AKROCHEM CORPORATION

Phenolic Resins

Phenolic Resins are products of SI Group and Ask Chemicals.

Tackifier Resins

Tackifier resins are used as an additive to impart tack in synthetic rubbers that do not possess the inherent tack necessary for plied-up construction. The largest use for these types of resins is in tire building. For tire building applications a typical usage is 3-8 phr.

Akrochem's phenolic tackifier resins for this application and others like it are as follows:

GENERAL PURPOSE

SP-1068 (P-90)

SP-1068 is an unmodified, thermoplastic resin made from octylphenol and formaldehyde. It is typically used to increase tack in natural and synthetic elastomers, including SBR, BR, IIR and IR. SP-1068 has the lowest temperature softening point of our general purpose tackifier resins.

HRJ-4047 (P-165)

HRJ-4047 is an unmodified, thermoplastic resin made from octylphenol and formaldehyde. It is compatible with natural and synthetic elastomers, including SBR, BR, IIR and IR. It is a good general purpose tackifier, similar to SP-1068, but with a higher temperature softening point.

RIBETAK 7510P

Ribetak 7510P is an alkyl-phenol, thermoplastic resin. It is recommended for natural and synthetic elastomers, including SBR, BR, IIR, IR, and EPDM. It is a good general purpose tackifier similar to SP-1068.

MODIFIED/HIGH PERFORMANCE

SP-1077 (P-133)

SP-1077 is a modified, thermoplastic alkylphenol resin developed as a tackifier for synthetic and natural elastomers, including SBR, BR, IIR, IR and EPDM. It has been found that adequate tack levels can be achieved using lower levels of SP-1077 than is possible with conventional tackifiers, such as SP-1068. In addition, SP-1077 provides tack in difficult to tackify compounds, such as EPDM.

HRJ-10420

HRJ-10420 is a thermoplastic resin made from octylphenol and formaldehyde. It is used to increase tack in natural and synthetic elastomers, including SBR, BR, IIR, and IR. Typical loadings range from 3-8 phr.

ELAZTOBOND T-6000 (P-182)

T-6000 is a modified phenol-formaldehyde resin specially modified to increase tack properties in Natural Rubber, Polybutadiene and SBR. Its unique qualities also provide unusual tack in hard to tackify materials like EPDM and NBR. Its high softening point yields good holding strength at higher temperatures. Typical loadings range from 2-15 phr.

Tackifier Resins			
Product	**Ball & Ring Softening Point (°C)**	**Physical Form**	**Specific Gravity**
General Purpose			
SP-1068 (P-90)	85 - 95	Pellet	1.03
RIBETAK 7510P	90-105	Pastille	1.10
HRJ-4047 (P-165)	92 - 101	Pellet	1.04
HRJ-10420	97-107	Pellet	1.02
Modified/High Performance			
SP-1077 (P-133)	92 - 102	Flake	1.04
ELAZTOBOND T-6000(P-182)	110 - 120	Lump	1.25

Terpene Phenolic Resins

The major use of terpene phenolic resins is in the field of adhesives. The use of terpene phenolic resins will improve the adhesion of hot-melt packaging and pressure sensitive adhesives to substrates like coated and recycled paper, glass and metal foils that are typically tough to bond to. Terpene phenolics are often used in combination with a heat reactive resin to gain a balance of properties. Their function in a resin system is to increase the open time and tack of the adhesive. Akrochem's terpene phenolic resins for this application and others like it are as follows:

SP-560 (P-03)

SP-560 is a thermoplastic, oil-soluble, terpene phenolic resin. This resin is used mainly in adhesives as either the base resin or as a modifying resin in the formulation of polychloroprene cements. It can also be used in hot-melt or solution adhesives made from other elastomers where the combination of high tack and high heat performance is desired. To improve the high temperature performance of cements, SP-560 may be blended in any proportion with heat reactive resins. The heat resistance of the adhesive formulation will increase along with the percentage of heat reactive resin, but this will be gained at the expense of decreasing open time.

