

**RESEARCH FACILITIES AND TESTING INSTRUMENTS  
AVAILABLE AT RESEARCH UNIVERSITIES AND INDUSTRIES**

Name of Company	List of Equipment
<p><b>Ansell Shah Alam Sdn Bhd</b>  <b>Analytical Services</b>  <b>Science &amp; Technology Innovation</b>  <b>Centre</b>  <b>Lot 16, Persiaran Perusahaan,</b>  <b>Section 23,</b>  <b>40000 Shah Alam,</b>  <b>Selangor, Malaysia.</b>  <b>Tel : 603 - 5541 9797</b>  <b>Fax : 603 - 5541 7955</b></p>	<p><b><u>A) Morphology &amp; Surface Analysis</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. Scanning Electron Microscope ( SEM )</li> <li>2. Energy-dispersive X-ray spectroscopy ( EDX )</li> <li>3. IR Microscopy</li> <li>4. Optical Microscopy</li> </ol> <p><b><u>B) Physical &amp; Elemental Analysis</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. Ion Chromatography ( IC )</li> <li>2. Atomic Absorption Spectrometer ( AAS )</li> </ol> <p><b><u>C) Physical &amp; Mechanical Properties Testing</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. Tensometer for tensile testing</li> <li>2. Grip Tester</li> <li>3. Burst Tester for Condom</li> <li>4. Blade Cut, Abrasion, Tear and Puncture Resistance Testing</li> <li>5. Leak Tester for Package Integrity</li> <li>6. Taber Abraser</li> <li>7. Gurley Stiffness Tester</li> </ol> <p><b><u>D) Molecular Identification &amp; Analysis</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. UV-Vis Spectrophotometer</li> <li>2. Fourier Transform Infra-Red Spectrometer ( FT-IR )</li> <li>3. Gas Chromatography GC-FID</li> <li>4. High Performance Liquid Chromatography ( HPLC )</li> </ol> <p><b><u>E) Electrostatic Discharges (ESD) Testing</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. Resistance / Resistivity Measurements</li> <li>2. Static Decay Meter</li> <li>3. Charge Plate Monitor System</li> </ol> <p><b><u>F) Product Cleanliness Testing</u></b></p> <p>Testing Facility / Method :</p> <ol style="list-style-type: none"> <li>1. Anions Analysis ( Ion Chromatography )</li> <li>2. Cations Analysis ( Atomic Absorption Spectrometer )</li> <li>3. Liquid Particle Count Analysis</li> <li>4. Latex Proteins Analysis</li> </ol> <p><b><u>G) Chemical Analysis</u></b></p>

	Testing Facility / Method : <ol style="list-style-type: none"> <li>1. Residual Powder Content Analysis in rubber gloves</li> <li>2. Chemical Swelling Index for latex dipped goods</li> <li>3. Total Water Extractables Content Analysis in gloves</li> <li>4. Froth Level Analysis</li> <li>5. Migration Value &amp; Organic Content Analysis for latex gloves</li> </ol>
--	--

