotriazole-2-yl)-5-tert-butyl-4-hydroxy phenyl)-1-oxopropyl-ω-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>LQ |  | 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 |
| **SONGSORB® CS 928**<br>2-hydroxy-3-(1,1-dimethylbenzyl)-5-(1,1,3,3-tetramethylbutyl)phenyl]-2Hbenzotriazole<br>CAS NO. 73936-91-1<br>SL |  | 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 |
| **SONGSORB® CS 329**<br>2-(2H-benzotriazole-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol<br>CAS NO. 3147-75-9<br>SL |  | 323 | 103.0 ~ 105.0 | n-Butanol 1,7<br>n-Butyl acetate 24,5<br>MIBK 16,5<br>2-Butoxyethanol (butyl cellosolve) 2,5<br>Solvesso 100 18,5<br>Solvesso 150 14,0<br>Distilled water < 0.05<br>Xylene 49,0<br>Toluene 44,7<br>n-Hexane 6,0 |
| **SONGSORB® CS 328**<br>2-(2'-hydroxy-3',5'-di-t-amylphenyl) benzotriazole<br>CAS NO. 25973-55-1<br>SL |  | 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 |
| **SONGSORB® CS 326**<br>2-(2'-hydroxy-3'-tert-butyl-5'-methylphenyl)-5-chlorobenzotriazole<br>CAS NO. 3896-11-5<br>PW |  | 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 |
| **SONGSORB® CS 384-2**<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>LQ |  | 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 |
| **SONGSORB® CS 900**<br>2-[2-hydroxy-3,5-di(1,1-dimethylbenzyl) phenyl]-2H-benzotriazole<br>CAS NO. 70321-86-7<br>SL |  | 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 |

| | | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C) |
|---|---|---|---|---|
| **SONGSORB® CS 81**<br>2-hydroxy-4-n-octoxybenzophenone<br>CAS NO. 1843-05-6<br>SL |  | 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 |
| **SONGSORB® CS 312**<br>N-(2-ethoxyphenyl)-N'-(2-ethylphenyl) ethanediamide<br>CAS NO. 23949-66-8<br>SL |  | 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 |
| **SONGSORB® CS UV1**<br>Ethyl 4-[[(methylphenylamino)methylene]amino] benzoate<br>CAS NO. 57834-33-0<br>LQ |  | 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 |
| **SONGSORB® CS 3035**<br>2-Propenoic acid, 2-cyano-3,3-diphenyl-, ethyl ester<br>CAS NO. 5232-99-5<br>PW |  | 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 |
| **SONGSORB® CS 1577**<br>2-(4,6-diphenyl-1,3,5-triazine-2-yl)-5-hexyloxy phenol<br>CAS NO. 147315-50-2<br>SL |  | 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 |
| **SONGSORB® CS 400**<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>LQ |  | 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 |

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# Hindered Amine Light Stabilizers (HALS)

| | | Molecular Weight | Melting Range (°C) | Solubility (g/100 g solvent at 25°C) |
|---|---|---|---|---|
| **SONGSORB® CS 292**<br>Mixture of bis (1,2,2,6,6-pentamethyl-4-piperidinyl)-sebacate and 1-(methyl)-8-(1,2,2,6,6-pentamethyl-4-piperidinyl)-sebacate<br>CAS NO. 41556-26-7 / 82919-37-7<br>LQ |  | 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 |
| **SONGSORB® CS 770**<br>Bis(2,2,6,6-tetramethyl-4-piperidinyl) sebacate<br>CAS NO. 52829-07-9<br>SL |  | 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 |
| **SONGSORB® CS 622**<br>Polymer of dimethyl succinate and 4-hydroxy-2,2,6,6-tetramethyl-1-piperidine ethanol<br>CAS NO. 65447-77-0<br>SL |  | 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 |
| **SONGSORB® CS 119**<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-piperidinyl)amino]-1,3,5-triazin-2-yl] amino]propyl]-N',N"-dibutyl-N',N"-bis (1,2,2,6,6-pentamethyl-4-piperidinyl)-<br>CAS NO. 106990-43-6<br>PS |  | 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 |
| **SONGSORB® CS 944**<br>1,6–Hexanediamine, N,N'–bis(2,2,6,6–tetramethyl–4– piperidinyl)–, 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>MB |  | 2000-3100 | 100 ~ 135 | 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 |
| **SONGSORB® CS 144**<br>Bis (1,2,2,6,6-pentamethyl-4-piperidinyl)-[[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylmalonate<br>CAS NO. 63843-89-0<br>SL |  | 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 |
| **SONGSORB® CS 5100**<br>Decanedioic acid, bis(2,2,6,6-tetramethyl-1-(octyloxy)-4-piperidinyl)ester, reaction products with 1,1-dimethylethyl-hydroperoxide and octane<br>CAS NO. 129757-67-1<br>LQ |  | 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 |
| **SONGSORB® CS AQ01**<br>POE (n) 2,2,6,6-tetramethyl-4-piperidinol<br>CAS No. Proprietary<br>LQ | 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 18,0<br>Xylene > 50<br>Toluene > 50<br>n-Hexane < 0.1 |

