SINOPCC GROUP

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LIGHT STABILIZERS
UV ABSORBERS

TINTOLL Sustainable Innovation for a Better Future

TINTOLL STABILIZERS

As one of the leading specialty chemical companies in the innovative technology of performance additives, TINTOLL contributes to value creation by providing innovative and sustainable solutions to customers from many industries. Our product portfolio includes more than 100 distinctive UV absorbers, light stabilizers, antioxidants to enhance the performance and durability of materials such as plastics, coatings and cosmetics, and photoinitiators in energy curing coatings. Our goal is to be the world's most innovative provider of polymer stabilizing additives solutions.

We keep pursuing the outstanding goal by our professional experience and the excellent team work gathering with research and manufacture to keep delivering innovative green products to echo the voices from governments, customers and consumers.

We keep developing and innovating better polymer additives to improve the superior quality of working temperature, compatibility, anti-oxidation and weather resistance under high temperature or UV light to polymer. This would extend polymer's life time to reduce pollution and be more environmentally friendly to our world.

Since our foundation, we have continued to add new products to our PowerSorb line, including Benzophenones, Benzotriazoles, Benzonates, and Triazines based UV Absorber; PowerStab line, including HALS (hindered amine light stabilizers); PowerNox line, including Phosphite antioxidants, Thioether antioxidant and HAPO (Hindered Phenols Antioxidants); and PowerCure line, including Free Radical Photoinitiators, Cationic Photoinitiators and Polymeric Photoinitiators.

In order to guarantee the quality and availability customers expect, TINTOLL pursues a strategy of backward integration. Equipped with precise monitoring systems, our factories are run with state-of-the-art equipment and continuously upgraded.

We deliver the highest quality products in a timely manner according to the changing needs of our customers, leveraging our expertise and assets to generate economies of scale and increase efficiency and throughput. And, should your requirements exceed our current capacity or capabilities, we stand ready to invest in enhancing or expanding facilities, equipment or processes.

We are committed to improving our manufacturing processes, not only for operational efficiency, but also for the sustainability and safety of our operations and the surrounding environment. Our plants, with fully integrated by-product recovery and recycling, aim to achieve zero by-product or waste generation through a balanced plant concept.

We achieve sustainable growth by reducing energy consumption by developing new and innovative technologies around new and existing products. Our ISO-9001 certification further demonstrates our commitment to international quality standards. ISO-9001 certification further demonstrates our commitment to international quality standards.

TINTOLL Sustainable Innovation for a Better Future

TINTOLL STABILIZERS

WHY SELECT TINTOLL?

FOCUSING ON CUSTOMERS' NEEDS

TINTOLL is dedicated to customer's needs of polymer stabilizing additives and photoinitatiors in UV curing coatings, constantly developing new products and offering integrated raw material solutions.

INNOVATION AND TECHNOLOGIES

Innovation at TINTOLL is defined by our core value of sustainability and builds on our key strengths: superior scientific expertise, state-of-the-art technology, global marketing and sales network, and global regulatory experience.

COMPREHENSIVE CUSTOMER SUPPORT

TINTOLL supports customers at every stage of the product development process: from the evaluating promising products, to sample testing, to scale production and delivery, together with formulations.

SUSTAINABLE AND RELIABLE SUPPLY

We want to contribute towards a brighter, sustainable future and therefore maintain our competitive edge by creating economic benefits through proprietary technology, economies of scale, and backward integration.

TINTOLL Sustainable Innovation for a Better Future

LIGHT STABILIZERS

Exposure of plastics to light, heat and oxygen promotes the degradation of plastics, adversely affecting durability. UV radiation can break chemical bonds in polymers. This photodegradation eventually leads to cracking, chalking, color changes, and loss of physical properties such as impact strength, tensile strength, elongation, and others. In addition to the effects of UV radiation, the weathering of plastics also includes environmental factors such as temperature, precipitation, and the presence of pollutants.

The addition of light stabilizers can effectively prevent the photodegradation of polymers. TINTOLL's comprehensive range of solutions including hindered amine light stabilizers (commonly known as HALS), hindered benzoates and UV absorbers can mitigate degradation of plastics exposed to harmful UV radiation and achieve excellent lifetime.

UV stabilizers can be divided into UV absorbers and hindered amine light stabilizers (HALS):

UV absorbers slow down the degradation process by preferentially absorbing harmful UV radiation and dissipating it as heat.

Therefore, UV absorbers can effectively protect the contents in packaging products (such as wrapping films or bottles, etc.). UV absorbers also protect other UV-sensitive additives such as pigments and flame retardants.

LIGHT STABILIZERS

HALS are very effective stabilizers for polymers, especially polyolefins. They do not absorb UV radiation, but inhibit polymer degradation by scavenging free radicals. Remarkable plateaus are achieved at relatively low concentrations. The high efficiency and long life of HALS is due to a cyclic process where HALS are regenerated rather than consumed during stabilization.

