EXCELLENT WEAR RESISTANCE SOLUTIONS
Phase II, 50,000 sqm. Suzhou, factory, ready in 2011
UP GROUP Taiwan Suzhou UP Wear Resistance Compound Materials Ltd. China, and ID UP, IN UP, VN UP are known worldwide as the most competitive company in the world for wear resistant compound steel plate manufacturing. From its constitution, it has carried out a continuous program of investments with development of our own technology innovations that in some cases has constituted a true landmark in the technology of producing wear resistant compound steel plate, wires and electrodes, as well as the hardfacing rebuilding technique.

In production capacity, UP GROUP is the largest manufacturer in the world with more than 250,000 square meters per annum in production of compound steel plate. Our latest technology provides exceptionally cost effective and excellent wear resistance solutions to the unnecessary expense and down time caused through abrasion, erosion, corrosion and heat.

In hardfacing rebuilding services, the performance of components hardfaced by UP process has proven that great cost savings and longer operation time can be achieved, compare to the replacement with a new part either cast or forged.

Many thanks to our extensive commercial network, UP GROUP achieve a worldwide active presence and selling more than 35 countries in the world.
UP Plate is chromium carbide overlay welded on a special mild steel backing plate. It is manufactured by our own welding machine design with exclusive technique. The unique manufacturing process obtains lots of advantages as follows:

- Very flat and smooth surface
- Outstanding wear resistance feature
- Lower production cost
- Excellent fusion strength
- Formable
- Consistent hardness
- Moderate impact resistance
- Excellent heat resistance
- Easily welded to most structural steel

The microstructure of our UP PLATE is a mixture of high volume hexagonal shaped of chromium carbide in tough austenitic and martensitic matrix.

Comparison of hardness distribution between UP PLATE and other

<table>
<thead>
<tr>
<th>UP-Plate</th>
<th>Hard Layer HV750</th>
<th>Base Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>Hard Layer HV600</td>
<td>Base Material</td>
</tr>
</tbody>
</table>

UP PLATE is available in many range of thickness and choice of overlay alloy or backing plate combinations produced with either single or double pass overlay layers as appropriate.

Deposited using the open arc welding process, UP PLATE overlays are distinguished by a wide and smooth bead shape with clearly defined and well developed pattern of stress cracking. This confers outstanding all round resistance to wear. Visible cracks on the surface do not reduce the performance of the hardfacing. They are in the hardfacing overlay only and do not progress into the backing metal.
## UP-PLATE SIZE AND DIMENSION

### UP-X

<table>
<thead>
<tr>
<th>Hardness</th>
<th>C</th>
<th>Cr</th>
<th>Mn</th>
<th>Si</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>650–750HV</td>
<td>3.5%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UP-X Plate is good for general application with high abrasion and moderate impact.**

### UP-N

<table>
<thead>
<tr>
<th>Hardness</th>
<th>C</th>
<th>Cr</th>
<th>Nb</th>
<th>Mn</th>
<th>Si</th>
<th>V</th>
<th>Mo</th>
<th>W</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>700–800HV</td>
<td>3.5%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**UP-N is good for severe sliding abrasion and fine particle abrasion, but low impact resistant.**

### UP-H

<table>
<thead>
<tr>
<th>Hardness</th>
<th>C</th>
<th>Cr</th>
<th>Nb</th>
<th>Mn</th>
<th>Si</th>
<th>V</th>
<th>Mo</th>
<th>W</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>750–850HV</td>
<td>3.5%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UP-H is good for severe abrasion with high temperature.**

### UP-I

<table>
<thead>
<tr>
<th>Hardness</th>
<th>C</th>
<th>Cr</th>
<th>Nb</th>
<th>Mn</th>
<th>Si</th>
<th>V</th>
<th>Mo</th>
<th>W</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>550–650HV</td>
<td>3.5%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**UP-I Plate is good for high abrasion and high impact wear resistant!**

