

# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

|                                                                                                                               |                                                                                              |                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Accredited to<br/>ISO/IEC 17025:2017</p> | <h3>Tun Abdul Razak Research Centre</h3> <p>Issue No: 037    Issue date: 26 January 2024</p> |                                                                                                                                                                                                                                                                                                           |
|                                                                                                                               | <p>Brickendonbury<br/>Hertford<br/>Hertfordshire<br/>SG13 8NL</p>                            | <p>Contact: Ms J Patel<br/>Tel: +44 (0)1992 584966<br/>Fax: +44 (0)1992 554837<br/>E-Mail: <a href="mailto:jpatel@tarrc.co.uk">jpatel@tarrc.co.uk</a><br/>Websites: <a href="http://www.tarrc.co.uk">www.tarrc.co.uk</a><br/><a href="http://www.rubberconsultants.com">www.rubberconsultants.com</a></p> |
| Testing performed at the above address only                                                                                   |                                                                                              |                                                                                                                                                                                                                                                                                                           |

### DETAIL OF ACCREDITATION

| Materials/Products tested                                                          | Type of test/Properties measured/Range of measurement                       | Standard specifications/ Equipment/Techniques used                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RUBBERS/ELASTOMERS, RUBBER/ELASTOMER PRODUCTS AND MATERIALS IN CONTACT WITH RUBBER | <u>Chemical Tests</u>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                    | Aromaticity of oils extracted from rubbers/rubber compounds                 | Documented In-House Method 093a using NMR according to ISO 21461:2012                                                                                                                                                                                                                                                                                                                                  |
|                                                                                    | Ash content                                                                 | Documented In-House Method 001 based on ISO 247:1990                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                    | Nitrosamine testing of rubber                                               | Documented In-House Method 051 using Gas Chromatography with Nitrogen Chemiluminescence Detection, covering BS EN 12868:1999 and BS ISO 29941:2010                                                                                                                                                                                                                                                     |
|                                                                                    | Qualitative and Quantitative Analysis for rubber identification and content | Documented In-House Methods using: <ul style="list-style-type: none"> <li>- Thermogravimetric Analysis (TGA): method 011</li> <li>- Differential Scanning Calorimetry (DSC): method 012a</li> <li>- FT-IR Spectroscopy: Method 031a</li> <li>- Pyrolysis with Infra-Red (PIR) including surface ATR Spectroscopy: method 031b</li> <li>- TG-IR interface Method 031c (IR interfaced to TGA)</li> </ul> |



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| RUBBERS/ELASTOMERS,<br>RUBBER/ELASTOMER                                 | <u>Chemical Tests</u> (cont'd)                                                                                                                                                                                             | Documented In-House Methods using:                                                                                                                   |
| RUBBER, POLYMERS, PLASTICS,<br>ELASTOMERS                               | Identification of elements for composition analysis, reverse engineering filler type, or contamination                                                                                                                     | Documented In-House Methods using:                                                                                                                   |
| RUBBER, POLYMER, PLASTIC,<br>ELASTOMER PRODUCTS                         |                                                                                                                                                                                                                            | Scanning Electron Microscopy (SEM) with Energy Dispersive X-ray Spectrometry (EDS), Line-scans and X-ray Mapping Spectrometry: methods 072b and 072d |
| MATERIALS IN CONTACT WITH<br>RUBBERS, POLYMERS,<br>PLASTICS, ELASTOMERS |                                                                                                                                                                                                                            |                                                                                                                                                      |
| MATERIALS IN CONTACT WITH<br>RUBBERS, POLYMERS,<br>PLASTICS, ELASTOMERS | <u>Chemical and Physical Test</u>                                                                                                                                                                                          | Documented In-House Methods using:                                                                                                                   |
| RUBBER, POLYMERS, PLASTICS,<br>ELASTOMERS                               | Qualitative scanning electron microscopy (SEM) using magnifications in the range 1.5x to 300,000x<br>Quantitative measurement of length using magnifications in the range 50x to 30,000x                                   | - Scanning Electron Microscopy (SEM): method 072c                                                                                                    |
| RUBBER, POLYMER, PLASTIC,<br>ELASTOMER PRODUCTS                         |                                                                                                                                                                                                                            | Sample preparation for scanning electron microscopy (SEM)                                                                                            |
| RUBBERS, POLYMERS,<br>PLASTICS, ELASTOMERS                              | <u>Physical Tests</u>                                                                                                                                                                                                      |                                                                                                                                                      |
| RUBBER, POLYMER,<br>PLASTIC, ELASTOMER<br>PRODUCTS                      | Optical Microscopy/Qualitative Analysis                                                                                                                                                                                    | Documented In House Method using:                                                                                                                    |
| MATERIALS IN CONTACT WITH<br>RUBBERS, POLYMERS,<br>PLASTICS, ELASTOMERS | Quantitative measurement of length using magnifications in the range: 200x to 500x for phase contrast and 100x to 500x for transmitted, incident, bright field, and dark field imaging (using compound optical microscope) | - Compound Optical Microscope including phase contrast, transmitted and incident light, bright field and dark field imaging, Method 071a             |
|                                                                         |                                                                                                                                                                                                                            | 4x to 112x using stereo optical microscope                                                                                                           |



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| TYRES - COMMERCIAL AND PASSENGER VEHICLES | <u>Performance Test</u><br>Endurance<br>200 - 5000 kgf | Documented In-House Method based on, and meeting the requirements of, ECE 30, 54, 108 and 109 (TTL 002) |
| END                                       |                                                        |                                                                                                         |