

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 460 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			
Antioxidants	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 1680	■			■			■			■
	SONGNOX® CS 6260	■			■			■			■
	SONGNOX® CS PQ	■			■		■	■			■
	SONGNOX® CS TPP*	■			■			■			
	SONGNOX® CS DTDTP	■			■			■			
	SONGNOX® CS DLTDP	■			■			■			■
	SONGNOX® CS DSTDP	■			■			■			■
	SONGNOX® CS 5057							■			

Please ask the expert about additional antioxidants and blends. *Not available in Europe

UV Absorbers (UVAs)

SONGSORB® CS 1130	■	■	■	■		■	■			
SONGSORB® CS 928	■		■	■	■	■				■
SONGSORB® CS 329	■		■	■	■	■				
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 1577	■		■			■	■		■	
SONGSORB® CS 400	■		■	■	■	■	■	■		
SONGSORB® CS 460	■		■				■			

* Not available in Europe

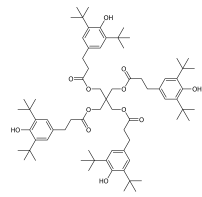
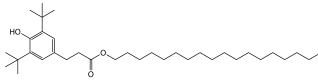
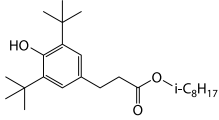
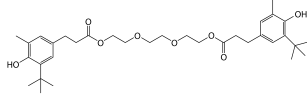
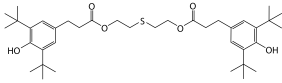
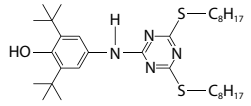
Hindered Amine Light Stabilizers (HALS)

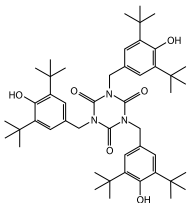
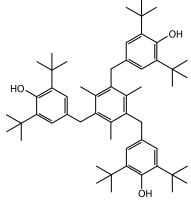
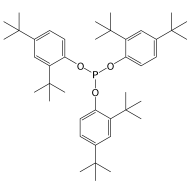
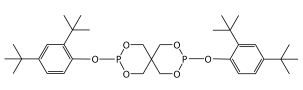
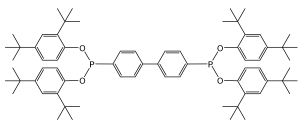
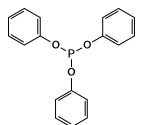
	Automotive	Inks	Industrial	Wood	Construction	Solventborne	Waterborne	UV curing	Powder
SONGSORB® CS 292	■	■	■	■	■	■			
SONGSORB® CS 770			■			■			
SONGSORB® CS 622			■			■			■
SONGSORB® CS 119	■		■			■			■
SONGSORB® CS 944	■		■			■			■
SONGSORB® CS 144	■		■			■			■
SONGSORB® CS 5100			■	■	■	■			
SONGSORB® CS AQ01	■	■	■	■	■	■	■		
SONGSORB® CS 111	■		■			■			■

■ Recommended ■ Suitable

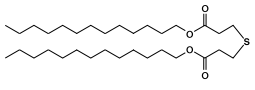
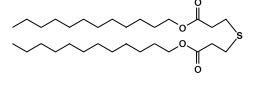
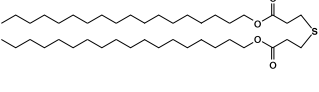
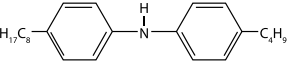


