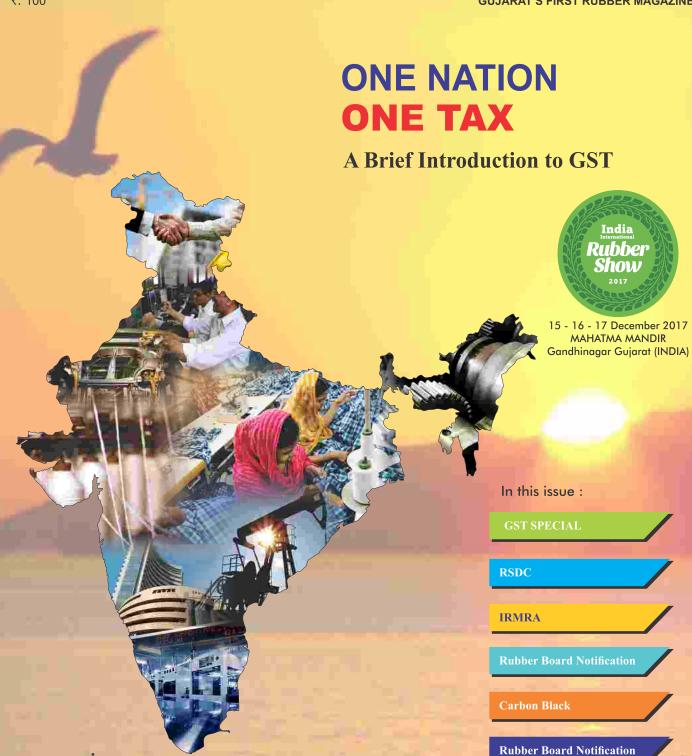


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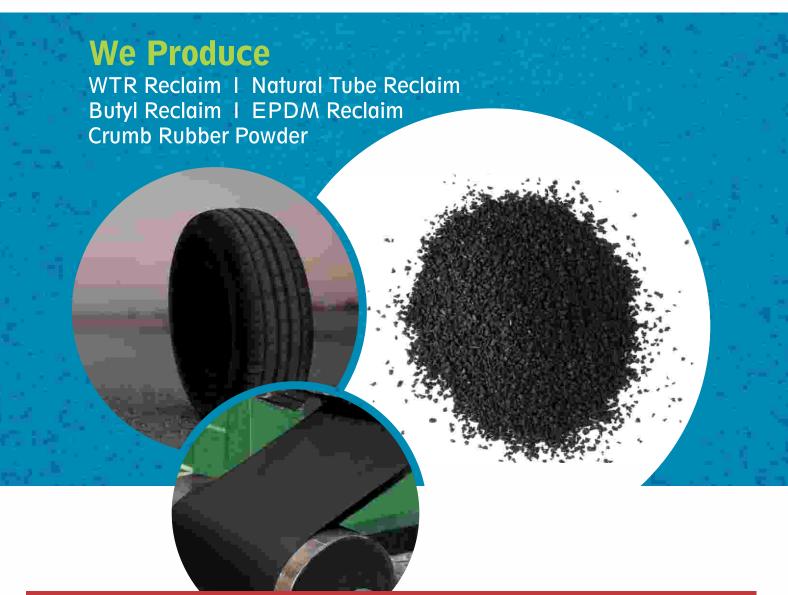
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We invite Technical Notes, Data & News Relevant to Rubber

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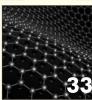




















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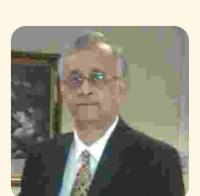


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The RMWA Journal



Dipak Doshi

President's Message



"Excellent Begining....."

Dear Prestigious Readers,

I am exceptionally fortunate to write the 1st ever president's message in this published volume magazine named 'The RMWA Journal'. I am also grateful to the entire member's community of Rubber Manufacturer's Welfare Association to make this success happen.

Let this magazine work as a strong platform for us to determine our multiple goals for the ultimate benefit of our member community. Let this magazine start a new trend to connect each other with technology, products, views, educational write-ups, advertisements, achievements and many more objects to cherish the journey of the beneficiaries of the community.

Upon effective success of the India Rubber Show 2016, we were eager to start our association's own magazine and I am happy to share the success of The RMWA Journal magazine. Not holding onto the magazine, this year we are also organizing the India International Rubber Show 2017 at Mahatma Mandir, Gandhinagar, which I am sure you all are alert of.

There have been many more developments apart from the quarterly seminars; there is a probability that with the help of members we strive to develop a rubber training and testing facility in Gujarat.

I am very much delighted with a constant faith to address request to all of you to participate and contribute in any of the above programs to make it better and better for our future generations to gain from.

This magazine will definitely make its own path as the team of RMWA has worked enthusiastically to make this happen.

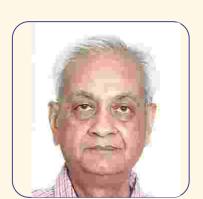
Rubber Industry as a whole has a lot to offer. The world has a lot to take advantage from rubber products. Lets make an effort to shine Gujarat rubber product manufacturers, chemical suppliers, machinery manufacturers, traders and students to be visible to India as well as world. Lets get visible.

Wishing team best luck for this endeavor..!!

With warm regards to all,
Dipak Doshi
President – Rubber Manufacturer's Welfare Association.







Manoj Shah

Editor's Note



"Technical on Rubbers"

Dear Readers,

I congratulate members of RMWA managing committee for initiating a quarterly magazine which provides technical information, latest development in the rubber industry and updates on activities of the association. It is indeed an excellent initiate which will help us stay up to the speed with the latest developments and opportunities in our domain.

In my 40+ years of experience in rubber industry, I have observed two major issues.

- ◆ First, most of the small and medium rubber enterprises do not implement proper control mechanism on incoming raw material. As a result, they experience heavy rejection, which in turn increases their operating expenditure (OpEx). This can be avoided simply by performing few simple, low cost tests.
- ◆ Second issue is lack of basic knowledge of rubber compounding. As an editor of RMWA quarterly magazine, I intend to provide basic information in this regards through a series of technical articles. These articles will be published in the magazine on regular basis.

I look forward to sharing my thoughts and knowledge with you through this excellent platform.

Manoj Shah Editor The RMWA Journal





RMWA News

Glimpses of INDIA RUBBER SHOW (IRS) 2016



Rubber Manufacuturers Welfare Association Constantly striving for the betterment of our industry. In that endeavour we organize expo as INDIA RUBBER SHOW 2016





- ◆ In the year 2016 RMWA initiated in organising Expo for the first time in Gujarat.
- ◆ India Rubber Show was a great success with maximum10000 visitors from various segments where rubber is associated.
- ◆ The 120 exhibitors participated in the same and availed benefit of business networking both at national and international platforms.
- ◆ This was the for the first expo overall world wide where all rubber manufacturers were brought under one roof to show case their products.
- ◆ The event was a mega success.







Glimpses of INDIA RUBBER SHOW (IRS) 2016



















News



In the Year 2016.....

