«Rubber Products» SIA production

Quality Control System

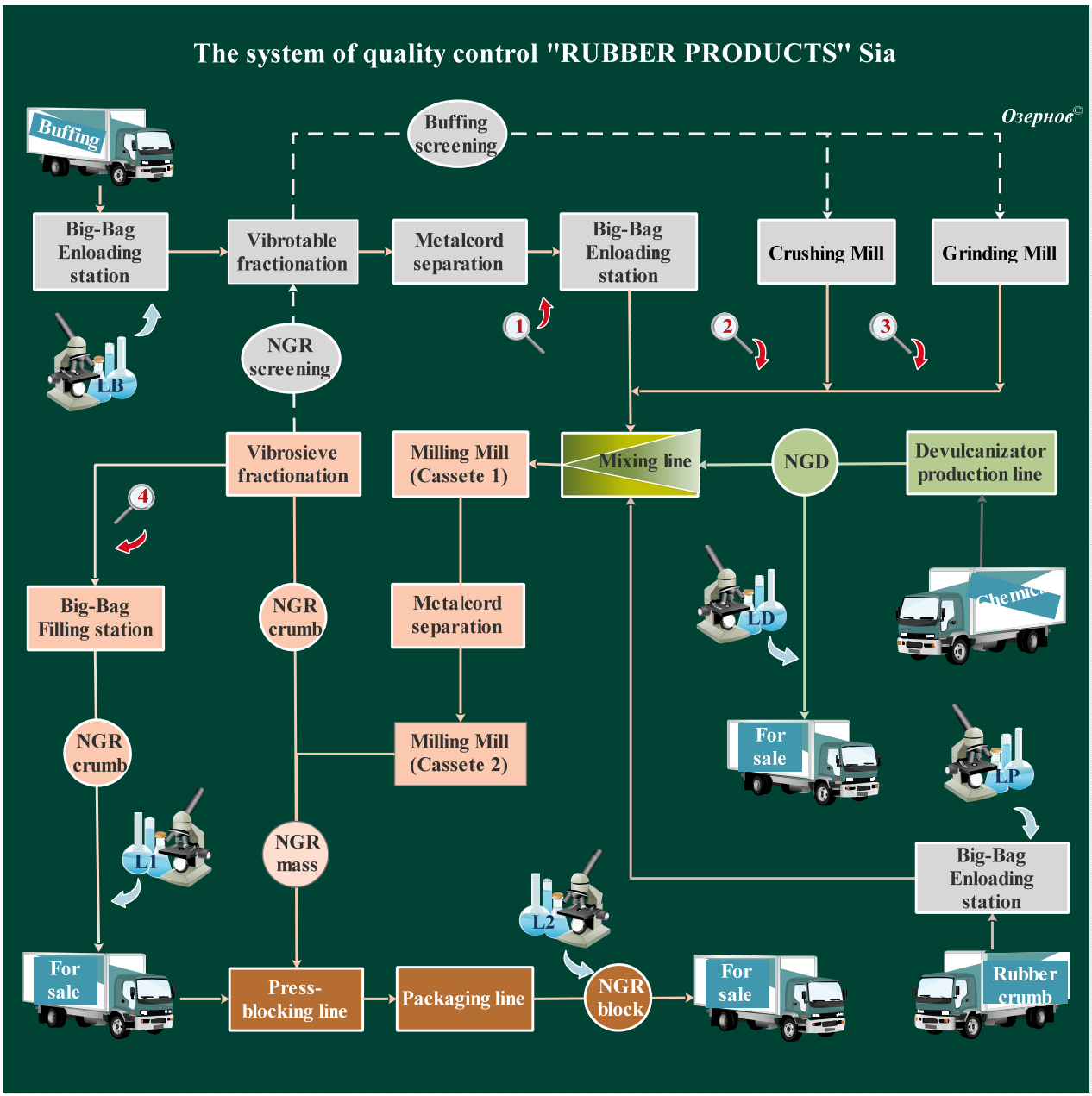
1. Purpose of Quality Control System of the Enterprise (QCSE):

1.1.1 Securing of the quality characteristics of production, required by the customers;

1.1.2 Optimization of the technological operations performance;

1.1.3 Rendering the customers recommendations on the best application of the production, its transportation and storage;

1.1.4 Compliance with industry standards.



2. General provisions

2.1. Monitoring of QSCE perform the following persons in the scope of their responsibility, determined in the Job descriptions (Appendix 1):

2.1.1. Chief Industrial Engineer

2.1.2. Chemical Engineer

2.1.3. Production Director

2.1.4. Shift Supervisors.

2.2. Each technological shift assigns the sequence number of the batch of product, produced by this shift.

2.3. The assigned number continues the numbering of the previous shifts.

2.4. Number of the batch is registered in the Shift log-book.

2.5. Each package of the **finished** products should be labeled with identification tag (Appendix 2, Form 1)

2.6. Each package of the **intermediate** products should be labeled with temporary identification tag (Appendix 2, Form 2).