<p><b>FOREST RESEARCH INSTITUTE MALAYSIA (FRIM)</b></p> <p><b>EQUIPMENT IN WOOD COMPOSITES TESTING LABORATORY</b></p> <p><b>Kepong, Selangor</b></p> <p><b>Tel: 03-6279 7000</b></p> <p><b>Website: <a href="http://www.frim.gov.my">http://www.frim.gov.my</a></b></p>	<table border="1"> <thead> <tr> <th><b>EQUIPMENT</b></th> <th><b>MANUFACTURER</b></th> </tr> </thead> <tbody> <tr><td>Universal Testing Machine</td><td>Instron</td></tr> <tr><td>UV-Spectrophotometer-</td><td>Shimadzu</td></tr> <tr><td>UV-Spectrophotometer-</td><td>PerkinElmer</td></tr> <tr><td>Sawing Machine-</td><td>Maschinenbau Gmbh Master</td></tr> <tr><td>Sawing Machine-</td><td>Electra D-49716</td></tr> <tr><td>Sawing Machine-</td><td>LMT 80/2</td></tr> <tr><td>Veneer Caliper(Digital)-</td><td>Mitutoyo CD-18</td></tr> <tr><td>Linear Scale Caliper</td><td>Mitutoyo ALC-7705W</td></tr> <tr><td>Veneer Caliper(Digital)-)</td><td>Mitutoyo CD-20 (R</td></tr> <tr><td>Digital Caliper</td><td>Mitutoyo</td></tr> <tr><td>Micrometer (R)</td><td>Mitutoyo</td></tr> <tr><td>Micrometer</td><td>Mitutoyo 293-240</td></tr> <tr><td>Drum Chipper-</td><td>Pallmann PHT 120x430</td></tr> <tr><td>Viscometer –</td><td>Brookfield LVF</td></tr> <tr><td>Viscometer</td><td>Brookfield RVT</td></tr> <tr><td>Thermocouple-</td><td>Eurotron</td></tr> <tr><td>Hot Press -</td><td>Taihei</td></tr> <tr><td>Ring Flaker -</td><td>Pallmann</td></tr> <tr><td>Disc Flaker</td><td>Pallmann</td></tr> <tr><td>Sander</td><td>Taiwan</td></tr> <tr><td>Fibre Cutter</td><td>Local</td></tr> <tr><td>Analytical Sieve Shaker</td><td>Japan</td></tr> <tr><td>Linear Shaker</td><td>Japan</td></tr> <tr><td>Vibrating Screener</td><td>Local</td></tr> <tr><td>Steel Screener</td><td>Local</td></tr> <tr><td>Sawing Machine 1</td><td>-</td></tr> <tr><td>Sawing Machine 2</td><td>-</td></tr> <tr><td>Sawing Machine 3</td><td>-</td></tr> <tr><td>Sawing Machine 4</td><td>-</td></tr> <tr><td>Pilot Plant for Wood Composites</td><td>Local</td></tr> <tr><td>WPC Compounder System</td><td>Taiwan</td></tr> <tr><td>Thermo Mechanical Pulper –</td><td>Andritz Sprout Bauer</td></tr> <tr><td>Fiber Dryer</td><td>Local</td></tr> <tr><td>Pulvuriser</td><td>Local</td></tr> <tr><td>Cold Press</td><td>Local</td></tr> <tr><td>MDF Mixer</td><td>Local</td></tr> <tr><td>OSB Mixer</td><td>Local</td></tr> <tr><td>Particle Board Mixer</td><td>Local</td></tr> <tr><td>Universal Testing Machine-</td><td>Shimadzu</td></tr> <tr><td>pH Meter-</td><td>Acument Basic</td></tr> <tr><td>Digital Impact Tester</td><td>Taiwan</td></tr> <tr><td>1 m3 Dynamic Conditioning Chamber</td><td>Germany</td></tr> <tr><td>23 m3 Dynamic Conditioning Chamber</td><td>Local</td></tr> </tbody> </table>	<b>EQUIPMENT</b>	<b>MANUFACTURER</b>	Universal Testing Machine	Instron	UV-Spectrophotometer-	Shimadzu	UV-Spectrophotometer-	PerkinElmer	Sawing Machine-	Maschinenbau Gmbh Master	Sawing Machine-	Electra D-49716	Sawing Machine-	LMT 80/2	Veneer Caliper(Digital)-	Mitutoyo CD-18	Linear Scale Caliper	Mitutoyo ALC-7705W	Veneer Caliper(Digital)-)	Mitutoyo CD-20 (R	Digital Caliper	Mitutoyo	Micrometer (R)	Mitutoyo	Micrometer	Mitutoyo 293-240	Drum Chipper-	Pallmann PHT 120x430	Viscometer –	Brookfield LVF	Viscometer	Brookfield RVT	Thermocouple-	Eurotron	Hot Press -	Taihei	Ring Flaker -	Pallmann	Disc Flaker	Pallmann	Sander	Taiwan	Fibre Cutter	Local	Analytical Sieve Shaker	Japan	Linear Shaker	Japan	Vibrating Screener	Local	Steel Screener	Local	Sawing Machine 1	-	Sawing Machine 2	-	Sawing Machine 3	-	Sawing Machine 4	-	Pilot Plant for Wood Composites	Local	WPC Compounder System	Taiwan	Thermo Mechanical Pulper –	Andritz Sprout Bauer	Fiber Dryer	Local	Pulvuriser	Local	Cold Press	Local	MDF Mixer	Local	OSB Mixer	Local	Particle Board Mixer	Local	Universal Testing Machine-	Shimadzu	pH Meter-	Acument Basic	Digital Impact Tester	Taiwan	1 m3 Dynamic Conditioning Chamber	Germany	23 m3 Dynamic Conditioning Chamber	Local
<b>EQUIPMENT</b>	<b>MANUFACTURER</b>																																																																																								
Universal Testing Machine	Instron																																																																																								
UV-Spectrophotometer-	Shimadzu																																																																																								
UV-Spectrophotometer-	PerkinElmer																																																																																								
Sawing Machine-	Maschinenbau Gmbh Master																																																																																								