Full Day Technical Workshop on role of Physical and Chemical Testing for Quality Assurance of Rubber Products was arranged by RMWA with IRMRA where nearly 50 members took part and the very interactive session of Question and Answers was organised between the members and speakers Shri Suchismita Sahoo and Dr. Bharat Kapgate from IRMRA.

There is a lot happening at RMWA this year. GST seminar was a part of it last month and it happened to be a great success as the speaker from government department and professional practitioners from the industry.

The focus was to make the member community understand on the tax structure on movement of goods. We thank Mr. Mahesh Jani, Dy. Commissioner, Sales tax department, Ahmedabad, Ms. Shivangi Shah, ICWA. & Mr. Paresh Sheth, Advocate, V B Sheth & Co., Rajkot, without them this extremely educative & effective seminar would not have been possible.

The members had engaged themselves to gain knowledge from it and the doubt-clearing session had a lasting impression to all the gainers. I am sure, with the great support of such dignitaries we wish to earn more knowledge under them. We thank again to the speaker, member & RMWA team to make this success happen. Looking forward to meet you in next seminars.

There is again a grand success by RMWA to conduct seminar cum workshop at DESMA factory visit and Mr. Banerjee's seminar on injection moulding and transfer moulding.

Mr. Banerjee has specially made arrangement on his informative slide show for better understanding on the process and specifically focused on the advantages over other moulding processes.

Shri Arun Mankodi & entire DESMA personal was very warm to welcome the RMWA members and the factory visit with practical demonstration made the process very understanding.

We again thank to all people involved to make this grand success.

Looking forward to meet you in the next topic of workshop cum seminar.









Members Page



TRANSFORMATION THROUGH INNOVATION

The Unique Selling Proposition of boron rubbers india is customization...!!





Boron Rubbers India, the company, which hit the market in the year 1994 as manufacturer of rubber products such as rubber sheets, has also evolved into customization of rubber sheets, molded parts and critical parts for highly technical usages. It would not have been possible without their passion for innovating new products. The Research and Development base of Boron Rubbers India has reached to such a level that the products manufactured by them has become import substitute which clearly shows the dedication of the company towards the project taken by them.

There are various applicators like atomic reactors, nuclear power plants, nuclear laboratories, airports, sugar & cement factories, chemicals & fertilizer units, thermal power stations, ports, railways, state transports, textiles & paper units, automobiles, tank liners and many more. The users expect a sure result from the company as the company firmly believes in indepth theoretical study; selection of materials & life verses cost principle for each and every requirement and offer a optimum quality to the user. The vision of Boron Rubbers India widens each year as they strive to develop new market and put a step forward with Indiafriendly nations. The Vibrant Gujarat Award is an example of benchmark on how a MSME unit can do business differently. "QUALITY IN TIME" is their watchword.

The Company was awarded this year at the MSME convention 2017, MSME Clusters – Basis of Innovation, Inclusion and Competitiveness in the category of Innovation Excellence.

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Members Page



Global Outlook for Domestics Needs

We Bhavik Enterprise are a leading Business Chain in field of Rubber Raw Materials, We offer Distribution, Door to Door service, Direct sales and sourcing to companies through our Pan India Distribution Network.

Under the Guidance of Our Company Visionary Late Shri Ramesh.T.Kamani , We believe in developing new and innovative techniques to cater the Industry with Imported and New Age goods which are competitive and effective in terms of Quality, Development and Price.

Our comprehensive all india marketing & distribution structure established from years of Experience in dealing with Rubber & Plastic Industries across India and Our Ethical business practice has been recognized by world renowned companies who have chosen us to be their strategic partner for Indian Market

We have always believed in Global Outlook for Domestics Needs and Local Industry. We use our geographical advantages in Bringing Imported goods to our Country through various Channels.

We possess Warehouse and Necessary Infrastructure for Proper Integration of our Marketing Channels and Distribution depending upon the Product and the Market Needs.

We have set our Quality Standards and Benchmark by achieving the Latest ISO 9001 Certification by Reputed Certification Body. We always cherish our Goal of Dedication and commitment to our customer with Consistent Quality, Regular Supply And Competitive Pricing.

Bhavik Enterprise has Always Stepped forward towards Participation in Many events, conferences and exhibitions actively towards showcasing the Latest Products, Specialty Grades for new development application, GenNext Raw materials and Products and Availing new strategic collaborations.

Our New Venture M/S Padmanabha Elastosil Pvt Ltd, located in Chennai shall Exclusively Cater the South Indian Rubber & Plastic Industry with Wide Range of Raw Materials and Just in time Deliveries as per Customers Requirement.

Team Bhavik Enterprise

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15 - 16 - 17 December 2017

Forthcoming Events



INDIA INTERNATIONAL RUBBER SHOW (IIRS 2017)

Rubber Manufacturers' Welfare Association (RMWA) is an association of about 300 manufacturers, ancillaries, traders, academicians, institutes, professionals etc engaged in various activities with rubber in the state of Gujarat. There are about 500 small and medium units in Gujarat.

After the mega success of India Rubber Show 2016, we are pleased to announce the next edition of this trade exhibition, which will be even bigger and better in terms of scale and presence of participants. This next edition of India International Rubber Show 2017 has been scheduled on At Mahatma Mandir, Gandhinagar, Gujarat, India.15-16-17 December, 2017

India International Rubber Show 2017, will play a crucial role in the growth and

Development of the India's burgeoning Rubber industry and represents a truly comprehensive range of global products and brands interested in subcontinent

IIRS 2017 will be National level exhibition presenting the largest gathering of Rubber industry players, to showcase the industries' supply chain, ranging from Rubber raw materials to Allied Products who actively service, in Gujarat.

With its comprehensive showcase, IIRS 2017 is the ideal one-stop platform for industry professionals and stakeholders, to source for suppliers and vendors, in addition to exploring lucrative business opportunities in the Western India.

IIRS 2017 is the only event in Gujarat that includes a trade show, educational seminars & workshops and special programs. It has been designed to provide a forum where Manufacturer, Suppliers, and buyers of Automobile & Automotive Manufacturers, Packaging, Plastic & Printing Industries and Electrical & Electronics Industries can meet on common ground and conduct business.

We invite you, to be part of the success story, turning into a History to be written together on a platform created, for the entire industry.