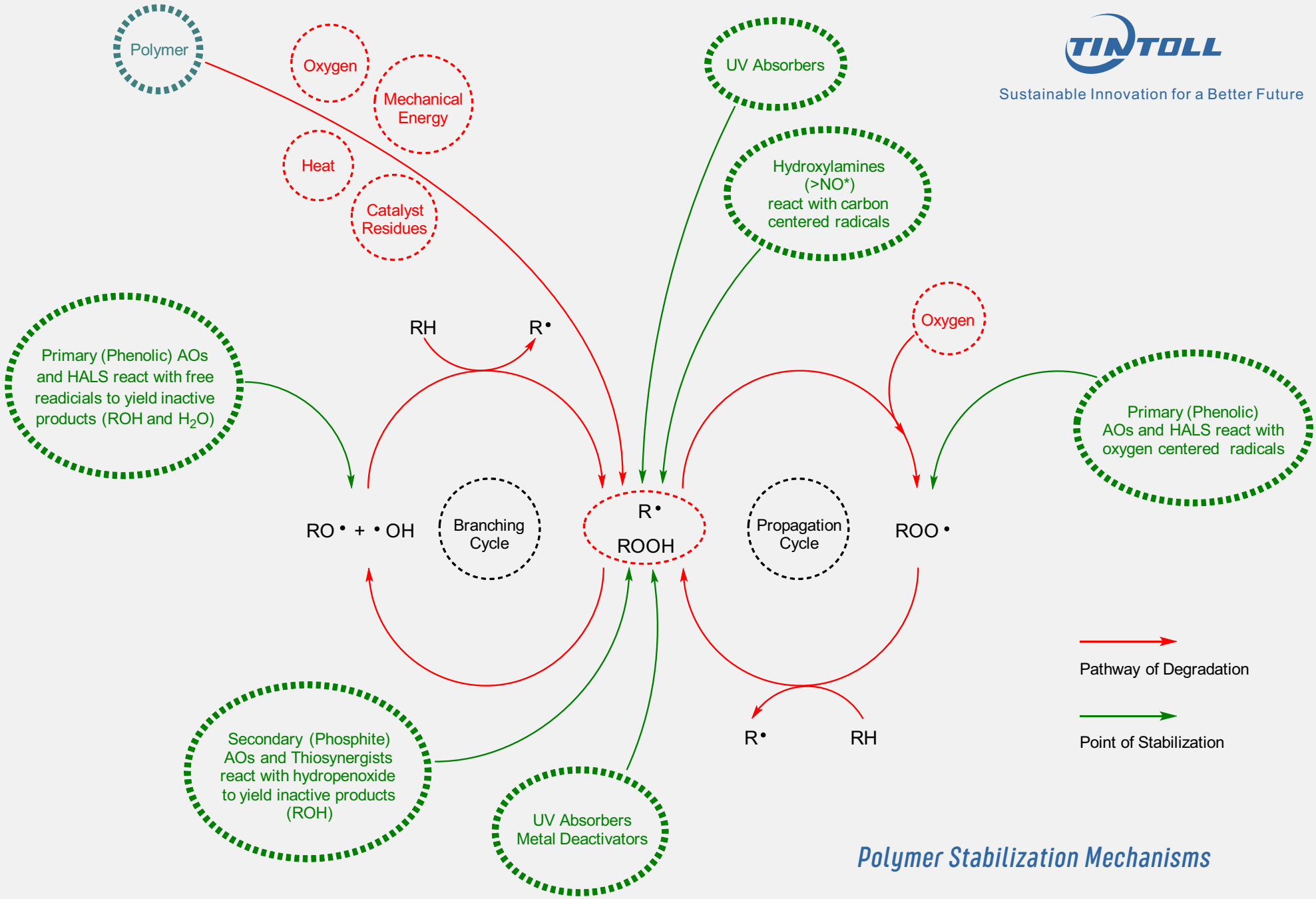
Therefore, HALS are the most effective additives for light stabilization of polyolefins and they are very effective in high surface area applications such as films and fibers. HALS are also efficient heat stabilizers that can prolong the service life of polyolefin products.

Selection of an appropriate light stabilization system depends on material type, end application, material thickness, environment of use, interaction with other components of the system, and performance and cost expectations.

Ultraviolet absorbers (UVA) and hindered amine light stabilizers (HALS) are often used together to show a synergistic effect to achieve photostabilization of polymeric materials.

Since 1989, TINTOLL has actively participated in the development of innovative light stabilizers and application research, and currently has more than 100 specialty products to meet the diverse needs of customers. TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL also provides customers with light stabilizer development services for special applications.

TINTOLL Sustainable Innovation for a Better Future



TINTOLL

Sustainable Innovation for a Better Future

Polymer Stabilization Mechanisms

HINDERED AMINE LIGHT STABILIZERS

Hindered amine light stabilizers (HALS) are important stabilizers for long-term thermal protection of polymers, and are very effective in inhibiting polymer degradation caused by free radicals at medium and low temperatures.

Hindered Amine Light Stabilizers (HALS) exhibit excellent UV protection by scavenging free radicals generated by photodegradation to prevent polymer degradation. After the chemical scavenges free radicals, it returns to its original structure and repeatedly scavenges free radicals for effective long-term performance.

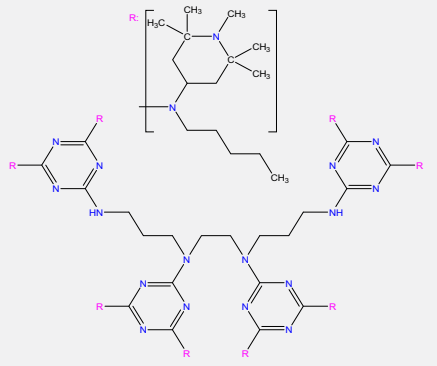
HALS can be classified according to their molecular weight (MW): HALS with a low molecular weight of approximately 200 to 500 g/mole are generally referred to as low MW HALS, while HALS with a molecular weight of 2000 or higher are referred to as high MW HALS. In general, high molecular weight hindered amine stabilizers are more effective than low molecular weight hindered amine stabilizers, and very low molecular weight hindered amine stabilizers do not provide much thermal stability at all.

The high efficiency of HALS is based on a series of complex free radical scavenging reactions. HALS oxidation is a relatively slow and temperature-dependent reaction. They are not very effective at high temperatures (above about 80°C), HALS are often used in combination with primary and secondary antioxidants, so that the combination can show a good synergistic effect.

For more than 30 years, TINTOLL has been committed to providing innovative high-performance light stabilizer and antioxidant solutions to meet the growing and changing technical needs of the global plastics market.

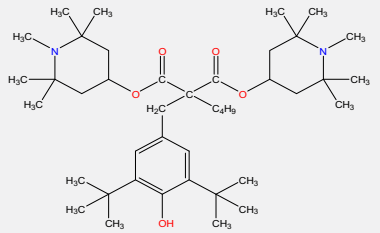
PowerStab™ 119

CAS No.: 106990-43-6



PowerStab™ 144

CAS No.: 63843-89-0



PowerStab™ 119:

N,N',N'',N'''-tetrakis(4,6-bis(butyl-(N-methyl-2,2,6,6-tetramethylpiperidin-4-yl)amino)triazin-2-yl)-4,7-diazadecane-1,10-diamine

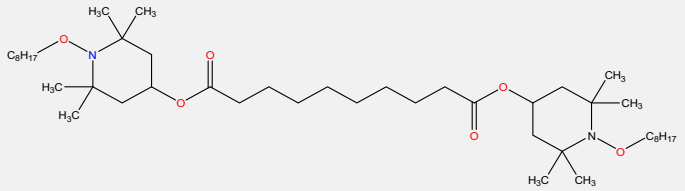
PowerStab™ 144:

Bis(1,2,2,6,6-pentamethyl-4-piperidinyl)-[[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]methyl]butylmalonate

PowerStab™ 123

CAS No.: 129757-67-1

Bis(1-octyloxy-2,2,6,6-tetramethyl-4-piperidyl) sebacate



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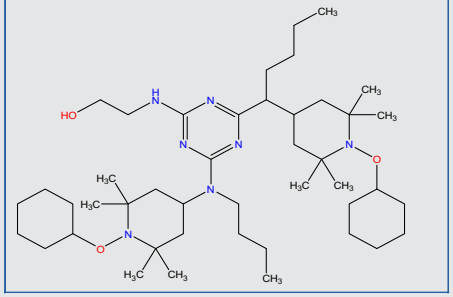
HINDERED AMINE LIGHT STABILIZERS

