Energy Conservation

Technological Solutions for Spinning

By VOLTAS LIMITED
VOLTAS LIMITED
A TATA Enterprise

Textile machinery division

India’s Leading Solution Provider To the Textile Industry
VOLTAS HAS A PROUD PARENTAGE of the TATA GROUP...
Based on market value, Tata Group has become the country's wealthiest group that crosses $100 billion mark
Textile Value Chain and Voltas TMD

1. Leverage Core Competency
2. Add value through Project management and Service
3. Packaged Solutions
4. Unique Services

Represent World class Principals

Add value through Project management and Service

TMD

Spinning
Weaving & Processing
Stitching & Garmenting
GARMENT

RAW MATERIAL
YARN
FABRIC
Established Across The Value Chain..

- Spinning
- Cotton
- Blowroom
- Carding
- Combing
- Drawing
- Yarn
- Autoconer
- Simplex
- Ring Frame
Key Principals
Spinning
Presence In Post Spinning

Knitting
- Circular
- Flat
- Warp

Fabric Forming
- Knitted Fabric

Warping & Sizing
- Warping
- Sizing

Weaving
- Rapier
- Airjet
- Waterjet

Woven Fabric

Non-woven
- Needle Punch
- Spunlace
- Spunbond

Non-Woven Fabric
Presence In Post Spinning

Fabric → Discontinuous Dyeing → Printing → Finishing

Processing & Finishing
Energy Consumption – Spinning Mills perspective
Measure of Energy in the Spinning Mills

• UKG – Units Consumed per Kg of Yarn produced is common measure used by Spinning Mills

• 40’s Converted UKG is used for comparison of different mills producing Different counts

• Benchmarking 40’s converted UKG
  – Non compact modern mills - 4.2 to 4.5.
  – For compact yarn, - 4.4.to 4.8
## UKG of different Counts

<table>
<thead>
<tr>
<th>Count (Ne)Warp</th>
<th>Compact RF</th>
<th>Non Compact RF</th>
<th>Overall Mills</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>6.7 to 7</td>
<td>5.8 to 6</td>
<td>10.5 to 11</td>
</tr>
<tr>
<td>80</td>
<td>5.4 - 5.7</td>
<td>4.8 to 5</td>
<td>9 to 9.5</td>
</tr>
<tr>
<td>60</td>
<td>4.2 to 4.3</td>
<td>3.5 to 3.8</td>
<td>6.8 to 7.2</td>
</tr>
<tr>
<td>40</td>
<td>2.1 to 2.43</td>
<td>1.9 to 2.0</td>
<td>4.6 to 5</td>
</tr>
<tr>
<td>30</td>
<td>1.6 to 1.7</td>
<td>1.3 - 1.5</td>
<td>3.6 to 3.8</td>
</tr>
</tbody>
</table>

Note: Speed More than 20000RPM with normal TM
# Energy Consumption Pattern— Spinning Mill

<table>
<thead>
<tr>
<th>Area</th>
<th>Department</th>
<th>% to Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery</td>
<td>Blow room and Card</td>
<td>5-6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preparatory</td>
<td>5-7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ring Frames</td>
<td>42-55%</td>
<td>57-75</td>
</tr>
<tr>
<td></td>
<td>Auto Coners</td>
<td>5-7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>57-75</strong></td>
</tr>
<tr>
<td>Utilities</td>
<td>Waste Recovery System</td>
<td>5-7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humidification Plant</td>
<td>12-15%</td>
<td>20-30</td>
</tr>
<tr>
<td></td>
<td>Compressor</td>
<td>2-6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>YCP</td>
<td>1-2%</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>Lighting (Factory + Colony)</td>
<td>2%</td>
<td>2</td>
</tr>
</tbody>
</table>
Machinery – Technology Solutions
BR and Card

- High and Super high production Machines
- Intelligent Lay out
- Reversal of Stripper roller of Unimix to enhance production without power
- Feed distributor to feed cards

Best practices:

- Timely Change of Wire Clothing in BR and Cards
- Selection of Lubricants and its Storage
- Suction Monitoring as per Recommendation and Control
- Periodic Machinery and Energy Audits
- Modernizing with High production Machinery
DF, Comber and SF

