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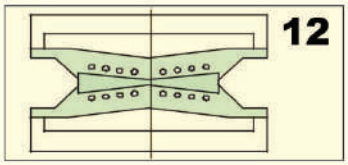

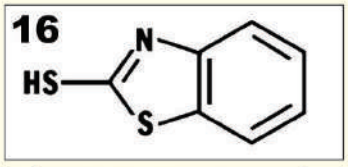

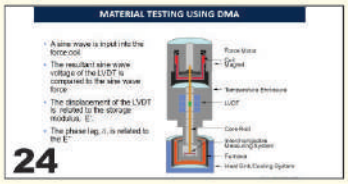

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Editor's Note

Manoj Shah
Editor, RMWA

"Rubber Compound Market"

Dear Readers ,,,,

Consumption of rubber compound is increasing globally. Share of styrene butadiene rubber compound will grow in the global rubber compound market because SBR is used in applications like tyres, footwear, and adhesive and polymer modification. SBR is relatively cheaper when compared to other elastomers. Increasing demand for elastomers in international market will improve rubber compound market too. According to a research market report rubber compound market will grow 2% annually by 2022.

The automotive industry is showing significant growth in Asia pacific sector. The forecast of automotive industry is high during 2018-2022 periods according to a market research report. This in turn will increase rubber compound market.

Since long natural rubber prices have witnessed a falling trend. This is largely due to rising U.S. gas production. The other reason according to report is ineffective curtailment programme of the production. This has impacted the market to a great extent.

Happy Reading ....

STYRENE BUTADIENE RUBBER

Manoj Shah
Nitro Polymers

STYRENE BUTADIENE RUBBER [SBR]

· Germany researched this polymer duringo 1930 /1940 to free them from depending on natural rubber for tyre production. SBR at that time was poor in properties as compared to natural rubber. With lot of technology development at polymerisation stage it stands on its own merit competingnatural rubber.

· It is co-polymer of styrene and butadiene. Polymerisation occurs at 5* C to form SBR rubber.

· There are 6/7 of butadiene units per one styrene unit. Butadiene is mostly in trans configuration.

· Styrene is 23% by weight in SBR polymer.

· Solution SBR is produced by stereo-specific polymerisation with Lithium catalyst. Most of these are block polymers. They are thermoplastic.

· Hot polymerised grade have highly branched chain. Processing is difficult with hot polymers. Hot grades have low mill shrinkage& good dimensional stability. Physical properties of vulcanizates are poor.

· Cold polymerised grades are more linear & easy processing. Mastication is not required.

· Oil extended SBR are easy processing. There is high proportion of straight chain & wide molecular weight distribution. There is 10 to 15 % of low molecular weight portion which does not cross-link on curing & act as a processing aid. Aromatic oil imparts excellent processing but they are staining. Naphthenic oils are moderate processing but they are non-staining.

· Black master batches of SBR are easy processing. The benefit of M/B lies in shorter mixing time, improved extrusion, less power consumption & clean factory operations.

Commercial grades

· Series 1000 hot polymers
· Series 1500 cold polymers
· Series 1600 cold polymers + carbon black + less than 14% oil
· Series 1700 cold oil master batches
· Series 1800 cold polymers + carbon black + more than 14% oil
· Series 1900 miscellaneous dry polymers M/
· Series 2000 hot lattices
· Series 2100 cold lattices
· There are various grades in each series depending on its intentional end use.

Compounding

· Base compound [Hardness 42*A]

SBR 1552	100	Polymer
Stearic acid	2	Activation
Zinc oxide	5	Activation
Antioxidant PBN	1	Protection
Sulphur	2	Curing agentCBS /
HBS / CZ	1.25	Accelerator
TMTD	0.15	Accelerator

· SBR requires low sulphur but high accelerator level because it is low unsaturated rubber.

· Gum SBR compound shows poor physical properties. EV curing system imparts good heat resistance.

· Abrasion resistance & ageing behaviour are superior than natural rubber.

· In SBR initiation of crack is slower but growth is faster.

· Blends of SBR / NR & SBR / PBR are used in number of products to achieve required end properties & ease of processing.

Processing

· Cold grade SBR does not require mastication. Hot grade do require.

· Low green tack so require natural rubber solution painting in built-up SBR rubber product.

· Accepts more filler easily hence superior extrusion properties.

- Excessive milling leads to jell formation which results in poor processing properties.

Applications

- SBR is mainly used in tyre & tyre related products along with natural & poly butadiene rubber.
- Non-tyre uses are in wire &cable jacketing, general purpose mechanical goods & microcellular foot wears.
- Food grade SBR is used in chew-in-gum.

Typical formulation for	Extrusion	Moulding
SBR 1552	100	100
Zinc oxide	5	5
Stearicacid	2.5	2
Antioxidant TDQ	1	
Antioxidant 4010	0.5	0.5
Sulphur	1.5	-
MBT	nil	1.2
CBS / CZ / HBS	1.2	nil
TMTD	0.25	0.2
Carbon black FEF	35	nil
Carbon black HAF	nil	40
China	nil	40
$CaCO_3$ [ppted]	50	nil
Aromatic oil	20	nil
Naphthenic oil	nil	15
Brown factice	10	nil

Information of Upcoming Rubber Events / Exhibitions

IRC 2019

Organised between 3rd to 5th September, Kia, Oval, London

Rubber Tech China 2019

Organised between 18th to 20th September, Shanghai, China

Tyre Expo India 2019

Organised at Chennai Trade Centre, between 26th to 28th September, 2019

K-2019

Organised at Duessoldorf, Germany between 16th to 23rd October

Kazakhstan International Exhibition for Tyre & Tyre

Repair Equipment* Organised at Almaty, Republic of Kazakhstan between 17th to 19th October, 2019

exhibition for Tyre and Tyre Repair Equipments

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NITRILE	Sealing, gasket & packing to avoid leakages from oil, solvent, petroleum based fluids, lubricating oil, transformer fluid & very low permeability to gases.
EPDM	Outdoor applications like weather strips, drinking water applications, rain water sealing, protection against sunlight & heat gaining as a roof membrane, acid resistance, liner in pulverizing system.
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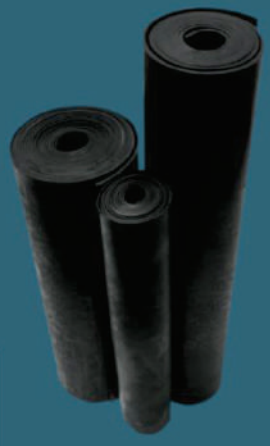

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An Overview of Primary Accelerators Used for Rubber Vulcanization

Indian Rubber Manufacturers Research Association
Suchismita Sahoo, Dr. K. Rajkumar

Introduction

Rubber being inherently soft and weak material needs reinforcing fillers and vulcanization or chemical crosslinking of the rubber chains to satisfactorily perform under critical stress conditions. Sulphur is the most commonly used vulcanizing agent for the unsaturated rubbers like natural rubber (NR), styrene butadiene rubber (SBR), nitrile butadiene rubber (NBR), polychloroprene rubber (CR) etc. The use of only sulphur for curing does not produce effective results in terms of longer cure time and inefficient crosslinking. Typically with only 5 -20 phr (parts per hundred grams of rubber) sulphur the curing time would be 5-15 hours to complete at a temperature of 130 -160°C which is a result of the slow reaction between the rubber and sulphur atoms to form the chemical crosslinks. Therefore to reduce the cure time and achieve optimum properties an additive is used which would accelerate the formation of crosslinks.

An accelerator is defined as the chemical added into a rubber compound to increase the rate of vulcanization at a relatively lower temperature and with greater efficiency. There are over 150 different chemicals from different classes of composition which can function as accelerators for rubber vulcanizates. Approximately 50 accelerators are most commonly used by the rubber industry.

The accelerators can be classified based on their chemical composition and function

Table 1: Classification of Accelerators

Accelerators	Chemical Group	Vulcanization Speed
BA, HMT	Aldehyde Amine	Slow
DPG, DOTG	Guanidine	Slow
MBT, MBTS, ZMBT	Thiazole	Semi Ultra fast
ZBDP	Thiophosphate	Ultra fast
CBS, TBBS, MBS, DCBS	Sulfenamides	Fast-Delayed action
ETU, DPTU, DBTU	Thiourea	Ultra fast
TMTM, TMTD, DPTT, TBzTD	Thiuram	Ultra fast
ZDMC, ZDEC, ZDBC, ZBEC	Dithiocarbamate	Ultra fast
ZIX	Xanthates	Ultra fast

Accelerators can also be classified as Primary and Secondary accelerators based on the role they play in a compound. Thiazoles and Sulfenamide accelerators are commonly used as primary accelerators due to their characteristics such as good processing safety, a broad vulcanization

temperature and optimum cross link density as well as a delay in reversion. The primary accelerators are used at 0.5 to 1.5 phr dosages in most rubber compounds. The basic accelerators such as Guanidines, Thiurams, and Dithiocarbamates etc are used as secondary accelerators to activate the primary accelerators. The use of secondary accelerators increases the speed of vulcanization substantially but at the expense of scorch safety. The dosages of the secondary accelerators are generally between 10-40% of the primary accelerator.