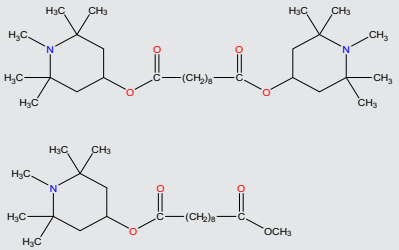
PowerStab™ 152

CAS No.: 191743-75-6



PowerStab™ 292

CAS No.: 41556-26-7, 82919-37-7



PowerStab™ 152:

2-Aminoethanol reaction products with cyclohexane and

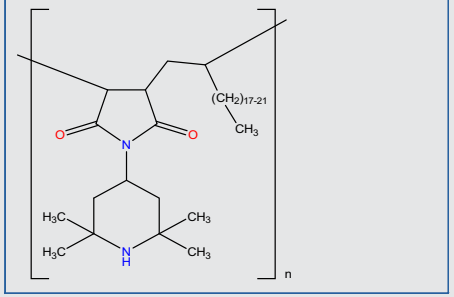
peroxidized N-butyl-2,2,6,6-tetramethyl-4-piperidinamine-2,4,6-trichloro-1,3,5-triazine reaction products

PowerStab™ 292:

Bis(1,2,2,6,6-pentamethyl-4-piperidinyl)-sebacate, 1-(Methyl)-8-(1,2,2,6,6-pentamethyl-4-piperidinyl)-sebacate

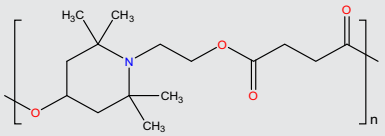
PowerStab™ 505

CAS No.: 152261-33-1



PowerStab™ 622

CAS No.: 65447-77-0



PowerStab™ 505:

Alkenes, C20-24 alpha-, polymers with maleic anhydride, reaction products with 2,2,6,6-tetramethyl-4-piperidinamine

PowerStab™ 622:

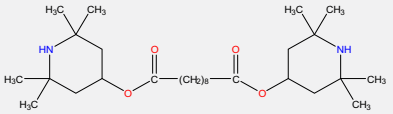
Dimethyl succinate polymer with 4-hydroxy-2,2,6,6-tetramethyl-1-piperidine ethanol

HALS LIGHT STABILIZERS

PowerStab™ 770

CAS No.: 52829-07-9

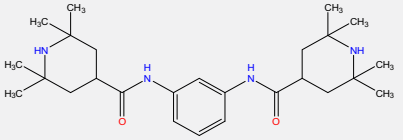
Bis(2,2,6,6-tetramethyl-4-piperidyl) sebacate



PowerStab™ 856

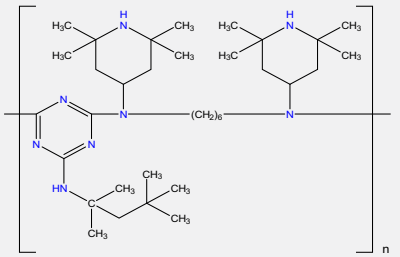
CAS No.: 42774-15-2

N,N'-bis(2,2,6,6-tetramethyl-4-piperidyl)isophthalamide



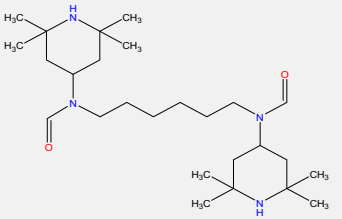
PowerStab™ 944

CAS No.: 71878-19-8



PowerStab™ 945

CAS No.: 124172-53-8



PowerStab™ 944

Poly[[6-[(1,1,3,3-tetramethylbutyl)amino]-1,3,5-triazine-2,4-diyl] [(2,2,6,6-tetramethyl4-piperidinyl)imino]-1,6-hexanediyl-[(2,2,6,6-tetramethyl-4-piperidinyl)imino]]

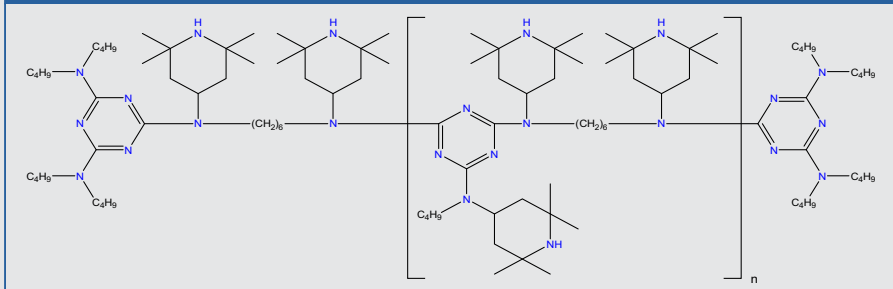
PowerStab™ 945

N,N'-bisformyl-N,N'-bis-(2,2,6,6-tetramethyl-4-piperidinyl)-hexamethylendiamine

PowerStab™ 2020

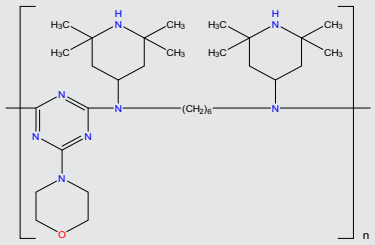
CAS No.: 192268-64-7

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 N-butyl-1-butanamine and N-butyl-2,2,6,6-tetramethyl-4-piperidinamine



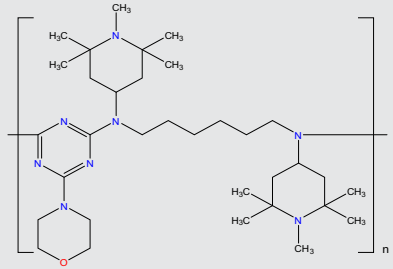
PowerStab™ 3346

CAS No.: 82451-48-7



PowerStab™ 3529

CAS No.: 193098-40-7

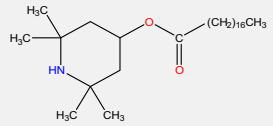


PowerStab™ 3346
N,N'-Bis(2,2,6,6-tetramethyl-4-piperidinyl)-1,6-hexanediamine-2,4-dichloro-6-morpholino-1,3,5-triazine copolymer

PowerStab™ 3529
N,N'-Bis(2,2,6,6-tetramethyl-4-piperidinyl)-1,6-hexanediamine polymers with morpholine-2,4,6-trichloro-1,3,5-triazine reaction products methylated

