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## DISCOVER TWC GROUP

# Exceeding Expectation & Synergising Sustainability

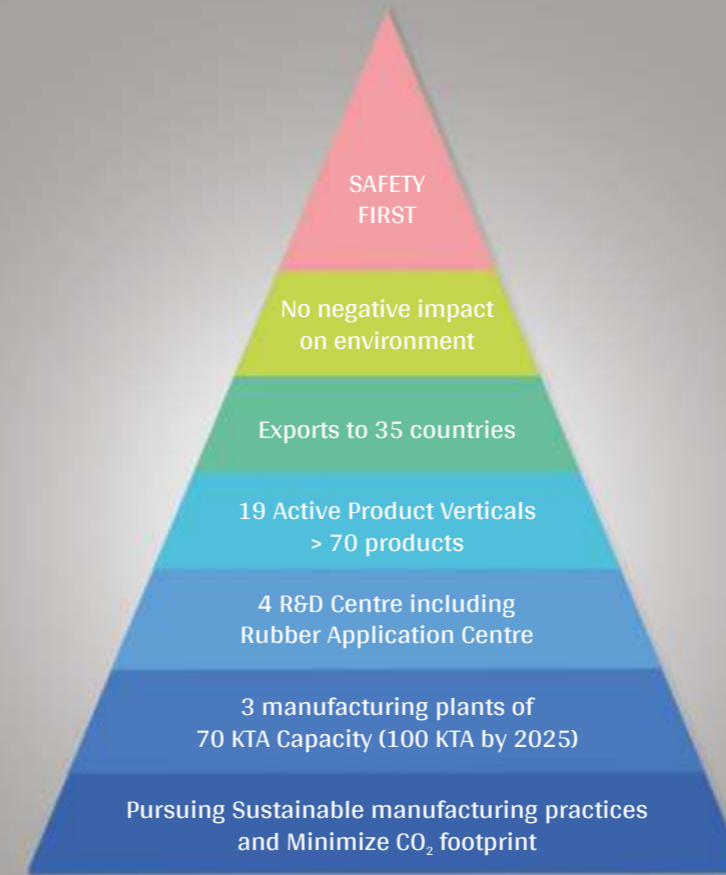
TWC GROUP - a technology leader in specialty resins, bonding chemicals, processing additives and ozone protection waxes - in the Indian Sub-Continent.

TWC GROUP (Techno Waxchem Pvt Ltd, Kolkata & Rajsha Chemicals Pvt Ltd, Vadodara) is an eminent technology leader in manufacturing niche specialty rubber chemicals; i.e. bonding chemicals, adhesion promoters, homogenizers, processing additives, ozone protection waxes, performance-enhancing sustaining resins, polymer bound chemicals, tackifiers, carbon coupling agents, reinforcing phenolic resins, etc.

Established by Founder and CMD Sushil Agarwal in 1991, the organization has grown multi-fold & multi-locational. The journey that started with a base in Kolkata, East of India has now spread to the West of India, Vadodara. By the end of 2023, his business has grown to around 70 KTA, encompassing 19 product verticals, including 70 products. His working philosophy is to aim for the sky but enjoy every moment of success on the journey, learn from every setback and ensure to create value for the organization and society. Activities are primarily focused around developing specialty rubber chemicals being imported by tire and rubber industries to pursue "Made in India" approach.

We have three manufacturing sites, two in Kolkata (Techno Waxchem Pvt Ltd ) and a consolidated one in Vadodara (Rajsha Chemicals Pvt Ltd). With its product offerings and manufacturing capabilities, one can consider it as "Exclusive One-Stop Outlet for Various Specialty Rubber Chemicals".

Our group has grown in all spheres of business - revenue, production capacities, manufacturing locations, customer base - local to global, product verticals & number of products in each vertical, employee strength and ESG responsibility etc. The products are successfully developed and produced with consistent quality in world class manufacturing facility to exceed customers satisfaction.



<b>TECHNO WAXCHEM PVT. LTD. UNIT 1 &amp; 2</b>	<b>RAJSHA CHEMICALS PVT. LTD.</b>
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KOLKATA West Bengal



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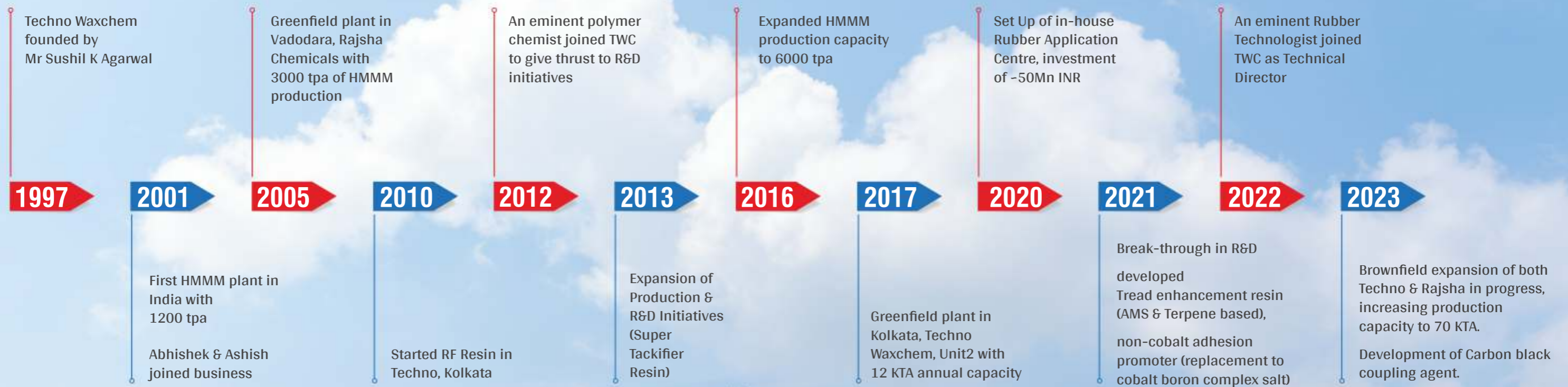
VADODARA Gujarat



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## GLORIFIED HISTORY



History was about quality growth and building recognition in the industry.

## FUTURE BEHOLDS

### Future is all about Sustainable Growth

TWC will continue to grow by leaps & bounds. By 2030, we have few focused deliverables. We target to continue being a global player not only in our current portfolio but also develop and commercialize new chemistries in the field of specialty chemicals. The development of sustainable products will be the governing strategy.

Being a dominant player in HMMM Resin, along with an increase of our capacity, we have ventured into manufacturing formaldehyde as our backward integration strategy towards sustainable growth.

## SUSTAINABILITY DRIVE

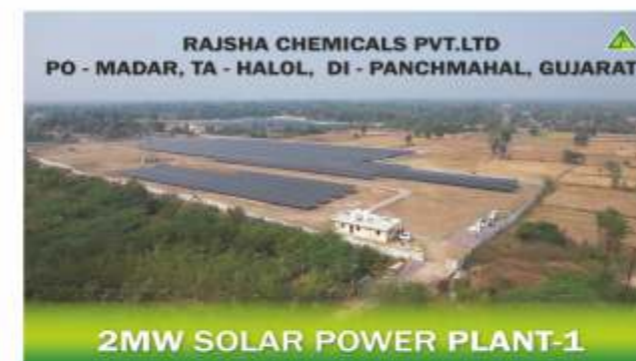
As a responsible organization, TWC has invested and is investing further into solar plants, both on-site & off-site in Kolkata & Vadodara.

We are also putting capex in the adiabatic cooling solution to reduce water consumption by 95%. We are also indulged into rain-water collection and usage in our manufacturing facilities, there by targeting reduction of water consumption by 30%

We use agro-based bio-fuel for our heat generation to the tune of 90%

By 2030, we target to reduce our Scope 1 and Scope 2 emissions by 50% and Scope 3 emissions by 30%. Our investment in renewable energy is ongoing, and we target to increase our solar capacity to around 10 MW.

Our commitment to carbon neutrality is well appreciated by our customers.



## QUALITY BUSINESS MANAGEMENT

Quality Certification coupled with Quality management directs towards Quality Business Management. All employee of TWC GROUP plays a pivotal role towards achievement of Quality targets and Key Performance Indicators.

Quality certification has always been of paramount importance, with ISO becoming a benchmark for major industries. We see an improvement shift in quality certification and our QA team is geared to stay ahead of industry average.

TWC is an ISO 9001: 2015, ISO 14001: 2015, ISO 45001: 2018 and IATF 16949 certified organization adhering to best quality standards. The company's ISO status is certified by DNV.

