

## HASETRI - List of Test Facilities

	<b>Method Name</b>
	<p><b>SPECIAL TEST FOR ANALYTICAL</b></p> <ul style="list-style-type: none"><li>- TGA at 40 Deg. C/MIN</li><li>- DSC at 10 Deg. C/MIN</li><li>- DSC at 10 Deg. C/MIN, Low Temp.</li><li>- FTIR (Fourier Transformed Infrared Spectrophotometer)</li><li>- FTIR (Fourier Transformed Infrared Spectrophotometer), Pyrolysis</li><li>- Optical Microscopy</li><li>- Optical Microscopy, Hot Stage Analysis</li><li>- Molecular Weight of Polymer by GPC</li><li>- Calcium Oxide</li><li>- Extraction</li><li>- TLC</li><li>- Volume Fraction of Rubber</li></ul> <p><b>ANALYSIS OF RUBBER PRODUCT</b></p> <ul style="list-style-type: none"><li>- Polymer Identification</li><li>- % Rubber Hydrolic</li><li>- % Carbon Balck</li><li>- % Volatiles</li><li>- % Ash</li><li>- Semi Quantative Ash Analysis</li><li>- Plasticiser Identification</li><li>- Quantitative Antioxidant Analysis</li><li>- Carbon Chain Distribution of WAX by GC</li><li>- Purity of Rubber Chemicals by GC</li><li>- Benzene &amp; Aromatic Content of Solvent Naphtha by GC</li><li>- Quantitative Estimated of 6PPD in Rubber Vulcanizate by HPLC</li><li>- Assay of Rubber Chemicals by HPLC</li><li>- Characterisation by UV-Vis</li><li>- Toluene Discoloration of C-Black</li><li>- Surface Area of Materials (Powder)</li><li>- Determination of S &amp; N by NCS Analyser</li><li>- Material Identification by GC-MS</li><li>- SEM</li><li>- SEM - EDS</li><li>- ICP - OES</li><li>- Bay Proton Test</li></ul> <p><b>TESTING OF UNVULCANISED RAW RUBBER</b></p> <ul style="list-style-type: none"><li>- Mooney Viscosity by MV 2000 E</li><li>- Delta Mooney by MV 2000 E</li><li>- Mooney Scorch by MV 2000 E</li><li>- Rheometry Study by MDR 2000 E</li><li>- Dispersion by Disperse Grader</li><li>- Extrusion/Die swell property by Brabender Plasticorder</li><li>- Banbury Mixing</li></ul>

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	<ul style="list-style-type: none"> <li>- Mill Mixing</li> <li>- Moulding</li> <li>- Mixing in Brabender</li> <li>- Analysis by RPA : Strain Sweep</li> <li>- Analysis by RPA : Frequency Sweep</li> <li>- Analysis by RPA : Temperature Sweep</li> <li>- Analysis by RPA : Matrix Sweep</li> <li>- Analysis by RPA : Cure Study</li> <li>- Analysis by RPA : Cure Simulation</li> <li>- Tack Study</li> <li>- P.R.I.</li> </ul> <p><b>VULCANISED RUBBER</b></p> <ul style="list-style-type: none"> <li>- Tensile Properties at RT</li> <li>- Tensile Properties at HT</li> <li>- Tear Properties at RT</li> <li>- Tear Properties at HT</li> <li>- Hardness</li> <li>- DIN Abrasion</li> <li>- Goodrich Heat Build-up</li> <li>- Goodrich DMA</li> <li>- Goodrich Blow Cut Test</li> <li>- Monsanto FTFT at RT</li> <li>- De-Mattia Flex-Cut Initiation</li> <li>- De-Mattia Flex-Cut Growth</li> <li>- Tension/Permanent Set at RT Using Zwick UTS</li> <li>- Tension/Permanent Set at HT</li> <li>- Swell Index</li> <li>- Carrying out Ageing at one Temp.(1 Day)</li> <li>- Carrying out Ageing at one Temp.(3 Days)</li> <li>- Carrying out Ageing at one Temp.(7 Days)</li> <li>- Ozone Resistance Test at Specified Temp. for 24 Hours</li> <li>- Analysis of Tube (Dimension &amp; Physicals) - V</li> <li>- Analysis of Tube (Dimension &amp; Physicals) - C</li> <li>- Tube Valve Adhesion</li> <li>- Tube Splice strength by De-Mattia Flexometer</li> <li>- Details analysis of Tube valves</li> <li>- Analysis of Flap (Dimension &amp; Phy.) - V</li> <li>- Analysis of Flap (Dimension &amp; Phy.) - C</li> <li>- Sample Preparation by Splitting. M/C</li> <li>- Sample Preparation by Crushing</li> <li>- Sample Preparation by Drilling/Grinding</li> <li>- Sample Preparation from Finished Products</li> <li>- Rebound Resilience - RT</li> <li>- Rebound Resilience - HT</li> </ul>

