A division of Walchandnagar Industries Ltd.

Tiwac
Division (ISO 9001 Certified)

- A diversified Engineering company
- Sales Rs. 640 Cr. ($ 135 Mn)
- 3 Plants, 1700 employees
- ISO 9001 Company
- Centenary Year 2008
- Business in more than 25 countries

- Factory: Dharwad, Karnataka, India
- Set up in 1962-63 to manufacture Mechanical Alarm Time Pieces in technical collaboration with Louis Schwab of Switzerland.
- Pressure Gauges and Temperature Gauges introduced the year 1992-93.
Our Values
Organisational Culture centres on:

◆ **Quality**
  Quality in everything we do!

◆ **Precision**
  High precision machinery to ensure precision in products! Imported from Germany, Switzerland and England.

◆ **Time**
  Timeliness!

Location
- Situated on a hill at 700 m height from mean sea level.
- Is known for its salubrious climate for precision work.
- Dharwad is a University Town.
- Well connected by Road (on Golden Quadrilateral road network)
- Connected by Air to Mumbai and Bangalore.

Social Side of Tiwac
- TIWAC maintains a colony for technicians and officers.
- Guest house for visitors.

Product Development
- **Strong Product Development team**
  Developed new products:
  - Industrial Pressure Gauges,
  - Temperature Gauges
  - Sector Mechanism for Dash Board Instruments
  - Precision Components for Electrical Meters, Timers, Electronic gadgets, Automobile etc..
  - Synchronous Multiplex Timer (used in Sugar factories as an import substitution)
People
Committed and Devoted staff.
- Experienced Engineers & Supervisors – 48
- Trained technicians;
  - Precision Assembly and testing by Ladies Staff – 170 technicians
- Trainees & Apprentice
  - Young technicians regularly inducted.
  - Trained on the job.

Pressure Gauges
- Sizes from 40mm (1.5") to 250mm (10")
- Range 0 to 700 kg/cm² (10000 PSI)
- Vacuum Gauges
- As per Indian Standard IS 3624 of 1987 specifications.
- The types of gauges are,
  - Liquid filled,
  - Diaphragm seal,
  - Low pressure diaphragm,
  - Electrical Contact Gauges,
  - Master Gauges etc.

Temperature Gauges
- Manufactured in various types,
- Mercury in Steel Type in the size from 63mm to 250mm (10")
- Range: 38 °C to 600 °C
- Other types
  - Ether filled
  - Gas / Nitrogen filled
  - Bi-metal

Plant & Machinery
Automats
- Gear Hobbing
- Pivot Polishing
Power Press
- Welding
Heat Treatment
Chemical Section
- Second Operation
Tool Room
### Automats

<table>
<thead>
<tr>
<th>Machine</th>
<th>Bechler (Switzerland)</th>
<th>HMT Petermann</th>
<th>Bechet (Switzerland)</th>
<th>Deobil (Swiss)</th>
<th>Bechler (Switzerland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Capacity</td>
<td>12mm</td>
<td>7mm</td>
<td>4mm</td>
<td>10 mm</td>
<td>Cam slotting machine</td>
</tr>
<tr>
<td></td>
<td>bar capacity</td>
<td>bar capacity</td>
<td>bar capacity</td>
<td>with threading and drilling attachment</td>
<td>(type CR 510)</td>
</tr>
<tr>
<td></td>
<td>2 Nos</td>
<td>5 Nos</td>
<td>1 No</td>
<td>1 No</td>
<td>1 No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tool Grinding and Laping machine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cam slotting machine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(type CR 510)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 No</td>
<td>1 No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spindle drilling and threading attachment available on the machines</td>
</tr>
</tbody>
</table>

### Gear & Pivot

<table>
<thead>
<tr>
<th>Machine</th>
<th>Wahl (Swiss) Gear Hobbing Machine type W 90 with W 25 Automatic Leader</th>
<th>Keffer (West Germany) Gear Hobbing (Type 110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. dia of work piece</td>
<td>40 mm</td>
<td>Number of teeth 5 to 200</td>
</tr>
<tr>
<td>Max. cutting length</td>
<td>50mm</td>
<td>Dia of std hob 25mm x 10 x 8</td>
</tr>
<tr>
<td>Module</td>
<td>0.05 to 1.00</td>
<td>Max Module 1.</td>
</tr>
<tr>
<td>Number of teeth cut</td>
<td>6 to 200</td>
<td></td>
</tr>
<tr>
<td>with automatic leader W25 type.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pivot Polishing

- Hauser Pivot Burnishing Machine (type 241)
- Hauser Wheel Sharpening Machine (type 806)