Sawing Machine-	Electra D-49716																																																																																								
Sawing Machine-	LMT 80/2																																																																																								
Veneer Caliper(Digital)-	Mitutoyo CD-18																																																																																								
Linear Scale Caliper	Mitutoyo ALC-7705W																																																																																								
Veneer Caliper(Digital)-)	Mitutoyo CD-20 (R																																																																																								
Digital Caliper	Mitutoyo																																																																																								
Micrometer (R)	Mitutoyo																																																																																								
Micrometer	Mitutoyo 293-240																																																																																								
Drum Chipper-	Pallmann PHT 120x430																																																																																								
Viscometer –	Brookfield LVF																																																																																								
Viscometer	Brookfield RVT																																																																																								
Thermocouple-	Eurotron																																																																																								
Hot Press -	Taihei																																																																																								
Ring Flaker -	Pallmann																																																																																								
Disc Flaker	Pallmann																																																																																								
Sander	Taiwan																																																																																								
Fibre Cutter	Local																																																																																								
Analytical Sieve Shaker	Japan																																																																																								
Linear Shaker	Japan																																																																																								
Vibrating Screener	Local																																																																																								
Steel Screener	Local																																																																																								
Sawing Machine 1	-																																																																																								
Sawing Machine 2	-																																																																																								
Sawing Machine 3	-																																																																																								
Sawing Machine 4	-																																																																																								
Pilot Plant for Wood Composites	Local																																																																																								
WPC Compounder System	Taiwan																																																																																								
Thermo Mechanical Pulper –	Andritz Sprout Bauer																																																																																								
Fiber Dryer	Local																																																																																								
Pulvuriser	Local																																																																																								
Cold Press	Local																																																																																								
MDF Mixer	Local																																																																																								
OSB Mixer	Local																																																																																								
Particle Board Mixer	Local																																																																																								
Universal Testing Machine-	Shimadzu																																																																																								
pH Meter-	Acument Basic																																																																																								
Digital Impact Tester	Taiwan																																																																																								
1 m3 Dynamic Conditioning Chamber	Germany																																																																																								
23 m3 Dynamic Conditioning Chamber	Local																																																																																								