Terpene Phenolic Resins			
Product	**Ball & Ring Softening Point (°C)**	**Physical Form**	**Specific Gravity**
SP-560 (P-03)	146 - 160	Flake	1.10

Bonding/Adhesion Promoters

Bonding/adhesion promoters are designed to help rubber compounds form permanent bonds to non-rubber portions, fibers, fabrics and metals. Akrochem's bonding/adhesion promoter resins for this application and others like it are as follows:

ELAZTOBOND A-250 (P-185)

A-250 is a modified phenol-formaldehyde resin that has been developed as a replacement for resorcinol-formaldehyde resins. In combination with a methylene donor such as hexamethylenetetramine (AKROFORM® HMT-80/EPR/P) or hexamethoxymethylmelamine (AKROSPERSE® HMMM-50/EPR/S) and silica, A-250 resin functions as an adhesion promoter. The A-250, hexa,and silica loadings typically fall within the following ranges: 2-4, 1-4 and 10-25 phr, respectively. A-250 resin has replaced straight resorcinol in many applications due to improved dispersibility and health concerns. A-250 is especially important in polychloroprene fabric adhesion, since normal resorcinol can scorch polychloroprene.

Bonding/Adhesion Promoters			
Product	**Ball & Ring Softening Point (°C)**	**Physical Form**	**Specific Gravity**
ELAZTOBOND A-250 (P-185)	100 - 110	Flake	1.25

Reinforcing (Two-Step) Resins

Reinforcing or two-step resins are significant in rubber, adding useful properties to a compound. The properties that reinforcing resins impart are: increased hardness, lower compound viscosity, higher tensile, shorter elongation, chemical resistance and higher abrasion resistance. These resins also act as a process aid for stiff, highly loaded compounds.

Reinforcing resins are generally oil modified with either tall oil or cashew nut oil. The main purpose of the modifying oil is to make the resin more compatible with the polymer, but it also makes the resin more flexible after it is cured and acts as a process aid as well. These resins are cured with hexamethylenetetramine and are available with or without the hexa already added. Akrochem's reinforcing (two-step) resins for this application and others like it are as follows:

WITH HEXA

SP-6600 (P-87)

SP-6600 is a cashew nut oil modified phenol-formaldehyde two-step resin. It exhibits compatibility in all proportions with NBR. During processing, the resin plasticizes the stock, making filler loading and milling easier. In the cured state, increases in the resin content will decrease elongation but will increase tensile strength, flexural strength, hardness, abrasion resistance and rigidity. SP-6600 has limited compatibility with SBR and CR. However, within these compatibility limits, it is used to reinforce these rubbers.

SP-6601 (P-55)

SP-6601 is a tall oil modified phenol-formaldehyde two-step resin with hexa. It was primarily designed for use in SBR compounds. As a rule, phenolic resins have little or no compatibility with SBR. SP-6601 resin, however, is an exception in that as much as 50 phr of the resin (by weight) on 100 phr (by weight) of SBR can be used before compatibility problems are encountered. If compatibility with SBR becomes an issue, try adding NBR which will serve as a common solvent or flux to help overcome potential issues. This resin serves as an effective plasticizer during processing and facilitates pigment dispersion. Increasing the amounts of SP-6601 resin will increase the hardness and abrasion resistance of SBR vulcanizates.

SP-8855 (P-40) [Product of ASK Chemicals]

SP-8855 is an unmodified phenol-formaldehyde two-step resin containing hexa. SP-8855 is used as a hardening and reinforcing agent for NBR, NBR-SBR blends, CSPE and Polybutadiene polymers. It has medium flow, cure and setting properties.

© SI Group, 2015

WITHOUT HEXA

SP-6700 (P-86)

SP-6700 is a cashew nut oil modified phenol-formaldehyde resin. It does not contain hexa and is the base resin that is used in the manufacture of SP-6600. It is compatible in all proportions in nitrile rubber. SP-6700 is produced for those high temperature compounding cycles where the early presence of hexa could result in scorching. In banbury operations, it is often more desirable to add hexa to the stock on the sheet off mill. The quantity of hexa added is dependent on processing conditions and the physical properties desired.