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	<ul style="list-style-type: none"> <li>- Dynamic Properties - RT</li> <li>- Dynamic Properties - HT</li> <li>- Dynamic Properties - LT</li> <li>- Glass Transition by DMA</li> <li>- Frequency Temp. Superposition</li> <li>- Dynamic Properties - Frequency Sweep</li> <li>- Dynamic Properties - Strain Sweep</li> <li>- Gas Permeability - HT</li> <li>- Gas Permeability - RT</li> <li>- Determination of Chipping &amp; Chunking</li> <li>- Determination of Tyre Ageing Characteristics</li> <li>- Crack Growth - RT by Flexing Machine</li> <li>- Crack Growth - HT by Flexing Machine</li> <li>- De-Mattia HT</li> <li>- Hyper Elastic Properties</li> <li>- Quasi-Static Properties</li> <li>- Determination of Bulk Tear</li> <li>- Compression Mode stress - Strain</li> <li>- Compression Mode stress - Strain HT</li> <li>- Pure Shear Hyper Elastic Properties</li> <li>- Quadruple Shear</li> <li>- Comperssion Set - RT</li> <li>- Comperssion Set - HT</li> <li>- Step Loading Unloading</li> <li>- Creep &amp; Stress Relaxation for 24 Hours</li> <li>- Dry Abrasion - LAT 100</li> <li>- Rolling Resistance - LAT 100</li> <li>- Dry Traction - LAT 100</li> <li>- Wet Traction - LAT 100</li> </ul> <p><b>LATEX TESTING</b></p> <ul style="list-style-type: none"> <li>- % Total Solid Content</li> <li>- Dry rubber Content</li> <li>- pH</li> <li>- Brookfield Viscosity</li> <li>- Mooney Viscosity of Contained Polymer</li> <li>- Total Alkalinity</li> <li>- Metal Content ( Cu, Mn, Mg, Fe, Ni, Co, Cr)</li> <li>- Surface Tension</li> <li>- Coagulum Content</li> <li>- Chemical Stability</li> <li>- Specific Gravity</li> <li>- Bound Styrene of SBR Latex</li> <li>- KOH Number of NR Latex</li> <li>- Volatile Fatty Acid Number of NR Latex</li> </ul>

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	<p><b>FABRIC TESTING</b></p> <ul style="list-style-type: none"><li>- Strength Properties</li><li>- Linear Density &amp; Moisture</li><li>- Shrinkage</li><li>- Twist</li><li>- Gauge</li><li>- H-Adhesion or Peel Adhesion</li><li>- Heat Durability (only ageing)</li><li>- Dip Pick up of Nylon Cord</li> <li>- Dip Pick up of Rayon cord</li><li>- Dip Pick up of Glass Fiber</li><li>- Relative dip pick up for aramid</li><li>- Spin finish Content</li><li>- Crystallinity of Fabric</li><li>- Melting Point of Fabric</li><li>- Identification of Fabric</li><li>- Lay Length &amp; Lay Direction</li><li>- Torsion Test</li><li>- Reverse Bend Test</li><li>- Coating Thickness</li><li>- Humidity Ageing (24 Hours)</li><li>- Straightness</li><li>- Residual Torsion</li><li>- Stiffness</li><li>- CT Cord Fatigue Test</li></ul> <p><b>CHEMICAL TESTING</b></p> <ul style="list-style-type: none"><li>- Brookfield Viscosity</li><li>- Identification of S- Bloom</li><li>- A/O by TLC</li><li>- Doctor Test of Solvent</li><li>- Acid insoluble</li><li>- Total Solid</li><li>- Solubility</li><li>- pH</li><li>- Solvent Extraction</li><li>- Ash</li><li>- Det. Of Zn (Chem.)</li><li>- Sulphur content by CS<sub>2</sub></li><li>- Plasting weight Wire cords</li><li>- Ignition Loss</li><li>- Chemical Digestion</li><li>- Moisture Content by IR Moisture Analyser</li><li>- VP Content of VP Latex</li></ul>