Antioxidants

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

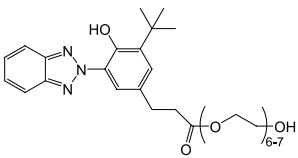
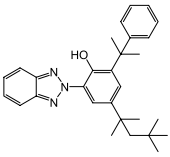
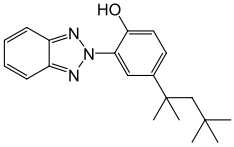
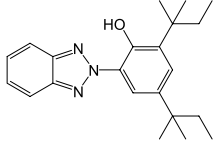
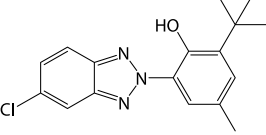
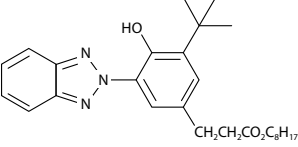
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SONGNOX® CS 3114 Tris-(3,5-di-tert-butylhydroxybenzyl) isocyanurate CAS NO. 27676-62-6 Solid Phenolic		784	218.0 ~ 223.0	n-Butanol 0.05 n-Butyl acetate 25.0 MIBK 13.0 2-Butoxyethanol (butyl cellosolve) 3.0 Solvesso 100 6.0 Solvesso 150 8.0 Distilled water < 0.05 Xylene 21.0 Toluene 22.0 n-Hexane 0.1
SONGNOX® CS 1330 1,3,5-Trimethyl-2,4,6-tris(3,5-di-tert-butyl-4-hydroxybenzyl) benzene CAS NO. 1709-70-2 Solid Phenolic		775	241.0 ~ 247.0	n-Butanol 0.05 n-Butyl acetate 27.0 MIBK 18.0 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 12.0 Solvesso 150 15.0 Distilled water < 0.05 Xylene 22.0 Toluene 30.0 n-Hexane 0.1
SONGNOX® CS 1680 Tris(2,4-di-tert-butylphenyl) phosphite CAS NO. 31570-04-4 Solid Phosphite		647	181.0 ~ 187.0	n-Butanol < 0.05 n-Butyl acetate 4.8 MIBK 5.0 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 10.0 Solvesso 150 8.0 Distilled water < 0.05 Xylene 24.0 Toluene 25.0 n-Hexane 10.0
SONGNOX® CS 6260 Bis(2,4-di-tert-butylphenyl) pentaerythritol diphosphite CAS NO. 26741-53-7 Solid Phosphite		605	170.0 ~ 180.0	n-Butanol < 0.05 n-Butyl acetate 14.5 MIBK 2.0 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 0.5 Solvesso 150 0.5 Distilled water < 0.05 Xylene 17.0 Toluene 25.0 n-Hexane 2.0
SONGNOX® CS PQ Phosphorous trichloride, reaction products with 1,1'-biphenyl and 2,4-bis(1,1-dimethyl-ethyl) phenol CAS NO. 119345-01-6 Solid Phosphite		1035	75.0 ~ 100.0	n-Butanol 45 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) 4.7 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50
SONGNOX® CS TPP* Triphenyl phosphite CAS NO. 101-02-0 Liquid Phosphite * Not available in Europe		310	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50

Antioxidants

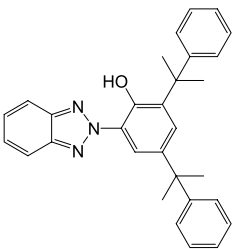
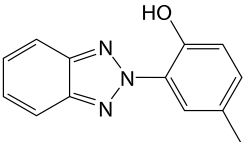
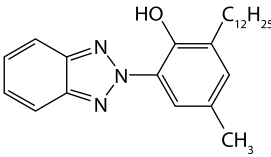
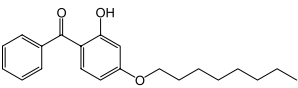
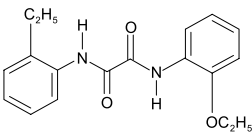
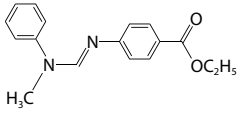
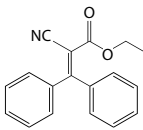
		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGNOX® CS DTDTP Ditridecyl thiodipropionate CAS NO. 10595-72-9 Liquid Thioether		543	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water 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



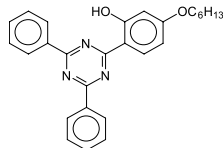
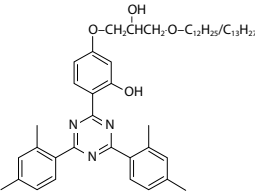
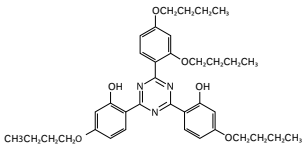
UV Absorbers (UVAs)