The participation charges are as follows:-

□ One Side Open Stall : Rs. 7000/- Per SQM
 □ Two Side Open Stall : Rs. 7500/- Per SQM
 □ Three Side Open Stall : Rs. 8000/- Per SQM
 □ Sponsors Area : Rs. 10000/- Per SQM

Technical Seminar on any of the following subjects

- □ Rubber Molding techniques
- ☐ Rubber Failure Modes : Diagnosis and Prevention
- ☐ Rubber Material and Compound Design
- ☐ Rubber Quality Problems and Troubleshooting
- Reverse Engineering and Life PredictionRubber Product Design and Testing
- □ Rubber Processing Techniques

The RMWA Journal



11th Governing Council Meeting graced by Honfble Minister Shri Rajiv Pratap Rudy with Mr. Raghupati Singhania Chairman & MD of JK Tyres, Mr. Vinod Simon, Chairman RSDC and Mr. Atul Bhatanagar, Former CEO, NSDC



GC members of RSDC from left to right Mr. Rummy Chhabra, Mr. Rajiv Budhraja, Mr. Bijoy Kammarkar (Rubber Board, Delhi), Mr. Yogen Lathia, Mr. Mohinder Gupta, Mr. Vinod Simon, Dr. R. Mukhopadhyay, Mr. Vijay Pahwa, Dr. K. Rajkumar

Rubber Skill Development Council



Our country has a high index for university graduates, unemployment or underemployment. This is caused primarily due to the educational mismatch. The high formal qualification is unable to match with skill requirements of the sector.

11th Governing Council Meeting graced by Hon'ble Minister Shri Rajiv Pratap Rudy with Mr. Raghupati Singhania Chairman & MD of JK Tyres, Mr. Vinod Simon, Chairman RSDC and Mr. Atul Bhatanagar, Former CEO, NSDCIn order to match the skill gap between the training institutes and industry, there is a renewed focus on skills development from the Honourable Prime Minister of India, emphasizing on "speed, scale and skill". This led to the launch of Skill India Mission in July, 2015. Skill-based training is going to be the backbone of the Skill India Mission and the best way to ensure that the vocational training serves its intended purpose is through public private partnership model. This is where the Sector Skill Councils (SSC) came into existence which is monitored by both industry members and government body to address the skill gap in the sector and implement the activities of skill development as per government mission.

Rubber Skill Development Council (RSDC)

To address the Skill Gap in the Rubber Sector, Rubber Skill Development Council (RSDC), is one such Sector Skill Council which is set up by All India Rubber Industries Association (AIRIA) & Automotive Tyre Manufacturer's Association (ATMA) in Collaboration with National Skill Development Corporation (NSDC). The main aim of RSDC is skill development for rubber industry by developing the skills foundation so as to increase both the quantity and quality of skilled workforce in the industry. It was in July, 2012 that Rubber Skill Development Council came into existence. For a more centralized approach, the head office for RSDC was established in New Delhi with regional offices in Chennai, Mumbai, Chandigarh and state offices in Kerala and Tripura.

GC members of RSDC from left to right Mr. Rummy Chhabra, Mr. Rajiv Budhraja, Mr. Bijoy Karmarkar (Rubber Board, Delhi), Mr. Yogen Lathia, Mr. Mohinder Gupta, Mr. Vinod Simon, Dr. R. Mukhopadhyay, Mr. Vijay Pahwa, Dr. K. Rajkumar

RSDC has mandated to develop a strong eco system through various activities, such as developing National Occupational Standards (NOS), affiliating training institutions to align and deliver trainings to NOS, conducts Train The Trainer programs, certification of trainees, assessors and trainers, and conducting skill gap analysis (SGA), survey with the industry to assist in the planning and delivery of training, besides identifying skill development needs of the sector.

RSDC has devised innovative training models for enhancing vocational education system in the sector. These models gives various benefits to industry such as access to trained workforce that is equipped with technical skills, lower or negligible budget for training, re-training and re-skilling, greater productivity with improved alignment of workforce with job requirements. To meet the quality norms/ standards of RSDC, affiliated Training Partners conducts trainings aligned to NOS based curriculum. RSDC follows the robust NOS based assessment process which includes theory as well as practical assessment and to continuously strength the process RSDC's assessment subcommittee evaluates and screens the assessment process.



National Occupational Standards (NOS)

· RSDC has developed National Occupational Standard (NOS) for 66 job role for rubber manufacturing and 32 for natural rubber (plantation) sector. NOS are a list of occupational standards that applies to a particular job role. These NOSs can be used for a variety of purposes, including skill reviews, developing job descriptions, recruitment and selection, training needs analysis, and providing benchmarks of effective practice.

Skill Gap Analysis (SGA)

Another prime responsibility of RSDC is to conduct Skill Gap Analysis (SGA), the study covers manufacturing units available cluster-wise and product category-wise for skill gaps in each job role, current employment and forecasted employment numbers. Skill gap study been carried out for nine states to understand the demand and supply side of the sector in Phase I & Phase II project. Remaining eleven states are will get covered under the phase III project. RSDC is also planning to conduct SGA in natural rubber plantation segment in collaboration with Rubber Board of India so that an insight can be gained into the plantation segment.

Training & Development

□ RSDC has 32 affiliated training providers who have started NOS based training programs for various job roles in the rubber sector across the country. The trainings focuses on developing hands on skills for the trainees, through theoretical and practical sessions, complemented with on-the-job trainings So far, 38,000 trainees have been trained by RSDC affiliated Training providers in various job roles of manufacturing and natural rubber sub-sector. Trainees been assessed and certified as per RSDC quality standards and guidelines. RSDC has empanelled third party assessment agency to conduct the assessment. In the wake of technological advancement, these assessments are paperless and are carried out on tablets. To conduct these assessments smoothly, the trainees are trained on soft skills as well as sensitized towards computer education. The assessors are RSDC certified and are shortlisted on the basis of their industry experience. A successful trainee gets jointly certified by GOI, RSDC and NSDC.

A successful trainee gets jointly certified by GOI, RSDC and NSDC. Some of the Industry members like Metro Tyre, Bhargave Rubber, Govind Rubber Limited, Relaxo Footwear, Poddar Tyre Limited, Emrald Tyres have benefited by RSDC's skill development programs and acquired skilled workforce that was readily available.

Re-Skilling of existing workforce in the Rubber Sector

• Shop floor training of students for Tyre Maintenance and Service job role under the PMKVY scheme.



Hon'ble Minister of Skill Development and Entrepreneurship, Shri Rajiv Pratap Rudy with RPL certified candidates during inauguration ceremony in Kottayam, Kerala



1





Shop floor training of students for Tyre Maintenance and Service job role under the PMKVY scheme.



Students attending practical session on shop floor for understanding the job role for Junior Rubber Technician

□ Apart from conducting fresh skilling programs for the unskilled youth of our country, RSDC also certifies those people who acquire the industry skill through on-the-job learning but lack formal education degree. Recognition of Prior Learning (RPL) is a program that re-skill, assesses and certifies this workforce that is already employed in the industry. The re-skilling is also structured and aligned to the NOS's.

☐ Students attending practical session on shop floor for understanding the job role for Junior Rubber Technician

Industries like Govind Rubber Limited, Metro Tyres and Relaxo Footwear are some such members who have trained and certified more than 10,000 employees. In a similar drive, Rubber Board of India conducted RPL in plantation sector for Tappers in Kerala. More than 10,000 tapers have already been trained and certified. Hon'ble Minister of Skill Development and Entrepreneurship inaugurated the RPL certification ceremony held in Kottayam, Kerala in December 2016. Further, Rubber Board will also conduct RPL in the state of Tripura and Assam. RPL is also being conducted in Punjab, Haryana and Tamil Nadu for manufacturing workforce and plantation sector, respectively.