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	<ul style="list-style-type: none"> <li>- Silica Content of Silicon Dioxide</li> <li>- Dirt in NR</li> <li>- Nitrogen Content of NR</li> <li>- Cobalt Content (Chemical)</li> <li>- Cyclohexane Insoluble</li> <li>- Moisture by Karl Fisher</li> <li>- High Temperature Stability of Insoluble Sulphur</li> <li>- Moisture by Azeotropic Distillation</li> <li>- Saponification No.</li> <li>- Aniline Point</li> <li>- Assay of MBT</li> <li>- Assay of DPG</li> <li>- Assay of TBBS/CBS/NOBS/DCBS</li> <li>- Free MBT</li> <li>- Assay of MBTS</li> <li>- Saybolt Viscosity</li> <li>- Sieve Residue of Powdery Material</li> <li>- Heat Loss</li> <li>- Softening pt.</li> <li>- Melting pt.</li> <li>- Distillation range</li> <li>- Congealling pt. of Wax</li> <li>- Bulk attrition of C-Black</li> <li>- Sieve Residue of C-Black</li> <li>- Pour Density of C-Black</li> <li>- Defects in Bead wire Coating</li> <li>- Freezing Point</li> <li>- UV Analysis of Rubber Chemicals</li> <li>- Sp. Gravity by sp. Gr. Bottle</li> <li>- Sp. Gravity by Hydrometer</li> <li>- Sp. Gravity by Liquid displacement</li> <li>- DBP Absorption of C-Black</li> <li>- Water Setting Characteristics of Clay</li> <li>- Flash &amp; Fire pt.</li> <li>- CA,CP,CN of Processing Oil</li> <li>- Iodine No.</li> <li>- Acid No.</li> <li>- Oil Content of oiled sulphur</li> <li>- Organic acid &amp; Soap</li> <li>- Methylol Content</li> <li>- Acidity as % Free acid</li> <li>- Oil Content of oil extended Polymer</li> <li>- Bound Styrene by GC Analsis</li> <li>- Iodine Absorption No. of C-Black</li> </ul>

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	<b>Method Name</b>
	<ul style="list-style-type: none"> <li>- Clay/gel Analysis of Processing Oil</li> <li>- Drop Melting pt. of wax</li> <li>- RI of Liq. Sample</li> <li>- Bound Styrene</li> <li>- Micro Structure of Polybutadiene Rubber</li> <li>- Pour point of oil</li> <li>- Volatile matter in NR</li> <li>- Pellet Hardness of C-Black</li> <li>- Titer Value of Stearic Acid</li> <li>- Proximate Analysis of Coal</li> <li>- Refractive Index</li> <li>- Micro Structure of Solution SBR</li> <li>- Calorific Value Determination</li> <li>- PCA Content in Oil</li> </ul> <p><b>FEA Analysis Truck Bias</b></p> <ul style="list-style-type: none"> <li>- 2D Infaltion Analysis</li> <li>- 3D Load Deflection</li> <li>- 3D Steady State Rolling</li> <li>- 3D SSR with Slip Angle</li> <li>- 3D Lateral/Tangential/Camber Stiffness</li> </ul> <p>Temperature/Rolling Resistance Cure Simulation</p> <p><b>FEA Analysis Pass/Light Truck</b></p> <ul style="list-style-type: none"> <li>- 2D Infaltion Analysis</li> <li>- 3D Load Deflection</li> <li>- 3D Steady State Rolling</li> <li>- 3D SSR with Slip Angle</li> <li>- 3D Lateral/Tangential/Camber Stiffness</li> </ul> <p><b>FEA Analysis Tractor Bias</b></p> <ul style="list-style-type: none"> <li>- 2D Infaltion Analysis</li> <li>- 3D Load Deflection</li> <li>- 3D Steady State Rolling</li> <li>- 3D SSR with Slip Angle</li> <li>- 3D Lateral/Tangential/Camber Stiffness</li> </ul> <p><b>FEA Analysis Truck Radial</b></p> <ul style="list-style-type: none"> <li>- 2D Infaltion Analysis</li> <li>- 3D Load Deflection</li> <li>- 3D Steady State Rolling</li> <li>- 3D SSR with Slip Angle</li> <li>- 3D Lateral/Tangential/Camber Stiffness</li> </ul> <p><b>FEA Analysis Pass/Light Truck Radial</b></p> <ul style="list-style-type: none"> <li>- 2D Infaltion Analysis</li> <li>- 3D Load Deflection</li> <li>- 3D Steady State Rolling</li> </ul>