		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGSORB® CS 1130 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 CAS NO. 104810-48-2 / 104810-47-1 / 25322-68-3 Liquid Benzotriazole		Mix	—	n-Butanol 0.1 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane < 0.1
SONGSORB® CS 928 2-hydroxy-3-(1,1-dimethylbenzyl)-5-(1,1,3,3-tetramethylbutyl)phenyl]-2Hbenzotriazole CAS NO. 73936-91-1 Solid Benzotriazole		442	110.0 ~ 113.0	n-Butanol 2.0 n-Butyl acetate 42.5 MIBK 28.5 2-Butoxyethanol (butyl cellosolve) 7.5 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane 12.0
SONGSORB® CS 329 2-(2H-benzotriazole-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol CAS NO. 3147-75-9 Solid Benzotriazole		323	103.0 ~ 105.0	n-Butanol 1.7 n-Butyl acetate 24.5 MIBK 16.5 2-Butoxyethanol (butyl cellosolve) 2.5 Solvesso 100 18.5 Solvesso 150 14.0 Distilled water < 0.05 Xylene 49.0 Toluene 44.7 n-Hexane 6.0
SONGSORB® CS 328 2-(2'-hydroxy-3',5'-di-t-amylphenyl) benzotriazole CAS NO. 25973-55-1 Solid Benzotriazole		352	80.0 ~ 88.0	n-Butanol 0.2 n-Butyl acetate 34.5 MIBK 17.5 2-Butoxyethanol (butyl cellosolve) 0.2 Solvesso 100 20.0 Solvesso 150 18.0 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane 20.0
SONGSORB® CS 326 2-(2'-hydroxy-3'-tert-butyl-5'-methylphenyl)-5-chlorobenzotriazole CAS NO. 3896-11-5 Solid Cl-benzotriazole		316	138.0 ~ 141.0	n-Butanol 0.35 n-Butyl acetate 2.0 MIBK 0.1 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 2.0 Solvesso 150 1.0 Distilled water < 0.05 Xylene 11.5 Toluene 10.4 n-Hexane 1.5
SONGSORB® CS 384-2 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 CAS No. 127519-17-9 Liquid Benzotriazole		451.6	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50

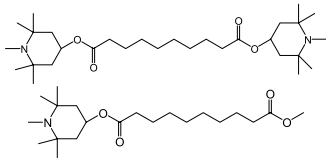
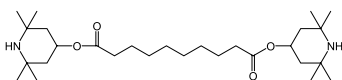
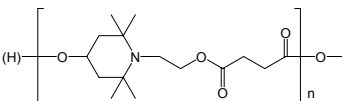
UV Absorbers (UVAs)