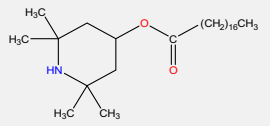
PowerStab™ 3853

CAS No.: 167078-06-0



PowerStab™ 3853PP5

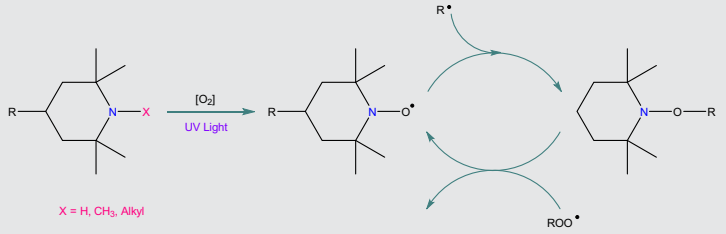
CAS No.: 167078-06-0, 9003-07-0



PowerStab™ 3853
Fatty acids, C12-21 and C18-unsaturated, 2,2,6,6-tetramethyl-4-piperidinyl esters

PowerStab™ 3853PP5
Fatty acids, C12-21 and C18-unsaturated, 2,2,6,6-tetramethyl-4-piperidinyl esters, Polypropylene

HALS REACTION MECHANISM



NICKEL QUENCHERS

Stabilization of agricultural films is a demanding application for polymer additives. Polyethylene films are expected to last for several years, during which time they may be exposed to harsh weather conditions and pesticides. Nickel quencher additives have been used successfully for many years to meet these difficult requirements.

Quenchers work by quenching the energy generated during the photo oxidation reaction, thereby returning the excited molecules to a ground state where they are less likely to propagate the photo oxidation reaction that generates free radicals, thereby protecting the polymer from UV light degradation, preventing or delaying the degradation of polymers. They are pesticide resistant and can be used to protect agricultural films from UV degradation. Nickel organic UV absorbers can also be used in polyolefin fiber applications.

Since 1989, TINTOLL has actively participated in the development of innovative light stabilizers and application research, and currently has more than 100 specialty products to meet the diverse needs of customers. TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL also provides customers with light stabilizer development services for special applications. .

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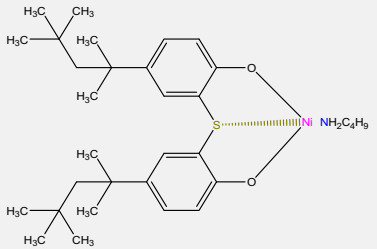
NICKEL QUENCHERS

PowerSorb™ 1084

CAS No.: 14516-71-3

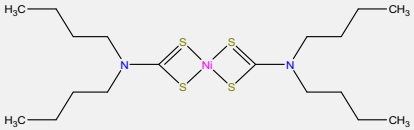
[2,2'-Thiobis(4-t-octylphenolato)]-n-butylamine nickel



PowerStab™ NDBC

CAS No.: 13927-77-0

Nickel(II) Dibutyldithiocarbamate



HALS-BASED BLENDS

Specialty plastics used under harsh conditions require specific stabilization solutions that enable customers to meet industry performance requirements. TINTOLL develops additive solutions based on hindered amine stabilizers (HALS) that provide excellent UV resistance, as well as additional benefits such as agrochemical and heat resistance in greenhouse films and low fogging in automotive parts.

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HALS-BASED BLENDS

PowerStab™ 111

CAS No.: 106990-43-6 + 65447-77-0

HALS Bend of PowerStab 119 and PowerStab 622.

PowerStab™ 783

CAS No.: 65447-77-0 + 70624-18-9

HALS blend of PowerStab 622 and PowerStab 944.

PowerStab™ 791

CAS No.: 52829-07-9 + 70624-18-9

HALS blend of 50% PowerStab 944 and 50% PowerStab 770.

PowerStab™ 5050

CAS No.: 41556-26-7 + 82919-37-7 + 127519-17-9

Blend of PowerStab 292 and PowerSorb 384-2

PowerStab™ 5151

CAS No.: 104810-48-2 + 104810-47-1 + 25322-68-3
41556-26-7 + 82919-37-7

Blend of PowerSorb 1130 and PowerStab 292 at ratio of 2:1

UV ABSORBERS

UV radiation leads to free radical formation and polymer degradation, which reduces the usability, functionality and safety of plastic products. UV absorbers convert photochemical energy into harmless heat, protect UV-sensitive materials from damage caused by free radicals, and prevent polymer degradation. UV absorbers are often combined with other types of light stabilizers such as hindered amine light stabilizers HALS, for optimum weatherability.

TINTOLL offers the plastics industry a range of hindered benzoates, benzotriazoles, benzoxazinones, benzophenones and triazine as high-performance UV absorbers that effectively protect adhesives, plastics, coatings and elastomers from the damaging effects of outdoor weathering caused by exposure to UV light. The selection of UV absorbers should consider the characteristics, melting point, volatility, solubility and absorption spectrum of different products.

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

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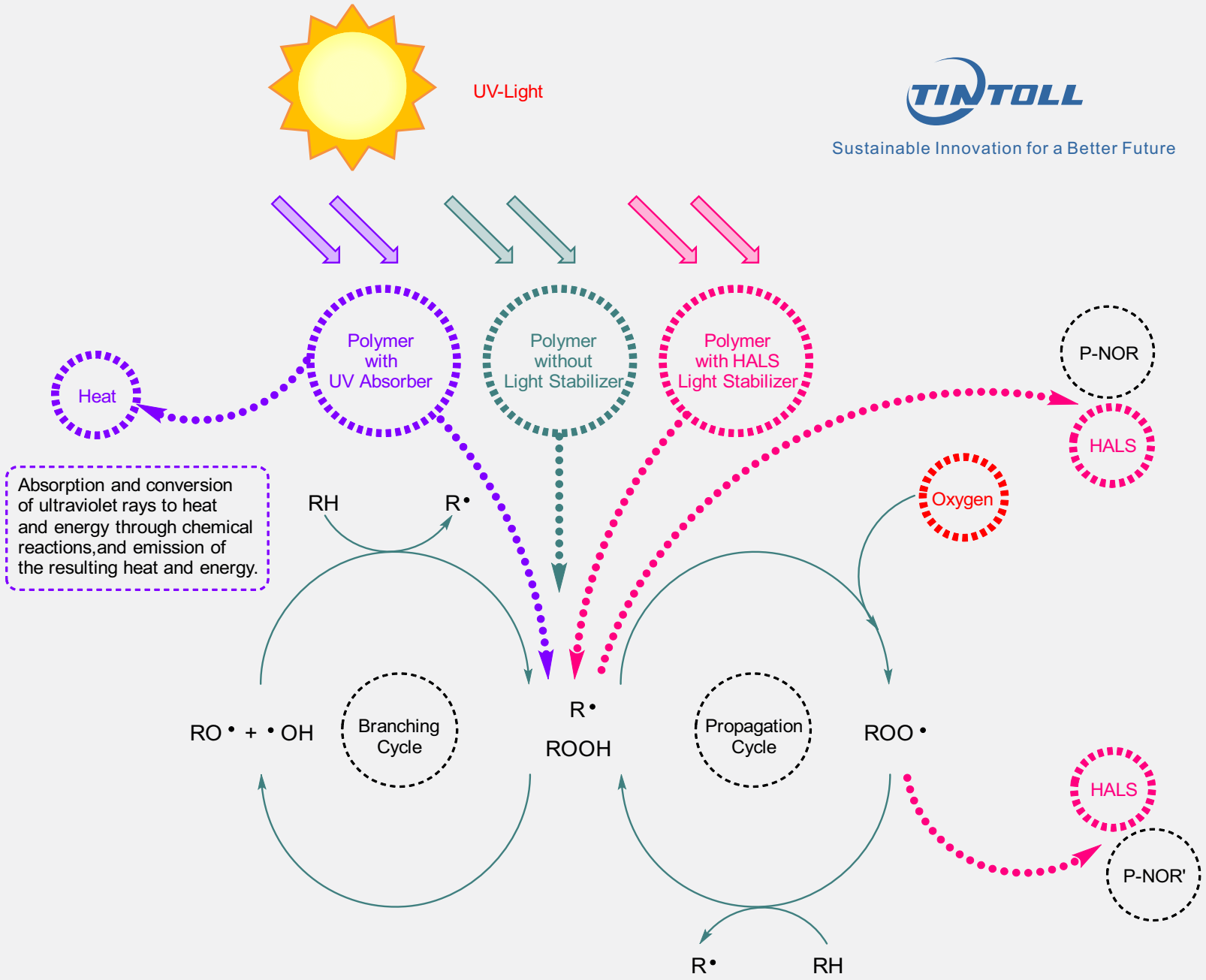
DIFFERENCE BETWEEN LIGHT STABILIZERS AND UV ABSORBERS