Primary accelerators

1. Thiazoles (Mercapto)
2. Sulfenamides

Secondary accelerators

1. Guanidines
2. Dithiocarbamates
3. Thiurams
4. Specialty Accelerators.

Vulcanization

Inorder to understand the role of accelerators, it is important to understand vulcanization of rubber and the associated chemical reactions. Unlike plastics rubber material do not have fixed molding time because during molding, rubber undergoes vulcanization. And the vulcanization time varies with variation in type of rubber and curing system used. The optimum cure time is determined by using an oscillating disc rheometer (ODR) or a moving die rheometer (MDR).

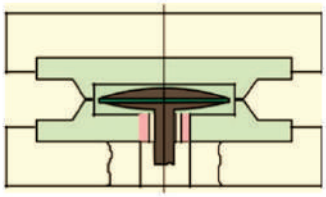


Figure 1 (a): ODR –Oscillating Disc Rheometer

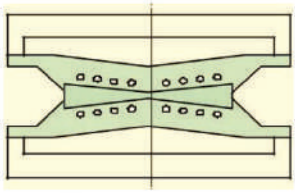


Figure 1(b) MDR – Moving Die Rheometer

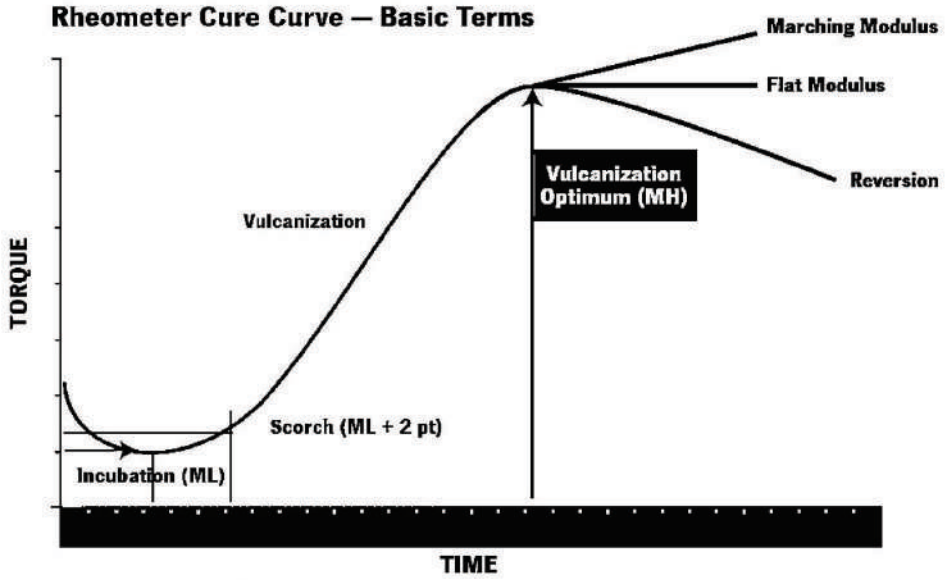


Figure 2: A typical rheometer curve showing various parameters

The testing is carried out at the desired temperature of vulcanization which typically ranges from 130-160°C. Initially when the temperature increases the material starts softening and attains the minimum viscosity. The time before the vulcanization starts is known as the scorch time and the accelerator plays a key role in determining the scorch time. As the vulcanization starts the torque increases till it attains a maximum value. The time required to attain 90% of the maximum torque is termed as the optimum cure time which is the time required to attain 10% of the maximum torque is termed the scorch time. The selection of accelerator for sulphur vulcanization determines the kind of network structure and consequently leads to the specific material properties. The chosen accelerator affects the cure rate and scorch safety.

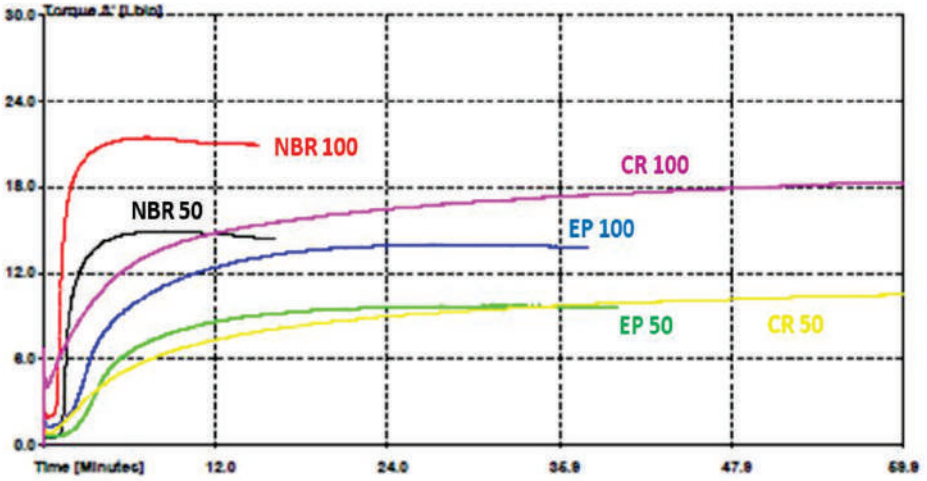


Figure 3: Cure curves of various rubbers with different loadings of carbon black with the below formulation.

Table 2formulation of variousrubbersfor curing studieon rheometer

Sample Code	NBR-50	NBR-100
Ingredient	Phr	Phr
NBR (JSR230SL)	100	100
Sulphur	2	2
ZnO	5	5
St. Acid	1.5	1.5
FEF BLACK (N550)	50	100
DOP	10	20
CBS	2	2
TMTD	0.3	0.3

Sample Code	EP-50	EP-100
Ingredient	Phr	Phr
EPDM	100	100
ZnO	5	5
St. Acid	1	1
FEF BLACK (N550)	50	100
Parf. Oil	10	20
MBTS	0.8	0.8
ZDBC	0.6	0.6
TMTD	0.3	0.3
SULPHUR	1	1

Sample Code	CR-50	CR-100
Ingredient	Phr	Phr
B30	100	100
MgO	4	4
ZnO	5	5
St. Acid	1	1
FEF BLACK (N550)	50	100
Aro.Oil	10	20
Na22	0.3	0.3

Accelerators respond differently to different types of rubbers. The rubber chain which is highly unsaturated exhibit a faster cure rate compared to less unsaturated rubbers. As can be seen from the Figure above NBR (Nitrile rubber) has a faster cure rate compared to EPDM (Ethylene propylene diene rubber) which is a saturated rubber. Polychloroprene (CR) has an unsaturated backbone but the double bond is deactivated due to the presence of highly electronegative –Cl group. Therefore CR also cures slowly compared to other unsaturated rubbers like NR and NBR.

For the saturated rubbers like IIR (butyl) and EPDM, a higher amount of sulphur should not be added as there are very less double bonds to accommodate the sulphur. To obtain faster curing, higher level of accelerators is used but the solubility of the accelerator should be considered to avoid the bloom on rubber surface. This challenge can be overcome by using small amounts of several accelerators so that the accelerator residues are soluble in the rubber.

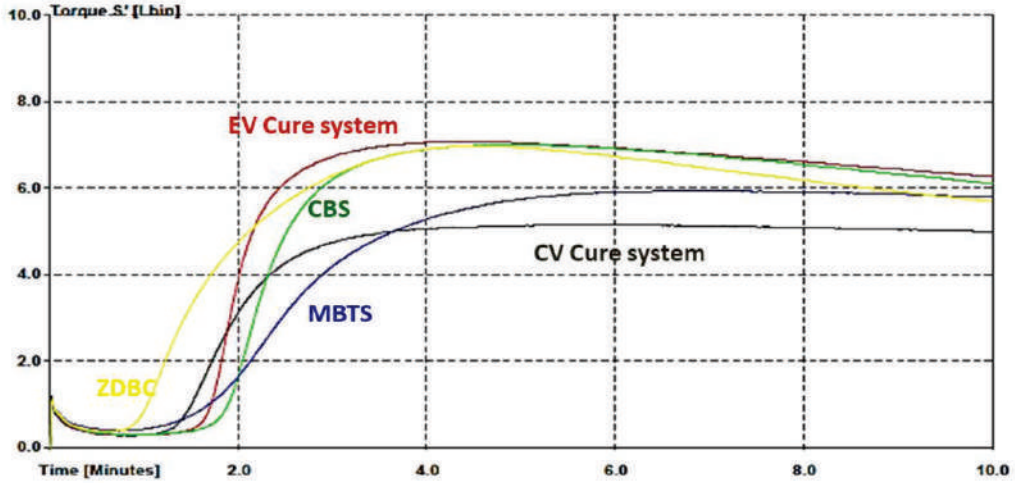


Figure 4: Cure curves with different accelerator systems with the below formulation

Table3: Natural rubberformulationwith variousacceleratorsrubber for curing studiin rheometer

Sample Code	CV	EV	CBS	MBTS	ZDBC
Ingredient	Phr	Phr	Phr	Phr	Phr
NR (RMA-1X)	100	100	100	100	100
ZnO	2	2	2	2	2
St. Acid	1.5	1.5	1.5	1.5	1.5
6PPD	1	1	1	1	1
TDQ	1	1	1	1	1
FEF BLACK (N550)	50	50	50	50	50
Aro . Oil	5	5	5	5	5
CBS	0.5	2	1.5	-	-
TMTD	0.1	0.3	-	-	-
MBTS	-	-	-	1.5	-
ZDBC	-	-	-	-	1.5
SULPHUR	3	1	2	3	3

Selection of accelerator

Before selecting an accelerator system for manufacturing a rubber product, the following points must be taken into account.