2.7. All documents on each batch in the frame of QSCE, shell be stored the stipulated time (Table 8) for the purposes of documentary due diligence.

3. Sequence of Organoleptic and Instrumental Testing performance (temporary practice till the full staffing). (Table 1).

3.1. Sampling and monitoring performs the Shift Supervisor in the course of manufacturing of the products and arrival of the feedstock.

3.2. The samples are numbered, dated and entered into the Shift Logbook with entry of date and time of sampling.

3.3. The results of testing are recorded to the Shift Logbook.

Organoleptic and Instrumental Testing (Table 1)

n/n	Place of sampling	Method, frequency of sampling, instruments	Test parameters
1	Hopper of supplying material to the mixing unit	Manual sampling once per hour (Hand Magnifier, Thermometer, Moisture Gauge)	Structure Humidity Temperature Cord and foreign matters occurrence
2	Mixing screw receiver No.2 at the outlet of the Grinding Mills Line		
3	Discharge Hopper of the Mills Line		
4	Discharge Hopper of the Grinding Mills Line, or Shaking Sieve		

4. **Laboratory tests operating procedure** (Table 2)*.

4.1. Sampling and Monitoring is performed in the course of manufacturing of the products in compliance with Clause 3 and Table 2.

4.2. Sampling and monitoring perform:

4.2.1. Chief Industrial Engineer and Chemical Engineer from 9:00 AM till 5:00 PM:

4.2.2. At the Two-shift or Three-shift operation, in the absence of Chief Industrial Engineer and Chemical Engineer - the Shifts Supervisors.

<table>
<tr><th colspan="4">Laboratory testing (Table 2).</th></tr>
<tr><th>n/n</th><th>Place of Sampling</th><th>Method, frequency of sampling, instruments</th><th>Test Parameters</th></tr>
<tr><td>  </td><td>Big-Bags with Buffing after unloading to the Store</td><td rowspan="2">Composited samples testing.
Sample (total weight 2 kilo) is to be gathered from eight different packages of the batches by the separate samples of 0.250 kilo weight each. Samples are to be mixed thoroughly together in uniform mass and submitted to the laboratory testing.</td><td>Table 3</td></tr>
<tr><td>  </td><td>Big-Bags with Rubber Crumb after unloading to the Store</td><td>Table 4</td></tr>
<tr><td>  </td><td>Discharge Hopper of the Grinding Mills Line, or Shaking Sieve (NGR_P / NGR_M)</td><td rowspan="3">Composited samples testing.
Sample (total weight 2 kilo) is to be gathered from eight different packages of the batches by the separate samples of 0.250 kilo weight each every hour. Samples are to be mixed thoroughly together in uniform mass and submitted to the laboratory testing.</td><td>Table 5</td></tr>
<tr><td>  </td><td>Receiving Hopper of the NGR_B Pre-forming line</td></tr>
<tr><td>  </td><td>Devulcanizer NGR_D Line Weight Station</td><td>Table 6</td></tr>
</table>

* In the absence of own Laboratory and complete staff, the testing is performing in the third-party certified laboratories, in the scope and sequence, established by the General Director Mr. I. Jevmenov.

4.3. **Incoming feedstock inspection:**

Parameter	Method of Testing	Regulation
Shredded Rubber Crumb, Buffing (Table 3) (Each new batch, immediately after coming to the enterprise)		
Average size of particles and their distribution	ASTM D5644	
Specific surface area	BET	
Density and Specific Weight	ASTM D297/ASTM D1817	
Moisture content, %	ASTM D1509	
Natural Rubber content to total weight ratio	ASTM D3452	
Metal content, %	ASTM D5603	
Fibre content, %	ASTM D5603	
Inorganic substances content, %	ASTM E1131	
Mix of the machined Rubber Crumb (Buffing) (Table 4) (Each new batch, immediately after coming to the enterprise)		
Content of Isoprene in SBR	ISO 7270 (pyro-GC) / ISO 4650 (FTIR)	
Content of Rubber	TGA (Thermogravimetric method)	
Organic additives		
Carbon Black		
Mineral substances		
Total Sulphur	AA	
Carbon char at 550°C	ISO 247	
Particles bigger than 2 mm	10 mesh	
Particles smaller than 0.00 mm	20 mesh	
Fraction content, including:		
Acetone extract, %	ASTM D297	
Char content, %	ASTM D297	
Carbon Black content, %	ASTM E1131	
Polymeric carbon content, %	ASTM E1131	
Natural Rubber content to total weight ratio	ASTM D3452	
Metal content, %	ASTM D5603	
Fibre content, %	ASTM D5603	