**UP-C special customize product, please contact us for details.**

<table>
<thead>
<tr>
<th>Thickness &amp; Specification</th>
<th>Size</th>
<th>Available (Marked with an X)</th>
<th>Thickness &amp; Specification</th>
<th>Size</th>
<th>Available (Marked with an X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm=(4 on 4)(4 + 4)</td>
<td>1,200 mm x 2,400 mm X</td>
<td>18mm=(8 on 10)(10 + 8)</td>
<td>1,200 mm x 2,400 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10mm=(4 on 6)(6 + 4)</td>
<td>1,500 mm x 3,400 mm X</td>
<td>17mm=(9 on 8)(8 + 9)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12mm=(4 on 8)(8 + 4)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>19mm=(9 on 10)(10 + 9)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13mm=(5 on 8)(8 + 5)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>20mm=(10 on 10)(10 + 10)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15mm=(5 on 10)(10 + 5)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>22mm=(12 on 10)(10 + 12)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12mm=(6 on 6)(6 + 6)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>24mm=(12 on 12)(12 + 12)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14mm=(6 on 8)(8 + 6)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>25mm=(12 on 13)(13 + 12)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16mm=(8 on 8)(8 + 8)</td>
<td>1,500 mm x 3,000 mm X</td>
<td>25mm=(15 on 10)(10 + 15)</td>
<td>1,500 mm x 3,000 mm X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Special specifications and dimension are available as request.
COLD FORMING (ROLLING)

Moderate forming are available in all thickness. It is recommended that all forming should be done along with the direction of deposited. A very generous radius is required based on our suggestion bending radius.

CUTTING

UP PLATE has a high chromium content which makes it difficult to flame out. It only can be cut by plasma cutting, EDM and high pressure water cutting. Our experience has shown that good to cut from the base plate side to avoid the high carbon cladding material washing over the base plate.

GRINDING

UP PLATE cannot be machined using conventional methods. Grinding, laser cutting and EDM methods are the only proven satisfactory methods for precision removal of metal.
UP PIPE is special pipe manufactured by UP PLATE. The seams can be welded by our exclusive stick electrodes which can confer wear resistance as same as cladding of UP PLATE. A wide range dimension can be specified.

<table>
<thead>
<tr>
<th>Ø&quot;</th>
<th>I.D.(mm)</th>
<th>O.D.(mm)</th>
<th>Hardfacing Layer(mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td>76.0</td>
<td>95.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
<tr>
<td>4&quot;</td>
<td>102.0</td>
<td>114.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
<tr>
<td>6&quot;</td>
<td>151.0</td>
<td>165.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
<tr>
<td>8&quot;</td>
<td>197.0</td>
<td>216.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
<tr>
<td>10&quot;</td>
<td>250.0</td>
<td>270.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
<tr>
<td>12&quot;</td>
<td>300.0</td>
<td>320.0</td>
<td>4.0</td>
<td>Continuous Welded</td>
</tr>
</tbody>
</table>

SPECIAL SPECIFICATIONS AND DIMENSION SUCH AS ELBOW ARE AVAILABLE AS REQUEST

THE ADVANTAGES

- Effectiveness of Maintenance Cost Reduction
- Effectiveness of Breakdown Reduction
- Reduction of Spillage Pollution
- Operation Cost Saving
APPLICATION

CEMENT PLANT

DUCTING LINER

PROTECTION

FLS SEPARATOR

UP-PLATE (6 on 6)

COMPARE WITH O&A AFTER 3 MONTHS OPERATION

ROLLER PRESS

MPS MILL-IMPACT PLATE
APPLICATION
STEEL MILL

WEAR LINER PLATE

WEAR LINER PLATE

COKE SCREEN PLATE

DISTRIBUTION CHUTE

BLADE

DISCMARGE CHUTE
UP GROUP became one of the certified sub-contractor for:

- FLSmidth
- POLYSIUS
- UBE INDUSTRIES, LTD.
- NCDRI
- TCDRI
- LOESCHE GmbH
UP process is the epoch making automatic welding method. This is the most suitable process for roller tyres and table segment of vertical mills.