This created an eco-system of reliability and trust which ensures that we win customers confidence. Most of our products comply to and meet stringent REACH requirements mandated for exporting to various countries.

This is the beginning, and we are happy to be compelled to use our best effort to conserve our environment as well. The journey of sustainability has started, with all of us doing our bit to ensure we improve our environment. TWC (Techno Waxchem and Rajsha Chemicals) are existing on the coveted EcoVadis platform. In 2023, Techno Waxchem was awarded the Gold status, which substantiates our credentials. We feel pride to be among the top 5 percentile of global organization having gold standard. We aspire to upgrade to Platinum status in shortest possible time frame.

## QUALITY CERTIFICATE

### Techno Waxchem Private Limited, Kolkata



### Rajsha Chemicals Private Limited, Vadodra



## ECOVADIS CERTIFICATE



**Techno Waxchem Pvt. Ltd.**  
 Joined in 2020  
 Currently PLATINUM Medal Certified

## CORPORATE SOCIAL RESPONSIBILITY

TWC Group proudly stands as a beacon of social responsibility, prioritizing impact alongside Financial growth. Beyond the bottom line, it believes in contributing positively to the communities it touches and embracing initiatives that make a lasting impact. TWC Group runs a few CSR activities that are spread across healthcare, education and infrastructure for research & development. In the last 3 years, TWC has contributed over USD 1 Mn in multiple projects, including:

- The establishment of the wet-chemistry laboratory at Dr D Banerjee Centre of Excellence (DBCoE); one great body of Indian Rubber Institute at Mysuru.
- The company has also contributed to residential school projects for unprivileged girls.
- A cancer hospital for setting up OT and ICU infrastructure.

- A primary school and other school for education of children having physical or mental dis-abilities.
- Alongwith this the group provided an ambulance for the welfare of senior citizens and is engaged in the welfare of animals.

“Our commitment in contributing to societies welfare is an overbearing responsibility. CSR in an ongoing focused area for us and we are having more plans in place, which are going to be executed soon.”



## MANUFACTURING FACILITY

To meet the growing demand for its products, TWC GROUP has an immediate capacity enhancement mission for 2025, which will take the total production capacity to around 100 KTA.

Today, TWC has been successful in developing and commercializing specialty rubber chemicals with great patronage and mentorship from its customers. The group aspires to enter new specialty chemicals, which includes curatives; accelerators or retarders, antioxidants or antiozonants and additives for lubricants and polymers.

Though the initial thrust was to have a Made in India approach for substituting chemicals being imported, the organization has spread its horizons from being local to global, under management visionary approach, which has been supported by TWC family.

We believe in quality product executed through the best supply logistics at a competitive price with minimal inventory cost to our customers. We also believe in one philosophy – to work closely with our customers, satisfy their expectations and thus grow with our customers.



Manufacturing Facility - Techno Waxchem, Kolkata



Manufacturing Facility- Rajsha Chemicals, Vadodra

## RESEARCH & DEVELOPMENT

Developmental capability is the backbone of TWC GROUP. Our expertise in R&D, Technology Application and Customer Service has been appreciated by our customers.

The group has specialist and experts in the form of technical and research doctorates having synergy with adequate numbers of team members in our 3 R&D Centre and 1 exclusive Rubber Application Centre.

In 2017, we invested - 50Mn INR in state-of-the-art Rubber Application Centre at Kolkata. This center is armed with major equipment, much needed for simulating applications.

The ever-changing dynamics of tire rating and upcoming regulations, industry is engaged in developments of products targeting the Magic Triangle norms. The magic triangle of tire performance engulfs all characteristic of advancement and improvement of Tire Performance – Fuel Economy – Safety. An equilibrium in achieving all these factors coupled with usage of sustainable materials is the future.



## INDUSTRIES WE SERVE



## DISTRIBUTORS IN INDIA



## GLOBAL BUSINESS

50% revenue comes in from 35 countries. Our export growth is a compounding of new product – new customers, new product – existing customers, existing product – new customers.



# PRODUCTS

## FEW PRODUCT VERTICALS TWC GROUP OFFERS INCLUDE

Adhesion Promoters & Dipping Resins for bonding between two substrates – Rubber with reinforcing steel cords / textiles:

- Resorcinol Dispersions
- Resorcinolic Resins
- HMMM Resin & Dispersions
- HMT Dispersions
- Dipping Resins

Tackifying Resins for providing tack to rubber products for processing or performance:

- Super Tackifier ; General Purpose Tackifier

Homogenisers for improving quality consistency of compound containing multiple elastomers:

- Black Homogeniser
- Non-Staining Homogeniser for coloured compound

Process Aids for smooth processing with reduction in energy (mixing of black and non-black fillers / dispersion / extrusion / calendaring / moulding, etc.):

- Process additives / silica dispersants: Zinc salt of fatty acids; Non-Zinc additives and dispersants; Multi-function process aid, etc.

Tread Performance Enhancement Resins for enhanced traction – helping improve tire rating:

- Poly AMS Resin ; Terpene Phenolic Resin; Poly-Terpene Resin

Non-Cobalt Adhesion Promoters for possible substitution of Cobalt base promoters:

- Zinc tetrahedral base adhesion promoters

Hydrazide compounds-based Coupling Agents for enhanced carbon black and natural rubber interaction to achieve reduced rolling resistance/heat build-up:

- Carbon Black Coupling Agents

Ozone Protection Waxes for imparting static protection against ozone attack on rubber:

- Mono-Modal Waxes , Bi-Modal Waxes , Plateau Wax, High Temp. Wax, etc.

Modified DCPD resin for Cut & Chip Resistance, especially in off-road tyres:

- Modified DCPD Resin

Reinforcing Phenolic Resins for imparting stiffness to rubber compound:

- Tall Oil modified PF Resin; CNSL modified PF resin; Straight PF Resin ; Alkyl Phenol Mod PF Resin , etc.

Sustainable Modified Gum Rosin in free-flowing pastilles form:

- Colophony NS

Resins for Paint & Coating Industry:

- Amino Resin

Resin for Chloroprene Adhesives:

- Rubbond PB 110

Polymer Bound Chemicals for safe handling and enhanced dispersion :

- Resorcinol80, Pb080, HMT80, etc.



## Adhesion Promoter – Methylene Acceptor

Active member of Dry Bonding System for textile / metal cord or fabric.

### RESORCINOL DISPERSIONS

Product	Appearance	Composition	Specific Gravity @ 25°C	Active Content (%)	Ash Content (%)	Moisture Content (%)	Typical Usage (phr)	Function & Application
Technic® RSB11	White to Red Brown Powder	Resorcinol and Precipitate Silica Blend	1.56	48 - 52	44 - 46	3.5 Max	4 - 5	Resorcinol dispersed on carriers is designed to give easier mixing in rubber compounds.
Technic® ARSB	White to Red Brown Powder	Derivative of Resorcinol and Precipitate Silica Blend	1.56	48 - 52	44 - 46	3.5 Max	3 - 4	Alkyl-Resorcinol dispersed on carrier. It is to be mixed in master-batch stage.
Technic® RL	Orange to Red Brown Liquid	Resorcinol and HMMM	1.2	89 - 93	nil	3.0 max	3 - 4	Single Component Bonding System with both Resorcinol & Methylene Donor present.
Technic® RDL	White to Brown Powder	Resorcinol, HMMM & Silica Blend	1.5	64 - 68	27 - 33	3.0 max	3 - 4	Single Component Bonding System with both Resorcinol & Methylene Donor dispersed on Silica.
Product	Appearance	Composition	Specific Gravity @ 25°C	Active Content (%)	Softening Point (°C)	Moisture Content (%)	Recommended Dosage (phr)	Function & Application
Rubbond® RSA	Off White Grey to Red Brown Flakes	Resorcinol and Stearic Acid Melt	1.10 - 1.30	65 - 69 *	100 - 110	0.3 max	4 - 5	* Other variation of 75% & 80% Active content is also available.