SP-6701 (P-49)

SP-6701 is a tall oil modified phenol-formaldehyde resin. It does not contain hexa and is the base resin that is used in the manufacture of SP-6601. SP-6601 is used primarily in SBR stocks where high processing temperatures are encountered. Due to the high temperature compounding cycles, the early presence of hexa could result in premature cure or scorch. The hexa should be added with the accelerators and sulfur as the last step in the mixing cycle.

Reinforcing (Two-Step) Resins				
Product	**Melting Point Capillary Method (°F)**	**Physical Form**	**Hexa Content (%)**	**Specific Gravity**
With Hexa				
SP-6600 (P-87)	140 - 165	Powder	6.5 - 8.5	1.17
SP-6601 (P-55)	145 - 160	Powder	6.5 - 8.5	1.17
SP-8855 (P-40)	170 - 190	Powder	6.0 - 8.0	1.18
Without Hexa				
SP-6700 (P-86)	90 - 100*	Flake	None	1.16
SP-6701 (P-49)	90 - 100*	Flake	None	1.16

** Ball & Ring Method (°C)*

One-Step Resins

One-step resins are often referred to as resoles. These resins will cure with the application of heat and have good compatibility with NBR. These resins are used primarily in the formulation of solvent-based adhesives. Akrochem's one-step resin for this application and others like it is as follows:

BRJ-473 (P-102)

BRJ-473 is a thermosetting phenolic resin used primarily in the formulation of NBR adhesives. BRJ-473 is supplied as a solution in methyl-ethyl-ketone (MEK) and can be easily blended directly into solutions of rubber. Adhesives based on combinations of BRJ-473 with NBR have excellent oil and vinyl plasticizer resistance, high bond strengths and stable viscosity.

One-Step Resins				
Product	**Melting Point Capillary Method (°F)**	**Physical Form**	**Hexa Content (%)**	**Specific Gravity**
BRJ-473 (P-102)	N/A	Liquid	None	1.10

Heat Reactive Resins

The most significant use of heat reactive phenolic resins is in modifying the properties of polychloroprene cements. The addition of phenolic resin, magnesium oxide, zinc oxide and a small amount of water greatly improves the heat resistance and chemical bonding of a polychloroprene cement.

A frequent complaint in making polychloroprene adhesives is inadequate open time. Changing resins, from one with a short open time to one with a longer open time, is the most common means of dealing with this issue. However, a gain in open time usually results in a sacrifice in heat resistance. Akrochem's heat reactive resins for this application and others like it are as follows:

SP-134 (P-28)

SP-134 is a modified alkyphenol-formaldehyde resin used in making polychloroprene contact cements that require long open times. It can also be used in formulating adhesives with NBR, SBR, Natural and reclaimed rubbers. SP-134 is completely compatible with NBR and CR. It has a compatibility limit of approximately 25 parts by weight in combination with 100 parts by weight of SBR, Natural and reclaimed rubbers.

SP-103 (P-109)

SP-103 is a modified alkylphenol-formaldehyde resin used in making polychloroprene contact cements. The outstanding features of this resin are its light color and ability to extend open time without affecting other properties of the finished adhesive. It can also be used in formulating adhesives with NBR, SBR, Natural and reclaimed rubbers. SP-103 is completely compatible with NBR and CR. It has a compatibility limit of approximately 25 parts by weight in combination with 100 parts by weight of SBR, Natural and reclaimed rubbers.

SP-154 (P-105)

SP-154 is a heat reactive phenolic resin that was developed for the formulation of solvent-borne polychloroprene contact cements. It can also be used in formulating adhesives with NBR, SBR, Natural and reclaimed rubbers. SP-154 is completely compatible with NBR and CR. It has a compatibility limit of approximately 25 parts by weight in combination with 100 parts by weight of SBR, Natural and reclaimed rubbers. Adhesives made using SP-154 have excellent heat resistance, high cohesive strength and light color.