University/College Tie-ups

☐ MoU signing ceremony at Tripura University with Mr. Vinod T. Simon, Chairman, RSDC and Mr. O.S. Adhikari, Registrar, Tripura University in the presence of Prof. Anjan Mukherjee, Vice Chancellor, Mr. Narendu Bhattacharya, Deputy Registrar & Prof. R.K. Nath, Coordinator, B.Voc Programme of Tripura University and Ms. Shewani Nagpal, Director, Training & Affiliaton & Mr. Prasenjit Dey, Project Coordinator – NE States of RSDCRSDC has signed a MoU with Tripura Central University for introducing the course for Bachelor in Vocational Studies (B. Voc) in Rubber Technology approved by UGC of Ministry of Human Resource Development (MOHRD). This was the very first university tie-up of RSDC. Hindustan University, Chennai has also joined in and signed the MoU with RSDC for conducting B. Voc program. Kamraj College of Engineering, Madurai has joined hand with RSDC to conduct a special Dual Certification course for their students who are pursuing in engineering stream. It is aimed at giving the students an exposure and understanding of the working environment of a rubber industry shop floor. After completion of the course the students get certified as Rubber Technologist. The first batch of this certification course has already been completed in April 2017.

☐ Bachelor in Vocational Studies is a 3 years program that gives the students an insight into the working of an industry shop floor. The program offers the students' freedom to exit any time during the 3 years. Exiting at the end of 1st year earns the students a certificate of Diplome at the end of 2nd year they are certified as Advanced







MoU signing ceremony at Tripura University with Mr. Vinod T. Simon, Chairman, RSDC and Mr. O.S. Adhikari, Registrar, Tripura University in the presence of Prof. Anjan Mukhenjee, Vice Chancellor, Mr. Narendu Bhattacharya, Deputy Registrar & Prof. R.K. Nath, Coordinator, B.Voc Programme of Tripura University and Ms. Shewani Nagpal, Director, Training & Affiliaton & Mr. Prasenjit Dey, Project Coordinator – NE States of RSDC

Figure 1 and 1 and

Placement drive held in Madurai where RSDC and JK Fenner collaborated for providing employment opportunities through apprenticeship program

Diploma and after the completion of 3 years the students are certified as B. Voc in Rubber Technology.

State Government Partnerships

☐ Memorandum of Understanding (MoU) have been signed with various state government Skill Development missions, namely, Jharkhand Skill Development Mission Society (JSDMS) Punjab Skill Development Mission (PSDM), Tripura Skill Directorate Mission, The Centre for Entrepreneurship Development (CED) at Industries Commissionate, Government of Gujarat, Gujarat Skill Development Mission (GSDM) and Additional Skills Acquisition Program (ASAP), Govt. of Kerala

RSDC's Role in the state government collaborations is mainly to facilitate the following:

- ☐ Periodic sector-specific Training of Trainers (ToT) programs to equip trainers with latest industry relevant skills, knowledge, tools and technology.
- ☐ Skill gap study of the Rubber Industry to assess sector specific gap between supply and demand of skilled human resources in the state.
- □ Develop NSQF complied course curriculum and trade norms in Rubber Industry to maintain high training standards and uniformity of training across government training programs and institutes in the state.

Assessment and certification of trainees based on NOS to assure high job placement and work productivity.

☐ Promote industry participation in training, apprenticeship and placements in Rubber Industry.

Knowledge transfer for setting up 'Centre of Excellence' in Rubber Industry.

Other Activities

Placement drive held in Madurai where RSDC and JK Fenner collaborated for providing employment opportunities through apprenticeship program

A Job Portal exclusively for Rubber industry has been established by RSDC, which has a data base of more than 1,000 skilled candidates and is being updated regularly as the trainings are concluded. The employer as well as the employees can register on this portal for free. It is a common platform for the industry to meet the skilled workforce from across the country. RSDC is also responsible for the placement of these trainees. Job Portal is one such way to connect them to the industry. Various placement drives have been conducted in collaboration with industry partners for the placements. One such drive was recently conducted in Madurai, Tamil Nadu with J K Fenner in March 2017. Job Fair has been planned in Madhya Pradesh, in collaboration with the Training Partners, for the students trained in Tyre Service and Maintenance job roles. More than 5,000 students have been placed with the industry after the completion of their training program.



रबड़ बोर्ड

(भारत सरकार, व्याणिक्य एवं उद्योग मंत्रालय) पी.बी.ने.1122, सब जेल रोड, कोट्टयम 686 002 केरल गुज्य, भारत

प्रचार व जनसंपरक प्रभाग

Press release



THE RUBBER BOARD

(Government of India, Ministry of Commerce & Indiastry) P.B.NO 1122, SUB JAIL ROAD, KOTTAYAM - 686 002 KERALA STATE, INDIA.



PUBLICITY AND PUBLIC RELATIONS DIVISION

Ref.No.48/1(PRE-26)/2017-18/PUB

Dt. 02 June 2017

Kottayam

PMKVY skill development programme in rubber sector yield results

Recognition of Prior Learning (RPL), the skill development programme for rubber tappers under Pradhan Mantri Kuashal Vikas Yojana (PMKVY) being implemented by the Rubber Board is yielding results as reflected by the survey conducted by the Rubber Board. Improvement in the skills of the tapper as a result of the programme and its impact on yield were the focus of the survey.

The survey revealed that there is a 33 per cent increase in the skills of tappers who were trained under the programme. The monthly yield in the holdings tapped by those who had undergone the training, has shown an increase of 16 per cent. Previous studies conducted by the Board have already established that yield from rubber could be increased by more than 30 per cent by adopting scientific tapping.

In the first phase of the project implemented in Kerala, ten thousand persons including rubber tappers and those involved in the processing of rubber were trained.

In the second phase of the skill development programme, 22,000 persons will be trained under the job roles of Latex Harvest Technician (Tapper); Processing Technician- Rubber Sheeting; General Worker - Rubber Plantation and Rubber Nursery Worker in Kerala, Karnataka, Tamil Nadu and northeastern states.

One of the main reasons for yield decrease in the traditional rubber growing areas is unscientific tapping. The Rubber Board has initiated a massive skill development programme with an objective to increase production and profitability of rubber plantation sector. Through the programme, Board is aiming at certifying majority of tappers in India by 2020.

2. Rubber tappers and growers who do tapping in their own holdings and who are above 18 years of age can participate in the skill development programmes. Thirty tappers will be trained in a batch during a period of three days.

PMKVY is implemented by the Ministry of Skill Development and Entrepreneurship (MSDE) with the objective to develop, improve and certify skill of Indian youth. Assessment and





Recognition of Prior Learning is also undertaken by PMKVY under the scheme. With a vision of a Skilled India, the scheme is planned for implementation during 2016-20. PMKVY is implemented by NSDC under the guidance of the MSDE.

NSDC is a Public Private Partnership under the MSDE to fulfill the need for skilled manpower across sectors and narrow the existing gap between the demand and supply of skills.