Difference between UV Absorbers and Light Stabilizers

BENZOATE UV ABSORBERS

Benzoate UV absorbers can increase the resistance of polyolefins to harmful UV light by scavenging free radicals formed during photo degradation of plastic materials. The use of benzoate UV absorbers together with hindered amine light stabilizers (HALS) creates a synergistic effect, providing superior performance over HALS alone, especially in polyolefin substrates. It has good compatibility with polyolefin substrates, is resistant to extraction, and can be used in many types of polyolefins.

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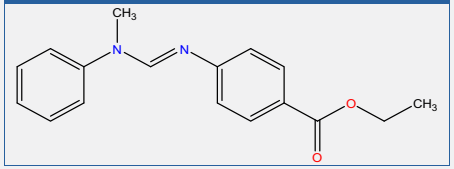
PowerSorb™ 101

CAS No.: 57834-33-0

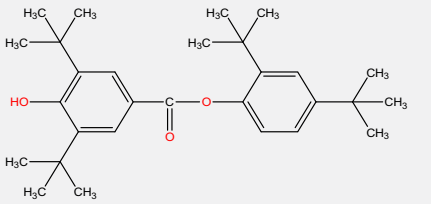
Ethyl 4-[[(methylphenylamino)methylene]amino]benzoate



PowerSorb™ 120

CAS No.: 4221-80-1

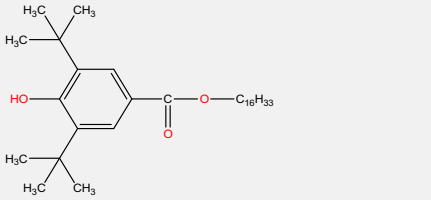
2,4-Di-tert-butylphenyl-4'-hydroxy-3',5'-di-tert-butyl benzoate



PowerSorb™ 2908

CAS No.: 67845-93-6

Hexadecyl-3,5-di-tert-butyl-4-hydroxybenzoate



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

BENZOPHENONE UV ABSORBERS

Benzophenone UV absorbers are general purpose UV absorbers commonly used in polyolefin applications and can be incorporated into a range of polymer products. These UV absorbers have good absorption in the wavelength range from 260 to 350 nm and are stable throughout processing.

Benzophenone UV absorbers have excellent compatibility with various resins and are widely used not only as plastic additives but also in applications such as coatings and synthetic resin adhesives.

Benzophenone UV absorbers provide protection for thick and thin sections and are optimized when used in unpigmented or lightly tinted formulations. When used in combination with hindered amine light stabilizers (HALS), the UV protection can be improved, especially when stabilizing thin sections.

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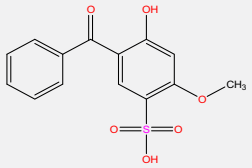
BENZOPHENONE UV ABSORBERS

PowerStab™ 284

CAS No.: 4065-45-6

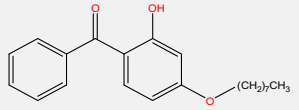
2-Benzoyl-5-methoxy-1-phenol-4-sulfonic acid



PowerStab™ 531

CAS No.: 1843-05-6

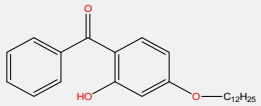
2-Hydroxy-4-n-octoxybenzophenone



PowerStab™ 1200

CAS No.: 2985-59-3

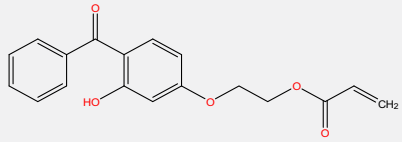
4-Dodecyloxy-2-hydroxybenzophenone



PowerStab™ 2098

CAS No.: 16432-81-8

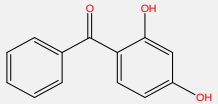
2-Hydroxy-4-(acrylyloxyethoxy) benzophenone



PowerStab™ 3000

CAS No.: 131-56-6

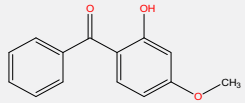
2,4-Dihydroxybenzophenone



PowerStab™ 3040

CAS No.: 131-57-7

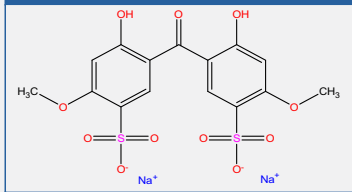
2-Hydroxy-4-methoxybenzophenone



PowerStab™ 3048

CAS No.: 76656-36-5

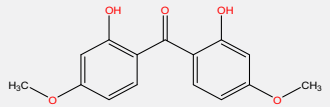
2,2'-Dihydroxy-4,4'-dimethoxy benzophenone-5,5'-disodium sulfonate



PowerStab™ 3049

CAS No.: 131-54-4

2,2-Dihydroxy-4,4'-dimethoxy benzophenone



BENZOTRIAZOLE UV ABSORBERS

Benzotriazole UV absorbers are excellent cost-effective UV absorbers that have balanced UV absorption bands from short wavelengths to long wavelengths. Benzotriazole UV absorbers have exceptional UV absorption from 300 to 380 nm and are commonly used to enhance the durability of various engineering plastics and polyolefins.