- Compatibility and solubility of the accelerator in the base rubber
- Processing conditions and stages
- Desired shelf life of the rubber compound
- Adequate scorch safety considering the part shape to avoid moulding defects
- Vulcanization temperature
- Cycle time of the product

Selection of a good acceleration system is one of the challenging steps in compounding. The curing system chosen should have good storage stability with a good scorch safety to ensure the vulcanization does not start before the mixing and processing. It must be compatible with the processing method. For example, for a thick, rubber product like a rubber covered roll, the curing time may be several hours at a temperature of 130 – 150°C; on the other hand a thin rubber covering on an insulated electric wire may be cured in seconds at a temperature of 180 – 190°C in an autoclave.

Primary accelerators

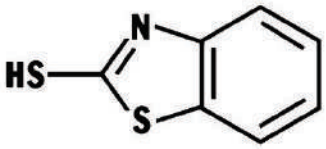
The primary accelerators contain nitrogen or sulphur, or both. The accelerators have been developed and evolved over a period of many years. They are selected based on the type of rubber and other required parameters like rate of curing, process safety etc. These accelerators usually provide an optimum balance in scorch safety, medium to fast cure, and efficient crosslink density. Secondary accelerators usually produce scorchy, very fast curing compounds.

The most commonly used accelerators are the thiazoles and derivatives of the thiazoles, and sulfenamides. Their advantages include effective acceleration at medium and high temperatures and the wide range of cure rates and scorch characteristics. They are often used in combination with a secondary accelerator to obtain optimum process safety and curing rate.

Thiazole Accelerators

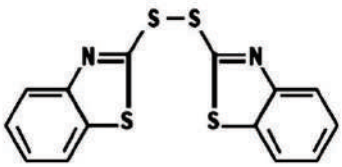
The common thiazole accelerators are 2-mercaptobenzothiazole (MBT), 2-2'- Dithiobis(benzothiazole disulfide (MBTS), and the zinc salt of 2-mercaptobenzothiazole. The zinc salt is mostly used in latex foams and dipped goods. Both MBT and MBTS imparts poor scorch safety to the black filled rubber compounds. MBTS has better scorch safety compared to MBT. To overcome the challenges it is used in combination with a secondary accelerator. Often MBTS is used in combination with a guanidine accelerator to provide an optimum balance of scorch safety and mechanical properties. MBT imparts flat curing properties and also imparts good aging characteristics. MBTS acceleration provides an ideal starting point for new compound development, especially in mineral-filled compounds.

MBT



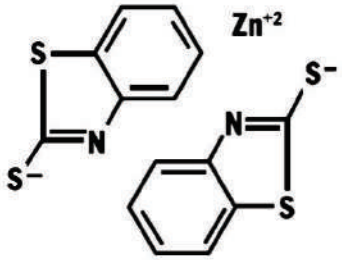
MBT or 2-mercaptobenzothiazole is one of the first thiazole to be commercially used in the rubber industry. It is highly reactive and used for applications which require a good degree of curing at relatively lower temperatures i.e. 140°C or below, and in slower curing synthetic rubbers. MBT imparts flat curing properties and also imparts good aging characteristics. Combinations of MBT with ultra accelerators are used where faster curing is required..

MBTS



MBTS or benzothiazole disulfide was originally developed for safe processing of rubber compounds which are cured at or above 140°C. MBTS continues to be widely used in commercial applications. Its activity and scorch properties can be controlled over a wide range by using various combinations of MBT and ultra-accelerators with MBTS. MBTS acceleration is the ideal starting point in new compound development, especially in mineral filled compounds.

ZMBT or Zinc-2-Mercaptobenzothiazole

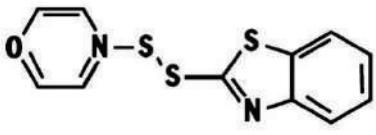


ZMBT or zinc-2-mercaptobenzothiazole is a modified thiazole. It is mainly used in latex. ZMBT has much higher scorch safety. It also imparts the flat curing properties and good aging characteristics given by MBT.

Sulfenamide-Types

The sulfenamides contain amine functional groups. The scorch time and cure rate will depend on the various amine functional groups of sulfenamides reflect their scorch time and cure rate differences. Higher the basic nature of amine, the cure rate will be faster with a low scorch time. In terms of processing safety, Benzothiazyl 1,2-dicyclohexyl sulfenamide is the highest, with N-cyclohexyl-2-benzothiazole sulfenamide the lowest. The trend is to use the modifications of the original sulfenamide accelerators that give greater processing safety. A popular accelerator is N-tert-butyl-2-benzothiazolesulfenamide (BBS). Besides giving a longer scorch delay, BBS gives higher modulus than CBS. More often the sulfenamides are used alongwith secondary accelerators like TMTD.

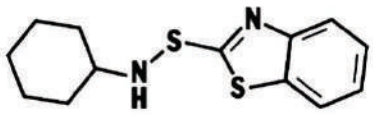
OBS



OBS or N-oxydiethylene benzothiazole-2-sulfenamide is considered a preferred delayed action accelerator by many compounders for natural and synthetic rubber compounds requiring maximum processing safety and good curing characteristics. Overall properties of natural and synthetic compounds with OBS accelerator are better in comparison to thiazoles.

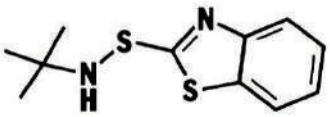
CBS

CBS or N-cyclohexyl-2-benzothiazolesulfe-namide is used in natural and synthetic rubber. It is faster curing than OBTS, develops higher modulus and is somewhat scorchier.



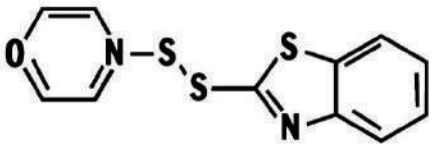
BBS

BBS or N-tert-butyl-2-benzothiazolesulfenamide accelerator is less scorchy and faster curing than CBS in both natural and synthetic rubbers. In many compounds the dosage can be reduced to 10% in comparison to sulfenamides.



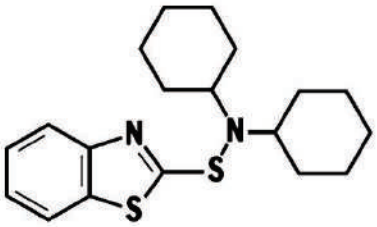
OMTS

4-Morpholinyl-2-benzothiazole disulfide exhibits faster curing in natural and synthetic rubber than other sulfenamides It develops high modulus and good aging in low sulphur compounds. Good aging can be attributed to its ability to donate sulphur which is particularly evident when used in combination with a dithiocarbamate.



DCBS

DCBS or benzothiazyl 1,2-dicyclohexylsulfenamide is a delayed action accelerator. DCBS provides the longest scorch and process safety. It mostly finds application for thick rubber articles. DCBS is very sensitive to activation by secondary accelerators like DPG, DOTG, TMTM, and TMTD. Small dosages of these secondary accelerators also affect the cure rate and other properties.



Conclusion

Accelerator choice is critical for obtaining the right balance of process safety, cycle time and mechanical properties. Selection of the right accelerator system is challenging and critical to obtain the desirable properties. Many parameters, such as compound storage stability, processability, scorch, crosslinking, and cured rubber requirements are few of the key parameters which needs to be considered while selecting the primary accelerators. Thiazoles and sulfenamides are the most commonly used primary accelerators which offer a good start for the formulation designing. Their differentiating qualities are the effective acceleration they provide at medium and high temperatures and the wide range of curing rates and scorching characteristics. They provide an optimum balance of scorch safety, medium to fast cure, and good mechanical properties of the vulcanizates. However the specific parameters can be achieved by using secondary accelerator in combination with these primary accelerators.