### Press & Weld

<table>
<thead>
<tr>
<th>Power Press</th>
<th>75 Ton and 20 Ton geared mechanical power press of Indian Make</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42 Ton and 16 Ton geared mechanical power press of Swiss make (Beautler)</td>
</tr>
<tr>
<td></td>
<td>Argon Arc welding</td>
</tr>
<tr>
<td></td>
<td>Gas Cutting &amp; Welding Set</td>
</tr>
</tbody>
</table>

### Metallurgical Processing

<table>
<thead>
<tr>
<th>Heat Treatment</th>
<th>Cynide Bath for Heat Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Muffle Furnace</td>
</tr>
<tr>
<td></td>
<td>Tempering Furnace</td>
</tr>
<tr>
<td>Chemical</td>
<td>Bright Nickel Electroplating</td>
</tr>
<tr>
<td></td>
<td>Chromating</td>
</tr>
<tr>
<td></td>
<td>Chrome Electroplating</td>
</tr>
<tr>
<td></td>
<td>Blackening</td>
</tr>
<tr>
<td></td>
<td>Phosphating</td>
</tr>
<tr>
<td></td>
<td>Spray Painting</td>
</tr>
<tr>
<td></td>
<td>Zinc Plating</td>
</tr>
<tr>
<td></td>
<td>Stoving facilities</td>
</tr>
</tbody>
</table>
Tool Room

- Full-fledged tool room with Jig Boring, Grinding and Heat Treatment facilities.
- High speed Drilling machines, Precision Milling Machines, Spring Controlled Presses, Leg Presses, Pultra lathes, tapping machines.

Approvals

- Steel Authority of India Limited – BHADRAVATI; DURGAPUR; SALEM; BOKARO; BHILAI
- Nuclear Power Corporation Limited – NPCIL
- Goa Shipyard Ltd.
- MECON Ltd., Ranchi
- Indian Farmers & Fertilizers Co-op. Ltd.- IFFCO

A Partial Customer List

- Cement: O C L India Ltd.
  - Rajashree Cement
- Chemical: Rastriya Chemicals & Fertilizers
  - Hindustan Petro Chemicals Ltd.
  - Chemfab Alkalies.
- Compressor: Atlas Capco
  - Ingersoll Rand
  - Southwest Compressors
- Paper Mills: ITC Ltd.
  - Emami Paper Mills
- ITC Ltd.
- Emami Paper Mills
**Sugar Plants**
Walchandnagar Industries Ltd.
National Heavy Engineering Corp.
Thyssen Krupp

**Fertilisers**
Indian Farmers Fertilizers Co-op.
Mangalore Chem. & Fertilizers Ltd.

**Projects**
GAIL Ltd.
ONGC Ltd.
Hindustan Petro. Corp. Ltd.

**Earth Moving**
Bharat Earth Movers Ltd.

**Fertilisers**
Indian Farmers Fertilizers Co-op.
Mangalore Chem. & Fertilizers Ltd.

**Projects**
GAIL Ltd.
ONGC Ltd.
Hindustan Petro. Corp. Ltd.

**Earth Moving**
Bharat Earth Movers Ltd.

**Dash Board Instruments**
Siemens VDO Ltd
Mind Stonderidge Instruments Ltd.
Tafe Ltd.

**Instruments**
Rishabh Instruments
Esbee Industrial Corporation Ltd.
V R L Automation Instrumentation Ltd.

**Textile Machinery**
Laxmi Electrical Controls Ltd

**Steel Auth. or India ltd.**
Bokaro Steel Plant
Salem Steel Plant
Rourkela Steel Plant
Burnapur Steel Plant
Durgapur Steel Plant
Bhilai Steel Plant

**Steel**
Rastriya Ispat Nigam Ltd.
Visweswaryya Iron & Steel
Vizag Steel Plant

**AC & Refrigeration**
Rohini Refrigeration
Kirloskar Pneumatic Company

**Lubrication Systems**
Lincoln Helios

**CNG**
Vanaz Engineers Ltd
Minda Instruments Ltd
Sagas Autotech
Waaree Instruments
D P Instruments Ltd
D V S Instruments
Dynamic Gauges
Forbes Marshall
Gauges Bourdon (I)
Goa Thermostatic P.
Goa Instruments
M I C Instruments

**Gear Box**
Walchandnagar Industries Ltd.
Flander Ltd.
Vulcan Gears

**Shipping**
Goa Shipyard
ABG Shipyard
Garden Reach Ship Build.
Heinen & Hopmen
Hindustan Shipyard
**Product Range**

**PRESSURE GAUGES**

**Quality Pressure Gauges (Class IA )**

Weatherproof Aluminum Stove enameled case, Brass / SS Internals, Aluminum White painted dial with hand marked graduations, Zero adjustment, Black painted pointer, shatter proof glass, Heavy duty movement, Accuracy + / - 0.5% FSD (As per IS 3624, Clause 14.1.2).