### RESORCINOL RESINS

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Free Resorcinol (%)	Moisture Content (%)	Typical Usage (phr)	Function & Application
Technic® B18S	Orange Red to Brown Pastilles	Resorcinol Formaldehyde Resin	1.36	100 - 110	18 max	1.0 max	3 - 4	It is a reaction product of Resorcinol with Formaldehyde, reducing the free monomer content. Good for fabric, brass plated steel tyre cord and zinc plated steel cord adhesion to rubber.
Technic® B19S	Orange Red to Brown Pastilles	Resorcinol Formaldehyde Resin	1.36	100 - 114	15 max	1.0 max	3 - 4	
Technic® B20S	Dark Red to Brown Pastilles	Styrenated Resorcinol Formaldehyde Resin	1.24	99 - 109	5 max	0.7 max	3 - 4	Low Free Resorcinol, very low fuming. Very suitable for steel cord adhesion
Technic® B21S	Red to Dark Brown Pastilles	Styrenated Resorcinol Formaldehyde Resin	1.3	100 - 110	8 max	0.7 max	3 - 4	Low Free Resorcinol, very low fuming. Very suitable for steel cord adhesion
Technic® B22Z	Dark Red to Brown Pastilles	Styrenated Resorcinol Formaldehyde Resin	1.2	100 - 110	0.1 max	0.7 max	3 - 4	Very Low Free Resorcinol, no fuming at all. Very suitable for steel cord adhesion
Technic® B24S	Dark Red to Brown Pastilles	Modified Resorcinol Formaldehyde Resin	1.24	90 - 100	0.1 max	0.7 max	3 - 4	Very Low Free Resorcinol, low fuming and good for fabric and steel cord adhesion compound.
Technic® B22C	Dark Red to Brown Pastilles	Styrenated Modified Resorcinol Formaldehyde Resin	1.24	99 - 109	0.1 max	0.7 max	3 - 4	Very Low Free Resorcinol, low fuming and good for fabric and steel cord adhesion compound.

## Adhesion Promoter – Methylene Donor

### HMT DISPERSIONS

Product	Appearance	Composition	Specific Gravity @ 25°C	Active Content (%)	Ash Content (%)	Moisture Content (%)	Typical Usage (phr)	Function & Application
Rubbond® SCH	Free Flowing White Powder	Hexa Methylene Tetramine on Carrier	1.27	97 min	3 max	0.5 max	2 - 4	It offers a balanced combination of good adhesion and excellent flex fatigue resistance in conjunction with Resorcinol acceptor through formation of an in-situ resin during rubber processing. Ideally it is added in the last stage of mixing with Sulphur & Accelerators.
Rubbond® OSCH	Free Flowing White Powder	Hexa Methylene Tetramine on Carrier & Oil	1.27	90 min	4 max	0.6 max	2 - 4	

### HMMM RESIN & DISPERSIONS

Product	Appearance	Composition	Specific Gravity @ 25°C	Active Matter (%)	Ash Content (%)	(%) Free Formaldehyde	Typical Usage (phr)	Function & Application
Rubbond® HM100	Clear Viscous Liquid	Hexa Methoxy Methylol Melamine (HMMM) Resin	1.2	98	nil	0.1 max	3 - 4	HMMM (Methylene Donor) is expected to provide about 5 - 6 methylene group to make cross-linking reactions with Resorcinol bonding system in rubber compounds. HMMM improves processability of uncured rubber compounds. It enhances the physical, mechanical and dynamic properties of cured rubber compounds.
Rubbond® HM72C	Free Flowing Powder	72% HMMM on Calcium Silicate	1.41	71 - 73	21 - 29	0.1 max	4 - 5	
Rubbond® HM72	Free Flowing Powder	72% HMMM on PPT Silica	1.41	71 - 73	23 - 29	0.1 max	4 - 5	It helps in maintain higher levels of adhesion after heat, humidity, steam and salt water ageing of rubber compounds. HMMM does not produces ammonia from the curing reaction and therefore, it is the methylene donor of choice for polyester and brass-coated steel cords reinforced rubber compounds.
Rubbond® HM650	Free Flowing Powder	65% HMMM on PPT Silica & Oil	1.41	64 - 66	26 - 30	0.1 max	4 - 5	
Rubbond® HM65	Free Flowing Powder	65% HMMM on PPT Silica	1.41	64 - 66	31 - 35	0.1 max	4 - 5	HMMM is a liquid material, for ease of handling it is dispersed on Silica.
Rubbond® HM50	Free Flowing Powder	50% HMMM on PPT Silica	1.41	49 - 51	43 - 47	0.1 max	4 - 5	

### NON-COBALT ADHESION PROMOTER

Our innovative product replacing classical cobalt salts. Bonding agent for metal to rubber bonding.

Product	Appearance	Composition	Specific Gravity @ 25°C	Ash Content (%)	Zinc Content (%)	Moisture (%)	Typical Usage (phr)	Function & Application
Techbond ZN30	White free flowing powder	Zinc Salt of Carboxylic Acid dispersed on Silica	1.53	58 - 60	5 - 6	13 - 16	2.85 min	Non-Cobalt, Zinc based adhesion promoter for steel cord adhesion compound
Techbond ZU40	White free flowing powder	Zinc Complex Salt dispersed on Silica	1.48	54 - 56	4 - 5	9 - 11	3.65 min	

## RESORCINOL DIPPING RESIN

An in-situ resin for dipping purpose. It reduces the maturation time involved for Resorcinol Formaldehyde reaction in the process of dipping while mixing it with latex.

Product	Appearance	Composition	Specific Gravity @ 25°C	Solids Content (%)	Free Resorcinol (%)	pH	Typical Usage (phr)	Function & Application
Technic® R75	Orange Red Viscous	Resorcinol Formaldehyde Resin in Aqueous Solution	1.2	75	14 - 16	0.5 - 1.50	8 - 10	RFL dips prepared from the pre-formed RF Resin solutions showed better adhesion performance in nylon, aramid & polyester tire cords. R50 & R75 can directly be added to the latex without ageing. Due to low viscosity of R50 resin solution, pumping is easy.
Technic® R50	Orange Red Liquid		1.17	50	9 - 10	1.0 - 2.0	8 - 10	

## REINFORCING PHENOLIC RESIN

Phenolic resin is one of the most common products used in rubber industry to impart required hardness to rubber compound for better reinforcement. Our complete range of reinforcing phenolic resin as below;

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Free Phenol (%)	Typical Usage (phr)	Function & Application
Rubbond® RR90	Pastilles	CNSL Modified Phenol Formaldehyde Resin	1.1	80 - 105	0.5 max	2 max	5 - 15	It improves hardness, tear resistance, abrasion resistance, tensile strength, reduce Mooney Viscosity and prolonged scorch time properties in rubber compound. CNSL, Tall Oil & Alkyl-Phenol modification of PF Resin are expected to have better compatibility with rubber compounds so that accelerated filler dispersions with improved processability of rubbers could be achieved. To avoid pre-vulcanisation and also to achieve good scorch properties, these resins are to be added as Methylene Acceptors in the first stage with a Methylene Donors like HMMM or HMT, which is added in the final stage alongwith Sulphur & Accelerators.
Rubbond® RR95	Pastilles	Tall Oil Modified Phenol Formaldehyde Resin	1.05	90 - 105	0.5 max	2 max	5 - 15	
Rubbond® RR110	Pastilles	Phenol Formaldehyde Resin	1.1	90 - 120	0.5 max	2 max	5 - 15	
Rubbond® RR160	Pastilles	Alkyl-Phenol Modified Phenol Formaldehyde Resin	1	101 - 113	0.1 max	1 max	5 - 15	
Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	HMT Content	Typical Usage (phr)	Function & Application
Rubbond® RR100H	Light to Tan Powder	Phenol Formaldehyde Resin with HMT	1.11	80 - 90	1.0 max	9 - 11	5 - 15	Reinforcing Phenolic Resin is always added with Methylene Donor. Since these products are already mixed with HMT, so it can be used directly. It improves hardness, tear, abrasion resistance and tensile strength of the compound.
Rubbond® RR95H	Light to Tan Powder	Tall Oil Modified Phenol Formaldehyde Resin with HMT	1.11	70 - 85	1.0 max	7 - 9	5 - 15	

## CUT & CHIPPING RESISTANCE RESIN

Customized designed product for improvement of cutting, chipping and chunking of tire treads.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Iodine Value	Typical Usage (phr)	Function & Application
Technic® CCR120	Pastilles	Modified DCPD, Rosin Co-Polymer	1.07	120 - 130	0.5 max	115 - 135	2 - 4	CCR resin provides high tensile, high elongation at break, good dynamic stiffness and elongation tear strength properties, resulting in improvement of cutting, chunking & chipping of tire treads.
Technic® CCR170	Hailstone or Lumps	Polymerised DCPD Resin	1.11	165 - 170	0.5 max	130 - 170	2 - 4	Designed with higher Tg value to impart better cohesive strength of adhesive and also contributes to rapid solvent release and faster drying of inks.