FRJ-551 (P-126)

FRJ-551 is a heat reactive alkylphenolic resin which is designed primarily for use in the formulation of polychloroprene-based contact adhesives. In adhesives based on polychloroprene, FRJ-551 gives good bond strength, both at room and elevated temperatures.

HRJ-1367 (P-148)

HRJ-1367 is an oil soluble, heat reactive, phenolic resin based on a para-substituted alylphenol. It is used in the formulation of polychloroprene contact cements with good green strength and heat resistance. The outstanding features of this resin are its high reactivity, narrow molecular weight and light color. It can also be used in formulating adhesives with NBR, SBR, Natural and reclaimed rubbers. HRJ-1367 is completely compatible with NBR and CR. It has a compatibility limit of approximately 25 parts by weight in combination with 100 parts by weight of SBR, Natural and reclaimed rubbers.

Heat Reactive Resins	
Open Time	**Heat Resistance**
(shortest to longest)	*(lowest to highest)*
SP-154 (P-105)	SP-103 (P-109)
SP-134 (P-28)	HRJ-1367 (P-148)
FRJ-551 (P-126)	FRJ-551 (P-126)
HRJ-1367 (P-148)	SP-134 (P-28)
SP-103 (P-109)	SP-154 (P-105)

Heat Reactive Resins					
Product	**Melting Point Capillary Method (°F)**	**Physical Form**	**Methylol Content (%)**	**Color (Gardner)**	**Specific Gravity**
For Coatings					
SP-134 (P-28)	140 - 165	Flake	13 - 18	1 - 7	1.10
SP-103 (P-109)	146 - 158	Flake	8 - 11	0 - 7	1.10
SP-154 (P-105)	160 - 190	Flake	8 - 12	1 - 7	1.10
FRJ-551 (P-126)	170 - 195	Flake	12 - 16	0 - 8	1.03
HRJ-1367 (P-148)	92 - 100*	Flake	14 - 18	1 - 6	1.10

** Softening Point - Ball & Ring Method (°C)*

Curing Resins

Curing resins are heat reactive resins made from octylphenol and formaldehyde. They have been developed to cure IIR and NR. Standard butyl curing resins need to be used in combination with halogen and zinc donors. Bromine modified curing resins for butyls do not require a halogen donor. Also available is an unmodified resin developed specifically to cure natural rubber. Akrochem's curing resins for this application and others like it are as follows:

UNMODIFIED CURING RESINS FOR BUTYL

SP-1044 (P-146)

SP-1044 is a heat reactive resin made from octylphenol and formaldehyde designed for the cure of IIR by the resin cure system. SP-1044 used in combination with halogen and zinc donors, yields butyl vulcanizates with outstanding resistance to high heat and compression set. In addition, these vulcanizates are non-blooming, non-staining and have high modulus values. The octyl group also makes SP-1044 compatible with other elastomers, and can be used to make cements offering a wide range of properties.

SP-1045 (P-101)

SP-1045 is a heat reactive resin made from octylphenol and formaldehyde designed for the cure of IIR by the resin cure system. The octyl group also makes SP-1045 compatible with other elastomers, and can be used to make cements offering a wide range of properties. SP-1045 used in combination with halogen and zinc donors, yields butyl vulcanizates with outstanding resistance to high heat and compression set. In addition, these vulcanizates are non-blooming, non-staining and have high modulus values.

MODIFIED CURING RESINS FOR BUTYL

SP-1056 (P-125)

SP-1056 is a heat reactive, brominated (6–7.5%) octylphenol-formaldehyde resin that contains methylol groups. Due to its higher bromine content, compounds with SP-1056 will cure faster and have less scorch safety than those that utilize SP-1055. SP-1056 may be used with IIR or other unsaturated elastomers with or without functionality. The presence of functionality allows for a faster cure. SP-1056 also does not require a halogen donor. The use of brominated resins in compounding is especially effective when rubber may be exposed to heat or repeated use. The rubber will not deteriorate as quickly as rubber crosslinked with other curing agents.

