

CYASORB®

LIGHT STABILIZERS

NEXT GENERATION LIGHT STABILIZERS

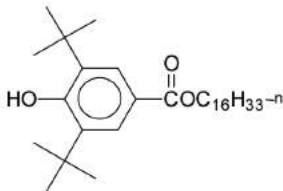
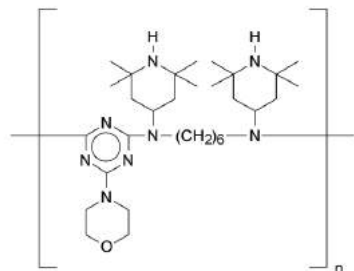
Composition	CYASORB THT 4611 1, 6-Hexanediamine, N, N'-Bis(2,2,6,6-tetramethyl-4-piperidiny)-, Polymers with 2,4-Dichloro-6-(4-morpholinyl)-1,3,5-triazine 2-[4,6-Bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol CAS Number 82451-48-7 CAS Number 2725-22-6	CYASORB THT 4801 Proprietary	CYASORB THT 4802 Proprietary
Structure	Proprietary Ratio	Proprietary	Proprietary
Typical Properties	TGA, T-10% 343°C Melting Point 75-90°C Product Form Pastille Solubility (g/100 g @ 25°C) Acetone 12.4 1-butanol <5 Ethyl acetate 27.4 n-Heptane 5.1 Toluene 10.9 Water <5 Mixed xylenes 14.3	Melting Point 75-90°C Product Form Pastille Solubility Soluble in many organic solvents	Melting Point 85-95°C Product Form Pastille Solubility Soluble in many organic solvents
Suggested Uses	Polyolefins- PP, PE, HDPE, LDPE, LLDPE TPO, and TPE. Polyamides.	Polyolefins, especially LLDPE, HDPE, mPE, and LDPE.	Polyolefins, especially LLDPE, HDPE, mPE, PP and LDPE.
Performance Benefits	• Extraordinary UV stabilization efficiency • Low color and volatility • Extraction resistant • Excellent LTHA properties	• Extraordinary UV stabilizing efficiency • Very low color	• Extraordinary UV stabilizing efficiency • Very low color • Improved color stability on thermal aging • Lower reactivity with acidic by-products • Compatible with UV absorbers

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Composition	CYASORB UV-6408 Proprietary		CYASORB THT 6435 1,6-Hexanediamine, N,N'-Bis(2,2,6,6-tetramethyl-4-piperidiny)-, polymers with morpholine-2,4,6-trichloro-1,3,5-triazine reaction products, methylated 2-[4,6-Bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol CAS Number 193098-40-7 CAS Number 2725-22-6		CYASORB THT 6460 Proprietary	
	Proprietary		Proprietary Ratio		Proprietary	
Structure	Proprietary		Proprietary Ratio		Proprietary	
Typical Properties	Product Form	Compacted granular	TGA, T-10% (heating rate 10°C/min in air)	331°C	TGA, T-10% (heating rate 10°C/min in air)	327°C
	Solubility Soluble in many organic solvents		Melting Point	85-95°C	Melting Point	85-95°C
Suggested Uses	Polyolefins-LLDPE, HDPE, mPE, and LDPE.		Polyolefins- PP, PE, HDPE, LDPE, LLDPE TPO, and TPE. Polyamides.		Polyolefins- PE, HDPE, LDPE, LLDPE, and TPE.	
	Polyolefins-LLDPE, HDPE, mPE, and LDPE.		Polyolefins- PP, PE, HDPE, LDPE, LLDPE TPO, and TPE. Polyamides.		Polyolefins- PE, HDPE, LDPE, LLDPE, and TPE.	
Performance Benefits	• Superior UV stabilization in agricultural film applications, especially mulch film • Higher resistance to pesticides • Excellent UV stabilization in flame retardant systems • Excellent LTHA properties		• Extraordinary UV stabilization efficiency • Low color and volatility • Extraction resistant • Enhanced gas fade resistance • Resistance to agricultural chemicals and acidic by-products • Superior LTHA properties		• Superior UV stabilization in agricultural film applications • Low color and volatility • Extraction resistant • Enhanced gas fade resistance • Outstanding resistance to agricultural chemicals • Superior LTHA properties • Excellent persistence	
	• Superior UV stabilization in agricultural film applications, especially mulch film • Higher resistance to pesticides • Excellent UV stabilization in flame retardant systems • Excellent LTHA properties		• Extraordinary UV stabilization efficiency • Low color and volatility • Extraction resistant • Enhanced gas fade resistance • Resistance to agricultural chemicals and acidic by-products • Superior LTHA properties		• Superior UV stabilization in agricultural film applications • Low color and volatility • Extraction resistant • Enhanced gas fade resistance • Outstanding resistance to agricultural chemicals • Superior LTHA properties • Excellent persistence	

