Advanced Technical Vision in iron-making industry
The crucial reason for iron-makers to pursue as long a blast furnace life campaign as possible is the high cost of relining.

While the hearth remains the most critical zone for repair, the stack can always be re-profiled. Robotic repairs or manual installation by lifting platform are today commonplace, well established, techniques used worldwide.

The furnace life extension is nowadays optimized by advanced engineered refractory products.

Seven Refractories offers a complete range of monolithic and precasted shape products suitable for any blast furnace lining or repair.

Thanks to our significant international experience Seven can offer the best engineering support in product selection, and undertake the installation of turn-key projects.

The blast furnace service life extension, related environmental issues, and cost reduction are all common goals to be pursued with the client, in an open and mutual vision.
Runner design, product architecture, and application technology, contribute to determining the performance of the casthouse units. Seven Refractories provides reliable high alumina - silicon carbide - carbon products for all working and safety runner linings.

**Working lining characteristics**
- Designed for long campaign service life
- Low and ultra-low cement castable
- Brown fused alumina and silicon carbide base
- High erosion resistant
- Slag resistance
- Thermal cycling resistant
- Low cracking behaviour
- Pitch free and non toxic emission

**Safety lining characteristics**
- Long service life
- No crack formations
- Oxidation resistant
- Iron and slag corrosion resistant
- High mechanical properties
- Casted on site or supplied in precast blocks
- Designed for zoned lining
- Pitch-free and no toxic emission
Seven Refractories offers different lining solutions for your casthouse based on layout, installation technique, experience and user preferences.

<table>
<thead>
<tr>
<th>Seven cast</th>
<th>Regular, low and ultra-low cement vibrating castables for any application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seven flow</td>
<td>Self-flowing low and ultra-low easy to install castables</td>
</tr>
<tr>
<td>Seven gun</td>
<td>Dry dense and regular hydraulic mixes for all general maintenance</td>
</tr>
<tr>
<td>Seven ram</td>
<td>Ramming mix chemically and ceramic bonded mixes for any kind of application</td>
</tr>
<tr>
<td>Seven plast</td>
<td>Shaped plastic chemically and ceramic bonded mixes for special applications</td>
</tr>
<tr>
<td>Seven shot</td>
<td>Low and ultra-low cement spraying castables for dedicated quick lining and repairs</td>
</tr>
<tr>
<td>Seven grout</td>
<td>Hydraulic and chemically bonded self-flowing mixes used for hot and cold injection</td>
</tr>
<tr>
<td>Seven dry</td>
<td>Special dry chemically bonded mixes for dedicated applications</td>
</tr>
<tr>
<td>Seven cem</td>
<td>Special chemically bonded mortar for jointing precasted blocks and bricks lining</td>
</tr>
<tr>
<td>Seven shape</td>
<td>Special ready shaped dried blocks for special use</td>
</tr>
</tbody>
</table>
1. WORKING LINING
VIBRATING AGS CASTABLE
OR RAMMING MIX

2. SAFETY LINING
VIBRATING CASTABLE

3. SAFETY LINING
CHAMOTTE BRICKS

4. WORKING LINING
VIBRATING AGS REINFORCED CASTABLE

5. WORKING LINING
VIBRATING AGS CASTABLE
OR RAMMING MIX

6. PERMANENT LINING
CHAMOTTE BRICKS OR CASTABLE

7. SHELL PROTECTION
INSULATING BOARD OR PAPER

8. SAFETY LINING
CHAMOTTE BRICKS

9. WORKING LINING
VIBRATING AGS CASTABLE
OR RAMMING MIX
Cast rate, corrosion resistance and balancing the taphole wear and the renewal of the "mushroom" are all aspects creating synergy between the user’s demand and the producer’s capability.

Special attention is paid to the product design and manufacturing to ensure stable furnace operation and hearth walls protection.

Four families of products for different requirements have been designed:

| Seven tap 100 | suitable for little blast furnace. |
| Seven tap 200 | is engineered for consistent performance in small and medium sizes blast furnaces. |
| Seven tap 300 | a higher content for anti-abrasives increases the taphole performance and makes it more suitable for medium and large blast furnaces. |
| Seven tap 400 | is the top grades of the range where the high content of SiC, Si₃N₄ and carbon make the products suited to extreme operating blast furnace conditions. |
All Seven taphole clay products are resin bonded and ecologically compatible.

The fast curing and the low atmospheric emission ensure the clay adheres to the current EC legislation. No warning labelling is required.

Seven clays are designed for any type of mudgun. Their binding system has an improved temperature threshold preventing hardening in the mudgun barrel and cone.

<table>
<thead>
<tr>
<th>Brand name</th>
<th>BF typology</th>
<th>Mineral base</th>
<th>BF daily productivity</th>
<th>Si₃N₄ addition</th>
<th>Si₃N₄+C %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seven TAP 180</td>
<td>Small size</td>
<td>Chamotte Bauxite</td>
<td>&lt; 3.000 t</td>
<td>no</td>
<td>28</td>
</tr>
<tr>
<td>Seven TAP 200</td>
<td>Small size</td>
<td>BFA Bauxite</td>
<td>&lt; 3.000 t</td>
<td>no</td>
<td>29</td>
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<tr>
<td>Seven TAP 225</td>
<td>Medium size</td>
<td>BFA Bauxite</td>
<td>3.000 - 5.000 t</td>
<td>no</td>
<td>32</td>
</tr>
<tr>
<td>Seven TAP 300</td>
<td>Large size</td>
<td>BFA</td>
<td>3.000 - 5.000 t</td>
<td>yes</td>
<td>34</td>
</tr>
<tr>
<td>Seven TAP 375</td>
<td>Large size</td>
<td>BFA</td>
<td>5.000 - 13.000 t or higher</td>
<td>yes</td>
<td>38</td>
</tr>
<tr>
<td>Seven TAP 400</td>
<td>Large size</td>
<td>BFA</td>
<td>5.000 - 13.000 t or higher</td>
<td>yes</td>
<td>40</td>
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<td>Special applications</td>
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<tr>
<td>Seven TAP 055 PL</td>
<td>BFA</td>
<td>yes</td>
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<tr>
<td>Seven TAP HB 30</td>
<td>BFA</td>
<td>yes</td>
<td>34</td>
<td></td>
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</tr>
</tbody>
</table>
• Preliminary study and investigation for the project edition
• Design and architecture, bill of materials, thermal calculation
• Full range of products for lining and maintenance
  • Regular, low, ultra-low and no-cement castable
  • Regular and dense low-cement gunning mix
• Ramming
• Shotcreting
• Taphole clays
• Grouting, patching and dry vibrating products

• Provision of mixer, gunning machines, pump, etc.
• Training on mixing, gunning and maintenance techniques
• Training on equipment usage
• Supervision and monitoring by experienced technicians
• Global Research & Development
• Monitoring and targetting of results
• Technical advice from experts