		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGSORB® CS 900 2-[2-hydroxy-3,5-di(1,1-dimethylbenzyl)phenyl]-2H-benzotriazole CAS NO. 70321-86-7 Solid Benzotriazole		448	138.0 ~ 142.0	n-Butanol < 0.05 n-Butyl acetate 2.0 MIBK 0.1 2-Butoxyethanol (butyl cellosolve) 0.05 Solvesso 100 0.2 Solvesso 150 2.0 Distilled water < 0.05 Xylene 12.5 Toluene 18.0 n-Hexane 2.0
SONGSORB® CS 1000 2-(2'-Hydroxy-5'-methylphenyl) benzotriazole CAS NO. 2440-22-4 Solid Benzotriazole		225	128.0 ~ 132.0	n-Butanol 0.05 n-Butyl acetate 4.0 MIBK 4.0 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 5.0 Solvesso 150 6.0 Distilled water < 0.05 Xylene 6.0 Toluene 7.0 n-Hexane 0.1
SONGSORB® CS 171 mixture of: isomers of 2-(2 H-benzotriazol-2-yl)-4- methyl-(n)-dodecylphenol; isomers of 2-(2 Hbenzotriazol-2-yl)-4-methyl-(n)-tetracosylphenol; isomers of 2-(2 H- benzotriazol-2-yl)-4-methyl-5,6- didodecyl-phenol. n = 5 or 6 CAS NO. 125304-04-3 Liquid Benzotriazole		Mix	-	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50
SONGSORB® CS 81 2-hydroxy-4-n-octoxybenzophenone CAS NO. 1843-05-6 Solid Benzophenone		326	> 47.0	n-Butanol 0.15 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) 0.9 Solvesso 100 7.0 Solvesso 150 5.5 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane 18.0
SONGSORB® CS 312 N-(2-ethoxyphenyl)-N'-(2-ethylphenyl) ethanediamide CAS NO. 23949-66-8 Solid Oxanilide		312	124.0 ~ 128.0	n-Butanol < 0.05 n-Butyl acetate 2.0 MIBK 1.7 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 0.5 Solvesso 150 0.5 Distilled water < 0.05 Xylene 5.0 Toluene 7.5 n-Hexane < 0.1
SONGSORB® CS UV1 Ethyl 4-[[[(methylphenylamino)methylene]amino] benzoate CAS NO. 57834-33-0 Liquid Formamidine		282	26.0 ~ 28.0	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane < 0.05
SONGSORB® CS 3035 2-Propenoic acid, 2-cyano-3,3-diphenyl-, ethyl ester CAS NO. 5232-99-5 Solid Cyanoacrylate		277	95.0 ~ 100.0	n-Butanol < 0.05 n-Butyl acetate 16.5 MIBK 0.2 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 < 0.1 Solvesso 150 < 0.1 Distilled water < 0.05 Xylene 15.0 Toluene 29.5 n-Hexane < 0.1

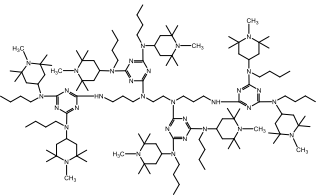
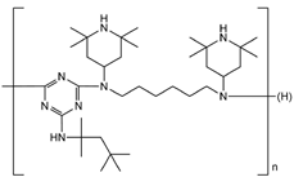
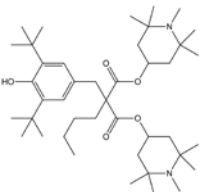
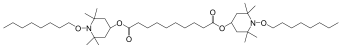
UV Absorbers (UVAs)

		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGSORB® CS 1577 2-(4,6-diphenyl-1,3,5-triazine-2-yl)-5-hexyloxy phenol CAS NO. 147315-50-2 Solid Triazine		425	147.0 ~ 151.0	n-Butanol < 0.05 n-Butyl acetate < 0.1 MIBK 0.9 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 0.2 Solvesso 150 0.2 Distilled water < 0.05 Xylene 5.5 Toluene 6.0 n-Hexane < 0.1
SONGSORB® CS 400 SONGSORB® CS 400 MPA Mixture of 2-[4-[(2-Hydroxy-3-dodecyloxypropyl)oxy]-2-hydroxyphenyl]-4,6-bis(2,4-dimethylphenyl)-1,3,5-triazine CAS No. 153519-44-9 Liquid Triazine		646	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50
SONGSORB® CS 460 2,4-Bis(2-hydroxy-4-butyloxyphenyl)-6-(2,4-bis-butyloxyphenyl)-1,3,5-triazine CAS No. 208343-47-9 Solid Triazine		629.79	93 - 102	n-Butanol < 0.1 n-Butyl acetate 4.0 MIBK 6.0 2-Butoxyethanol (butyl cellosolve) < 0.1 Solvesso 100 33 Solvesso 150 35 Distilled water < 0.1 Xylene 37 Toluene > 50 n-Hexane < 0.1

Hindered Amine Light Stabilizers (HALS)