# Light Stabilizer Blends

### SONGSORB® CS Blend Series

| Product Name | SONG-SORB® CS 622 | SONG-SORB® CS 119 | SONG-SORB® CS 384-2 | SONG-SORB® CS 292 | SONG-SORB® CS 1130 | SONG-SORB® CS 400 | SONG-SORB® CS 312 | SONG-SORB® CS 144 | SONG-SORB® CS 6223 |
|---|---|---|---|---|---|---|---|---|---|
| **SONGSORB® CS 111** | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **SONGSORB® CS B5050** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| **SONGSORB® CS B5151** | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| **SONGSORB® CS B5248** | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| **SONGSORB® CS B5866*** | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 |

*Notice: Use of SONGSORB® CS B5866 may be restricted through valid US-patent, EP-patent and/or corresponding patents and patent applications in other countries.

# Antioxidant Blends

### SONGNOX® CS Blend Series

| Product Name | SONGNOX® CS 1680 | SONGNOX® CS 1010 | SONGNOX® CS 1076 |
|---|---|---|---|
| **SONGNOX® CS 11B** | 1 | 1 | 0 |
| **SONGNOX® CS 21B** | 2 | 1 | 0 |
| **SONGNOX® CS 31B** | 3 | 1 | 0 |
| **SONGNOX® CS 41B** | 4 | 1 | 0 |
| **SONGNOX® CS 417B** | 4 | 0 | 1 |



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# Light and heat stabilization formulations guide

| | Antioxidants (AOs) | UV Absorbers (UVAs) | Hindered Amine Light Stabilizers (HALS) |
|---|---|---|---|
| **Mechanism** | Deactivate free radicals | Convert UV into heat | Deactivate free radicals |
| **Application** | Interior / Exterior | Interior / Exterior | Exterior |
| **Protection** | Thermal oxidation | Photo oxidation and degradation | Photo degradation |
| **Prevention** | 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 |
| **Field** | Coating | Underneath substrate<br>Deeper coating layers | Coating surface<br>Pigments for coatings |

| Film Thickness | UVA |
|---|---|
| 10 ~ 20 µm | 8 ~ 4 % |
| 20 ~ 40 µm | 4 ~ 2 % |
| 40 ~ 80 µm | 2 ~ 1 % |

| Pigmentation | HALS | UVA (*) |
|---|---|---|
| opaque | 1.0 % ~ 2.0 % | 0.0 % ~ 0.5 % |
| semi-transparent | 0.5 % ~ 1.5 % | 0.5 % |
| 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

# 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
  25 kg PE Drum
- **HALS, Solids:** 20 kg PE Bag
  25 kg Carton Box
- **HALS, Liquids:** 25 kg PE Drum
  200 kg Steel Drum
  900 kg IBC
- **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

Standard pallet size is CP1.

# Key to Abbreviations of Physical Forms

- **PW:** Powder
- **SB:** Semi Bead
- **SL:** Solid
- **FF:** Free Flow
- **DW:** Dispersion
- **MB:** Micro Beads
- **FC:** Fusion Crystal
- **LQ:** Liquid or Molten
- **BD:** Beads
- **DF:** Dust Free Flow
- **CP:** Crystalline Powder
- **PS:** Pastilles
- **GR:** Granule
- **FG:** Fine Grind
- **VL:** Viscous Liquid

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# 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

SONGWON, which was founded in 1965 and is headquartered in Ulsan, South Korea, is a leader in the development, production and supply of specialty chemicals.

The second largest manufacturer of polymer stabilizers worldwide, SONGWON operates group companies all over the world, offering the combined benefits of a global framework and readily accessible local organizations.

Dedicated experts work closely together with customers to develop tailor-made solutions that meet individual requirements.

For further information, please go to:
**www.songwon.com**



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Version 4, January 2019 (Specialty Chemicals)

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