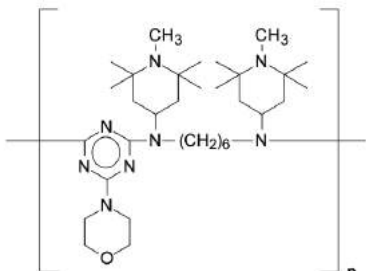
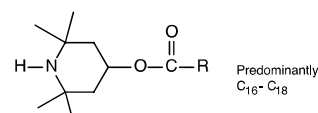
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LIGHT STABILIZERS

	NEXT GENERATION LIGHT STABILIZERS	HINDERED BENZOATE	HINDERED AMINES
Composition	CYASORB THT 7001EF Proprietary	CYASORB UV-2908 3,5-Di- <i>tert</i> -butyl-4-hydroxybenzoic acid, hexadecyl ester CAS Number 67845-93-6	CYASORB UV-3346 1,6-Hexanediamine, N, N'-Bis(2,2,6,6-tetramethyl-4-piperidinyl)-, Polymers with 2,4-Dichloro-6-(4-morpholinyl)-1,3,5-triazine CAS Number 82451-48-7
Structure	Proprietary		
Typical Properties	TGA, T-10% 276°C (heating rate 10°C/min in air) Melting Point 60-95°C Product Form Granular Solubility (g/100 g @ 25°C) Acetone <5 1-butanol <5 Ethyl acetate 31.3 n-Heptane 8.5 Toluene 27.6 Water <5 Mixed xylenes 13.5	TGA, T-10% 291°C (heating rate 10°C/min in air) Melting Point 58°C Molecular Weight 475 Product Form Powder Solubility (g/100 g @ 25°C) Acetone 8.3 Chloroform 61.1 Hexane 35.9 Methanol 1.3 Toluene 53.5	TGA, T-10% 340°C (heating rate 10°C/min in air) Melting Point 90-100°C Molecular Weight 1,600 +/-10% Product Form Pastille, powder Solubility (g/100 g @ 25°C) Acetone 14.5 1-butanol 8.1 Ethyl acetate 14.1 n-Heptane <5 Toluene 30.9 Water <5 Mixed xylenes 25.8
Suggested Uses	Polyolefins, especially TPO.	PE-Film, Tape, Injection & Rotational Molding. PP- Film, Tape, Injection Molding, Flame Retarded Plastics, TPO. PET, PBT, PC, and Flexible PVC.	PE- Film, Tape, Injection & Rotational Molding, Sheet, Metallocene. PP- Film, Tape, Fiber, Injection Molding, TPO. Polyacetals, Polyamides, PET, PBT, ASA, ABS, HIPS, PMMA and PUR.
Performance Benefits	- Outstanding UV stability - Excellent color stability - Non-blooming and non-fogging - No effect on paintability - Very low volatility - Resistant to mold deposit - Low interaction with halogenated flame retardants	- Potent, UV stable, radical scavenger - Gas fade resistant and low in basicity - Performance synergy with HALS - Superb protection in polypropylene, and in flame retardant polyolefin systems	- High molecular weight, oligomeric HALS - Very low color contribution - Exceptional, long term protection for all polyolefin applications

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LIGHT STABILIZERS

Composition	CYASORB UV-3529 1,6-Hexanediimine, N,N'-Bis(2,2,6,6-tetramethyl-4-piperidinyl)-, polymers with morpholine-2,4,6-trichloro-1,3,5-triazine reaction products, methylated CAS Number 193098-40-7	CYASORB UV-3808PP5 Proprietary	CYASORB UV-3853 Hindered Amine Light Stabilizer (HALS) CAS Number 167078-06-0
Structure		Proprietary	
Typical Properties	TGA, T-10% 350°C (heating rate 10°C/min in air) Melting Point 85-95°C Molecular Weight 1,700 +/-10% Product Form Pastille Solubility Soluble in many organic solvents	TGA, T-10% 266°C (heating rate 10°C/min in air) Melting Point 135-159°C Product Form Pellet	TGA, T-10% 249°C (heating rate 10°C/min in air) Melting Point >28°C Product Form Waxy solid Solubility (g/100 g @25°C) Acetone 2.2 Benzene 40.9 Ethanol 37.0 Ethyl Acetate 4.0 Toluene 24.9
Suggested Uses	PE- Film, Tape, Injection & Rotational Molding, Sheet, Metallocene. PP- Film, Tape, Fiber, Injection Molding, TPO. Polyacetals, Polyamides, PET, PBT, ASA, ABS, HIPS, Rigid and Flexible PVC, PMMA, and PUR.	Polyolefins, especially TPO.	PE- Tape, Injection Molding, Sheet, Metallocene. PP- Film, Tape, Fiber, Injection Molding, TPO. Polyacetals, Polyamides, ASA, ABS, HIPS, SAN, and PUR.
Performance Benefits	• Lower reactivity with acidic by-products • Minimal color contribution • Low volatility • Excellent compatibility with other HALS and UVAs	• Excellent surface stabilization • Low color contribution • Low volatility • Good compatibility with polyolefins with no observed blooming • Available in easy handling form	• Low MW HALS concentrate in PP, affording superior surface property protection • High solubility/compatibility with polyolefins and styrenics • Performance synergy with other stabilizers, especially high molecular weight HALS and UV absorbers