Available Green Carbon Black (rCB) Grades by Hi-Green Carbon

Powdery Grade	
SH - 665	15 kg

Granular Grades		
1	SS - 330	25 kg
2	SS - 550	25 kg
3	SS - 770	25 kg

*Also available in Jumbo Bag packaging

HI-GREEN CARBON

Plot No. 2621 & 2622, Gate No.1, Road D/2, Lodhika G.I.D.C., Kalawad Road, P. O. Metoda, Tal. Lodhika, Dist. Rajkot-360 021. (Gujarat) India.
Phone : +91-9909977044 ▪ Website : www.higreencarbon.com ▪ E-mail : info@higreencarbon.com

We are today living in an era of creative revolution. Technology is evolving daily and correspondingly encouraging rapid improvements in almost every sphere. There was a time once when one could've easily mocked concepts like artificial intelligence and visual scanning as just eye-catching concepts used in science-fiction films, but such is not the case anymore. We are leading ourselves towards a better future today; therefore, we are adopting such techniques in the real world for making our work more comfortable. Newer trends have emerged in Social Media as well. Social Media Marketers use various trends on their applications today for attracting a broad customer base and ensure that they don't get bored by browsing through their websites. Often, there is a new trend rather a new concept which one encounters in a very short span every time he/she visits websites like Facebook, Instagram, Pinterest, Reuters, etc. An expertly executed marketing and advertising campaign can serve the needs of any business and increase the demand for the product or service that they offer. There are many trends found today all-over various fast-developing websites. Let's take a peek into the 7 popular Digital Trends that cannot go ignored today.

1. Artificial Intelligence

AI is being used heavily to obtain information about consumer behavior and their areas of interest. They become helpful in analyzing consumer's search patterns. AI picks on data that has been accessed by the consumer on various social media platforms and utilizes it to understand what entices the consumers so much that they keep visiting those websites quite often. AI also offers tips and information by getting into conversations with customers. Floating Chatbots on various web-pages is also an excellent example of AI that obtains essential information about customers who have visited their webpage. "Businesses that are adopting to AI in 2019 will save costs and accelerate growth getting an edge over their competitors." — Gartner

2. Personalization

In today's generation, people have become more interested in communicating only to the ones who know their choices, likes as well as dislikes beforehand. Therefore personalization of content can play a vital role by straitening the consumers towards their interest areas. The availability of data like search history, number of links clicked, etc. are very easily obtained via AI that could help online marketers segment their target audience.

3. Video Advertising and Marketing

When the marketers saw people giving up on reading newspapers and magazines and started flocking towards the digital medium because of its pace, they too began publishing advertisements of their products online. This is because online ads can also be live and in the format of a video that would have more impact rather than a print-ad. With decreasing costs of filming-equipments and an increase in the camera-quality of smart phones, marketers are finding it much more convenient to move towards video advertising rather than publishing ads first on print and then sending direct mails to the interested customers. The 2–3 minutes animated videos can share all the information about the product at once and that too in a beautiful manner. Now, the 360-degree video concept is on the rise. The circular eye-like symbol on the top corner of the video determines that it can be viewed from all angles inside 360 degrees via sliding it from left to right and top to bottom

while it is being played.

4. Social Media Messaging

Statistics tell us that over 2 billion people remain active online throughout the day on the top 5 social media applications at least which are; Facebook, Whatsapp, Youtube, Facebook Messenger, and Instagram. Therefore it is not a bad idea for marketers to advertise their products/services to in such applications where their potential customers like to hang out always. It also promotes the personalization of content, and it is beneficial because one can directly market the product to the customer via conversating with him in a personal space where he would be more comfortable.

5. Social Media Stories

Social Media Stories have been one growing trend recently. After "Snapchat" launched the concept of "My Story" even Instagram, Facebook and Whatsapp adapted it. A social media story could be any image/graphic/photo/video/song that appears as a "status" for a set period on your profile. Savvy marketers/businesses make stories that depict and promote various events, product launches, etc. that their active followers can view. The most significant advantage of a story is that it is live; hence, it helps the marketer to share something which they don't want their customers to miss out on. He can also share a link on his story which would lead the viewer to the desired web-page for grasping on more details regarding the same.

6. Voice Search

The improvement in smart phone-speakers has reduced the errors committed by Voice-Search-Engines like "Google, Siri, and Alexa." Customers prefer to voice-search their queries instantly instead of taking time off and typing them. Voice-Search helps in providing relevant information regarding the search as an audio-answer. Marketers are adapting to the method of Voice-Search to cope up with the use of technology and make maximum revenue from sales. For instance, Domino's Pizza has used Voice Search Engine in its marketing strategies that enable customers to place their orders directly via Alexa.

7. Micro-Moments

The age of rapid improvisation in technology has made us so fast everywhere that we tend to become impatient if we need to wait for a particular piece of information for more than a minute. Today, we make decisions on what to do, where to travel, where to chill, what to buy, where to eat, etc. quite instantly. This is because we have access to applications like Google, Google Maps, Just-Dial and Amazon in our phones. Behind the curtains, these companies are conducting in-depth research and studying consumer behavior, patterns, and psychology. Therefore, answers to a few questions like "I want to know, I want to do, I want to go, I want to buy, etc." also termed as "Micro-Moments" are readily available to you whenever you are searching something.

2019 is just another year in the 21st century. All these innovations had occurred 4–5 years ago. It is okay to say that advancement in technology contributed largely to the improvement of the standard of these concepts, but the future awaits more customization in the scope of digital marketing. Therefore, one who hasn't yet adapted to the above concepts would find it even more difficult later on.

Instruments for Dynamic Testing of Polymer Materials

Kartik Srinivas
Principal Engineer
Advanced Scientific and Engineering Services (AdvanSES)

Dynamic Testing of Polymer Materials

1.1 Instruments for Dynamic Testing ofPolymers

There are five (5) main classes of experiments for measurement of viscoelastic behaviour

1.Transient measurements: creep and stress relaxation

2.Low frequency vibrations: free oscillations methods

3.High frequency vibrations: resonance methods

4.Forced vibration non-resonance methods

5.Wave propagation methods

The frequency scale for the different test methods are shown in Figure(1.1)

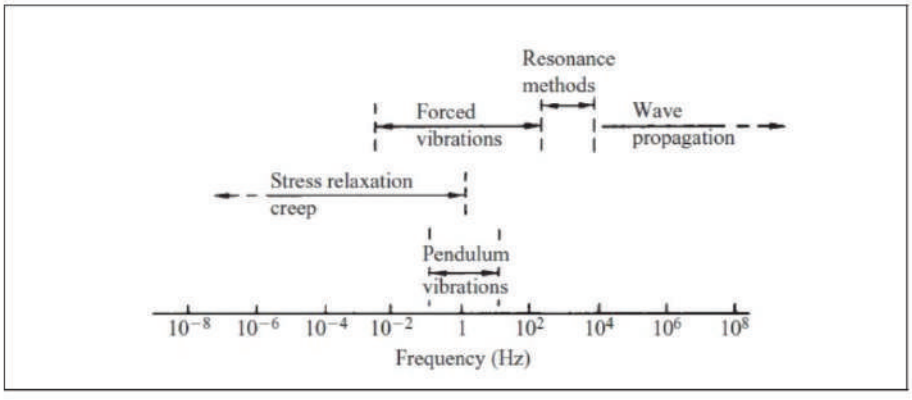


Figure 1.1: Frequency Scale for Different Test Methods

Dynamic characterization of elastomeric materials and polymers requires the use of sophisticated instruments with high fidelity load cells, displacement transducers and strain gaugestounderstandthedeformationstakingplaceinthematerialunderdynamicfrequen- cies. A Rheometer is used to test the dynamic properties during cure. A servo hydraulic fatigue testing machine and dynamic mechanical analyzer (DMA) instruments are the pri- mary material testing instruments used in dynamic characterization of polymers. The sophistication of material testing instruments increase with needs for higher frequencies and higher loads. Strain gauge based and piezoelectric quartz based load cells are used in this instruments to study the load, stress and strain and record the testdata.

Along with high quality hardware need also arises for a sophisticated and advanced software to carry out all the calculations. The software that calculates all the dynamic properties also needs to be as sophisticated and advanced as the hardware required to do the test

Figure 1.2: AdvanSES High Frequency and ElectroMechanical Testing Setup

Figure(1.2)showstheAdvanSESservohydraulictesterusedinmaterialtestingathigh frequencies the servo hydraulic tester is capable of going up to 100 hertz under sine wave definitionhydraulicactuatoristheprimarysourceoffrequencygenerationintheinstrument andtheservovalveintheactuatorcontrolstheflowofhydraulicfluidintotheactuatorsoas to apply a controlled displacemtn at controlled frequency. The load cell in the instrument measures the loads generated in the sample under the dynamic frequencies. The servo hydraulic tester is primary primarily used to study static and dynamic stiffness, loss and storage modulus and Tan-delta. Fatigue crack growth propagation of rubber samples can also be tested using a high fps camera integrated with the tester. Elevated temperature testingisalsoavailablewiththeuseofatemperaturechamberwithautomaticPIDcontrol.

