Clean Production and environmental protection of wool industry chain through the application of green and eco-friendly dyestuff and assistants

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Pollution is a common problem facing all the countries.

It has become an urgent task for governments and companies to embark on the path of sustainable developments and environment protection.
Policies, regulations and standards have been enforced by Chinese government to control pollution, improve the environment and safeguard people’s health.
Special standards were formulated by Ministry of Environmental Protection of China to regulate the pollutants and discharge of wool textile industry in China.

- Discharge standards of water pollutants for dyeing and finishing textile industry (GB4287-2012) : To contain the contaminant during dyeing and finishing.
- Discharge standards of water pollutants for woolen textile industry (GB28937-2012) : To contain the contaminant during scouring.

<table>
<thead>
<tr>
<th>Pollutants</th>
<th>Direct Discharge (in river)</th>
<th>Indirect Discharge (in municipal pipe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODcr (mg/L)</td>
<td>80</td>
<td>200</td>
</tr>
<tr>
<td>BOD5 (mg/L)</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Suspended substances (mg/L)</td>
<td>50 (for scouring: 60)</td>
<td>100</td>
</tr>
<tr>
<td>Ammonia nitrogen (mg/L)</td>
<td>10</td>
<td>20 (for scouring: 25)</td>
</tr>
<tr>
<td>Total nitrogen (mg/L)</td>
<td>15 (for scouring: 20)</td>
<td>30 (for scouring: 40)</td>
</tr>
<tr>
<td>Total phosphorus (mg/L)</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Adsorbable Organic Halogen (AOX)</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Sulfide</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Chromium(6)</td>
<td>No detection</td>
<td>No detection</td>
</tr>
<tr>
<td>Animal and vegetable oils</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Since January 1, 2015, some regions have been targeted with ever stricter limit.
Therefore to contain and resolve chemical pollution, it is essential to apply environmental chemicals.
Jiaxing Mount Chemical Co. Ltd

a specialized supplier of wool textile chemicals serving to the promotion and application of green and eco-friendly textile processing assistants and related new techniques.

Specialized supplier of wool textile assistant agents
Clean Production and environmental protection of wool industry chain through the application of green and eco-friendly dyestuff and assistants

Eco-friendly chemical control in scouring and carbonizing process

Eco-friendly chemical control in combing, top making, spinning and weaving process

Eco-friendly chemical control in dyeing and finishing process
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1. Eco-friendly chemical control in scouring and carbonizing process

Detergent
Alkali
Acid
Bleacher
Brightening agent
Polluted water treatment agent

Phosphas
Formaldehyde
NPE APEO
Side sodium alkyl benzene sulfonate
Octyl phenol polyether
Develop clean and environmental detergent

Select raw material derived from plants

Improve the formula

Readjust the techniques

ECO-degreasing detergent X100
The comparison of Environmental degreasant X100 and non-environmental detergent

<table>
<thead>
<tr>
<th>Raw wool: T1067/22.4mic</th>
<th>Yield: 66.28%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of detergent</td>
<td>X100</td>
</tr>
<tr>
<td>Dosage of detergent</td>
<td>1</td>
</tr>
<tr>
<td>(versus raw wool weight %)</td>
<td></td>
</tr>
<tr>
<td>Remaining grease in clean wool</td>
<td>0.24/0.36 avr.0.3</td>
</tr>
<tr>
<td>Remaining soil in clean wool</td>
<td>Little</td>
</tr>
<tr>
<td>Quality of clean wool</td>
<td>Good looseness</td>
</tr>
<tr>
<td>Color of clean wool</td>
<td>Even white</td>
</tr>
<tr>
<td>Processing indicator</td>
<td>Gauge length of combing:32</td>
</tr>
<tr>
<td>30mm Short fiber</td>
<td>9.7</td>
</tr>
<tr>
<td>CVH</td>
<td>45.7</td>
</tr>
<tr>
<td>Ha</td>
<td>82</td>
</tr>
<tr>
<td>Noil%</td>
<td>Average: 4.57%</td>
</tr>
<tr>
<td>Brightness of product</td>
<td>58.4</td>
</tr>
</tbody>
</table>
The clients of ECO-degreasing detergent X100

- Zhejiang New chuwa Co. Ltd.
- Reward (Ningbo) Wool Industry Co., Ltd.
- Zhejiang Red Sun wool textile co. ltd
- Tianyu Wool Industry (Zhangjiagang Free Trade Zone) Co., Ltd
- Michell International Pty Ltd
- Suqian Asia Textile Co. Ltd
- Jiangsu Jianlu Wool Textile Co., Ltd
- Zhejiang Lianao textile Co. Ltd.
- Jiangsu Sunshine Group
- ........................................