SP-1055 (P-124)

SP-1055 is a heat reactive, brominated (3.6–4.0%) octylphenol-formaldehyde resin that contains methylol groups. SP-1055 is very similar to SP-1056, with the main difference being the SP-1055 having lower bromine content. The lower bromine content yields a slower cure and allows for greater scorch safety than SP-1056. SP-1055 may be used with IIR or other unsaturated elastomers with or without functionality. The presence of functionality allows for a faster cure. SP-1055 also does not require a halogen donor. The use of brominated resins in compounding is especially effective when rubber may be exposed to heat or repeated use. The rubber will not deteriorate as quickly as rubber crosslinked with other curing agents.

UNMODIFIED CURING RESINS FOR NATURAL RUBBER

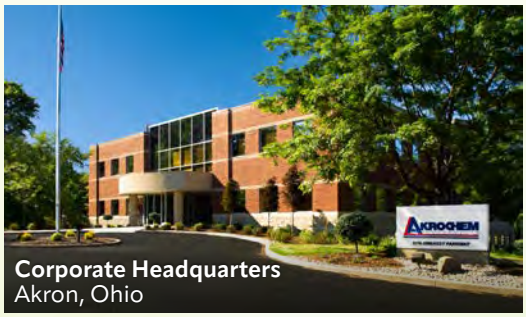
HRJ-10518 (P-180)

HRJ-10518 is a heat reactive resin made from octylphenol and formaldehyde. This resin contains active hyroxymethyl (methylol) groups, and was developed specifically to cure natural rubber. HRJ-10518 crosslinks rubber through C-C bridges, which results in an inherent ozone resistant and heat resistant cured rubber system. The long alkyl chain provides good compatibility with IIR, NR, NBR, CR and EPDM as well.

Curing Resins				
Product	**Ball & Ring Softening Point (°C)**	**Physical Form**	**Methylol Content (%)**	**Specific Gravity**
Butyl Curing				
SP-1044 (P-146)	80-90	Flake	7.5 - 9.5	1.04
SP-1045 (P-101)	80-95	Flake	9.5 - 11	1.04
Bromine Modified				
SP-1056 (P-125)	80 - 90	Flake	9 - 11	1.05
SP-1055 (P-124)	85 - 95	Flake	10 - 14	1.05
Natural Rubber Curing				
HRJ-10518 (P-180)	80 - 95	Flake	6 - 9	1.05

AKROCHEM

Helping customers to improve their productivity is something we are very familiar with. Akrochem's broad line of quality rubber compounding products and innovative technical experience are contributing to the success of companies across North America and around the world. By working with those companies to optimize cure systems, improve chemical dispersion and produce better batch uniformity, we help them become more profitable.



Corporate Headquarters
Akron, Ohio

Distribution Center
Stow, Ohio


Facility & Laboratories
Akron, OH


Regional Offices
The Woodlands, Texas


Facility & Laboratories
Jenkins Boulevard • Akron, Ohio

Warehouse Locations

- Akron, OH
- Atlanta, GA
- Baytown, TX
- Chino, CA
- Lincoln, NE
- St. Louis, MO
- Stow, OH

SI GROUP

SI Group is a leading global developer and manufacturer of chemical intermediates, specialty resins, and solutions that are critical to the quality and performance of countless industrial and consumer goods. Founded in 1906 and headquartered in Schenectady, New York, SI Group has over 2,800 employees worldwide. SI Group operates 20 manufacturing facilities on five continents with over $1 billion in annual sales. In 2018, SI Group received its third silver award for corporate social responsibility by EcoVadis, and is ranked among the top 7 percent of more than 45,000 worldwide companies. SI Group is The Substance Inside. For more information, visit www.siigroup.com.

3770 Embassy Parkway
Akron, Ohio 44333

330.535.2100
800.321.2260
(FAX) 330.535.8947

info@akrochem.com
www.akrochem.com