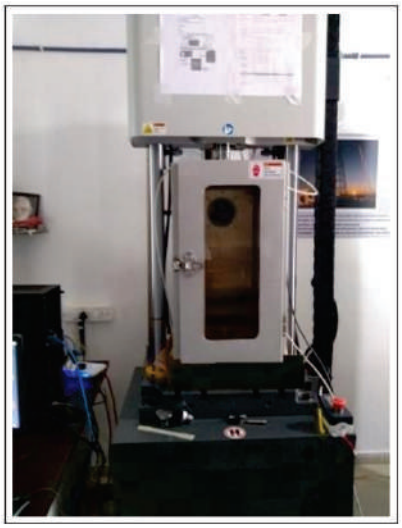


Figure 1.3: AdvanSES High Frequency Testing Setup with Temperature Chamber

High temperature tests (e.g. tensile, compression, flexure and fatigue tests) are used to determine the thermal-elastic behavior, heat resistance, endurance and durability ofmetal- lic and polymer materials. Elevated temperatures is combined with mechanical testing, environmentalaging,analyticalsolutionmethodstodevelopandprovideacomprehensive test protocol to evaluate materials andcomponents.

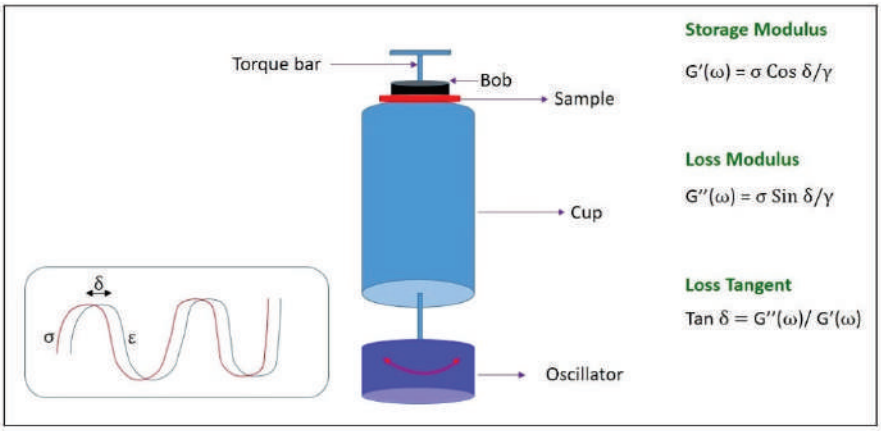


Figure 1.4: Oscillating Rheometer for Dynamic Testing

Figure(1.4) shows a rheometer instrument used for studying the dynamic properties of uncured and cured rubber compounds. The instrument consists of a torque applicator, an oscillator and a load measuring device. The sample is held between the torque bar and the cup. The oscillator supplies an oscillatory motion that is transferred to the sample by the cup. The angular torsional deformations of the sample and the load generated in the instrument are measured using advanced load cell, displacement transducers and rotary encoders.Asinewaveisinputintothesampleandasinewaveissimilarlyoutputfromthe instrument,boththeinputandoutputwavesarecomparedtocalculatethestoragemodulus, loss modulus and the tangentdelta.

The sample requirements for the rheometer testing are that the samples should be dimensionallystableofrectangularorcylindricalcrosssection.Totestthematerialasample is firmly gripped at both ends. the specimen is electromagnetically or servo driven into sinusoidal oscillations of defined amplitude and frequency. The viscoelastic properties of the material makes the torque lag behind the deformation. The lag between the input and output is the phase angle as shown earlier in Figure(**??**). The observed values for load, phaseangle,andgeometryconstantofthespecimenisusedtocalculatethecomplexshear modulus G*, the storage shear modulus G', the loss shear modulus G", and tandelta.

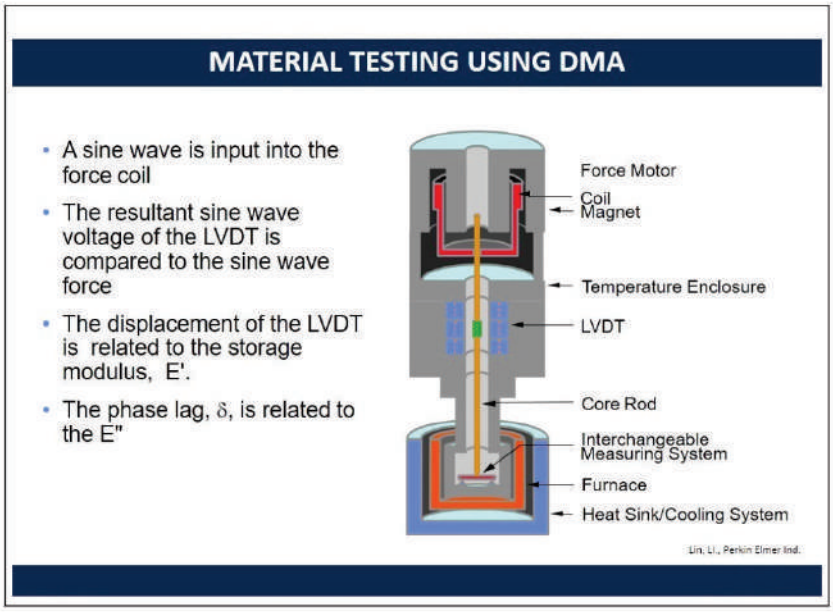


Figure 1.5: Axial Dynamic Mechanical Analyzer with Furnace

Figure(1.5) shows a DMA instrument manufactured buy TA Instruments. As shown in the figure, a force motor with a coil and magnet is used to apply a force and lvdtmeasures the displacement of the sample. Furnace is provided for elevated and low temperature measurements.Thesampleiskeptinsidethefurnaceandasinewaveisinputintotheforce motor, the resultant sine wave voltage of the lvdt is now compared to the input sine wave and the storage modulus, loss modulus, phase and tan delta are calculated from the test resultsdata.

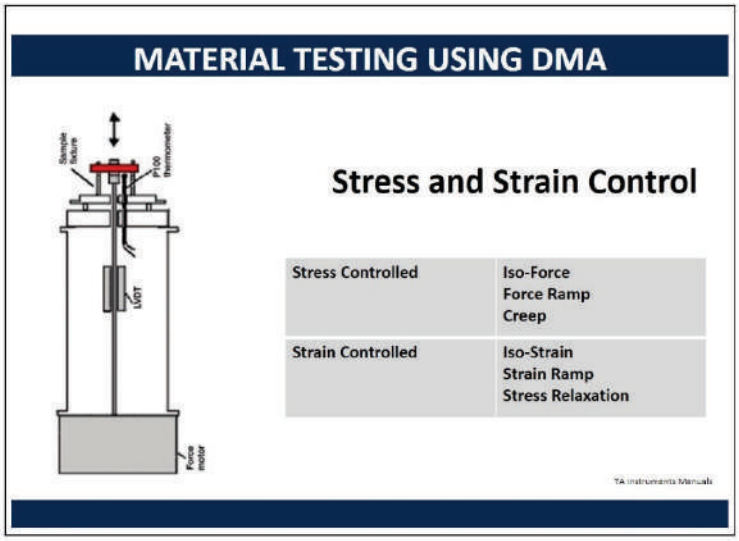


Figure 1.6: Axial Dynamic Mechanical Analyzer with Interchangable Sample Fixtures. Image Courtesy: Perkin Elmer Industries

Figure(1.6) shows a DMA instrument from Perkin Elmer. When compared to the TA Instruments, both the machines have similar performance. Both the instruments can be operated under stress control and strain control. Creep and stress relaxation experiments can be carried out in all the instruments along with frequency sweep, strain sweep and temperature sweep studies

A DMA instrument is very versatile instrument able to apply different deformation modes on the sample. Different deformation modes can be chosen based upon the quality of the material and the material properties under study. Figure(1.7) shows the different deformation modes available for application in a DMA instrument. Single and double cantilever beam, tensile, shear, compression and three point bending tests can be carried out using different kinds of fixtures.

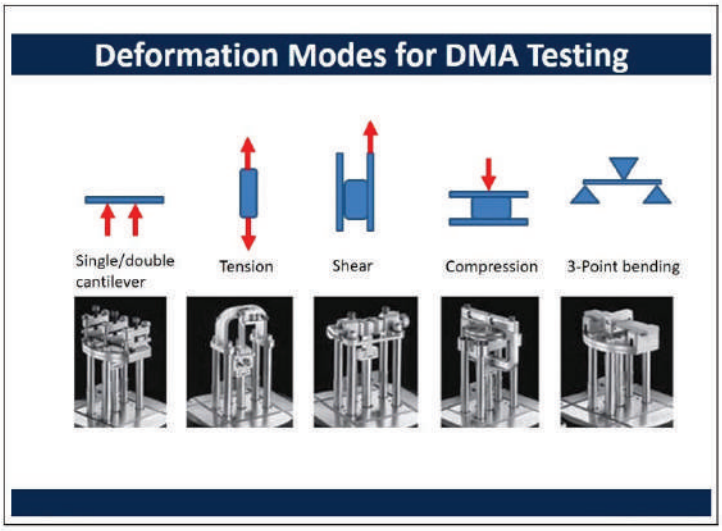


Figure 1.7: Deformation Modes Available in a Typical DMA Machine, Image Courtesy: TA Instruments and Perkin Elmer Industries

Materialssuchashardpolymersorsoftviscoelasticelastomersareidealmaterialstobe tested on a DMA machine for dynamic properties. The testing conditions and parameters such as applied frequency range, temperature and available sample sizes and shapedictate the machine required for the testing. To carry out frequency and strain sweep studies on automotive and aerospace components, it becomes imperative to use a servo hydraulic machine.Whilethenecessitytostudythedynamicpropertyofamaterialduringprocessing makes it imperative to use a moving or oscillating dierheometer.

