Technical data
Lab Data and Testing.

Ruma Products BV. Hoogeveen Holland.
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**Background Information**

Ruma has one of the most advanced Elastomer design and testing laboratory facilities in Europe with a fully integrated automatic data management system able to retrieve and store test and QC qualification data real time from the modern elastomer measurement equipment. This data is both stored for customer traceability purposes and is available to customers if required, whenever required, as well as for technically analysis for new elastomer and product development work. This later via SQL interfaces with specifically created queries from within the Ruma Lab.

The Laboratory Information Management System (LIMS) is a purpose designed and built management and analysis system specifically built for RUMA by STARLIMS (a major player in the design and building of research and development systems for Industrial applications) and has been in use is RUMA since 2007.

This system has integrated all our major Laboratory equipment into one single system.

![Fig 1A. Ruma Engineering, Research and Development Lab](image-url)
Fig 1B. Ruma Main Offices
Equipment:

Our lab consists of a selection of the most modern elastomer analysis and measuring equipment available on the market. The major equipment is as follows:

<table>
<thead>
<tr>
<th>Apparatus</th>
<th>manufacturer</th>
<th>Type</th>
<th>Serial nr.</th>
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<tbody>
<tr>
<td>Shadow meter</td>
<td>mitutoyo</td>
<td>PY-A3000</td>
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<td>microscope</td>
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<td>Resistance meter</td>
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<td>Volume Press Rheometer</td>
<td>Montech</td>
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<td>Volume Press Trekbank</td>
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<td>Lab mixer</td>
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<td>TD3-10MDX</td>
<td>2816</td>
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<td>Lab mill</td>
<td></td>
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<tr>
<td>Scales</td>
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<td>Scales</td>
<td>Metller</td>
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<td>B243461263</td>
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<tr>
<td>Analytical Scales</td>
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<td>Magnetic Mixer</td>
<td>IKA</td>
<td>RCT B</td>
<td>e1575028</td>
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<td>Montech</td>
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<td>Montech</td>
<td>V-MV 3000</td>
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<tr>
<td>DMA</td>
<td>Gabo</td>
<td>Eplexor 500N</td>
<td>528</td>
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<tr>
<td>TGA</td>
<td>Metller</td>
<td>TG50</td>
<td>K50834</td>
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<td>Metller</td>
<td>TGA/STDA851e</td>
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<td>Robot Sampler</td>
<td>Metller</td>
<td>801 RO</td>
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<tr>
<td>Refrigeration/heating Circ</td>
<td>Julabo</td>
<td>F12</td>
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<tr>
<td>DSC</td>
<td>Metller</td>
<td>DSC30S</td>
<td>K21180</td>
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<td>FT-IR</td>
<td>Excaliber</td>
<td>FTS-3000</td>
<td>010-0221-0047</td>
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<td>Hardness meter</td>
<td>Bareiss</td>
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<td>1871/00</td>
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<td>Monsanto</td>
<td>Tensometer 10</td>
<td>ST10-173</td>
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<td>Oil bath</td>
<td>Grant</td>
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<tr>
<td>Oven</td>
<td>Binder</td>
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<td>21 x Ovens</td>
<td>Memmert</td>
<td>UFE500</td>
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<td>Espec</td>
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<td>JD-H50</td>
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<td>HTHP sealing equipment</td>
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<td>Abrasion</td>
<td>Gibitra</td>
<td>Abrasion Check</td>
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</table>

Fig 2. Ruma major laboratory Equipment List
Fig 3. Temperature Controlled swell Testing Ovens

Fig 3. Part of the banks of 21 over Temperature controlled ovens used for Temperature Controlled water and Oil swelling tests. Used for Research and Development Swelling Elastomer testing and calibration as well as for quality control for Pre-production Swell Acceptance testing.
Fig 4. Lab Internal Mixer for manufacture of Lab Samples

Fig 5. Laboratory Computer Controlled Open Mill Mixer
Technical data

Fig 6. Temperature Controlled Elastomer Research Facilities

Fig 7. Computer Controlled Strain Gauge with integral temperature Chamber and Video recording
Fig 8. Swelling Elastomer Abrasion Tester

Fig 9. Screen Dump of our LIMS Data management System
Fig 10. Screen Dump of Our **CHAMPION** Swelling Elastomer Design Modelling System

Fig 11. Full Size Bonding Testing of Elastomer to Pipe
Certification

Unique In the Industry We are ISO 9001-2008 Certified for Swelling Elastomers and Products

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Ruma Products B.V.
Zeppelinstraat 5
7903 BR Hoogeveen
The Netherlands

has been approved by Lloyd’s Register Quality Assurance to the following Quality Management System Standard:

ISO 9001 : 2008

The Quality Management System is applicable to:

According to specifications the design and development, engineering, testing, manufacturing and delivery of swelling sealing products.

Approval Certificate No: ROA666229

Original Approval: 3 December 2012
Current Certificate: 3 December 2012
Certificate Expiry: 2 December 2015

Issued by: Lloyd’s Register Nederland B.V.

This document is subject to the provision on the reverse

K.P. van der Mandeelaan 41a, 3012 GB Rotterdam, The Netherlands - KvK nr. 24247948
This approval is carried out in accordance with the audit assessment and certification procedures and monitored by LRQA.
CERTIFICATE OF APPROVAL

This is to certify that the Environmental Management System of:

Ruma Products B.V.
Zeppelinstraat 5
7903 BR Hoogeveen
The Netherlands

has been approved by Lloyd's Register Quality Assurance to the following Environmental Management System Standard:

ISO 14001: 2004

The Environmental Management System is applicable to:

According to specifications the design and development, engineering, testing, manufacturing and delivery of swelling sealing products.

Approval Certificate No: RQA667117
Original Approval: 31 January 2014
Current Certificate: 31 January 2014
Certificate Expiry: 30 January 2017

Issued by: Lloyd's Register Nederland B.V.

K.P. van der Mandelebaan 41a, 3062 MB Rotterdam, The Netherlands - KvK nr. 24247948
This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
Manufacture Contact Information.

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Manufacture Stamp and Signature