## SUPER TACKIFIER RESIN

The product range is designed to give very high tack to green compounds. High softening point of our product supports in providing high initial tack coupled with maintaining tack over a longer period. Very suitable for ENE compounds with high dosage of Silica.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Moisture Content (%)	Typical Usage (phr)	Function & Application
Technic® KR140	Yellow to Brown Pastilles	p-tert-butylphenol Acetaldehyde Resin	1.00 - 1.06	135 - 150	1.0 max	0.7 max	2 - 4	Super Tackifier for initial high tack and longer term tack retention. Very suitable for SBR compounds with higher dosage of Silica.
Technic® TR140	Yellow to Brown Pastilles	p-tert-butylphenol Formaldehyde Resin	1.00 - 1.06	135 - 145	1.0 max	0.7 max	2 - 4	High Performance Tackifier for initial high tack and long term tack retention.

## TACKIFIER RESIN

General purpose tackifier resin

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Heat Loss (%)	Typical Usage (phr)	Function & Application
Technic® TR100	Yellow to Brown Pastilles	p-octylphenol Formaldehyde Resin	1.00 - 1.04	95 - 105	0.1 max	0.5 max	2 - 10	General purpose Tackifier Resin for all purpose. It gives excellent initial tack.
Technic® TR90	Yellow to Brown Pastilles	p-octylphenol Formaldehyde Resin	1.00 - 1.04	85 - 95	0.1 max	0.5 max	2 - 10	
Technic® TR65	Free Flowing Powder	p-octylphenol Formaldehyde Resin dispersed on Silica	1.1	-	33 - 37	3.5 max	2 - 10	General purpose Tackifier Resin for all purpose and dispersed well as it is a free flowing powder.

## SUSTAINABLE TACKIFIER RESIN

Gum rosin has been used as a natural tackifier with some inherent issues. We have designed our sustainable tackifier resin as a combination of phenolic resin coupled with modified gum rosin to provide equal to better tack in comparison to standard tackifier used in the industry.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Moisture Content (%)	Typical Usage (phr)	Function & Application
Technic® STR140	Yellow to Brown Pastilles	Gum Rosin modified Phenol Formaldehyde Resin	1.00 - 1.06	135 - 150	1.0 max	0.7 max	2 - 4	Super Tackifier for initial high tack and longer term tack retention.
Technic® STR100	Yellow to Brown Pastilles	Gum Rosin modified Phenol Formaldehyde Resin	1.00 - 1.04	95 - 105	1.0 max	0.5 max	2 - 10	General purpose Tackifier Resin for all purpose. It gives excellent initial tack.



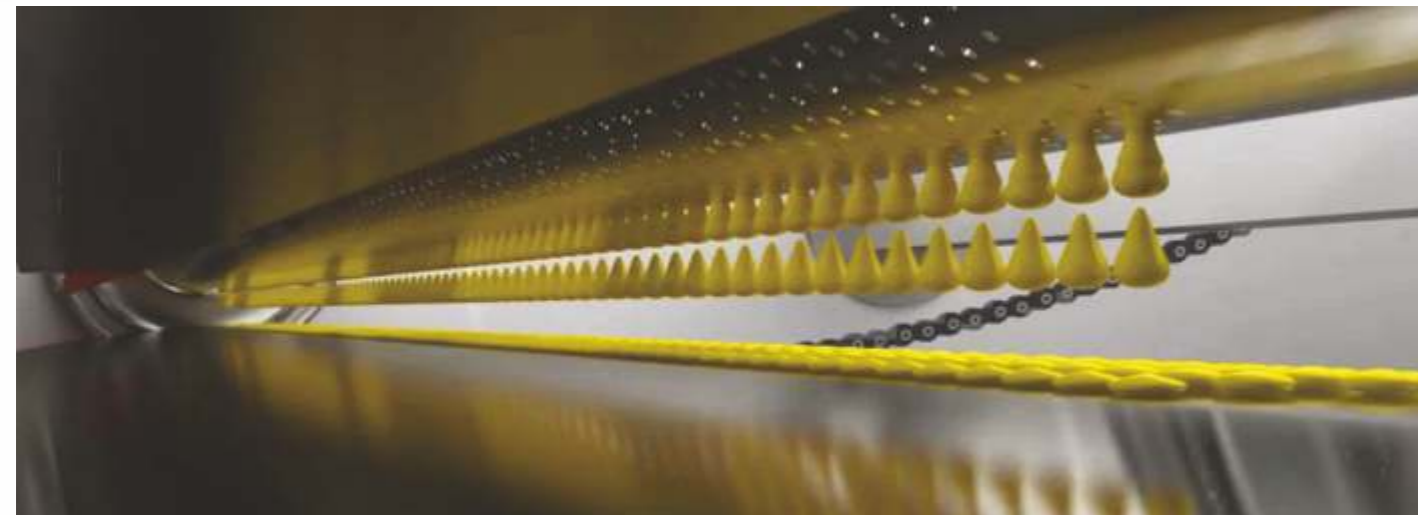
## OZONE PROTECTION WAXES

Blend of n-paraffin & iso-paraffin content leads to a perfect combination of wax suitable for rubber application. TWC has mastered the art of blending of waxes to suit tire industry requirement for all temperature range, very low to high.

Product	Appearance	Composition	Specific Gravity @ 25°C	Congeaing Point (°C)	N-Paraffin Content	C Max	Typical Usage (phr)	Function & Application
Rubwax® 1220	White-light brown pastilles	Blend of n-Paraffin and Iso-Paraffin Waxes	0.86 - 0.94	60 - 70	60 - 70	-	2 - 5	General purpose ozone protection wax.
Rubwax® 1242	White-light yellow pastilles	Blend of n-Paraffin and Iso-Paraffin Waxes	0.92	70 - 78	65 - 75	24 - 26 31 - 33	2 - 5	Long term protection against ozone attack (very low and high temperature).
Rubwax® 1243	White-light yellow pastilles	Blend of n-Paraffin and Iso-Paraffin Waxes	0.92	68 - 78	65 - 75	25 - 26 31 - 33	2 - 5	Long term protection against ozone attack at wider range of temperatures.
Rubwax® 1244	White-light yellow pastilles	Blend of n-Paraffin and Iso-Paraffin Waxes	0.92	64 - 70	75 - 85	31 - 33	2 - 5	Protection against ozone attack, especially in a temperature range of 10 - 50°C.
Rubwax® 1250	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.92	63 - 70	60 - 70	30 - 32	2 - 5	Protection against ozone attack, especially in a temperature range of 10 - 50°C.
Rubwax® 1252	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.91	60 - 69	60 - 85	30 - 32	2 - 5	Protection against ozone attack, especially in a temperature range of 10 - 50°C.
Rubwax® 1253	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.92	64 - 70	72 - 79	24 - 26 31 - 33	2 - 5	Protection against ozone attack, especially in a temperature range of 10 - 50°C.
Rubwax® 1257	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.92	70 - 76	80 - 90	33 - 35	2 - 5	Protection against ozone attack at high temperatures.
Rubwax® 1259	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.92	64 - 71	60 - 73	24 - 26 31 - 33	2 - 5	Long-term protection against ozone attack, especially in a temperature range of 10 - 50°C.
Rubwax® 1272	White-light yellow pastilles	Blend of Paraffin and Iso-Paraffin Waxes	0.92	64 - 70	-	30 - 33	2 - 5	Long term protection against ozone attack (very low and high temperature).

Type of Waxes	Type of Carbon Chain	Approach
Paraffin Wax	Linear carbon chain having C18 to C50 range. crystalline nature.	The higher the C#, the higher the molecular weight (MW), the higher the melt point, and finally, the higher the optimum ambient temperature needs to be for the wax to bloom.
Microcrystalline Wax	Extremely branched carbon chain having C30 to C80. amorphous nature.	Their complex structure resists migration to surface of rubber.
Blended Wax	Both chain available.	Waxes are formulated to achieve specific results by modifying the blooming characteristics of the wax.