Theimportanceofdynamictestingcomesfromthefactthatperformanceofelastomers and elastomeric products such as engine mounts, suspension bumpers, tire materials etc., cannot be fully predicted by using only traditional methods of static testing. Elastomer tests like hardness, tensile, compression-set, low temperature brittleness, tear resistance ests,ozoneresistanceetc.,areallessentiallyqualitycontroltestsanddonothelpusunder- stand the performance or the durability of the material under field service conditions. An elastomerisusedinallmajorapplicationsasadynamicpartbeingabletoprovidevibra- tion isolation, sealing, shock resistance, and necessary damping because of itsviscoelastic nature. Dynamic testing truly helps us to understand and predict these properties both at the material and componentlevel.

1.2 ASTM D5992 and ISO4664-1

ASTMD5992coversthemethodsandprocessavailablefordeterminingthedynamicprop- erties of vulcanized natural rubber and synthetic rubber compounds and components. The standard covers the sample shape and size requirements, the test methods, and the pro- cedures to generate the test results data and carry out further subsequent analysis. The methods described are primarily useful over the range of temperatures from cryogenic to 200 °C and for frequencies from 0.01 to 100 Hz, as not all instruments and methods will accommodate the entire ranges possible for materialbehavior.

Figures(1.8and1.9) show the results from a frequency sweep test on five (5) different elastomer compounds. Results of Storage modulus and Tan delta are plotted.

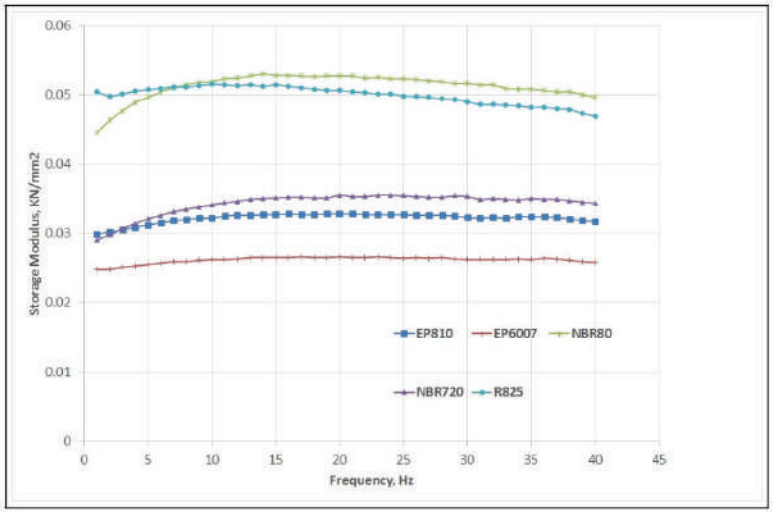


Figure 1.8: Plot of Storage Modulus Vs Frequency from a Frequency Sweep Test

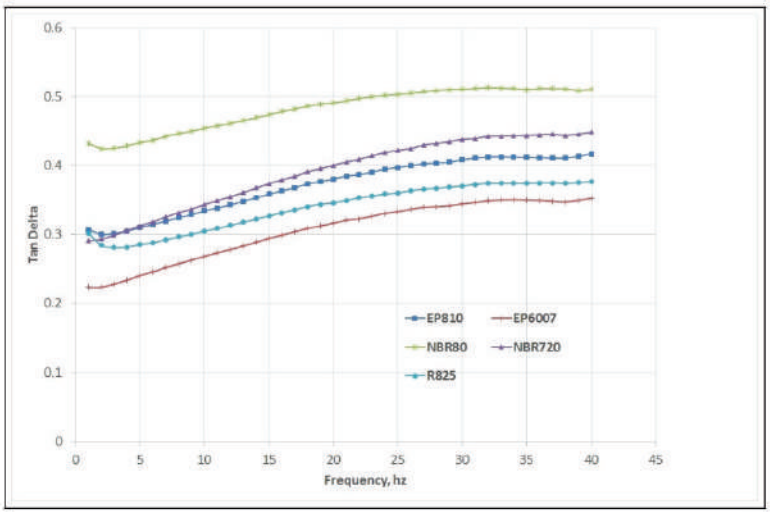


Figure 1.9: Plot of Tan delta Vs Frequency from a Frequency Sweep Test

The frequency sweep tests have been carried out by applying a pre-compression of 10 % and subsequently a displacement amplitude of 1 % has been applied in the positive and negative directions. Apart from tests on cylindrical and square block samples ASTM D5992 recommends the dual lap shear test specimen in rectangular, square andcylindrical shape specimens. Figure(1.10) shows the double lap shear shapes recommended in the standard.

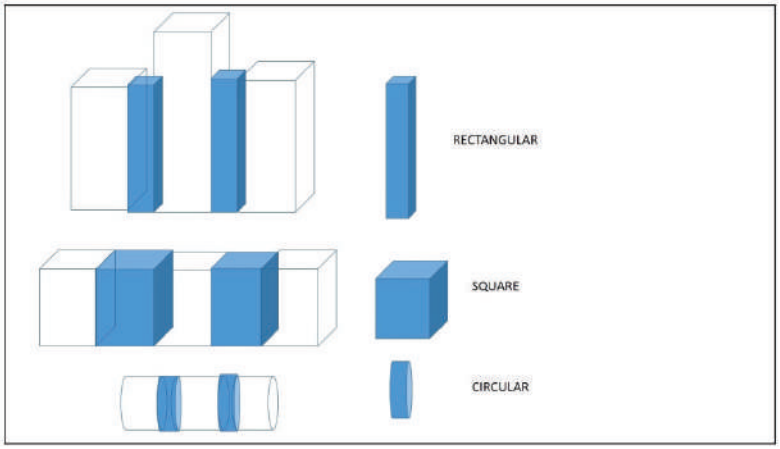


Figure 1.10: Double Lap Shear Shapes

Informative

12 Birla Carbon plants and a R&D Center receive Safety Recognition from the International Carbon Black Association

Source : Mumbai, India and Marietta, USA / June 6, 2019

The International Carbon Black Association (ICBA) recently awarded 12 Birla Carbon plants and a R&D Center with certificates of recognition for achieving a level of safety performance above industry average. Eleven plants and the Marietta R&D Laboratory received the gold award while one plant received the bronze award. This includes Birla Carbon plants across North and South America, Europe and Asia. A total of 44 global carbon black manufacturing facilities received this recognition as part of the 'Safety Recognition Program' from ICBA.

The ICBA began this recognition program to acknowledge the outstanding safety records maintained by carbon black manufacturers around the globe and to educate policymakers and the public about the carbon black industry's genuine regard for making employee safety a pre-condition for successful operations. The program identifies facilities that go the distance to protect the carbon black industry's most precious resource – its work force.

Speaking about the recognition, Joe Gaynor, Chief Legal, Risk and Sustainability Officer, Birla Carbon, said, "At Birla Carbon safety is a key component of everything we do. Our policies and processes are written and implemented keeping in mind the safety of our people, safe handling of carbon black and safe management of the manufacturing facilities. I want to congratulate the Birla Carbon plants who have given so much emphasis on building a culture of safety within the organization." He further added, "I also take this opportunity to thank the ICBA for recognizing the effort of all carbon black manufacturers in making their facilities safe places to work."

Participating companies submitted their previous year's safety performance data which has been certified by the company's member on the ICBA Board of Directors. The awards were given in three categories. The sites that meet more than one award criteria received the highest recognition.

NOKIAN TYRES WORKS TOWARDS GREENER TIRES

Source : 6/6/2019 - Nokia, Finland

On World Environment Day, Nokian Tyres wishes to highlight how drivers can impact air pollution. Nokian Tyres is passionate about improving sustainability, and these numbers highlight its impact on the environment. Car owners have more ways to make environmentally-friendly choices than they may realize. One way is choosing tires with a lower rolling resistance: This will save fuel and reduce CO_2 emissions. Nokian Tyres works hard to make tires greener: The rolling resistance of its tires has been reduced by 8 percent on average compared to 2013. This equals the exhaust fumes of 65,000 cars. Rolling resistance refers to the energy lost when the tire is moving as you drive. The lower the rolling resistance, the less energy is lost and less fuel needed. Better fuel efficiency affects the environment and the driver's carbon footprint positively by reducing CO_2 emissions. For electric cars, lower rolling resistance also means longer driving range. Here's a powerful example of the impact of rolling resistance: If all passenger cars in Finland, Sweden and Norway used low rolling resistance Nokian Hakkapeliitta R3 winter tires over the product's life cycle instead of other premium winter tires, benefits would be remarkable. The fuel savings would be nearly 300 million liters and carbon dioxide emissions would decrease by some 710,000 tons. In the EU, traffic is estimated to form around 24 percent of the greenhouse gas emissions. The target is to reduce GHG emissions by 20 percent by 2020 compared with the levels of 1990. Stricter targets set by the EU will apply from 2021 on. Premium tire manufacturers like Nokian Tyres are actively working to reduce rolling resistance by developing advanced rubber compounds and introducing new innovative tread designs and tire constructions. "Our engineers work hard to keep up the good work: Our goal is to reduce the rolling resistance of each new tire generation without compromising safety," said Teppo Huovila, Nokian Tyres' vice president of quality and sustainability. Over 90 percent of Nokian Tyres' tires are in the best rolling resistance categories A, B or C. To give some perspective: The most common passenger car tire label in the market is in the E category (ETRMA analysis, October 2018). The difference is huge for a car owner, and not just environmentally. A class summer tire that has a correct tire pressure can save up to 0.5 liters of fuel per 100 kilometers compared to the lowest performing tires. Nokian Tyres has worked for years with sustainability at the core of its business. In the RobecoSAM Sustainability Yearbook 2019, the company received the Silver Class distinction. Although over 85 percent of the carbon footprint of a tire comes from its use, Nokian Tyres continues to work to reduce the environmental impacts of a tire throughout its entire life cycle.