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LIGHT STABILIZERS

HINDERED AMINES

Composition	CYASORB UV-3853PP4/PP5	
	CYASORB UV-3853PP4 - 40% HALS in PP	
	CYASORB UV-3853PP5 - 50% HALS in PP	
	CAS Number (HALS)	167078-06-0
	CAS Number (PP)	9003-07-0

CYASORB UV-3853S

50% Hindered Amine Light Stabilizer (HALS) in an LDPE Resin

CAS Number (HALS)	167078-06-0
CAS Number (PE)	9002-88-4

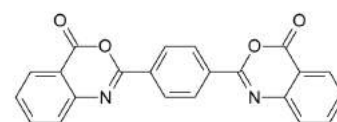
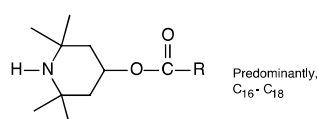
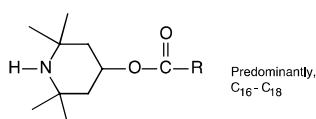
BENZOXAZINONE

CYASORB UV-3638F

2,2'-(1,4-Phenylene)bis[4H-3,1-benzoxazin-4-one]

CAS Number	18600-59-4
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Structure



Typical Properties	Product Form	Pellet	Melting Point	>28°C	TGA, T-10% (heating rate 10°C/min in air)	371°C
			Product Form	Powder	Melting Point	315°C
					Molecular Weight	369
					λ_{max} , nm	349
					Absorption Coefficient at Maxima (10 mg UV/L Methylene Chloride)	127.3
					Product Form	Powder, granular
					Solubility (g/100 g @ 25°C)	
					Acetone	<1
					Butyl Acetate	<1
					Chlorobenzene	<1
					Methyl Isobutyl Ketone	<1
					Xylene	<1
Suggested Uses	PE- Tape, Injection and Blow Molding, PP- Injection Molding, Tape, Film, and Fiber. TPO, Polyolefin Alloys, HIPS, ABS, and ASA.		PE- Tape, Injection Molding, Sheet, Metallocene. PP- Film, Tape, Fiber, Injection Molding, TPO. Polyacetals, ASA, ABS, and HIPS.		PET Film, Fiber, Containers, PETG, PC-Capstock and PC Molding.	
Performance Benefits	- Low MW HALS concentrate in PP - Non agglomerating, easy to handle form - High solubility/compatibility in polyolefins/styrenics - Performance synergy with other light stabilizers		- Low MW HALS concentrate (50%) in PE for ease in handling - High solubility/compatibility with polyolefins and styrenics - Performance synergy with other stabilizers, especially high molecular weight HALS and UV absorbers		- Very strong and broad UV absorption with no color contribution - Extremely low volatility - High UV screening efficiency - Excellent stabilization for polyesters and polycarbonates	

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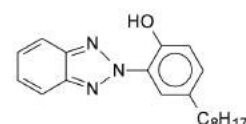
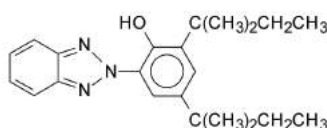
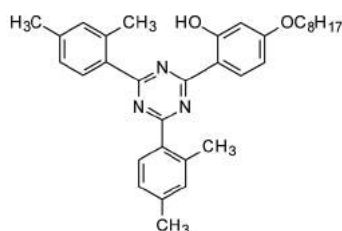
LIGHT STABILIZERS

TRIAZINE

BENZOTRIAZOLES

Composition	CYASORB UV-1164 2-[4,6-Bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol	CYASORB UV-2337 2-(2'-Hydroxy-3', 5'-di- <i>tert</i> -amylphenyl)-benzotriazole	CYASORB UV-5411 2-(2'-Hydroxy-5'-octylphenyl) benzotriazole
	CAS Number 2725-22-6	CAS Number 25973-55-1	CAS Number 3147-75-9