Benzotriazole UV absorbers have good heat resistance, can be used at a relatively high processing temperature, and are widely used in occasions that require long-term use.

Benzotriazole UV absorbers are compatible with a wide variety of polymer systems and additives. They are effective against loss of gloss, cracking, blistering, and discoloration. When combined with hindered amine light stabilizers (HALS), both UV protection and cost performance can be improved, especially when stabilizing thin sheets.

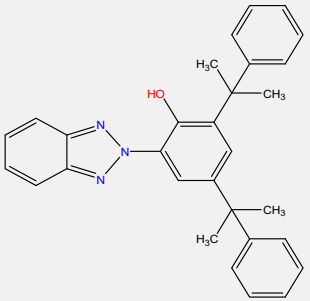
Since 1989, TINTOLL has actively participated in the development of innovative products and application research, and currently has more than 100 specialty products to meet the diverse needs of customers. TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL also provides customers with light stabilizer development services for special applications.

TINTOLL Sustainable Innovation for a Better Future

PowerSorb™ 234

CAS No.: 70321-86-7

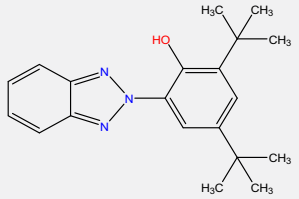
2-[2-Hydroxy-3,5-di(1,1-dimethylbenzyl)phenyl]-2H-benzotriazole



PowerSorb™ 320 SVHC

CAS No.: 3846-71-7 SVHC

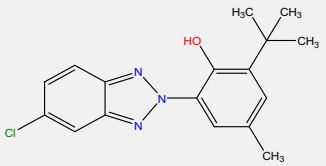
2-(2'-Hydroxy-3',5'-di-t-butylphenyl) benzotriazole



PowerSorb™ 326

CAS No.: 3896-11-5

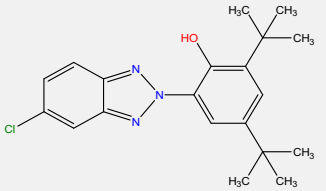
2-(2'-Hydroxy-3'-t-butyl-5'-methylphenyl)-5-chlorobenzotriazole



PowerSorb™ 327 SVHC

CAS No.: 3864-99-1

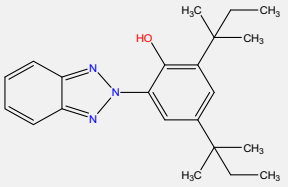
2-(2'-Hydroxy-3',5'-di-t-butylphenyl)-5-chlorobenzotriazole



PowerSorb™ 328 SVHC

CAS No.: 25973-55-1

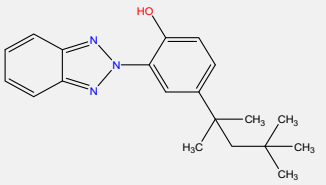
2-(2'-Hydroxy-3',5'-di-t-amylphenyl) benzotriazole



PowerSorb™ 329 SVHC

CAS No.: 3147-75-9

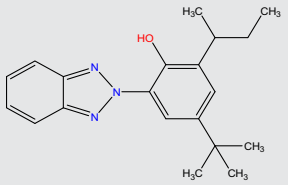
2-(2H-benzotriazol-2-yl)-4-(1,1,3,3-tetramethylbutyl)phenol



PowerSorb™ 350 SVHC

CAS No.: 36437-37-3

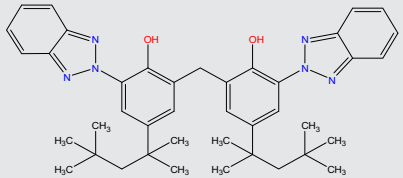
2-(2H-Benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol



PowerSorb™ 360

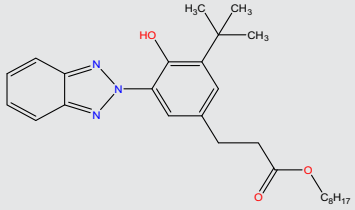
CAS No.: 103597-45-1

Bis[2-Hydroxy-5-t-octyl-3-(benzotriazol-2-yl)phenyl] methane



PowerSorb™ 384-2

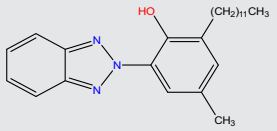
CAS No.: 127519-17-9



PowerSorb™ 571

CAS No.: 125304-04-3

2-(2H-benzothiazol-2-yl)-6-(dodecyl)-4-methylphenol



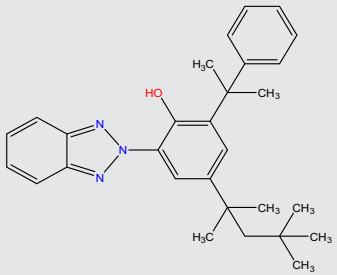
PowerSorb™ 384-2

A mixture of branched and linear C7-C9 alkyl 3-[3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxyphenyl]propionates

PowerSorb™ 928

CAS No.: 73936-91-1

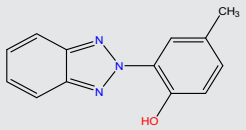
2-(2H-benzotriazol-2-yl)-6-(1-methyl-1-phenylethyl)-4-(1,1,3,3-tetramethylbutyl)phenol



PowerSorb™ 1000

CAS No.: 2440-22-4

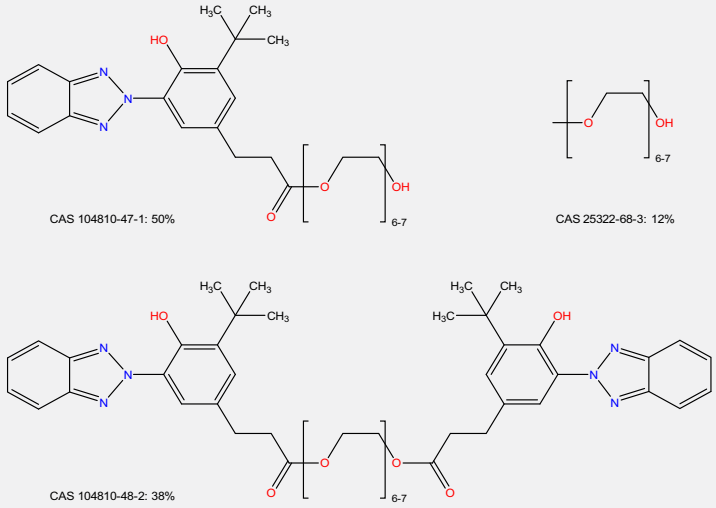
2-(2'-Hydroxy-5'-methylphenyl) benzotriazole



PowerSorb™ 1130

50% CAS 104810-47-1 + 38% CAS 104810-48-2 + 12% CAS 25322-68-3

Bis(1-octyloxy-2,2,6,6-tetramethyl-4-piperidyl) sebacate



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

BENZOXAZINONE UV ABSORBERS

Benzoxazinone UV Absorbers are powerful UV light absorbers across the broad spectrum UV light, especially for UVA radiation from 320 to 380 nm. Benzoxazinone UV Absorbers are more commonly used in polar polymers such as PET and PC, and are particularly effective in applications such as PET bottles and electronic displays.