"The Banning of Unregulated Deposit Schemes Ordinance, 2019' – FAQs"

- CA VRAJESH PARIKH

Important piece of legislation on :
"The Banning of Unregulated Deposit Schemes Ordinance, 2019' – FAQs"

India, has in the recent times witnessed lot of financial frauds with various people by collecting deposits from them and not returning them. In order to prevent the illegal operators from running such deposit schemes attracting deposits, and to regulate them, the government brought in the 'Banning of Unregulated Deposit Schemes Bill, 2018' which is made effective from 21/02/2019.

The Ordinance provides for a mechanism to completely ban unregulated deposit schemes to protect the interests of depositors and provides for stringent penalties for the offences involving wrongful inducement, solicitation or acceptance of deposits under an unregulated deposit schemes as well as fraudulent default in repayment or return under a Regulated Deposit Scheme.

I have picked up certain question and answers from the publication published by The Institute of Chartered Accountants of India which is for the benefit of members of Rubber and allied Industry and the same are being reproduced for the knowledge. As this is a very important piece of legislation for the years to come and to be thoroughly understood by all members of rubber and allied industry, I thought it fit to share the same on this platform.

For detailed FAQs on **The Banning of Unregulated Deposit Schemes Ordinance, 2019', you may visit website of The Institute of Chartered Accountants of India, i.e.** www.icai.org.

Q:What is the objective of this Ordinance?

A:The Ordinance is to provide for a comprehensive mechanism to ban Unregulated Deposit Schemes and to protect the interest of the depositors and for matters connected therewith or incidental thereto.

Q:What is deposit?

A:Section 2(4) of the Ordinance defines the term deposit as an amount of money received by way of an advance or loan or in any other form, by any deposit taker with a promise to return whether after a specified period or otherwise, either in cash or in kind or in the form of a specified service, with or without any benefit in the form of interest, bonus, profit or in any other form. However, certain deposits are excluded from the definition and as such the excluded deposits are not within the scope of the Ordinance.

Q:What are specific exclusions from the definition of deposits?

A:The exclusions are set out in Section 2(4) of the Ordinance itself that defines 'deposits' which are as follows: Loans received from banks; Loans/ financial assistance from private finance institutions (PFIs) or any registered non-banking financial companies(NBFCs), regional financial institutions and insurance companies; Amount received from or guaranteed by appropriate government; Amount received from a statutory authority; Amounts received from foreign government, foreign banks, and foreign authorities or person resident outside India as per the provisions of the Foreign Exchange Management Act(FEMA) 1999; Capital contributions by partners of a partnership firm or LLP; Loans received by an individual from his relatives; Loans received by a firm from relatives of partners; Any credit given by a seller to a buyer on the sale of any property (whether movable or immovable); Amounts received by a registered Asset Reconstruction Company (ARC); Amounts received under Section 34 or Section 29B of the Representation of the People Act, 1951; Any periodic payment made by the members of self-help groups as per the ceiling prescribed by state/ Union territory government; Amount received in the course of, or for the purpose of, business and bearing a genuine connection to such business for following and which has not become refundable Payment, advance or partpayment for supply/ hire ofgoods / services; Advance received in connectionwith and adjusted towardsconsideration of an immoveable property under an agreement or arrangement; Security deposit; Advance under long-termprojects for supply of capitalgoods;

Q:Whether the contribution received by a Partnership Firm/Limited Liability partnership included under deposits?

A:Contribution received towards the capital by partners of Partnership Firm/Limited Liability partnership not included under deposits under Section 2(4) (e) of the Ordinance.

Q:Whether deposits include loans from scheduled banks or co-operative banks or any other banking company?

A:Loans from scheduled banks or co-operative banks or any other banking company are excluded from definition of 'deposits' under Section 2(4)(a) of the Ordinance.

Q:Are advances from customers for the purpose of business excluded from the definition of deposits?

A:Yes, only if the advance confirms requirements for exclusion stated in Section 2(4)(l) of the Ordinance. Accordingly, the following amounts are excluded from the definition of deposits if these are received in the course or for the purpose of business or bearing a genuine connection to such business including

(I) Payments, advance, part payment for the supply or hire of goods or provision of services and is repayable in the event the goods or services are in fact sold, hired or otherwise provided.

(ii) Advance received in connection with consideration of an immovable property under an agreement / arrangement subject to the condition that the advance is adjusted against such immovable property as per agreement.

(iii) Security or dealership deposits for the performance of

contract or for supply of goods or provision of services.

(iv) Advance under long term projects for supply of capital goods.

However, when the aforesaid amounts (i) to (iv) become refundable, such amounts are deemed to be deposits on expiry of fifteen days from the date on which they become due for refund.

Q:Whether amounts received from relatives are considered as 'deposits'?

A:Under Section 2(4)(f) of the Ordinance, in case of individual, amounts received by way of loan from his relatives and in case of any firm, amounts received by way of loan from the relatives of any of its partners are not considered as deposits.

Q:Who all are covered under the term 'relative' for the exclusion as stated in 7 ?

A:Under explanation (v) to Section 2(4) a Relative for the purposes of this Ordinance would have the same meaning as assigned under Companies Act 2013 and Section 2(77) of the said Act states 'relative' with reference to any person, means anyone who is related to another, if

(1) they are members of a Hindu Undivided Family;
(2) they are husband and wife;
(3) Father including step-father.
(4) Mother including step-mother.
(5) Son including step-son.
(6) Son's wife.
(7) Daughter.
(8) Daughter's husband.
(9) Brother including step-brother;
(10) Sister including step-sister.

Heavy fine upto Rs. 10 lakhs and/or imprisonment upto Five years is prescribed for violation of any of the provisions of **The Banning of Unregulated Deposit Schemes Ordinance, 2019'. If the offence is repeated then this fine can go upto imprisonment of upto 10 years and a fine of upto Rs. 50 crores.**

Therefore, be careful about such kind of financial transactions before entering into .

Amendment by RBI

In order to provide an impetus to digital funds movement, the Reserve Bank of India (RBI) has decided to do away with the charges levied by the RBI for transactions processed in the Real Time Gross Settlement System (RTGS) and National Electronic Funds Transfer (NEFT) systems. RBI has asked the banks to pass on the benefits to customers. Sooner, the instructions to banks in this regard will be issued. Furthermore, the RBI has also decided to set a committee to review fees and charges imposed by banks on ATM withdrawal.

Mitsubishi Chemical Corporation Plans New Thermoplastic Elastomer Production Facility in India

Source : MCC March, 29,2019

Mitsubishi Chemical Completes Acquisition of Welset Plast Extrusions' PVC Compound Business; Plans New Thermoplastic Elastomer Production Facility in India Mar. 29, 2019

Mitsubishi Chemical Corporation (MCC; Head office: Chiyoda-ku, Tokyo; President: Masayuki Waga) today announced that it has completed its acquisition of the PVC compound business of Welset Plast Extrusions Private Limited in India (refer to the press release issued on June 21, 2018) and plans to construct a new facility to manufacture thermoplastic elastomer for automotive interior components and other products at MCPP India Private Limited*. Production is scheduled to begin by the end of fiscal 2019.

Applications for MCC's performance polymer products continue to expand in India's automotive industry, and growth is expected to remain steady in the future. MCC currently outsources the manufacturing of thermoplastic elastomers in India. The acquisition of Welset Plast Extrusions' PVC compound business, and the construction of the new production facility, will allow MCC to upgrade its performance polymer supply system to meet the increasing demand.

MCC has proactively pursued mergers and acquisitions and investment in the performance polymer business, expanding globally in regions such as Asia/Pacific, Europe, and North America. Currently its network includes 28 locations in 16 countries, and MCC positions MCPP India as its Asia/Pacific medical PVC compound manufacturing site. In addition, it will accelerate further global development by expanding the scale of manufacturing of its thermoplastic elastomers for automobiles.