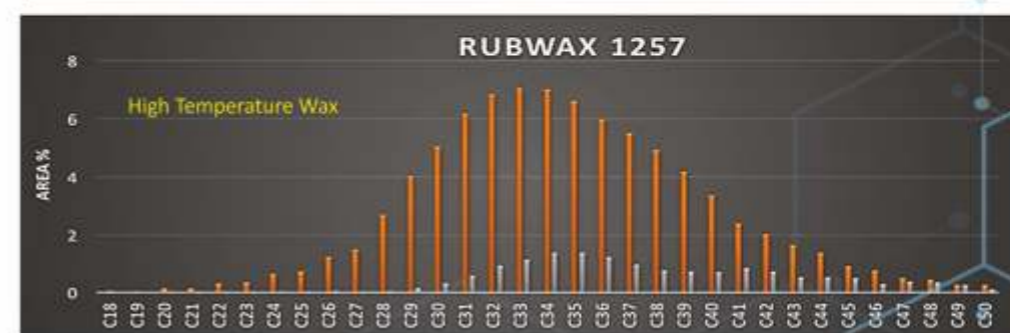
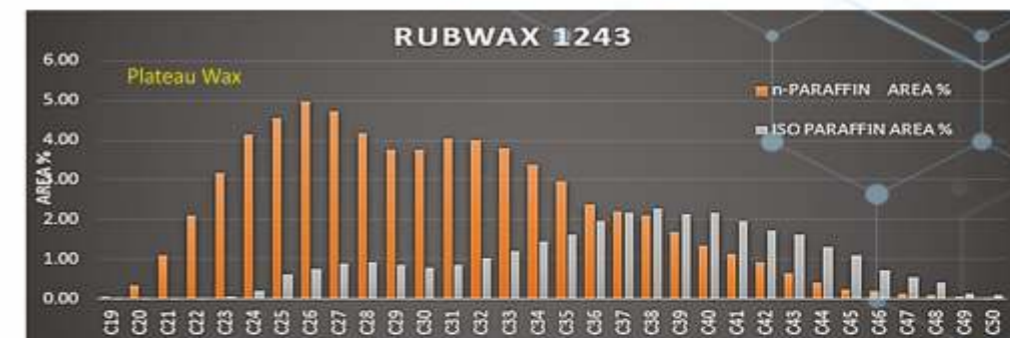
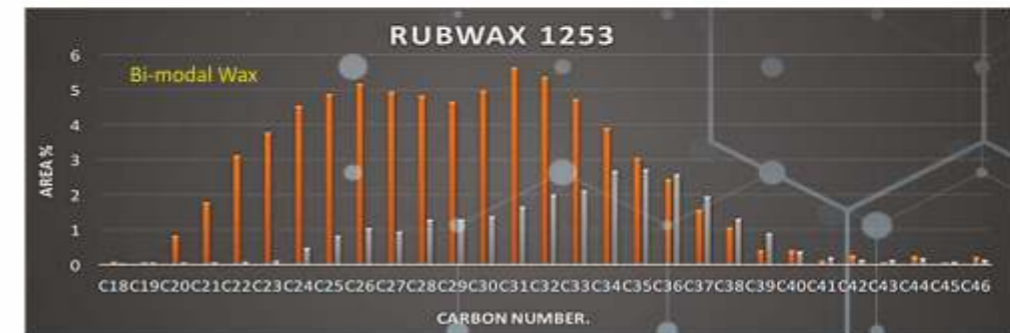
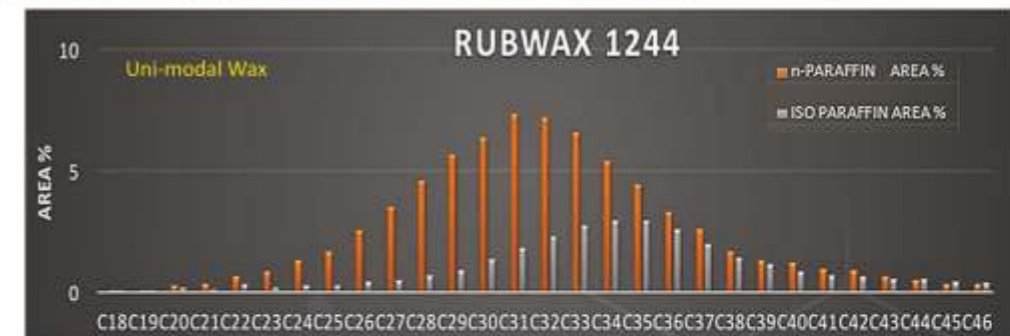
Paraffin wax provides good ozone protection at lower temperatures whereas microcrystalline wax provides good protection at higher temperature. Blooming of wax to the surface depends on type of wax besides being governed by compound formulation and operating scenario. Thus blended waxes provide protection at wider range of temperatures and hence so many types of waxes offering UV and ozone protection in varied range of temperature



## Ozone Protection Waxes

### ELONGATED PRODUCT LIFE

Our latest range of waxes ensure optimal protection against natural threats like Ozone and UV aging of rubber products. It also multiplies the mechanical properties of rubber, allowing it to sustain longer in extreme temperatures.



## TIRE ENHANCEMENT RESINS

Product	Appearance	Composition	Specific Gravity, g/cm <sup>3</sup>	Softening Point, °C	Tg	Dosage (phr)	Function and Application
Terperes® SA85	Transparent to light yellow pastilles	Poly Alpha-Methyl Styrene Resin	1.10	80 - 90	33 - 43	10 - 30	PAMS Resin for replacement of Oil in Tread compounds. It improves Wet Traction of PCR tire treads.
Terperes® SA100	Transparent to light yellow pastilles	Poly Alpha-Methyl Styrene Resin	1.03	95 - 105	44 - 50	10 - 30	
Terperes® PT115	Beige to Brown pastilles / Flakes	Poly-Terpene Resin	0.90	110 - 120	60 - 70	10 - 30	Sustainable Poly-Terpene Resin. It improves Wet traction of PCR tire treads.
Terperes® PT125	Lt. Beige / Yellow / Brown / pastilles	Poly-Terpene Resin	0.90	120 - 130	65 - 75	10 - 30	
Terperes® TP115	Lt. Tan / Off White / Yellow / pastilles	Terpene Phenolic Resin	1.00	110 - 120	60 - 70	10 - 30	Sustainable Resin by a combination of Phenol & Poly-Terpenes. Improvement of Wet traction of PCT tire treads.

### Three critical performance parameters

- Rolling resistance (RR): fuel economy
- Treadwear (TW) useful life of tire
- Wet traction (WT): grip on wet roads

### Key tread components

- Rubber
- Oil - Aromatic oil replaced by Low PAH oils
- Filler

### Performance trade-off

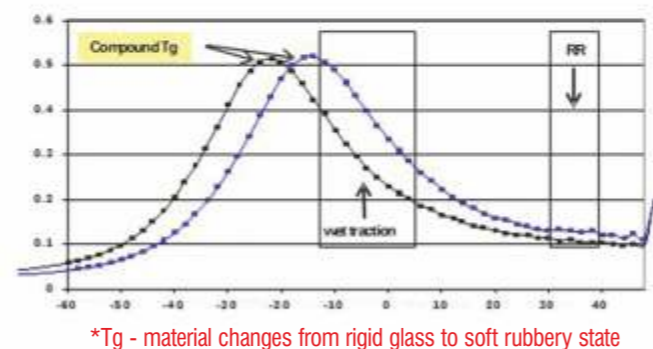
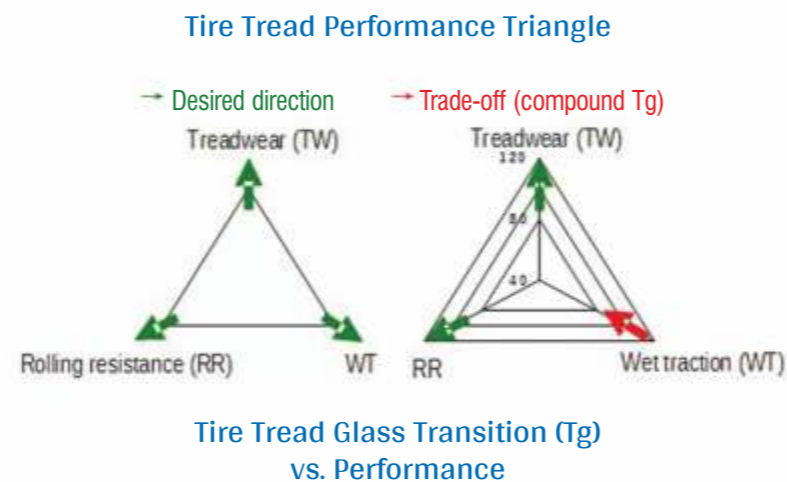
Compound Tg critical to performance