Assistant Director

(Publicity)

रबड़ बोर्ड

(भारत सरकार, व्याणिज्य एवं उद्योग मंत्रालय) पौ.बो.मं.1122, सब जेल रोड, कॉट्टयम 686 002 केरल राज्य, भारत

प्रचार व जनसंपरक प्रभाग

THE RUBBER BOARD

(Government of India, Ministry of Commerce & Industry) P.B.NO. 122, SUB JAH, ROAD, KOTTAYAM - 686 002 KERALA STATE, INDIA.



PUBLICITY AND PUBLIC RELATIONS DIVISION

Ref.No.48/1/(PRE-27)/2017-18/PUB 2017 Dt. 05 June

Growers can clear doubts on intercropping and planting in rubber Kottayam

Rubber growers can seek information on rubber planting operations and intercropping in rubber from Rubber Board Call Centre on 7 June 2017 from 10am to 1pm. Dr. M.D. Jessy, Joint Director, Rubber Research Institute of India will answer the queries from rubber growers. Call Centre number is 0481 – 2576622.

Rubber being a perennial crop, planting operations need to be done with utmost care. Rubber growers should make use of the findings of Rubber Research Institute of India. Cost of cultivation can be reduced by adopting scientific practices.

Rubber Board and State Agriculture Department are jointly working on a scheme for intercropping in immature rubber plantation with vegetables and fruit plants. Intercropping will give additional income to rubber growers.

Information about the services of the Board and also technical advice regarding cultivation, production, processing etc. of rubber can be regularly sought from the Call Centre functioning at its Head Office. The service is available from 9.30 am to 5.30 pm on all working days.

Assistant Director (Publicity)







Shri Paresh Sheth Advocate V.B.Sheth & Co. Rajkot

GST



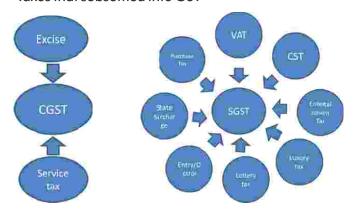


Are you

Concept of GST

- ☐ It is a Dual GST model (SGST, CGST & IGST)
- ☐ GST is a destination based Tax on consumption of goods & services
- ☐ It is Proposed to be levied at the each stage of business
- ☐ From manufacture to final consumption with credit of Taxes paid at previous stages available as setoff
- ☐ That means only Value addition will be taxed and burden of tax is to be borne by the final consumer

Taxes that subsumed into GST



Tax Levy under GST

- ☐ The Central GST and the State GST would be levied simultaneously
- ☐ Further both would be levied on the same price
- ☐ CGST, SGST would be chargeable only when the supplier and the recipient are both located within state
- $\ \square$ IGST will be charged for Interstate Transactions and Imports







7 Important things About GST:

- 1. GST Applicable on Supply
- 2. GST payable as per time of supply
- 3. Determining Place of Supply Could be the Key
- 4. Valuation in GST
- 5. ITC in GST
- Inter State supply of goods for consideration to attract IGST
 Time limit for adjudication

Accounts And Records:

- · Every registered person shall keep and maintain, at it's principal place of business, as mentioned in the certificate of registration following records:
- 1. Production of manufacture of goods
- 2. Inward and outward supply of goods or services or both
- 3. Stock of goods
- 4. Input tax credit availed
- 5. Output tax payable and paid
- ☐ If more than one place of business is specified in the certificate of registration the account relating to each place of business shall be kept at such place, however such record can be maintained in electronic form
- ☐ The account or records shall be maintained separately for each activity including manufacturing, trading and provisions of services etc.
- ☐ Every registered person shall keep and maintain:
- ☐ Account of stock, in respect of each commodity received and supplied by him containing particulars of the opening balance, receipt, supply, goods lost, stolen, destroyed, written off or







- disposed of by way of gift or free samples and balance of stock including raw material, finished goods, scrap and wastage.
- ☐ Separate account of advance received, paid and adjustment made thereto.
- ☐ An account containing the details of tax payable, collected and paid, input tax credit claimed, together with register for tax invoice, credit note, debit note, delivery challan, issued or received during any tax period.
- ☐ The particulars of names and addresses of suppliers from whom goods or services are received.
- ☐ Complete name and addresses of the person to whom the goods are supplied.
- ☐ Complete address of the premises where the goods are stored by him including goods stored during transit along with the







- (1) The invoice shall be prepared in Triplicate, in case of supply of goods, in the following manner:
- (a) the original copy being marked as ORIGINAL FOR RECIPIENT;
- (b) the duplicate copy being marked as DUPLICATE FOR TRANSPORTER.
- ☐ The transporter doesn't need to carry the invoice if the supplier has obtained an invoice reference number. (The supplier can obtain an Invoice reference number from the common portal (GSTN) by uploading a tax invoice issued by him. The invoice reference number will be valid for 30 days from the date of uploading)
- (c) the triplicate copy being marked as TRIPLICATE FOR SUPPLIER.
- (2) The CONSECUTIVE serial number of invoices issued during a tax period shall be furnished electronically through the Common Portal in FORM GSTR-1



Invoice for Export:

In case of exports of goods or services, the invoice shall carry an "SUPPLY MEANT FOR EXPORT/SUPPLY TO SEZ UNIT OR SEZ DEVELOPER FOR AUTHORISED OPERATIONS ON PAYMENT OF INTEGRATED TAX" Or "SUPPLY MEANT FOR EXPORT/SUPPLY TO SEZ UNIT OR SEZ DEVELOPER FOR AUTHORISED OPERATIONSUNDER BOND OR LETTER OF UNDERTAKING WITHOUT PAYMENT OF INTEGRATED TAX" as the case may be, and shall, in lieu of the details specified in clause (e), contain the following details:

- (i) name and address of the recipient;
- (ii) address of delivery;
- (iii) name of the country of destination; and number and date of application for removal of goods for export





GST on Export of Goods and Service:

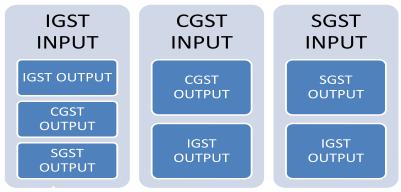
- ☐ GST on export would be zero rated
- ☐ Similar benefits is given to Special Economic Zones (in processing zones only)
- ☐ GST paid by Exporter on the procurement of goods and services will be refunded similar to old Rules 18/19 of Central Excise Rules, 2002



Input Tax Credit:

- ☐ The input tax credit shall be availed by a registered person, including the Input Service Distributor, on the basis of any of the following documents, namely:
- (a) an invoice issued by the supplier of goods or services or both in accordance with provision of Section 31
- (b) a debit note issued by a supplier
- (c) a bill of entry
- (d) an invoice issued in accordance with the provisions of clause (f) of sub-section (3) of section 31 (i.e. Tax Paid on Reverse Charge basis)

Input Tax Credit in GST:







Payment:

- 3 Electronics ledgers will be created on the portal:
- ☐ Electronic Liability Ledger The electronic tax liability ledger shall be maintained in FORM GST PMT-01 for each person liable to pay tax, interest, penalty, late fee or any other amount
- ☐ Electronic Credit Ledger The electronic credit ledger shall be maintained in FORM GST PMT-02 for each registered person eligible for input tax credit under the Act on the Common Portal and every claim of input tax credit under the Act shall be credited to the said Ledger
- ☐ Electronic Cash Ledger -The electronic cash ledger shall be maintained in FORM GST PMT-05 for each person, liable to pay tax, interest, penalty, late fee or any other amount, on the Common Portal for crediting the amount deposited and debiting the payment there from towards tax, interest, penalty, fee or any other amount
- ☐ Any person, or a person on his behalf, shall generate a challan in FORM GST PMT-06 on the Common Portal and enter the details of the amount to be deposited by him towards tax, interest, penalty, fees or any other amount.
- ☐ The challan in FORM GST PMT-06 generated at the Common Portal shall be valid for a period of fifteen days.
- ☐ The deposit shall be made through any of the following modes:
- Internet Banking through authorized banks from registered Bank A/c
- 2. Credit card or Debit card through the authorized bank;
- 3. (NeFT) or (RTGS) from any bank;
- 4. (OTC) through authorized banks for deposits up to ten thousand rupees per challan per tax period, by cash, cheque or demand draft







Refund:

- ☐ Excess payment of tax due to mistake or inadvertence
- ☐ Export (including deemed export) of goods / services under claim of rebate or Refund of accumulated input credit of duty / tax when goods / services are exported
- ☐ Credit accumulation due to output being tax exempt or nil-rated
- ☐ Credit accumulation due to inverted duty structure i.e. due to tax rate differential between output and inputs
- ☐ Application form for claiming refund can be filed through the GSTN portal
- ☐ An acknowledgement number would be shared with applicant via sms or email, once the application is filed electronically
- ☐ Adjustment would be made to return and cash ledger and reduce the "carry- forward input tax credit" automatically
- ☐ Refund will be credited electronically to the account of applicant via ECS, RTGS or NEFT
- ☐ No refund shall be provided for an amount of less than Rs 1000

GST applicable on "Supply":

- In GST Regime all supply such as sale, transfer, barter, lease, import etc. of goods and/or services made for a consideration will attract CGST and SGST or IGST
- 2. Schedule I: Activities to be treated as Supply even if made without consideration (E.g. Interstate Stock transfer and branch transfer)
- 3. Schedule II: Matters to be treated as supply of goods or supply of Services
- 4. Following activities shall be treated neither as a supply of goods nor a supply of services:
 - a) activities or transactions specified in scheduled III (E.g. Services by an employee to employer) or
 - b) activities or transactions undertaken by the central Govt., a State Govt. or any local authority in which they are engaged as public authorities as specified in scheduled IV

GST Liability in terms of "Time of Supply":

- ☐ The Liability to pay GST arises at the earliest:
- A) Goods:-Removal of goods or receipt of payment or issuance of Invoice or Date on which buyer shows receipt of goods
- B) Services:- Issuance of invoice or receipt of payment or date on which recipient shows receipt of services.

Valuation:

- ☐ TRANSACTION VALUE- The value of supply of goods or services or both shall be the transaction value, that is the price actually paid or
 - payable for the supply of goods or services or both where:
- 1. The supplier and the recipient of the supply are not related and
- 2. The price is the sole consideration for the supply





- ☐ Transaction Value does not include GST but includes other taxes, duties, fees and charges levied under any statue other than SGST/CGST/IGST Act
- ☐ Incidental expenses, including commission, packing, weighment, loading in factory, testing before supply, etc. charged by supplier are included in value
- ☐ Interest, late fee or penalty for delayed payment is includable in
- ☐ Discounts given before or at the time of supply will be allowed as deduction from transaction value. Such discounts must be clearly mentioned on the invoice.
- ☐ Discounts given after supply will be allowed only if-
 - 1. It is mentioned in the agreement entered into before sale AND
 - 2. input tax credit proportionate to the discount has been reversed by the recipient of the supply AND
 - 3. It can be clearly tracked to relevant tax invoice

Job Work:

- ☐ Section 143 deals with Job work procedure
- ☐ On intimation registered person shall send any input or capital goods for Job Work process other then moulds and dies, jigs and fixtures, or tools within 1 year or 3 years respectively without payment of duty
- ☐ The principal can supply the goods from the premises of job worker after declaring the place of business of the job worker as his additional place of business and keeps proper account for the input or capital goods
- ☐ If the input / capital goods are not received within the time specified then it shall be deemed to have been supplied when the said inputs were sent out
- ☐ Any waste or scrap generated during the job work process may be supplied by the job worker directly from is place of business on payment of tax if such job worker is registered or by the principal if the job worker is not registered

Returns:

- ☐ Every month 3 returns
 - 1. GSTR 1 for all outward supplies to be submitted by 10th of following month
 - 2. GSTR 2 for all inward supplies to be submitted by 15th of following month
 - 3. GSTR 3 final return for the month (after payment of taxes) to be submitted by 20th of following month



- ☐ GSTR 9 Annual return to be submitted by 31st December
- Returns to be submitted for all state wise registration separately

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"Make in India" of Rubber Products



Last Two decades Rubber Industry has gone through complete revolution. This is mainly due to addition of various specialty rubbers and improved curative system. In India there is lots of advancement in various sectors like Automotive, tyre, hose, belt, medical applications and extended research is going on in these fields. But some sectors like defence, Railways, Nuclear etc. where lot of rubber products are consumed but there is little advancement to adopt new art of Rubber technology, They are still relaying on various imported rubber products by paying huge cost. This creates new window for opportunities to rubber technologists in India to study these products and to develop improved product with better properties and better safety aspect. This type of research requires lot of dedication, knowledge and Analytical support by various sophisticated instruments

'Indian Rubber Manufacturer's Research Association, IRMRA' working with various government, public and private firms and helping them in "Make in India" policy. 'IRMRA' is equipped with latest Analytical equipment's Like Fourier Transform Infrared Spectrophotometer (FTIR), Gas Chromatograph Mass Spectroscopy (GC MS-MS), Inductively Coupled Plasma (ICP), Scanning electron microscope with Energy Dispersive X-ray spectroscopy (SEM-EDS), X-Ray Diffraction(XRD) and thermal equipment's like Thermo-gravimetric Analyzer (TGA), Differential Scanning Calorimeter (DSC), Dynamic Mechanical Analyzer (DMA). Our Mechanical Testing Laboratory equipped with Universal Testing Machine (UTM), Auto Hardness Testing Machine, Ozone Chamber, Rubber Processing Analyzer (RPA), Rheo meter, Moving Die Rheo meter (MDR), Mooney Viscometer, Din Abrader, Million Mega ohm meter, etc. IRMRA is also expertized in conventional Chemical analysis and having complete test facility for it.