		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGSORB® CS 292 Mixture of bis (1,2,2,6,6-pentamethyl-4-piperidyl)-sebacate and 1-(methyl)-8-(1,2,2,6,6-pentamethyl-4-piperidyl)-sebacate CAS NO. 41556-26-7 / 82919-37-7 Liquid N-alkyl HALS		509/370	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50
SONGSORB® CS 770 Bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate CAS NO. 52829-07-9 Solid N-H HALS		481	81.0 ~ 85.0	n-Butanol > 50 n-Butyl acetate 42.5 MIBK 21.5 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 < 0.05 Solvesso 150 < 0.05 Distilled water < 0.05 Xylene 49.0 Toluene > 50 n-Hexane < 0.1
SONGSORB® CS 622 Polymer of dimethyl succinate and 4-hydroxy-2,2,6,6-tetramethyl-1-piperidine ethanol CAS NO. 65447-77-0 Solid N-alkyl HALS		3100 ~ 4000	> 55.0 (softening point)	n-Butanol < 0.05 n-Butyl acetate 0.3 MIBK 18.0 2-Butoxyethanol (butyl cellosolve) 0.1 Solvesso 100 0.5 Solvesso 150 0.5 Distilled water < 0.05 Xylene 35.0 Toluene 7.1 n-Hexane < 0.1

Hindered Amine Light Stabilizers (HALS)

		Molecular Weight	Melting Range (°C)	Solubility (g/100 g solvent at 25°C)
SONGSORB® CS 119 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)- CAS NO. 106990-43-6 Solid N-alkyl HALS		2286	115.0 ~ 150.0	n-Butanol < 0.05 n-Butyl acetate 0.3 MIBK > 50 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 14.0 Solvesso 150 12.0 Distilled water < 0.05 Xylene 24.0 Toluene 25.0 n-Hexane < 0.1
SONGSORB® CS 944 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" CAS NO. 71878-19-8 Solid N-H HALS		2000-3100	100.0 ~ 135.0	n-Butanol 0,85 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) 0,1 Solvesso 100 0,3 Solvesso 150 0,2 Distilled water < 0,05 Xylene > 50 Toluene > 50 n-Hexane 6,0
SONGSORB® CS 144 Bis (1,2,2,6,6-pentamethyl-4-piperidinyl)-[[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylmalonate CAS NO. 63843-89-0 Solid N-alkyl HALS		685	146.0 ~ 150.0	n-Butanol < 0.05 n-Butyl acetate 6,5 MIBK 7,0 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 < 0.05 Solvesso 150 < 0.05 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane < 0.05
SONGSORB® CS 5100 Decanedioic acid, bis(2,2,6,6-tetramethyl-1-(octyloxy)-4-piperidinyl)ester, reaction products with 1,1-dimethylethyl-hydroperoxide and octane CAS NO. 129757-67-1 Liquid N-OR HALS		737	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water < 0.05 Xylene > 50 Toluene > 50 n-Hexane > 50
SONGSORB® CS AQ01 POE (n) 2,2,6,6-tetramethyl-4-piperidinol CAS No. Proprietary Liquid N-Alkyl HALS	Proprietary information	Polymer, confidential information	—	n-Butanol > 50 n-Butyl acetate > 50 MIBK > 50 2-Butoxyethanol (butyl cellosolve) > 50 Solvesso 100 > 50 Solvesso 150 > 50 Distilled water 18,0 Xylene > 50 Toluene > 50 n-Hexane < 0.1
SONGSORB® CS 111 Synergistic mixture of a methylated high molecular weight and an oligomeric hindered amine light stabilizers (HALS) CAS No. 65447-77-0 + 106990-43-6 Solid N-alkyl / N-alkyl HALS blend	Mixture of SONGSORB® CS 622 and SONGSORB® CS 119	2100-3000	115.0 ~ 150.0	n-Butanol < 0.05 n-Butyl acetate 0.3 MIBK 20.0 2-Butoxyethanol (butyl cellosolve) < 0.05 Solvesso 100 0.5 Solvesso 150 0.5 Distilled water < 0.05 Xylene 25.0 Toluene 7.0 n-Hexane < 0.1

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 Loss of mechanical properties Embrittlement	Yellowing Loss of adhesion Blistering	Loss of mechanical properties Surface defects Pigment fading Loss of water impermeability
Field	Coatings, adhesives, sealants	Underneath substrate Deeper material layers	Coating or sealant surface 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

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
180 kg Steel Drum
200 kg Steel Drum
900 kg IBC
1000 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