**Jabatan Kimia Malaysia  
Jalan Sultan  
Petaling Jaya, Selangor**

**Tel:**

**Website:  
www.kimia.gov.my**

1.	Liquid Chromotography Tendem Mass Spectrometry (LC-MSMS)
2.	Scanning Electron Microscope (SEM)
3.	Nuclear Magnetic Resonance Spectrometer (NMR)
4.	X-Ray Powder Diffractomer (XRD)
5.	Wavelength Dispersive X-ray Fluorescence Spectrometer (WDXDF)
6.	Fourier Transform Infrared Spectrometer (FTIR)
7.	Liquid Chromotography Time-of-Flight Mass Spectrometer (LC-TOFMS)
8.	Gas Chromotography Mass Spectrometry (GCMS)
9.	Differential Scanning Calorimeter (DSC)
10.	Ion Chromography (IC)

**Materials Characterisation Unit  
Malaysian Rubber Board  
260 Jalan Ampang  
50450 Kuala Lumpur**

**Tel : 603-9206 3671/3761  
Fax : 603-4251 9213**

**Email : upbac@lgm.gov.my  
Website :  
www.lgm.gov.my/chemtest/chemi  
caltesting.aspx**

#### **A) Chromatography Analysis**

Testing Facility :

1. TLC
2. GC-Thermo-Energy Analyzer (TEA)
3. GC-FID
4. GC-MSD
5. HSS-FID
6. HPLC

Analysis Offered :

- Identification and Quantification of Chemical Residues in Rubber Products and Latex Dipped Goods.
- Full Characterisation of HFA and VFA
- Identification of Components in Organic Mixtures
- Identification of Components in Solvent Systems
- Identification of Components in Petroleum Products
- Characterisation of Phthalates in Rubber Products and Latex-Dipped Goods
- Identification of PAHs in Rubber Products and Latex-Dipped Goods
- Nitrosamines Analysis Up to 7 different types of Volatile Nitrosamines as well as Semi Volatile Amine from Rubber and Rubber Products can be determined and quantified simultaneously

#### **B) Microscopy Analysis**

Testing Facility :

1. Scanning Electron Microscope ( SEM )
2. Energy-dispersive X-ray spectroscopy ( EDX )
3. Atomic Force Microscope ( AFM )

#### **C) Physicochemical Analysis**

Latex Analysis Includes :

1. Dry rubber content ( DRC )
2. Total solid content
3. Alkalinity
4. Potassium hydroxide ( KOH ) number
5. pH
6. Volatile fatty acid

7. Coagulum content
8. Volatile fatty acid
9. Coagulum content
10. Sludge content
11. Mechanical stability time (MST)
12. Brookfield viscosity

**D) Protein Analysis**

Analysis Offered :

1. Quantitative analysis of extractable protein content in rubber products and latex dipped goods
2. Determination of antigenic proteins in latex dipped goods
3. Determination of allergenic proteins in latex dipped goods
4. Powder content analysis in rubber gloves

**E) Soil & Foliar Analysis ( Agroanalytical )**

Testing Facility :

1. Inductive Coupling Plasma: Optical Emission Spectroscopy ( ICP-OES )
2. CNS Elemental Analyser
3. Atomis Absorption Spectrometer ( AAS )
4. Ion Chromatography ( IC )

Analysis Offered :

i) For Soil Samples

1. Moisture
2. pH, conductivity
3. Carbon, TOC, TIC
4. Nitrogen
5. Anion
6. Mechanical Analysis
7. Cation Exchangeable Capacity (CEC)
8. Total P, Available P
9. Total Mn
10. Exchangeable K, Ca Mg, Na
11. Elements such as Cu, Fe, Zn and etc.

ii) For Plant Samples

1. N, P, K, Ca, Mg, Al, Fe
2. Sulphur
3. Heavy Metals

iii) For Fertiliser Samples

1. Carbon, TOC, TIC
2. Nitrogen, Sulphur
3. K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, MgO

iv) For Rubber and Rubber Products

1. Ash
2. Carbon, Nitrogen
3. Sulphur, Free Sulphur
4. Ca, Mg, Zn, Ti, Si, Fe, Al
5. Heavy Metal
6. Anion

**F) Spectroscopy Analysis**

Testing Facility :

1. Nuclear Magnetic Resonance Spectrometer

	<p>2. Fourier Transform Infra-Red Spectrometer ( FT-IR )</p> <p><b><u>G) Thermal Analysis</u></b></p> <p>Testing Facility :</p> <ol style="list-style-type: none"> <li>1. Differential Scanning Calorimeter ( DSC )</li> <li>2. Thermogravimetric Analyser ( TGA )</li> </ol> <p><b><u>H) Ad-hoc Analysis</u></b></p> <p>Analysis Offered :</p> <ol style="list-style-type: none"> <li>1. Specification test for castor oil</li> <li>2. Specific gravity</li> <li>3. Refractive index</li> <li>4. Insoluble matter</li> <li>5. Ash content analysis</li> <li>6. Residue and inorganic</li> <li>7. Residue content</li> <li>8. Analysis using auto-titrator</li> <li>9. Iodine test on glove samples</li> <li>10. Analysis of moisture</li> </ol>
--	--