- High Tg materials improve wet traction
- High Tg materials hurt TW and R

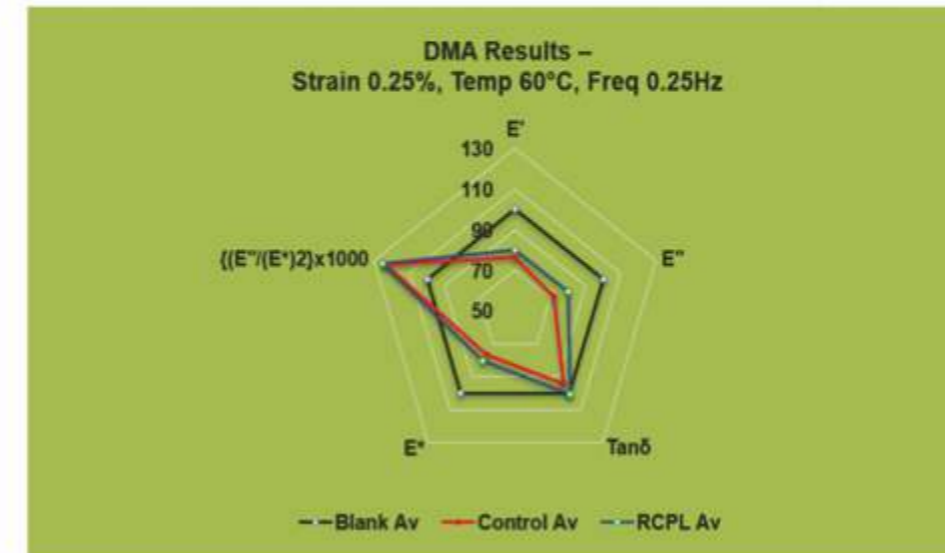
All components have trade-off

### Terperes SA85 Resin benefits for tread compounds

- Low molecular weight easier to process
- Higher T, better wet traction
- Improve compatibility of blends
  - Better filler dispersion (better RR & TW)
  - Improves compatibility of polymers
- Better dispersion - reduced shear modulus



## CONTROLLED STUDY OF Terperes® SA85



- Lower values in elastic (storage) modulus E' & viscous (loss) modulus E'' with no impact on tan  $\delta$  vs. blank. RCPL resin values comparable vs. control resin.
- Change in viscous phase vs stiffness or J compliance ( $\frac{E''}{(E')^2}$ ) is also comparable to control & directionally in line suggesting better traction (higher v/s. blank).
- Terperes® SA85 is customized Poly AMS Resin to achieve a desired Mw, Tg and SP
  - To improve Traction (Wet Grip) without much sacrifice of Rolling Resistance
  - Import substitute for Performance Enhancing Hydrocarbon Resin in India
- Our Lab studies
  - Blanks v/s two lots of Terperes® SA85 v/s Control Samples
  - Similar Rolling Resistance v/s Blank (no sacrifice of RR)
  - Similar Loss Compliance and RPA Viscous & Elastic Strain (Ctrl / RCPL)
    - Higher Loss Compliance vs. Blank is an indirect indication of more traction.
- Terperes® SA85 (and equivalents) is the choice of Poly AMS resin by customers.
- Controlled transportation / storage conditions (low temp) recommended.
- TWC (RCPL) installed temperature controlled storage facility in plant.

## POLY-TERPENE RESINS

- Poly Terpene (PT) Resins for enhancing traction of HP tires, helping achieve Tire Regulations.
- Poly Terpene resins are almost 100% sustainable.
- TERPERES PT115 and TERPERES PT125 are two PT Resins from TWC Group (Rajsha Chemicals).
- Comparative study on a High Performance PCR Tread compound indicates
  - TERPERES PT115 is comparable to key 115°C Softening Point Bench Mark products
  - Studies involved Processing, Performance, and the key DMA analysis.
  - TERPERES PT115 exhibiting possibility of better dispersion and better tack.
  - TERPERES PT125, high softening point PT Resin in the same comparison, is expectedly giving almost comparable behavior v/s. TERPERES PT115.

Terpene Phenol Resins also being made by TWC Group – Info can be supplied, if required.

## GUM ROSIN

Many typical and conventional Tyre and Rubber Industries use Gum Rosin in very crude manner (200 Kg Drum - cutting down the drum, breaking rosin into uneven size pieces and using it. Such process has some concerns like - Contamination, Irregular size of resin, Limitation to automatic weighing system /automation, Dispersion (due to limited mixing time and irregular sizes), and poor shop floor area and extra manpower (drum cutting/powdering, etc.). Our product is treated gum rosin and is supplied in free-flowing pastilles form.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Typical Usage (phr)	Function & Application
Rubbond® Colophony NS	Golden Pastilles	Treated Gum Rosin	1.04	96 - 106	2.0 max	2 - 5	Sustainable tackifier, enhances green tack.

## HOMOGENIZER

Homogenizers is used to mix two different polarity rubbers, high reclaim containing compound and high inert filler containing compound.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Ash Content (%)	Typical Usage (phr)	Function & Application
Rubbond® 40	Black Pastille	Aromatic Hydrocarbon Resin	1.04	96 - 106	2.0 max	2 - 5	It improves mould flow and extrusion properties. Reduces nerve and shrinkages, improves homogeneity of elastomers and fillers. Reduces mixing cycle time,
Technic® NSH	Light Yellow Pastille	Mixture of Hydrocarbon Resin	1.01	100 - 110	0.5 max	2 - 5	Non staining homogeniser, improves mould flow & extrusion, reduced nerve & shrinkage, improved homegenity between elastomers & fillers. Enhances Green

## ADHESIVE RESIN

Resole type alkyl-phenol resin for chloroprene adhesive application.

Product	Appearance	Composition	Specific Gravity @ 25°C	Softening Point (°C)	Methylol Content (%)	Typical Usage (phr)	Function & Application
Rubbond® PB110	Pale yellow flakes	AlkylPhenol Formaldehyde Resin	1.10	110 - 120	10 - 14	-	Resole Resin, used in adhesion for show, leather, automobile industries. It is also used in manufacturing neoprene and other elastomer based adhesives

## POLYMER BOUND CHEMICALS

TWC is happy to introduce our polymer bound range of product. With incremental environmental concerns and challenges on usage of powder materials, polymer bound chemicals is gaining importance. It also helps is better dispersion in the rubber compounds.

- There are multiple advantages in using polymer bound chemicals, like
- No fly loss during weightment and mixing in rubber mills, there-by keeping environment clean.
- Better dispersion of products in rubber matrix
- Ease of auto-weighment in smart factories

We have started manufacturing the below

Product	Appearance	Composition	Specific Gravity, g/cm³	Active Content	Ash Content, %	Typical Usage (phr)	Function and Application
Technic® Pb080	Dark Yellow to Orange Granules	Polymer bound yellow lead oxide	3.13 - 3.33	78.5 - 81.5	-	2.3 - 2.6	Bonding agent for both zinc and brass coated steel cord adhesion compound.
Technic® R80	Off White Granules	Polymer bound Resorcinol	1.17 - 1.25	77 - 81	-	2.3 - 2.6	Active member of dry bonding system, it acts as a methylene acceptor.
Technic® HMT80	Off White to Grey Granules	Polymer bound HMT	1.20 - 1.25	79 - 81	1.8 - 3.0	1.3 - 1.6	Active member of dry bonding system, it is methylene donor.
Technic® YP80	Yellow Granules	Polymer bound Yellow powder	1.64	77 - 81	-	-	Curing Agent for natural & synthetic rubber
Technic® IS65	Yellow Granules	Polymer bound Yellow powder	1.40	77 - 81	-	-	Curing Agent for natural & synthetic rubber
Technic® Zn080	White Granules	Polymer bound Zinc Oxide	2.90 - 3.00	77 - 81	-	3 - 8	Polymer bound zinc oxide for improved dispersion in compounds.

We can surely add our product portfolio based on customer's need for the same.



## Process Aid

# SMART

## SMARTER – SMOOTHER – Rubber Additives for future

TWC RubberAid® range of Zinc Free & Zinc based Process Aid for all rubber application. The use of process aid is very classical, it supports in imparting physical and chemicals improvement of rubber compounds.