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	Method Name
	<ul style="list-style-type: none"> <li>- Endurance for Truck - per day</li> <li>- High Speed for PC - per tyre</li> <li>- Hot Spot (Speed+Thermography) - per tyre</li> <li>- Belt Test</li> <li>- Burst test (Max 10bar Air Pressure) - per tyre</li>   <li>- Tyre changing PC</li> <li>- Tyre changing Truck</li> <li>- Truck Plunger - per tyre</li> <li>- Truck Load Deflection - per tyre</li> <li>- Dimension (Overall width OD) - per tyre</li> <li>- Dimension (Section width, Circumference/OD), Tread arc width, NSD at centre &amp; Engraving Snaps - per tyre</li> <li>- Dimension (Overall width OD), Tread drop, tread chord width, Tread arc radius, NSD at centre &amp; Shoulder, Total No. of blocks (Lugs) - per tyre</li> <li>- Angle book &amp; Crossection Analysis - per tyre</li> <li>- Angle book &amp; Crossection Analysis (Truck) - per tyre</li> <li>- Marking - per tyre</li> <li>- Shearography Test</li> <li>- Shearography Test for Motorcycle</li> <li>- Footprint Fujifilm</li> <li>- Footprint teckscan</li> <li>- Thermography Test - per hour</li> <li>- Air Retention test</li>   <li>- Footprint - PC (Length,width,L/S ratio,Area) - per condition</li> <li>- Footprint - Truck (Length,width,L/S ratio,Area) - per condition</li> <li>- Footprint - Truck (Impression) - per condition</li> <li>- Angle Book Preparation (Truck) - per condition</li> <li>- Angle Book Preparation (Pass.) - per condition</li> <li>- Rolling Resistance SAE 31269</li> <li>- Rolling Resistance SAE 32452</li> <li>- Rolling Resistance ISO 18164</li> <li>- Force &amp; Moment Sweep Test</li> <li>- Force &amp; Moment Test (GM 15204)</li> <li>- Force &amp; Moment Test (PRAT)</li> <li>- Dynamic Load Deflection</li> <li>- Force &amp; Moment Test (Hysteresis)</li> <li>- High Speed Uniformity</li> </ul> <p><b>Calibration</b></p> <ul style="list-style-type: none"> <li>Calibration of Glass thermometer L.C. 0.05</li> <li>Calibration of Glass thermometer L.C. 1.00</li> <li>Calibration of Temp. Sensor-40 to 30°C</li> </ul>

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	<b>Method Name</b>
	Calibration of Temp. Sensor from RT to 650°C Calibration of Temp. Sensor from RT to 1000°C Calibration of Metrology well/Bath Calibration of Metrology well/Bath upto 600°C Calibration of Metrology well upto 1000°C Calibration of Temp. Calibrator (Single Item) Calibration of Oven (9-point) upto 250°C Calibration Temperature Sensor With Indicator (per point) Calibration of Pneumatic Pressure Gauge upto 20bar Calibration of Hydraulic Pressure Gauge upto 500bar Calibration of Pressure Calibrator (Single Item) Calibration of pressure gauge (per point) Calibration of Weighing Balance upto 220gm Calibration of Weight Box upto 220gm M1-M2 Class Calibration of Weighing Balance upto 5kg Calibration of Weight Box upto 220gm F1,F2 Calibration of Assorted Weight from 500gm Calibration of Weighing Balance, L.C. 0.01 mg Calibration of Vernier Caliper Calibration of Micrometer Load Calibration (100 KN) Load Calibration (10 KN) Load Calibration (5 KN) Speed Calibration Time Calibration Hardness Tester Calibration Hardness Tester Calibrator Calibration