The Advantages of UP process:

**Feature 1** Remarkable saving total maintenance cost
Why it contributes to huge save?
- It increases service life of roller tyres
- It can be used for longer time by rebuilding
- It does not need cost of replacement as welding is performed at the field

**Feature 2** UP process is applicable to wide range of cast material
It is the technique which only possible by using the optimum automatic welding. Thickness of layer of hardfacing can be selected at discretion. However approximately 15mm is the most suitable within range of less than 25mm in view of economy and grinding efficiency.

The optimum material for hardfacing

- Ductile cast iron: FCD40, FCD45, FCD60
- High chrome cast iron: CIX2, NPX85, CH-S
- Ni – Cr cast iron: Ni-Hard Type I - IV
- Conventional cast iron: SC42, SC46
Feature 3  
UP process can easily rebuild and resurface worn out materials.
It is possible to perform and rebuild and resurface welding for any cast material in a short period of time by UP process. Worn out and used rollers and table are repeatedly rebuilt for reuse, so that cost reduction of the consumable and simplification of maintenance are possible.

Feature 4  
Field welding work – It is not quite necessary to perform the replacement work of wear parts, in-situ welding services.
UP process is fully automatic and is capable of performing rebuild and resurfaces welding to wear parts in place by bringing welding equipment to any mills. Especially, table segments can be rebuilt and resurfaced in place so that the working process is remarkably shortened and cost of maintenance is reduced.

Feature 5  
Selection of welding wires applicable to usage.
It is possible to select the most suitable wires according to type and usage of mills, suitable life expectancy is obtained on account of excellent wear resistant property of each material.

Following wires are used for UP process: in different purpose:

UP-615  Rutile based flux cored wire mainly for crusher hammers, rollers rails points and crossings, sections where severe impact under heavy loads applicable, work hardening type for joining and build up application.

UP-645  Hardface TIC is a cored wire used for hardfacing components subject to severe abrasion and heavy impact. The weld deposit contains finely dispersed Titanium Carbide particles in a high Chromium martensite matrix. The weld deposit is non machinable.

UP-628  A self shielded high carbon high chromium flux cored wire designed especially for extreme gouging abrasion conditions. The weld deposit is primarily used for hardfacing components subjected to extreme abrasion/erosion under moderate/heavy impact loads. The weld deposit contains a high proportion of hard primary chromium carbides in a tough martensitic-secondary carbide eutectic matrix. The weld deposit is non machinable.

Feature 6  
stable metal compositions with super wear resistant property.
The deposit through UP process consist extremely stable and remarkable hard M7C3 type carbides. The deposited carbides, therefore exhibit remarkable wear resistance.

We also provide wear protection welding consumables based on requirement for:
- Hardfacing Wire
- Hardfacing Electrode

Please contact us for details!
Suzhou U. P. Wear Resistance Compound Materials Co., Ltd.

The management of Suzhou U. P. Wear Resistance Compound Materials Co., Ltd. has been assessed and certified as meeting the requirements of

ISO 9001:2008

For the following activities:

Manufacture of wear resistance compound steel plates and parts

Further information regarding the scope of this certificate and the applicability of ISO 9001:2008 requirements may be obtained by contacting the organization.

This certificate is valid from 17 December 2009 until 16 December 2012 and remains valid subject to satisfactory surveillance audits. No certification audit due before 27 October 2012.


Certificate of Registration

Upking-Kurimoto Industrial Corp.

The above license has been assessed and registered by TQCSI International Pty Ltd as having the capability to design, manufacture and supply products to the requirements of ISO 9001:2000.

Signature: [Signature]

License No.: [License No.]

Issue Date: [Issue Date]

Expiry Date: [Expiry Date]

Authorized by: [Authorized by]

This certificate is valid according to the conditions set out above. Issue 1. Certified with SGS since December 2009.

ISO 9001:2000

The registration covers manufacture and supply of products and services.

Exclusions: 7.5 Design and Development

Issue Date: [Issue Date]

Expiry Date: [Expiry Date]

Authorized by: [Authorized by]

This certificate is valid according to the conditions set out above. Issue 1. Certified with SGS since December 2009.

ISO 9001:2000