Inorganic substances content, %	ASTM E1131	

4.4. **Outgoing inspection of the products:**

NGR_P, NGR_M, NGR_B (Табл.5)		
Parameter	**Method of Testing**	**Regulation**
Nominal Tensile Strength, МПа	DIN 53504-S2	
Nominal Elongation,%	DIN 53504-S2	
Shor Hardness A	DIN 5305	
ML	ISO 3417	
MH	ISO 3417	
Tc2	ISO 3417	
Tc90	ISO 3417	
Δ MH-ML	ISO 3417	
Muni Viscosity, ML(1+4)100° C	ISO 289	
Average size of particles and their distribution	ASTM D5644	
Specific surface area	BET	
Density and Specific Weight	ASTM D297 / ASTM D1817	
Moisture content, %	ASTM D1509	
Morphology taking into account surface roughness		
Fraction content, including:		
Acetone extract, %	ASTM D297	
Char content, %	ASTM D297	
Carbon Black content, %	ASTM E1131	
Polymeric carbon content, %	ASTM E1131	
Natural Rubber content to total weight ratio	ASTM D3452	
Metal content, %	ASTM D5603	

4.5. **Formation procedure of commercial batches of products.**

4.5.1. The feedstock batches with similar test results are grouped in such a way that it should be possible to form the similar quality commercial batch of ready products, manufactured from this feedstock.

4.5.2. By the quantity the commercial batches of products are grouped from the production, manufactured by one shift.

4.5.3. The volume of the commercial batch should correspond the technical specification of the transport facility or the sea container, if the Company's schedule foresees the container deliveries.

Minimal volume of one Batch made of uniform feedstock (Table 6)				
Kind of product	**Unit**	**Q-ty**	**Kind of package**	**Kind of transport**
NGR_P	peaces	20	Big-Bag (1.2x1.2x2.0) one-spout	Heavy truck (l/c 24 tons, body length 12,6 m)
	tons	20		
	peaces	22		Heavy truck (l/c 24 tons, body length 13,6 m)
	tons	22		
NGR_M	peaces	20	Big-Bag (1.2x1.2x2.0) one-spout	Heavy truck (l/c 24 tons, body length 12,6 m)
	tons	18		
	peaces	22		Heavy truck (l/c 24 tons, body length 13,6 m)
	tons	22		
NGR_B	peaces	30	Pallet EP 0,8*1,2	Heavy truck (l/c 24 tons, body length 13,6 m)
	tons	24	Block 40x50x20 in PE + shrink bundling film	

5. QCSE Documentation procedure (Table 7):

Feedstock and materials quality documentation procedure (Table 7)			
Document	**Purpose**	**Retention period**	**Responsible persons**
Quality Certificate	• Submitted by the Suppliers • Ensuring the uniformity of the feedstock for manufacturing of the commercial batches of products • Legal and contract protection	12 months from the date of shipping the product, manufactured from this feedstock to the customer	Chief Industrial Engineer; Production Director; Chemical Engineer
Certificate of compliance and/or Declaration of compliance			
Suppliers' documents, proving the quality			
Manufacturer's Quality Management System Certificate of compliance			
Feedstock sampling Certificate	• Legal and contract protection • Executed by the Company.		
Certificates of analysis, performed by own Laboratory			

Finished products quality documentation procedure (Table 8)			
Document	**Purpose**	**Retention period**	**Responsible persons**
Sampling Certificate Certificates of analysis, performed by own Laboratory Certificates of analysis, performed by the Certified Third-party Laboratory	• For internal use; • Statistics accumulation; • Legal and contract protection	12 months from the date of shipping the product, manufactured from this feedstock to the customer	Chief Industrial Engineer; Production Director; Chemical Engineer
Quality Management System Certificate Manufacturer's Quality Management System Certificate of compliance Quality Certificate Product Identification tug	• Issued to the Customer at the shipping of the products as the supporting documents; • Legal and contract protection		
Copies of shipping documents (Invoices, Waybills, Bills of lading)	• Issued to the Customer at the shipping of the products as the supporting documents; • Legal and contract protection		

5.1. The commercial batch, released from the enterprise, is provided with documents, approving the quality of the raw materials in the scope referring the requirements of the Sales Contract, as well as customs and other rules and regulations of the country or Customer's warehouse location.

5.2. If the legislation foresees additionally specific supporting documents, the list of this documentation should be agreed in the Sales Contract with the Customer.

Final provisions.

The QSCE provisions should be approved by the General Director and are binding for every authorized person listed therein.

The QSCE provisions should be taken into account by the Commercial department of the Company during the execution of the sales Contracts with the Customers and Purchase Contracts with the Suppliers of feedstock and materials.

Appendix 1. – Job descriptions (Chief Industrial Engineer; Production Director; Chemical Engineer, Shift Supervisor).

Appendix 2. **Form 1**. – Indication Packing Tag.

Form 2. – Temporary Indication Packing Tag.

R&D Director «Rubber Products» Ltd. **Oleg Ozernov**