<p><b>Malaysian Rubber Board Sungai Buloh Research Station Sungai Buloh, Seksyen U4 40150 Shah Alam, Selangor</b></p> <p><b>Product Testing and Calibration Unit.</b></p> <p><b>Tel : 603-6157 7941 / 6156 1121 Fax : 603-6156 3304 / 6156 4418 Email : ptl@lgm.gov. my</b></p> <p><b>Website: <a href="http://www.lgm.gov.my/testServices/ProductTest.aspx">http://www.lgm.gov.my/testServices/ProductTest.aspx</a></b></p>	<p><b><u>A) Physical Testing Services</u></b></p> <p>List of Testing Services Provided</p> <ol style="list-style-type: none"> <li>i) Rubber &amp; Rubber Products: Material/Product Testing</li> <li>ii) Testing of Rubber Bearings</li> <li>iii) Testing of Rubber Seals</li> <li>iv) Testing of Condoms</li> <li>v) Testing of Examination Gloves</li> <li>vi) Testing of Surgical Gloves</li> <li>vii) Testing of Household/Industrial Gloves</li> </ol> <p><b>i) Rubber &amp; Rubber Products: Material/Product Testing</b></p> <p>Type of Tests/Properties Measured :</p> <ol style="list-style-type: none"> <li>1. Abrasion</li> <li>2. Ageing</li> <li>3. Air Permeability</li> <li>4. Density/Sg</li> <li>5. Dimension</li> <li>6. Effects of Liquids</li> <li>7. Electrical Resistivity</li> <li>8. Fatigue</li> <li>9. Hardness</li> <li>10. Preparation of Test Pieces</li> <li>11. Ozone Resistance</li> <li>12. Resilience</li> <li>13. Ply Adhesion</li> <li>14. Set</li> <li>15. Shear Modulus</li> <li>16. Brittleness</li> <li>17. Stiffness</li> </ol>
--	--

18. Stress-Relaxation
19. Tear
20. Tensile Properties
21. Compression Stress Strain Properties
22. Low Temperature Resistance Test ( Range 0°C to -80°C )

#### **ii) Testing of Rubber Bearings**

Type of Tests/Properties Measured :

1. Tensile Properties
2. Ageing
3. Shear Modulus
4. Compression Set
5. Ozone Resistance
6. Bonding Strength
7. Hardness
8. Stiffness in Shear
9. Stiffness in Compression
10. Dimensions

#### **iii) Testing of Rubber Seals**

Type of Tests/Properties Measured :

1. Tensile Properties
2. Hardness
3. Compression set
4. Accelerated ageing
5. Water immersion
6. Oil resistance
7. Stress relaxation
8. Ozone resistance

#### **iv) Testing of Condoms**

Type of Tests/Properties Measured :

1. Dimensions:
  - a Length
  - b Width
2. Freedom from Holes
3. Bursting volume and pressure
4. Resistance to storage
5. Force at break and Elongation at break
6. Colour fastness
7. Labelling and packaging
8. Removing the lubricant
9. Tensile Properties
10. Oven Treatment
11. Water Leakage
12. Quantity of lubricant
13. Watertightness
14. Visible defects
15. Test for Package integrity

#### **v) Testing of Examination Gloves**

Type of Tests/Properties Measured :

1. Tensile Properties
2. Dimensions
3. Freedom from holes
4. Ageing
5. Watertightness
6. Cuff rupture resistance
7. Water Leakage
8. Seam strength of seamed gloves

**vi) Testing of Surgical Gloves**

Type of Tests/Properties Measured :

1. Tensile Properties
2. Dimensions
3. Freedom from holes
4. Ageing
5. Watertightness
6. Cuff rupture resistance
7. Water Leakage
8. Seam strength of seamed gloves

**vii) Testing of Household/Industrial Gloves**

Type of Tests/Properties Measured :

1. Tensile Properties
2. Dimensions
3. Tensile Properties  
    Before and After :
  - a Aging
  - b Cleanser Proof Test
  - c Oil Proof Test
  - d Acid Proof Test
  - e Alkaline Proof Test pp
4. Watertightness
5. Tension Set
6. Water Leakage
7. Tear Resistance
8. Cuff Rupture resistance
9. Volume Resistivity
10. Puncture Resistance