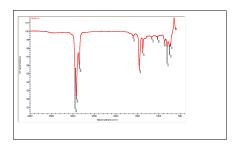
IRMRA's motto is "Helping Rubber World for Building better future" and IRMRA has dedicated team scientists and Scholars for conducting testing and Evaluation and also provides extended support for product development to rubber manufacturers and users. Some of the important analytical techniques are discussed below.



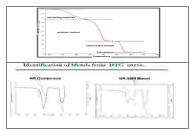












Fourier Transform Infrared Spectroscopy (FTIR) and (FTIR) / (ATR)

Polymer Identification is carried out by FTIR by ISO 4650 or ASTM 3677 method. The sample is extracted for 16 hrs with organic solvent such as acetone to remove organic additives like plasticizer, antioxidant, antiozonant, wax etc. The sample is thermally degraded and resulting pyrolyzate is casted on NaCl plate and IR spectra is obtained. The spectra is examined for various infrared bands and type of polymer is estimated For FTIR-ATR Small piece of sample is placed on ATR crystal and appropriate pressure has given by pressure arm and infrared spectra isacquired for IR region 4000 cm-1 to 600 cm-1. This spectrum gives additional information for polymer type. Similarly sample is extracted for 16 hrs with organic solvent and solvent extract is dried. The dried residue isplaced on the ATR crystal and FTIR ATR spectra areacquired. The spectrum is useful for identification of type of plasticizer added.

Thermo-gravimetric Analysis (TGA)

TGA is important tool for characterizing polymer, to find composition of rubber product and study of blends and to determine blend ratio. In TGA weight loss as a function of temperature has been used for determination of polymer content, Carbon black content. The purge gas used is nitrogen up to 6000C and after that purge gas is switched over to oxygen for carbon black combustion. The heating rate is maintained at 20 0C per min for entire temperature range. For blend ratio analysis sample is extracted with organic solvent for 16 hrs using soxhlet extraction apparatus and sample dried in oven for 2 hrs at 105 +/- 50C and dried sample is analyzed on TGA as per above mentioned procedure. The approximate blend ratio is estimated by comparison with library data. Library can created in house by preparing compounds of various blends and then analyzing on TGA.

Energy Dispersive X-ray Spectroscopy:

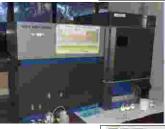
Sample is analyzed by Scanning electron Microscope (SEM) withX-ray detector (EDX) for determination of elements and with X-ray analysis software. The Back scatter detection (BSD) mode can be used for imaging. EDX can detect all the elementsexcept H, He, Li and Be. Here Energy dispersive analysis is done on elements above sodium (Na) in the periodic table in the energy range from 0 KeV to 20 KeV. The x-ray spectral lines are calibrated using a copper/aluminum standard toassure correct identification of the elements. Automatic baseline correction is used and onlythose elements above the background matrix are reported. Results should be considered as beingsemi-quantitative and it should be kept in mind that only an area of approximately 1.1 mm2is being analyzed, and the sample may not be homogenous over a larger





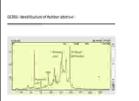












area. The beam energy used is 20 KeV, which would penetrate the surface to a depth of about 7 m. The results reflect the relative amounts of the elements present in the surfaces of the samples to this depth. This chemical test is used to identify chlorine, bromine, silica, calcium, magnesium and zinc levels semi-quantitatively. The sample is prepared by placing the sample on an aluminum pin mount coated withdouble-sided carbon adhesive tape.

Inductively coupled Plasma- optical emission Spectroscopy (ICP-OES)

ICP analysis is used to quantitative determine inorganic content. The metal content is determined as per ISO 19050. The sample is acid digested on hot plate to solubilize the elements of interest and digested solution is filtered and diluted in volumetric flask. The digested solution is injected into the plasma with help of peristaltic pump as a liquid stream at the rate of 1 ml per minute. The inductively coupled plasma is at very high temperature about 7000 – 8000 0K. When solution is aspirated into the flame excitation region where they are first de-solvated then vaporized and atomized in Argon plasma. All the compounds dissociated to yield atomic emission spectra. Before analysis ICP is calibrated for required elements by certified reference material (CRM) and elemental analysis is carried out against calibration curve.

Gas Chromatograph-Mass spectroscopy (GC-MS)

GCMS is one of the best hyphenated techniques of Chromatography and Mass Spectroscopy. Chromatography is important for separation of organic components and separated organic components are identified and quantified by Mass spectroscopy. For analysis first solvent extraction is carried by soxhlet extraction assembly. The extract residue is analyzed on GC-MS for identification of vulcanization system, antioxidant, stabilizers and other organic additives. GC-MS is also very important tool to identify and quantify restricted / banned organic component like Polycyclic Aromatic hydrocarbon, Nitrosamine, Phthalates etc. GC MS analysis preferablycarried out on capillary column, 30 meter length, 0.25 mm ID, 5% diphenyl/95% dimethyl polysiloxane.

Chemical Analysis

Some chemical methods are also very important for characterizing Rubber product such as Ash content analysis, total sulfur and free sulfur analysis, solvent extraction etc. Ash contentis analyzed by ASTM D 297 by conventional furnace method. A specimen is placed in a crucible and ashed in muffle furnace at 550 +/- 250C. Ash content gives information's about inorganic material in the rubber specimen. Total sulfur is carried out on un-extracted sample and for free sulphur, known weight of sample is extracted with acetone and analysis is carried out on extraction residue. Solvent





intended for repeated use. The test was conducted in n-Hexane and Distilled water initially 7 hrs and subsequently for 2 hrs, the Extraction value in mg/inch2 was measured.

Conclusion:

'Make in India' is mission initiated by Government Of India for Manufacturing the products in India, to become competitive, self reliable, to create jobs for youth, to increase export and to reduce import and to expand GDP. For organization it helps as tool to increase its brand value, technological up gradation, window for compete with other multinationals, open market and ease of doing business. Main problem for rubber manufacturing industry in India to have technical and analytical Support as it required lot of investment and organization Like 'IRMRA' are come forward to help rubber industries. IRMRA is under Ministry Of Commerce and taken many initiative to support 'Make in India' concept of government. IRMRA's mottois "Helping Rubber World for Building better future" and offerstheir services to rubber industries for testing, training, material evaluation, Failure analysis, Product development and third party inspection etc.at very nominal cost

K. Rajkumar, Manohar Nawale

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BHARAT RUBBER CHEM

Synthetic Rubber, Chemicals, Industrial Raw Materials

RUBBER RAW MATERIAL

- Silicon Rubber
- EPDM
- NItrile NBR
- Neoprene
- HI Nitrile
- Plasticizer

- Hyplon Rubber
- Carbon Black
- SBR
- Butyl Rubber
- Reclaimed Rubber

Email: bharat_chem@yahoo.com / bright.sale@yahoo.co.in



CARBON BLACK

Carbon Black



Carbon black is essential reinforcing filler for rubber industries. Carbon black is classified in several ways. One way is to classify carbon black in accordance to their levels of abrasion resistance; super abrasion furnace (SAF), intermediate super abrasion furnace (ISAF), and high abrasion furnace (HAF). Extrusion rate is another way to classify carbon black, where fast extrusion furnace (FEF) and general-purpose furnace (GPF) are in that category. There are other classifications, but basically they all depend on their manufacturing process, structure and surface area.