### The TWC Edge

- High Dosage of Silica usage
- Processing efficiency – mixing stages reduction
- Improves extrusion
- Energy reduction
- Easy to handle
- Dust free pastilles

### Process Aid advantages in NR/SBR compounds

- Impart increased cure rates – providing scorch safety
- Exhibit better reversion resistance
- Lower viscosity – good processability and extrusion
- Improved compound hardness and modulus
- Lower TanD – better fuel economy
- Lower heat build-up – better durability

## PROCESS ADDITIVE - DISPERSANT FOR FILLER, ZINC FREE

Product	Appearance	Composition	Specific Gravity, g/cm <sup>3</sup>	Dropping Point, °C	Ash Content (%)	Acid Number	Dosage (phr)	Function and Application
RubberAid® 254M	Beige / Yellowish / Creamish Pastilles	Blend of Substituted Fatty Acid Amides	1.01 ± 0.05	70 - 90	0.1 (Max)	10 (Max)	2 - 3	A zinc free processing additive developed for highly filled silica compounds. Reduces the tendency of re-agglomeration of filler particles, particularly silica. Maintains low viscosity during compound storage with good extrusion and does not influence on cured compound dynamic properties.
RubberAid® ZF16	Beige to Brown Pastilles / Flakes	Mixture of Fatty Acid Soaps, predominantly Calcium	1.0 ± 0.05	96 - 108	3 - 7	22 (Max)	1 - 5	Improves flow properties of polymeric compounds by reducing viscosity and promoting slippage at the rubber-to-metal interface, which could lead to higher extrusion rates, improved dimensional stability and a constant level of die swell. Eliminates sticking to rotors in internal mixers or open mills and calendar rolls.
RubberAid® ZF42	Light Beige / Yellow / Brown / Pastilles	Blends of Fatty Acid Derivatives	1.0 ± 0.05	83 - 97	1 Max	-	1 - 5	It provide very good lubricating effects and helps to improve flow and mould release. Can be incorporated both in the internal mixer or on the mill and is recommended to add this additive with the fillers.
RubberAid® ZF212	Light Tan / Off White / Pastilles	Blend of Fatty Acid Derivatives in an Inert Carrier	1.1 ± 0.05	55 - 65	18 - 22	-	2 - 5	Could prevent sticking of rubbers and compounds to rotors and rolls and its addition can reduce the risk of scorching in highly loaded rubber compounds. Improves the flow properties of the rubber compound, which could result in foiling the molds faster and under lower pressure.
RubberAid® ZF222	Light Tan / Off White / Yellow / Pastilles	Fatty Acid Esters and Condensation Products	1.0 ± 0.05	55 - 70	-	20 (Max)	2 - 4	Exhibits good plasticizing properties and highly effective in polar NBR rubber compounds. Improves the flow and release properties. Prevents sticking of elastomers and rubber compounds to rotors and rolls and can reduce the risk of scorching in highly loaded compounds.
RubberAid® ZF280	Crumbly powder	Processing Additive based on Organosilicones	1.10 ± 0.05	-	-	-	0.5 - 2	A new concept in processing additive based on organosilicones. It is highly compatible with rubber compounds. This enables utilisation of the highly efficient lubrication effect of silicones without extrusion or bloom. It improves flow properties and release behavior of rubber and mould release of vulcanizates. It also reduces mould fouling. Because of its low volatility at high temperature it is particularly suitable for FPM compounds.

## PROCESS ADDITIVES - ACTIVATORS, ZINC BASED

Product	Appearance	Composition	Specific Gravity, g/cm <sup>3</sup>	Dropping Point, °C	Ash Content (%)	Zinc Content (%)	Dosage (phr)	Function and Application
RubberAid® ZA73	Grey White - Creamish Pastilles / Flakes	Mixture of Zn soaps of Aliphatic and Aromatic Carboxylic Acids	1.24 ± 0.05	103 - 117	18 - 22	16 - 18	2 - 5	An effective activator for the sulfur vulcanization of diene rubbers, especially NR and improves modulus. An effective physical peptizer for the mastication of NR, also improves processability in mixing, extrusion, molding and anti-reversion properties.
RubberAid® ZA74	White - Creamish Pastilles / Flakes	Mixture of Zn soaps of Aliphatic and Aromatic Carboxylic Acids	1.1 ± 0.02	95 - 105	16 - 18	12 - 14	2 - 4	An effective physical peptizer for NR compounds. Can offer cure activation for increased reversion stability, processability and compound flow.
RubberAid® ZEH-S	White to Yellow Powder	Zinc 2-Ethylhexanoate dispersed on Silica	1.46 ± 0.05	-	46 - 50	15 - 17	1 - 3	It is a rubber soluble zinc soap and could be used as an activator for NR. It offers heat stability (reversion resistance) in NR compounds containing normal levels of sulfur, particularly with thiazole type accelerators.
RubberAid® ZEH	Highly Viscous Yellowish Liquid	Zinc 2-Ethylhexanoate	1.16 ± 0.05	-	25 - 29	22 - 24	1 - 3	It is a rubber soluble zinc soap and could be used as an activator for NR. It offers heat stability (reversion resistance) in NR compounds containing normal levels of sulfur, particularly with thiazole type accelerators.

## PROCESS ADDITIVE - DISPERSANT FOR FILLER, ZINC BASED

Product	Appearance	Composition	Specific Gravity, g/cm <sup>3</sup>	Dropping Point, °C	Ash Content (%)	Zinc Content (%)	Typical Usage (phr)	Function and Application
RubberAid® PA44	Beige to Creamish Pastilles / Flakes	Mixture of Zinc and Alkali Soaps	1.1 ± 0.05	95 - 105	12 - 14	9 max	2 - 3	Excellent flow promoter for rubber compounds with high level of white fillers, namely, silica, chalk, clay, etc. It improves dispersion of fillers and has beneficial influence on batch-to-batch uniformity. It decreases the tendency of re-agglomeration of silica. It is suitable for better extrusion and also, could be suitable for compression, transfer and injection molding applications. Suitable for radial tires, rubber belts and cables.
RubberAid® PA46F	Beige - Light Brown - Off White Pastilles	Blend of Fatty acid Derivatives	1.03 ± 0.05	78 - 92	-	4 - 6	1 - 5	Designed for high performance silica-loaded rubber compounds. Beneficial for use in high performance tires containing NR, BR, SBR, SBR rubbers. Improves processing and extrusion of silica loaded rubber compounds.
RubberAid® PA50	Beige to Light Brown Pastilles / Flakes	Zn Soaps of Unsaturated Fatty Acids	1.1 ± 0.05	97 - 109	14.5 (Max)	14.5 (Max)	3 - 5	It is rubber stable and does not bloom from the vulcanizates due to wide solubility range. Helps in the mastication, mixing and proper dispersion of fillers in NR mixed with PBR, SBR and NBR rubbers and rubber compounds. It is also good for EPM/EPDM polymers.
RubberAid® PA50P	Beige to Brown Pastilles / Flakes	Zn Soaps of Unsaturated Fatty Acids	1.05 ± 0.05	95 - 105	11 - 14	10 - 11	1 - 5	
RubberAid® PA60	Beige Pastilles / Flakes	Mixture of Zinc Soaps of Higher Molecular Weight Fatty Acids	1.15 ± 0.05	84 - 96	18 - 22	8.5 (Max)	1 - 5	The double bonds present in it could stabilize free radical formation, which in turn could improve reversion resistance and tear strength of rubber compounds. Can be used to lower power consumption during mixing cycle, dumping temp, Mooney viscosity and improve filler dispersions.
RubberAid® PA70	Beige - Light Brown Pastilles	Blend of Zinc Soaps of Unsaturated Fatty Acids and Esters	1.1 ± 0.05	98 - 108	15.5 - 18.5	-	3 - 5	Fast incorporation and improves dispersion of the silica without sacrifice in wet skid resistance could be achieved. Could facilitate flow property compared with common zinc soaps as well as increased energy savings in the mixing step.
RubberAid® PA276	Beige to Brown Pastilles / Flakes	Blends of Fatty Acid Soaps mainly Aliphatic in Nature	1.1 ± 0.05	95 - 105	15 - 17	12 - 14	2 - 4	Developed specifically for use in compounds containing high loadings of fillers, particularly with high surface area silicas. Reduces compound viscosity and enhances flow property during extrusion, which could lead to improved processability.

Major of our process aid is based on Palm Fatty Acid and other Vegetable Oil fatty acid, so a sustainable quotient is attached to the same.

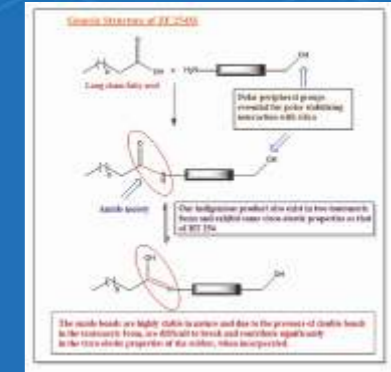
All the products can be supplied in powder form as well.