• Gearless Drive and Simple Construction
• High Production Combing Equipment (Up to 600 Nips per min)
• SF with Individual Servo Motors without Gears and Differential Gear Box

Best practices:

• Change of Bearings and overhauling of Drafting in time
• Selection of Lubricants and its storage
• Periodic Machinery Audits / Energy audits by Experts and its maintenance
• Modernization with high production Machinery
Ring Frame

- IE3 Class Energy Efficient Motors (2-5% Savings) with inverter
- Suction System with Inverter and pressure Transducer
- Roving Stop Motion
- Compact System with Inverter control

- Spindles with different DUI for fine counts
- Lower Diameter Rings for Fine counts

Best Practice:
Periodic Machinery Audits / Energy Audits by Experts
Spindle Tap change
Spindle Oil quality and Quantity
Timely Overhauling and Lubricants Management
IE3 Motors

For suction motors we are migrating to IE3 Motors, as this would be improving the efficiency by 2 to 3 %

<table>
<thead>
<tr>
<th>Motor KW</th>
<th>IE 2 Efficiency</th>
<th>IE 3 Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>84.6</td>
<td>87.1</td>
</tr>
<tr>
<td>4</td>
<td>85.8</td>
<td>88.1</td>
</tr>
<tr>
<td>5.5</td>
<td>87</td>
<td>89.2</td>
</tr>
<tr>
<td>6.5</td>
<td>87.5</td>
<td>89.6</td>
</tr>
<tr>
<td>7.5</td>
<td>88.1</td>
<td>90.1</td>
</tr>
</tbody>
</table>
INVERTERS with IE3 Main Motors

• Inverters are with premium efficiency Special type of motors to suit the textile Industry.

• Up to 5% Savings

• Retrofitment for existing machines available from LMW
Suction Motors

- Inverters for broken end suction Motors with pressure transducer to monitor pressure

- Also closed loop controlling could be made so that at various stages we could vary the speed of the suction motor

- Inclined Rubber coupling for suction tubes

Motor, Inverter with Suction Motors and Rubber coupling will lead up to 1.5 Watts Saving Per Spindle Depending upon the condition

- Energy Kit is available for Retrofit for existing Machines from LMW
Roving Stop Motion

- With Roving Stop motion when end breaks, we can reduce the suction pressure further and hence energy savings.
Higher Spindleage Mc with Individual Drives

- Higher Spindleage leading to lesser space consumption
- Individual Drive for drafting, Ring rail and Spindles
Online Monitoring System

- All the machine power could be monitored in the HMI of the machine or we could incorporate the same by connecting the CT in the machines.

- This would help us in evaluating the machine on a daily basis. In case of any defective bearing / non lubricant / scheduled change of rings/wires could be evaluated.
Bus Bar Trunking System
Bus Bar Trunking System

• We could eliminate the transmission and distribution losses as this eliminates the cables and PDBS.
• Maintenance free and T&D losses are not there due to this.
• No Voltage Drops
• Cable Losses could be reduced
Humidification Systems

- Energy Efficient Motor
- Energy Efficient Fans
- Automatic control

Benchmark Practice:
1. RO water for plant to avoid scale formation
2. Maintenance and cleaning of plants
3. Periodic Energy / Plant Audit
Rewounded Motors

- Rewounded motors always increases the losses.
- We need to have identification for the rewounded motors.
- Rewounding should be done with the reputed concern
- Proper greasing of Main motors
Compressors

- By selecting the optimum pressure we could save power.
- Unloading also consumes power, by installing the Inverter we could reduce the power loss.
- Cleaning should be carried out with a separate compressor.
- Leakage proof air leakage pipe pile
VOLTAS Contribution

• Energy Audit Services since 2008

• 80 Spinning Mills across India

• Key Customers – Madura Coats, Winsome, Vardhman, RTM

• Over 8000 KW Power Savings (48600 Tons Co2 Emission reduction) implemented during our Services to the Spinning mills

• Through energy waste control and innovative technological knowledge
In case of any clarifications as well to help you in auditing the plant and reduce the losses, kindly get in touch with

khameed@voltas.com.
Ph : 9443720880

mmohanraj@voltas.com
Ph : 9442624245.
Thank you