**B) Tyre Testing Services**

List of Testing Services Provided

1. Structural endurance test
2. High speed capability test
3. Load deflection and footprint measurement
4. Tyre forces measurement at slip/camber angle
5. Dynamic circumference measurement
6. Rolling resistance measurement
7. Bead unseating force measurement
8. Plunger energy measurement

**Universiti Putra Malaysia (UPM)  
Serdang, Selangor**

**Tel: 03-8946 6000**

**Website:  
[www.upm.edu.my](http://www.upm.edu.my)**

1. NMR spectroscopy
2. FTIR spectroscopy
3. UV-Vis spectroscopy
4. Fluorescence spectroscopy
5. Impedance spectroscopy (electrical conductivity, magnetic property, dielectric property)
6. X-ray fluorescence spectroscopy
7. XPS
8. Atomic absorption spectroscopy
9. Elemental analysis
10. X-ray diffractometer (crystallinity)
11. Gel permeation chromatography
12. BET
13. Scanning electron microscopy
14. Field emission electron microscopy
15. Optical microscopy
16. Transmission electron microscopy
17. Impact tester
18. Universal testing machine
19. Shear rheometer
20. Dynamic mechanical analyser
21. Differential scanning calorimeter
22. Thermogravimetric analyser
23. Internal mixer
24. Twin screw extruder (thermoplastic)
25. Injection moulding (thermoplastic)

UPM	Bil	Nama Alat	Jenama	Model
	1	Thermo Gravimetric Analyzer (TGA)	Perkin Elmer	TGA 7 & STA 6000
	2	Differential Scanning Calorimeter (DSC)	Perkin Elmer	Jade DSC
	3	Differential Thermal Analyzer (DTA)	Perkin Elmer	DTA 7
	4	Dynamic Mechanical Analyzer (DMA)	Perkin Elmer	Diamond DMA
	5	Gel Permeation Chromatography (GPC)	Varian	GPC 220
	6	Carbon, Hydrogen, Nitrogen & Sulfur Analyzer (CHNS)	Leco	CHNS 932 & Truspec CHN
	7	Fourier Transform Infra Red (FTIR)	Perkin Elmer	1650 , BX Spectrum II & Spectrum 100 Series
	8	X-ray Single Crystal	Varian	
	9	Scanning Electron Microscope (SEM)	Hitachi	H 7000
	10	Transmission Electron Microscope (TEM)	Leo	912 AB
	11	Universal Testing Machine	Instron	4302
	12	Nucleus Magnetic Resonance (NMR)	Jeol	ECX 400 & ECX 500
	13	Internal Mixer	Brabender	Brabender
	14	Hot Press	Hsin- Chi	Hsin 1123
	15	Gas Chromatography Mass Spectrum (GCMS)	Shimadzu	2010Plus

<p><b>UNIVERSITI SAINS MALAYSIA</b>  <b>School of Materials &amp; Mineral Resources Engineering</b>  <b>Seri Ampangan</b>  <b>Nibong Tebal</b>  <b>Seberang Perai Selatan</b>  <b>Pulau Pinang</b>  <b>Tel: 04- 594 1010</b></p> <p><b>Website:</b>  <a href="http://material.eng.usm.my">http://material.eng.usm.my</a></p>	<p>Please go to USM website for complete list of equipment.</p>
<p><b>UNIVERSITI TEKNOLOGI MALAYSIA</b>  <b>Skudai,</b>  <b>Johor</b></p> <p><b>Faculty of Chemical &amp; Natural Resources Engineering</b>  <b>Dept of Polymer Engineering</b></p> <p><b>Tel: 07-553 5504</b></p> <p><b>Website:</b>  <a href="http://fkksa.utm.my/polymer">http://fkksa.utm.my/polymer</a></p>	<p>Please go to UTM Polymer Engineering Laboratory website to view list of equipment.</p>
<p><b>SIRIM BERHAD</b>  <b>Plastics Technology Group</b></p> <p><b>No. 1, Persiaran Dato' Menteri Seksyen 2, Shah Alam, Selangor.</b></p> <p><b>Tel: 03-5544 6000</b></p> <p><b>Website:</b>  <a href="http://www.sirim.my/plastics/rnd1">http://www.sirim.my/plastics/rnd1</a></p>	<p>Please go to SIRIM website to view complete list of facilities and equipment.</p>

\*\*\*