Benzoxazinone UV absorbers have high UV absorption capacity and high heat resistance with a TGA (10%) of 371°C, suitable for the most demanding processing environments. Their UV absorbing ability is much larger than other UV absorbers, and their strong absorbing ability extends to the long wavelength side. These UV absorbers have excellent heat resistance and can be used in resins that require high processing temperatures.

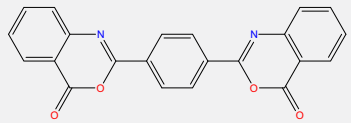
Since 1989, TINTOLL has actively participated in the development of innovative light stabilizers and application research, and currently has more than 100 specialty products to meet the diverse needs of customers. TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL also provides customers with light stabilizer development services for special applications.

TINTOLL Sustainable Innovation for a Better Future

PowerStab™ 3638

CAS No.: 18600-59-4

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



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

BENZYLIDENE MALONATE UV ABSORBERS

TINTOLL has been actively involved in the development and application research of innovative light stabilizers since 1989, offering the most comprehensive portfolio of stabilizers: Ultraviolet Absorbers (UVA) and Hindered Amine Light Stabilizers (HALS) for effective stabilization against light and weathering harmful effects. In addition to being widely used in various plastic products, light stabilizers are also suitable for water-based (WB), solvent-based (SB), UV-curable and powder coatings, as well as inks, adhesives and sealants.

TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL has also developed UV absorbers with special structures and special applications, such as Benzylidene Malonate UV Absorbers.

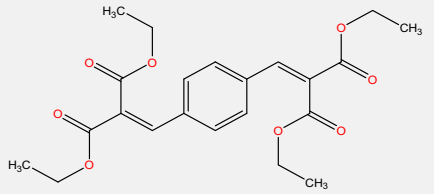
PowerSorb 988 is a benzylidene dimalonate type UV absorber with significant absorption in the high energy (low wavelength) range of the UV spectrum, which can significantly improve engineering plastics such as polycarbonate and polyester long-term stability. In addition to the stability of PC, as a high-efficiency colorless UV absorber, PowerSorb 988 can also be used to improve the light stability of PET to prevent possible UV yellowing and embrittlement. If it is necessary to maintain the transparency of the product, PowerSorb 988 will be a good choice.

TINTOLL Sustainable Innovation for a Better Future

PowerSorb™ 988

CAS No.: 6337-43-5

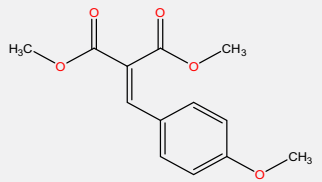
Tetra-ethyl-2,2'-(1,4-phenylene-dimethylidene)-bismalonate



PowerSorb™ 2025

CAS No.: 7443-25-6

Dimethyl 2-(4-Methoxybenzylidene)malonate



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

CYANOACRYLATE UV ABSORBERS

TINTOLL has been actively involved in the development and application research of innovative light stabilizers since 1989, offering the most comprehensive portfolio of stabilizers: Ultraviolet Absorbers (UVA) and Hindered Amine Light Stabilizers (HALS) for effective stabilization against light and weathering harmful effects. In addition to being widely used in various plastic products, light stabilizers are also suitable for water-based (WB), solvent-based (SB), UV-curable and powder coatings, as well as inks, adhesives and sealants.

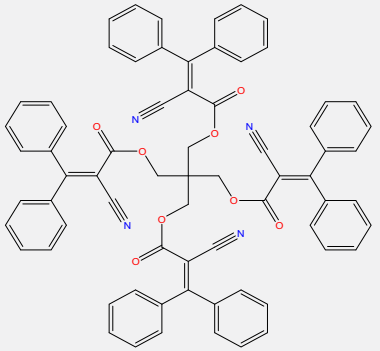
TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL has also developed UV absorbers with special structures and special applications, such as Cyanoacrylate UV Absorbers. PowerSorbTM 3030 is a Cyano-acrylate type UV absorbers active mostly in UV-B region, it is very effective for stabilization of Polycarbonate (PC). It's stable at processing temperatures of PC without blooming and builds up phenomenon on tooling equipment.

TINTOLL Sustainable Innovation for a Better Future

PowerStab™ 3630

CAS No.: 178671-58-4

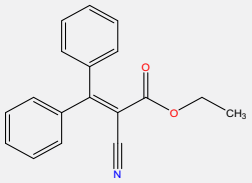
Pentaerythritoltetrakis(2-cyano-3,3-diphenylacrylate)



PowerStab™ 3035

CAS No.: 5232-99-5

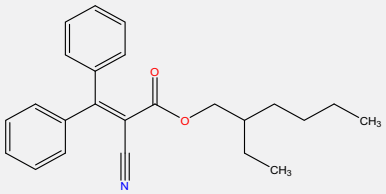
Ethyl-2-cyano-3,3-diphenylacrylate



PowerStab™ 3039

CAS No.: 6197-30-4

(2-ethylhexyl)-2-cyano-3,3-diphenylacrylate



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

OXANILIDE MALONATE UV ABSORBERS

TINTOLL has been actively involved in the development and application research of innovative light stabilizers since 1989, offering the most comprehensive portfolio of stabilizers: Ultraviolet Absorbers (UVA) and Hindered Amine Light Stabilizers (HALS) for effective stabilization against light and weathering harmful effects. In addition to being widely used in various plastic products, light stabilizers are also suitable for water-based (WB), solvent-based (SB), UV-curable and powder coatings, as well as inks, adhesives and sealants.

TINTOLL provides professional formulations for different composite materials. In addition, TINTOLL has also developed UV absorbers with special structures and special applications, such as Oxanilide UV Absorbers.

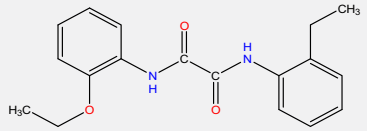
PowerSorb™ 312 is an Oxanilide type UV absorber which is effective for the light stabilization of a broad range of plastics and coatings. It is less discoloring than conventional UV absorbers, even in alkaline environments and in the presence of metal catalyst residues. Plastic applications include polyamides, PVC (rigid and flexible), polyesters (thermoplastic and thermoset), polyurethanes, adhesives, and sealants. The product is also suitable for use in powder coatings and solvent-borne coatings for automotive, industrial, and architectural applications.