Nomenclature for carbon blacks (ASTM standard D-1765)			
ASTM Classification	Industry Type	ASTM Classification	Industry Type
N110	SAF	N347	HAF-HS
N220	ISAF	N351	
N234	ISAF-HS	N375	
N242	ISAF-HS	N550	FEF
N285		N650	GPF-HS
N299		N765	SRF-HS
N327	HAF-LS	N770	SRF
N339	HAF-HS	N787	SRF-HM

SAF - Super abrasion furnace, ISAF - Intermediate super abrasion

HAF - High abrasion furnace, FEF - Fast extrusion furnace

SRF - Semi reinforcing furnace

HS - High structure, LS - low structure, HM - High modulus

The size of the carbon black particle has a profound influence on its dispersion characteristics within a rubber matrix and determines the final vulcanizates properties of the rubber compound. Blacks of very fine particle size are difficult to disperse because of the narrow spacing between particles and when dispersion is achieved, give a high reinforcement. Large particle size blacks are easily completely dispersed, but do not give reinforcement. The structure of the black affects the processing properties of the rubber compound, but generally does not have great significance in the reinforcement.

High structure blacks contain more void volume to be penetrated by rubber and thus take longer to incorporate. But once incorporated, they disperse more easily than lower structure blacks. High structure black also encounters more break down of primary aggregates during mixing which creates fresh surfaces with free radicals leading to higher bound rubber content.

Increased surface area or increased loading in a compound dictates an increase in viscosity, which in turn causes heat generation.. One important point that a compounder has to consider is the reflocculation of carbon black that occurs during storage between mixing and curing. Carbon black, once dispersed in rubber, may reform contacts among aggregates, because of attractive forces between the aggregates themselves

Mixing of carbon black into rubber consists essentially of two phases:

Incorporation the carbon black is distributed into the rubber matrix but not into the desired state for complete reinforcement. At this stage of mixing the rubber penetrates the voids in the large agglomerates of carbon black. It is also at this stage that strong interaction between the rubber and black surface occurs in the case of small particle sized





blacks with low structure, which makes the next step of dispersion difficult to achieve.

Dispersion the large carbon black agglomerates become broken down and 'wetted out' under the influence of the mixing shear forces into discretely dispersed small aggregates/particles. The rubber becomes occluded into the remaining small aggregates, penetrates the voids within and between the aggregates and enters any cavities, resulting in an increase in viscosity as the available free volume of rubber is diminished. The result of the rubber occlusion is an effective increase in black loading. High surface area, low structure blacks are difficult to disperse as their dense packing and low void volume gives them the ability to rapidly interact with the rubber. As a result of the strong adhesion between the black and rubber, good random spatial dispersion is difficult to achieve.

Carbon black classification

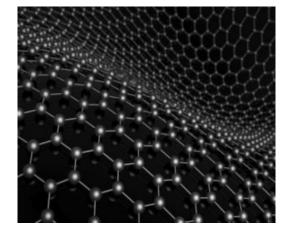
Carbon black refers to a group of industrial product consisting of furnace black, channel blacks, thermal blacks and lampblacks. They are material composed essentially of elemental carbon in form of near-spherical particles of colloidal sizes, combined mainly into particle aggregates obtained by partial ignition or thermal decomposition of hydrocarbons. Furnace black are made in a furnace by partial ignition of hydrocarbons. Thermal black and acetylene blacks are produced by thermal decomposition or natural gas and acetylene respectively. Channel blacks are manufactured by impingement of natural gas flames on channel irons. Lampblack is made by burning hydrocarbons in open, shallow pans. Only the furnace and thermal decomposition processes are significant commercial important.

A classification system is used to classify rubber grade carbon blacks by use of a four-character nomenclature system. The first character in the nomenclature system for rubber-grade carbon blacks is the lettering indicating the effect of the carbon blacks on the cure rate of a typical rubber compound containing the carbon black. The letter "N" (Normal) is used to indicate a normal curing rate typical of furnace blacks and "S" (Slow) is used for channel blacks or for furnace blacks that have been modified to effectively reduce the curing rate of rubber.

The second character is a digit to designate the average surface area of the carbon black as measured by nitrogen surface area. The surface area range of the carbon blacks has been divided into ten arbitrarily groups. These groups are as shown in Table . The third and fourth characters in this system are arbitrarily assigned digits. It is to be noted that currently no ASTM grades cover. Indeed, the main carbon black manufacturers have been proposing grades on an experimental or commercial basis. The Following Table gives some samples of few commercial carbon blacks. Also given are their typical surface area and particle size ranges.



Group No.	Avg. N ₂ Surface Area M²/g
0	>150 121 to 150
2	100 to 120
3	70 to 79 50 to 69
5 6	40 to 49 33 to 39
7 8	21 to 32 11 to 20
9	0 to 10







· Classification and characterization of commercial carbon black

ASTM Designation	Type Code	Туре	Typical N ₂ SA M²/g	Typical avg. particle, nm
N110	SAF	Supper abrasion furnace	130	11-19
N220	ISAF	Intermediate superabrasion furnace	115	20-25
N330	HAF	High abrasion furnace	79	26-30
N550	FEF	Fast extrusion furnace	41	40-48
N660	GPF	General purpose furnace	35	49-60
N760	SRF	Semi-reinforcing furnace	28	61-100
N990	MT	Medium thermal	9	200-500

Carbon black is generally incorporated into rubber by shear experienced in an open mill or Banbury mixer. It has been postulated that during the first stage of incorporation, carbon black agglomerates becomes encapsulated by polymer. In the next stage of incorporation the rubber is being forced through the channel between aggregates and agglomerates to form a reinforced rubbery composite. The consequence of this incorporation of carbon black into rubber is the creation of an interface whose total interfacial area and ability to have interaction between the materials depends on the carbon black loading, structure, specific surface area and dispersion obtained through the mixing process. The processing properties of rubber are very important in industry. The incorporation of carbon black into rubber greatly influences the properties of uncured rubber. Carbon black is known to significantly change the flow and viscosity of an uncured rubber compound. The hydrodynamic effect from the carbon black present reduces the volume fraction of the flow medium causing shear strain amplification when the compound is forced to flow thus increasing the viscosity. It is important that the asymmetric aggregate of carbon black increases the flow resistance and it is known that as the structure is increased to even higher level that the viscosity is increased. Filler-filler networking is also a factor that must be overcome when the compound flows which will again increase viscosity.

The effects of different carbon blacks on rubber properties are dominated by the carbon black specific area and structure. In general, higher surface area carbon black impact higher levels of reinforcement with resulting higher hysteresis. Higher structure generally gives improved extrusion behavior, higher compounds modulus and higher compound viscosity. The rubber properties are also influenced by the amount of carbon black in the rubber compound. Some rubber properties like tensile strength, abrasion resistance, are increased with the increasing loading of carbon black to an optimum and then they decrease.





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