*MCC acquired Arparn Plast Compound Private Limited (PVC compound business) after a demerger from Welset Plast Extrusions Private Limited, and will change its name to MCPP India Private Limited after the acquisition was formally completed.

**Thermoplastic elastomers are materials that have the characteristics of both rubber and plastic. They are used in automobile interior components, pen grips, and other products.

Outline of MCPP India Private Limited Locations : Mumbai (head office), Gurugram (regional office), and Silvassa (plant), India Representative: Harumoto Goto Capital : 229,298,180 rupees [MCC: 99.9%] (approximately 370 million yen) Line of business: Manufacture and sale of PVC compounds for medical use, electric wires and cables, and thermoplastic elastomers for automobiles Employees : Approximately 150 (as of March 1, 2019)

RSDC NEWS

Overwhelming response to Apprenticeship Scheme in Rubber sector

PIC 1: Re-skilling at SujaShoei Industries, Sedrapet, Tamil Nadu for Junior Rubber Technician

National Apprenticeship Promotion Scheme (NAPS) launched by the Government of India has elicited encouraging response from the Rubber sector in the country.

NAPS is the most potent way for developing the skilled manpower for any industry as it entails using existing training facilities available in the establishments without putting any extra burden on exchequer to set up training infrastructure.

At least 60 companies in Rubber sector have registered for NAPS. These include (*alphabetically)* Boron Rubber, Concord Control System, Emerald Tyre, Gayatree Rubber, Hartex Rubber, Jasmino Elastomer Pvt Ltd, JK Tyre, Michelin, Paragon Polymer Products Pvt Ltd, Lathia Rubber, Metro Tyre, Oriental Rubber, Parker Hannifin India Pvt Ltd, Shamsons Polymers and Stork rubber.

Generally any skilling initiative pertains to basic, class room training. NAPS, on the other hand, involves both basic training and on-the-job-training at a workplace. Both Basic Training Providers and the establishments where trainees undergo on-the-job trainings, are funded by the Government. The idea is to incentivize the employers to conduct more such programmes. Keeping in mind the ease of the industries, a user-friendly online portal (www.apprenticeshipindia.org) has been designed to facilitate easy processing of the entire apprenticeship cycle.

The majority of rubber units in the country are in the MSME sector. RSDC has launched a major effort towards up-skilling and reskilling of workforce employed in rubber industries across major rubber clusters in the country. Approximately 100 contracts have been signed and uploaded on the portal of rubber sector alone.

The skill training organized by RSDC is being currently provided under the PMKVY scheme. Individuals with prior learning experience or skills are also assessed and certified under Recognition of Prior Learning (RPL).

"NAPS has the potential to revolutionize the concept of having skilled manpower in the industry. In collaboration with several corporate and skilling partners, the exercise has always been a continuous pursuit of RSDC. The job roles for which candidates have been certified include Junior Rubber Technician, Mill Operator, Compression Moulding Operator and Material Handling and Storage Operator", said Ms Meghna Mishra, CEO RSDC.

NBCFDC Confers Meritorious Award to RSDC

In yet another feather in its cap, RSDC wasrecently felicitated by National BackwardClasses Finance and DevelopmentCorporation (NBCFDC), a Government ofIndia undertaking, Ministry of Social Justice &Empowerment for successfully conductingtrainings across thecountry.

The Joint Secretary, Ministry of Social Justice& Empowerment, Government of India andManaging Director, NBCFDC, conferredMeritorious Performance Award to RSDC in aglittering ceremony.Held on the occasion of Foundation Day ofNBCFDC at Dr.Ambedkar International Centre,Janpath New Delhi, the event witnessedparticipation of key people from the Skillingindustry and Sector Skill Councils. The awardwas received by Ms Meghna Mishra, CEO andMs Shewani Nagpal, Sr. Director, RSDC.RSDC was chosen for the award by NBCFDC for"effective implementation of NBCFDC skillinitiatives based on evaluation of overallperformance against sanctions conveyed during2017-18 & 2018-19", the award citation stated.

With a view to bolster the drive to bring backwardclasses in the skilling ecosystem, RSDC signed aMemorandum of Agreement (MoA) withNBCFDC in mid-2017. The arrangement wasentered into considering the immense potentialfor training youth belonging to marginalizedsections, in employable skills for the rubbersector.

Under this arrangement between RSDC andNBCFDC, a large number of skill trainings inrubber have been organized in different parts ofthe country. Besides fresh trainings, RSDC has also held aseries of Recognition of Prior Learning (RPL)initiatives so as to assess and train the existingworkforce in the unorganized segment in theregional areas and certify them for career growth.

To further this collaboration and providing an impetus to skill development training in Rubber in the North East of the country, RSDC will be organizing Skill Training for 520 trainees in the states of Assam and Tripura, in the next phase. The trainees include a large number of Senior Citizens as well.

Fresh and Upskilling/ Recognition of Prior Learning (RPL) Training will be provided across the states of Assam, Tripura in this collaboration with National Backward Classes Finance and Development Corporation (NBCFDC).

The job roles for which Fresh Training will be provided include that of Tyre Fitter. 60 trainees each in Assam and Tripura will undergo an intensive training of 350 hours spread over 3 months. Major beneficiaries of this training will be EBC and OBC.

Similarly, Up Skiling/ RPL Training will be held in two districts each in Assam and Tripura in the job role of Latex Harvest Technician.

Each district will have 100 nos. of trainees accounting for a total of 400 trainees. Interestingly half of trainees (200 nos.) will be Senior Citizens and rest half in EBC or OBC categories.

The main objectives of the proposed skill development training programme will be to upgrade the skills of its target group to enable them to start income generating activities of their own or to get gainfully employed. The job roles will be aligned to National Skill Qualification Framework (NSQF). The training will be provided by the empanelled training partners of RSDC as per the procedure permitted by Ministry of Skill Development & Entrepreneurship.

PIC: Joint Secretary, Ministry of Social Justice & Empowerment,Managing Director, NBCFDC presenting the award to CEO , RSDCand Sr. Director, RSDC.

RMWA Activities & News

Half Day Seminar on promoting Thai Rubber:

A Half Day Seminar was arranged at Hyatt Regency, Usmanpura, Ahmedabad on 15th May, 2019 which was addressed by Thai Royal Consulate, Mumbai, Rubber Authority of Thailand and Industrial Authority of Thailand.

The organization of the seminar was with view to promote Thai Natural Rubber, Processing & Products into Indian Rubber Industry. The introduction of Thai Rubber City was included during the seminar for possible investments by Indian Rubber Industry.

More than 40 members have attended this seminar and were made interactive at conclusion.

The entire Thai Authority comprising of Thai Royal Consulate, Dy.Governor of Business & Operation Rubber Authority, Director of Rubber Farmer Development, Dy.Governor of Industrial Estate Authority of Thailand, Investment Promotion Officer etc accompanied by RMWA Team made factory visit to one of our prominent members unit "Hi= Tech Elastomers Ltd" Ahmedabad.

The seminar was informative and possible future beneficial to Indian Rubber Industries by way of importing quality natural Rubber from Thailand. It was good first step forward by Thai Authority for future Possible Thai-India mutual beneficial Cooperation in Rubber Segment.

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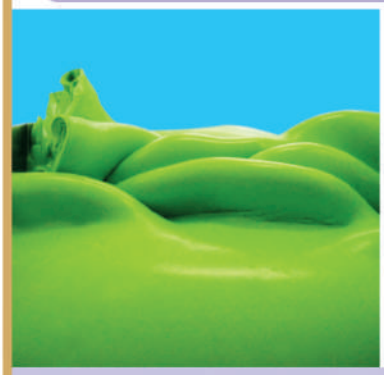

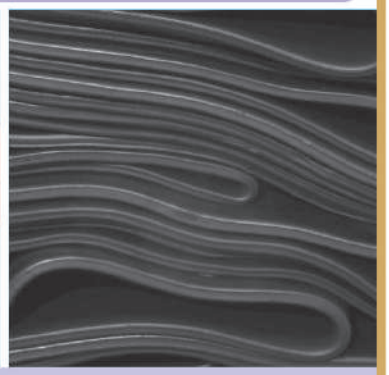

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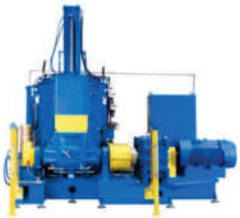

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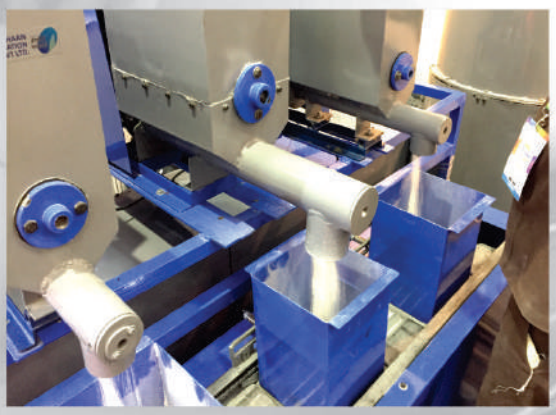

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