TINTOLL Sustainable Innovation for a Better Future

PowerSorb™ 312

CAS No.: 23949-66-8

N-(2-Ethoxyphenyl)-N'-(4-ethylphenyl)-ethlyene diamide



UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

TRIAZANE UV ABSORBERS

At present, the ultraviolet absorbers used in polymer materials mainly include benzotriazoles, benzophenones, salicylates and triazines. Triazine-based UV absorbers have high heat resistance and excellent wash-off resistance compared to benzotriazole-based UV absorbers. Triazine UV absorbers provide excellent protection across the entire UV spectrum and are particularly effective at absorbing short wavelength radiation (UVB). Triazine UV absorbers are commonly used in polyolefins to provide stability throughout high temperature processing with a TGA(10%) of 347°C.

The European Chemicals Agency (ECHA) included four benzotriazole UV absorbers (UV320, UV 327, UV 328, UV 350) in the list of Substances of Very High Concern (SVHC) in 2014 and 2015. Therefore, the use of benzotriazole UV absorbers is strictly limited and is gradually being replaced. The scale of R&D and production of triazine UV absorbers is expanding day by day.

Triazine UV absorbers allow polymers to maintain color, gloss and physical properties under long-term UV exposure, and are an effective solution to polymer degradation caused by high-energy light.

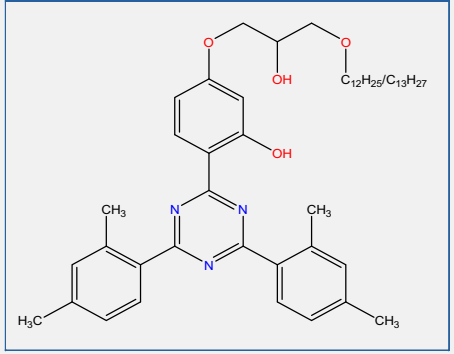
Triazine UV absorber has high efficiency (less dosage, good effect), low gloss (making it more widely used), high processing temperature, good compatibility (good dispersion, easy chemical modification of the molecule itself) and excellent broad spectrum (high molar absorption coefficient in UVA and UVB ultraviolet range). These advantages make triazine UV absorbers become the development direction of UV absorbers.

TINTOLL's PowerSorb family offers exceptional UV protection to enhance the performance of coatings, plastics and polymers in many advanced applications, preventing degradation such as fading, loss of gloss and surface chalking.

TRIAZANE UV ABSORBERS

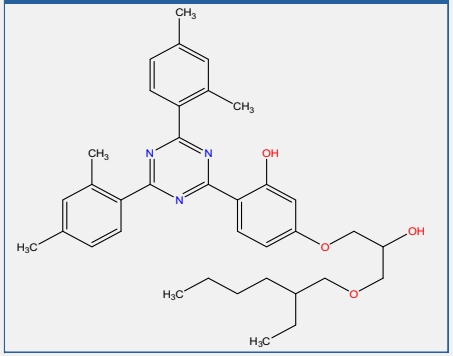
PowerSorb™ 400

CAS No.: 153519-44-9



PowerSorb™ 405

CAS No.: 137658-79-8



PowerSorb™ 400
Reaction products of 2-(4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl)-5-hydroxyphenol with ((C10-16, rich in C12-13 alkyloxy)methyl)oxyrane

PowerSorb™ 405
2-(4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl)-5-(3-((2-ethylhexyl)oxy)-2-hydroxypropoxy)phenol

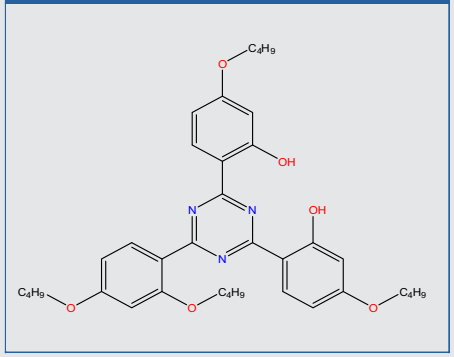
UV ABSORBERS

- BENZOATE
- BENZOPHENONE
- BENZOTRIAZOLE
- BENZOXAZINONE
- BENZYLIDENE MALONATE
- CYANOACRYLATE
- OXANILIDE
- TRIAZINE

TRIAZANE UV ABSORBERS

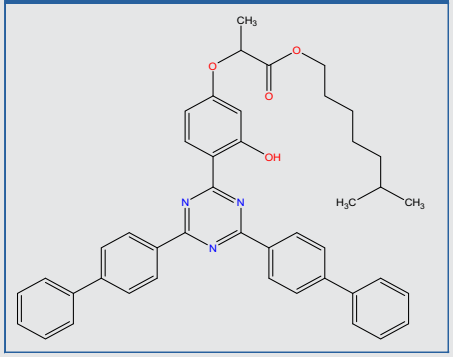
PowerSorb™ 460

CAS No.: 208343-47-9



PowerSorb™ 479

CAS No.: 204848-45-3



PowerSorb™ 460

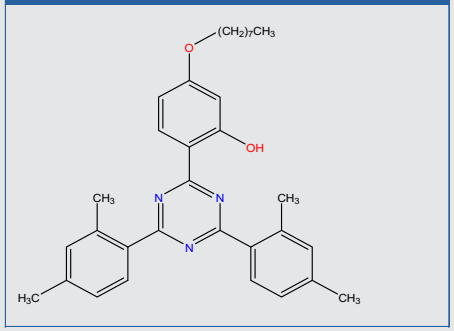
5-butoxy-2-[4-(4-butoxy-2-hydroxyphenyl)-6-(2,4-dibutoxyphenyl)-1,3,5-triazin-2-yl]phenol

PowerSorb™ 479

Isooctyl 2-[4-[4,6-bis[(1,1'-biphenyl)-4-yl]-1,3,5-triazin-2-yl]-3-hydroxyphenoxy]propanoate

PowerSorb™ 1164

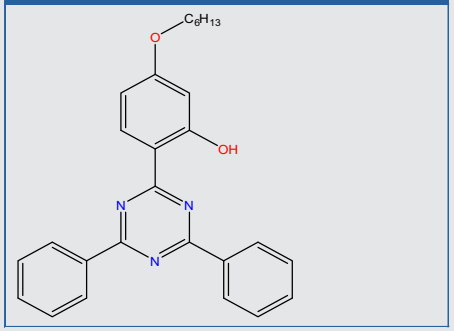
CAS No.: 2725-22-6



PowerSorb™ 1577

CAS No.: 147315-50-2

2-(4,6-Diphenyl-1,3,5-triazin-2-yl)-5-[(hexyl)oxy]-phenol



PowerSorb™ 1164

2-[4,6-Bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy)phenol

TINTOLL

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