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Connection</th>
<th>Thread Size</th>
<th>Pres. Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>Bottom and back mounting.</td>
<td>½&quot; BSP / NPT</td>
<td>0 to 700 Kg / cm² (0 to 10000 PSI)</td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRESSURE GAUGES**

**Special Type (Class B)**

Weatherproof Aluminum Stove enameled case, Brass / SS Internals, Heavy duty movement, Aluminum White painted dial with black printing, Zero adjustment black painted pointer, shatter proof glass, Heavy duty movement, Accuracy + / - 1.5 : 1.5% FSD (As per IS 3624 Clause 14.1.3).

Options: SS casing Liquid filling, Electrical Contact, Diaphragm seal, Blow Off Disc, Toughned / shatter proof glass.

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Connection</th>
<th>Thread Size</th>
<th>Pres. Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>Bottom, Back Direct, Panel and clamp mounting</td>
<td>¼&quot; BSP</td>
<td>Vac, 0 to 400 kg/cm² (0 to 6000 psi)</td>
</tr>
<tr>
<td>100</td>
<td>Bottom Direct &amp; Surface, Back 3/8&quot; BSP Direct, Panel &amp; Clamp Mounting</td>
<td>3/8&quot; BSP</td>
<td>Vac, 0 to 400 kg/cm² (0 to 10000 psi)</td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PRESSURE GAUGES

Low pressure diaphragm gauge

Weather Aluminum Stove enameled Case, Brass / SS Internals, Aluminum White Painted dial with black printing, Zero adjustment Black painted pointer, Crystal glass, SS 316 diaphragm element, SS flange Accuracy + / - 1.5% FSD (As per IS 3624, Clause 14.1.6)

<table>
<thead>
<tr>
<th>Size (mm)</th>
<th>Connection</th>
<th>Thread Size</th>
<th>Pres. Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Bottom and Back Direct Mounting</td>
<td>--</td>
<td>600 mm Wc to 10000 mm Wc</td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TEMPERATURE GAUGES

MERCURY IN STEEL THERMOMETER

Weatherproof Aluminum Stove enameled Case, Brass/SS Internals, Aluminum White Painted Dial, Zero Adjustment Black painted Pointer, Crystal glass, MS/SS Stem, Bulb and Capillary, Accuracy +/-1% FSD

Standard Bulb Size

<table>
<thead>
<tr>
<th>Connection</th>
<th>Sizes mm</th>
<th>Temperature Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63, 100, 150, 250</td>
<td>0 to 50 °C, 100 °C, 120 °C, 150 °C, 200 °C, 300 °C, 400 °C, 600 °C, -38 °C + 50 °C</td>
</tr>
</tbody>
</table>

SECTOR MECHANISM

Sector Mechanisms are used in Dash Board Instruments, Industrial Pressure and Temp. gauges.

<table>
<thead>
<tr>
<th>Assembly No.</th>
<th>Ratio</th>
<th>Material</th>
<th>Suitable for</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM 40 BB</td>
<td>1:9.8</td>
<td>Brass</td>
<td>40mm Pressure Gauge</td>
</tr>
<tr>
<td>TSM 50 BB</td>
<td>1:10</td>
<td></td>
<td>50 &amp; 63mm Pressure Gauge</td>
</tr>
<tr>
<td>TSM 63 BN</td>
<td>1:9.8</td>
<td>Brass With Nickel Silver Pinion &amp; Axle</td>
<td>Pressure &amp; Temp. Gauges used in Dash Board Instruments</td>
</tr>
<tr>
<td>TSM 100 BN</td>
<td>1:11.5</td>
<td></td>
<td>100 &amp; 150mm Pressure Gauges</td>
</tr>
<tr>
<td>TSM 150 BN</td>
<td>1:11.3</td>
<td>Nickel Silver</td>
<td>Quality Pressure Gauge of 100 &amp; 150mm</td>
</tr>
<tr>
<td>TSM 200 BN</td>
<td>1:11.5</td>
<td></td>
<td>Quality Pressure Gauge of 200 mm &amp; above</td>
</tr>
<tr>
<td>TSM 150 SS</td>
<td>1:11.3</td>
<td>SS 304</td>
<td>Quality Pressure Gauge of 100 &amp; 150mm</td>
</tr>
<tr>
<td>TSM 200 SS</td>
<td>1:11.5</td>
<td></td>
<td>Quality Pressure Gauge of 200 mm &amp; above</td>
</tr>
</tbody>
</table>