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

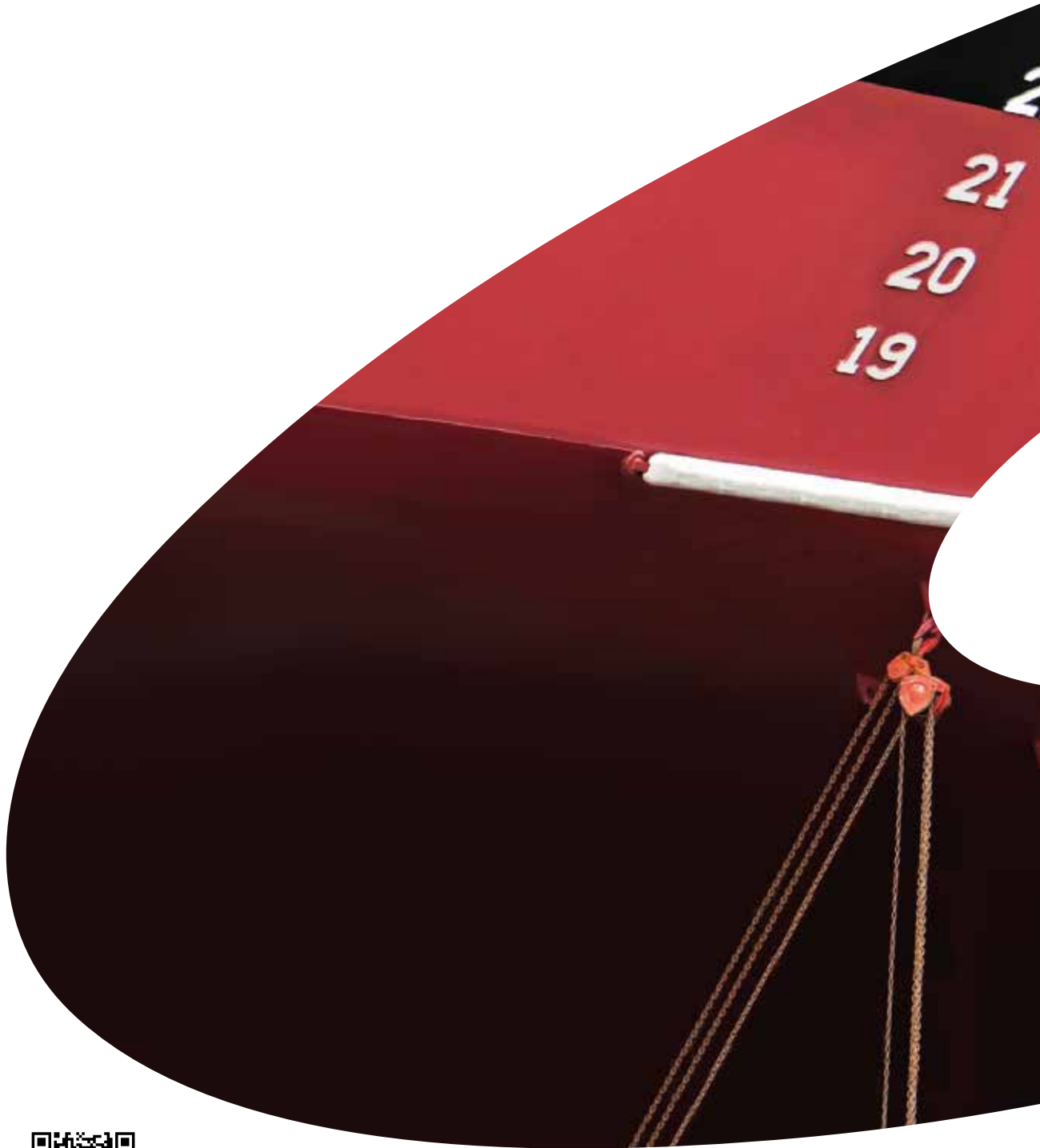
A leader in the development, production and supply of specialty chemicals, SONGWON's products touch your life every day, everywhere. Since 1965, we've been driving innovation, partnering for progress and paving the way for a better more sustainable tomorrow with 360° customized solutions.

Headquartered in South Korea, SONGWON is the 2nd 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:

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