Structure



Typical Properties	TGA, T-10% (heating rate 10°C/min in air)	347°C	TGA, T-10% (heating rate 10°C/min in air)	247°C	TGA, T-10% (heating rate 10°C/min in air)	247°C
	Melting Point	88-91°C	Melting Point	79-88°C	Melting Point	103-105°C
	Molecular Weight	509	Molecular Weight	352	Molecular Weight	323
	λ_{max} , nm	342, 293	λ_{max} , nm	348	λ_{max} , nm	346
	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	43.4, 80.4	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	41.8	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	49.3
	Product Form	Powder	Product Form	Powder	Product Form	Powder, granular
	Solubility (g/100 g @25°C)		Solubility (g/100 g @ 25°C)		Solubility (g/100 g @ 25°C)	
	Butanol	3	<i>n</i> -Butyl Acetate	32	Benzene	65
	Butyl Acetate	17	Methyl Amyl Ketone	30	<i>n</i> -Butyl Acetate	245
	Methyl Amyl Ketone	17	Methyl Ethyl Ketone	30	Methylene Chloride	70.9
	1-Methoxy-2-Propanol Acetate	11	Methyl Isobutyl Ketone	34	Styrene	49.7
	Xylenes	25	Xylene	50	Xylene	50
Suggested Uses	PE-Film, Tape, Sheet, Metallocene. PP-Film, Tape, Fiber, TPO. Polyacetal, Polyamides, PC-Capstock, PC-General Purpose, PET, PBT, ASA, ABS, PETG and PMMA.		PP- Injection Molding, TPO. Polyacetals, Polyamides, PET, ASA, ABS, HIPS, PS, SAN, Rigid and Flexible PVC, Thermoset Polyester, PMMA and PUR.		PP- Injection Molding, TPO. Polyacetals, Polyamides, PC, PET, PBT, ASA, ABS, HIPS, PS, SAN, Rigid and Flexible PVC, Thermoset Polyester, PMMA and PUR.	
Performance Benefits	- Strong absorbance in UV-A and UV-B regions - High permanence (very low volatility, high inherent light stability) - High solubility/compatibility in polyolefins and engineering polymers		- Strong and broad UV absorption - High solubility/compatibility with polymers and coatings - Low interaction with metals		- Strong UV absorber with low color contribution - Excellent inherent light stability - Exceptional UV protection for PC and engineering polymers	

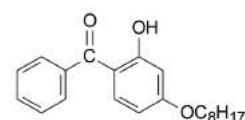
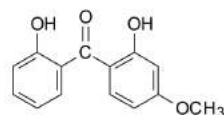
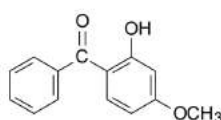
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BENZOPHENONES

Composition	CYASORB UV-9 2-Hydroxy-4-methoxybenzophenone	CYASORB UV-24 2,2'-Dihydroxy-4-methoxybenzophenone	CYASORB UV-531 2-Hydroxy-4- <i>n</i> -octoxybenzophenone
	CAS Number 131-57-7	CAS Number 131-53-3	CAS Number 1843-05-6

Structure



Typical Properties	Melting Point	62°C	Melting Point	68°C	Melting Point	47°C
	Molecular Weight	228	Molecular Weight	244	Molecular Weight	326
	$\lambda_{\max}$, nm	328	$\lambda_{\max}$, nm	356	$\lambda_{\max}$, nm	329
	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	41.7	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	54.1	Absorption Coefficient at Maxima (10 mg UV/L of Toluene)	31.7
	Product Form	Powder	Product Form	Powder	Product Form	Powder and flake
	Solubility (g/100 g @ 25°C)		Solubility (g/100 g @ 25°C)		Solubility (g/100 g @ 25°C)	
	Benzene	128	Benzene	46.6	Acetone	74.3
	95% Ethanol	6.2	Butyl Acetate	38.1	Benzene	72.7
	Methylene Chloride	147	Methyl Ethyl Ketone	55.3	Ethyl Acetate	180
	Styrene	105	Xylene	30.6	Methyl Ethyl Ketone	65
					Toluene	70
Suggested Uses	PS, Rigid and Flexible PVC, Thermoset-Polyester, and PMMA.		PET, Flexible PVC, and PUR.		PE-Film, Tape, Injection & Rotational Molding, Metallocene. PP-Film, Tape, Fiber, Injection Molding, TPO. Rigid and Flexible PVC.	
Performance Benefits	- Highly efficient UV absorber - Low color contribution - Ideal for use in PVC and thermoset polyester		- Strong and broad UV absorption - Good solubility/compatibility with polymers and coatings - High screening efficiency		- Strong UV absorber with low color contribution - High solubility/compatibility with polymers, especially polyolefins - Performance synergy with HALS and nickel quenchers	