Clients from New Zealand, Turkey and Kazakhstan have been ordering the X100 series products
China’s main Regions of scouring and carbonizing process and their applications of environmental detergent

- Total capacity of Jiangsu, Zhejiang, Shandong: 70%
- Total capacity of Hebei, Henan, Inner Mongolia, Qinghai, Xinjiang: 30%
- Market share of Dalis X100 series: 90%
- Usage of environmental detergent: 90%
- The usage of environmental detergent promoting in progress: 50%
- Dalia X100 promoting in progress: 50%
New technology and crafts to reduce the amount of chemicals: energy saving, emission reduction, and pollution abatement

- Wisely apply the amount of detergent by taking full advantage of CMC (critical micelle concentration)
- Reduce the use of alkaline by application of neutral or alkalescence scouring

The alkaline application of scouring industry in coastal areas of China:

- 1995: 50 kg
- 2000: 20 kg
- 2005: 15 kg
- 2010: 10 kg
- 2015: 6 kg
2. Eco-friendly chemical control in combing, top making, spinning and weaving process

- Carding oil
- Wool lubricating oil
- Antistatic agent
- Yarn reinforcing agent
- APEO
- Heavy metal
- Formaldehyde
- Phthalic acid dibutyl ester
Instance: Wool lubricating oil

Petroleum based: such as mineral oil – degradation-resistant, non-environmental

Organism based: such as animal and plant grease: easily degradable, environment friendly

Basic polymer 85%
Additive 15%

Non-environmental additive: NPE (as emulgator, penetrant) Formaldehyde (as preservative, clarifying agent)

Environmental additive: be friendly with human and environment, meeting REACH standards
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Jiaxing Mount Chemical Co. Ltd

DH series of environmental wool lubricant oil

Spinnability  High Finished product rate

Difficult for rancidity  Longevity

Color resistance  Odourless

- Jiaxing Mount Chemical Co. Ltd
- DH series of environmental wool lubricant oil
- Spinnability
- High Finished product rate
- Difficult for rancidity
- Longevity
- Color resistance
- Odourless
3. Eco-friendly chemical control in dyeing and finishing process

**Agents**
- Leveling agent
- Waterproof agent
- Soaping agent
- Moth proofing agent
- Bleaching agent
- Chlorine treating agent
- Softening agent
- Smoothing agent

**Dyestuff**
- Acid dyes
- Mordant dyes
- Activated dyes

**Agents**
- Azo
- Formaldehyde
- Apeo
- Phosphate
- Phthalandione
- dibutyl ester
- Perfluoroctane sulfonate
- trichloromethane
- Heavy metal

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**Clean Production and environmental protection of wool industry chain through the application of green and eco-friendly dyestuff and assistants**
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Strict control Dyestuff

Activate dyes for wool

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No heavy metal

Little damage to fiber
Most of the dyeing mills in China have acquired the application technology of activate dyes for wool. However, the mordant dyes and separated waste water treatment are still needed on some occasions for some specific colors.

<table>
<thead>
<tr>
<th>Process stage</th>
<th>PH value</th>
<th>Cr6+(mg/L)</th>
<th>Total Cr(mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>input</td>
<td>output</td>
</tr>
<tr>
<td>Collecting tank</td>
<td>6-9</td>
<td>5.0</td>
<td>15</td>
</tr>
<tr>
<td>Reduction tank</td>
<td>2-2.5</td>
<td>5.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Coagulative precipitation</td>
<td>6-8</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Takeover standard</td>
<td>6-9</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>
The Chinese wool textile companies are making fast and enormous progress in upgrade and reconstruction so that to accomplish green and sustainable development.

More Chinese wool textile mills have been recognized by Oeko-Tex Standard 100.

The industry association acts as a bridge between the government and companies, providing information and platform, wisely consulting for future development.
A better future is foreseen with the endeavor of the entire wool textile industry.