## PROCESS AID - COMPATABILITY WITH POLYMERS

Products	NR	SBR	BR	CR	NBR	XNBR	IIR	EPDM	CSM	CPE	ECO	HNBR	ACM	EM	EVM	FPM
RubberAid® ZA73	●	●	●	-	●	-	-	-	-	-	-	-	-	-	-	-
RubberAid® ZA74	●	●	●	-	●	-	-	-	-	-	-	-	-	-	-	-
RubberAid® ZEH-S	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-
RubberAid® ZEH	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-
RubberAid® PA44	●	●	●	-	●	●	●	●	-	-	-	●	●	●	●	-
RubberAid® PA46F	●	●	●	-	●	●	-	-	-	-	-	●	●	●	●	-
RubberAid® PA50	●	●	●	-	●	●	●	●	-	-	-	●	●	●	●	-
RubberAid® PA50P	●	●	●	-	●	●	●	●	-	-	-	●	●	●	●	-
RubberAid® PA60	●	●	●	-	●	●	-	-	-	-	-	-	-	-	-	-
RubberAid® PA70	●	●	●	-	●	●	-	-	-	-	-	-	-	-	-	-
RubberAid® PA276	●	●	●	-	●	-	-	-	-	-	-	-	-	-	-	-
RubberAid® ZF254M	●	●	●	●	●	●	-	-	-	-	-	-	-	-	-	-
RubberAid® ZF16	●	●	●	●	●	●	-	-	●	●	●	●	●	●	●	●
RubberAid® ZF16(P)	●	●	●	●	●	●	-	-	●	●	●	●	●	●	●	●
RubberAid® ZF42	●	●	●	●	●	●	-	-	●	●	●	●	●	-	-	-
RubberAid® ZF212	●	●	●	●	●	●	-	-	-	-	-	-	-	-	-	-
RubberAid® ZF222	●	●	●	●	●	●	-	-	●	●	●	●	●	●	●	●
RubberAid® ZF280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●

● Excellent ● Good

## Performance Highlight for Some of our specially developed Process Aid PROCESS AID FOR HIGH DOSAGE OF SILICA COMPOUNDS



**RUBBERAID ZF254M** is fatty acid amide based on vegetable oil, specially designed to support smooth mixing of very high dosage of Silica. The use of vegetable oil and fatty acid makes it a sustainable product to use.

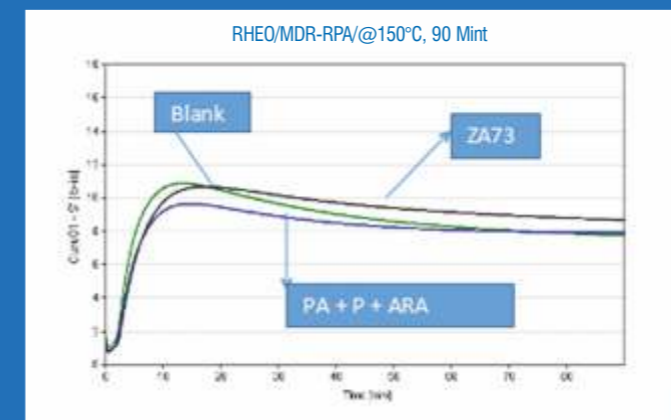
Amide and ester of vegetable oil functional group interact with the silica filler and breaks the cluster structure of silica. The hydrocarbon part goes to the polymer part and act as a lubricant to incorporate filler in the polymer matrix. Since amide can trap silica by nitrogen as well as its tautomeric hydroxyl group, therefore fatty acid amide always a best choice for silica processing aid.

## Performance of our variety process aid for high silica rubber compounds

SSBR based compound with 100 phr Silica and 5 phr Process Aid



**RUBBERAID ZA73** is a specially designed Multi-functional Process Aid. It is a mixture of zinc soap of Aliphatic & Aromatic Carboxylic Acids to effectively work as Peptizer, Process Aid & Anti-Reversion agent. A cost-effective solution and replacement to multiple products using a single product.



Ingredients	BLANK	PA + P + ARA	ZA73
Process Aid	0.00	1.50	0.00
Peptizer	0.00	0.20	0.00
ZA73	0.00	0.00	2.00
Anti Reversion Agent	0.00	0.50	0.00
Mooney Viscosity (MU) - ML(1+4) @ 100°C	61.81	51.11	48.58
Reversion (lb-in) @ 150°C / 90 mins	3.12	1.72	1.90
(%) Shrinkage	1.33	0.66	0.66

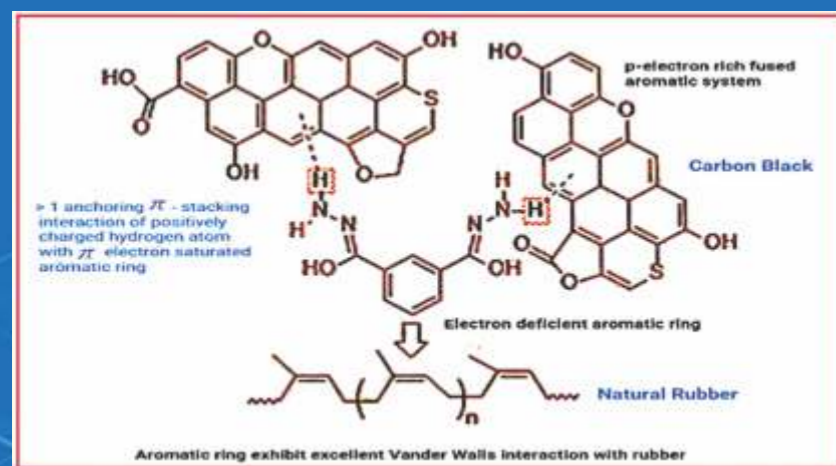
## CARBON BLACK COUPLING AGENT – HYDRAZIDE BASED COMPOUND

Resource / energy conservation efforts in automobile industry has led industry driving forward for fuel efficient tires. Tire rating on fuel efficiency is also implemented in major parts of the world. In order to achieve energy savings from tires, the reduction of rolling resistance, which is one of the resistances against driving force, is very important.

We take privilege in introducing our hydrazide based compound which supports and participates in interaction of carbon black (CB) and natural rubber (NR). Better interaction of NR & CB leads to improvement of TanD @ 70°C, which is a direct measurement of rolling resistance performance in tires.

Product	Appearance	Composition	Active Content, %	Dropping Point, °C	Loss on Drying (%)	Ash Content, %	Typical Usage (phr)	Function and Application
Technic® CCA08	Beige to light brown powder to crystal	Hydrazide Compound	95 min	203 - 208	0.75 max	1 max	0.5 - 1	CCA Hydrazide compounds has been successfully designed to meet need of carbon black and natural rubber NR interaction for tire and non-tire industries.
Technic® CCA15	White to Pale powder to crystal	Hydrazide Compound	95 min	223 - 231	1 max	1 max	0.5 - 1	It offers a balanced combination of improvement in polymer-filler and filler - filler interaction, with reduction of TanD at 60-70°C, resulting in improvement of Rolling Resistance.
Technic® CCA25	White to Pale powder	Hydrazide Compound dispersed on fatty acid derivative	23 - 27	-	2 max	14 - 16	2 - 4	To mitigate the risk of increase in viscosity of rubber compound because of better interaction of carbon black to polymer, the product is formulated with adding specially designed process aid for control of viscosity with minimal compromise in TanD.
Technic® CCA28	White to Pale powder	Hydrazide Compound dispersed on fatty acid derivative	23 - 27	-	2 max	14 - 16	2 - 4	

Schematic representation on the interactions of Carbon Black with NR and CCA\_05



- Molecule to bridge between (interact with) polymer & Carbon black surfaces.
- Dihydrazides - Have very labile hydrogen atoms which can interact with the active sites in carbon black.
- Two distant anchoring groups in a single molecule perceived to possibly act as linkage between carbon molecule and polymer - Natural Rubber (Cis 1-4 Poly Isoprene).

## DMA PERFORMANCE EVALUATION OF OUR DIFFERENT CCA PRODUCTS



## CONCLUSION

Technic®CCAs have helped in having good interaction between carbon black & NR (coupling) which could favorably influence Rolling Resistance /Heat Build-up (Resilience) for NR & CB compounds.

Helpful for Low RR (Tread Cap) and for Low Heat Build Up (tread cap & tread base) carbon black based tire treads and even for conveyor belt cover compound for energy efficient belts.

## NOTES