XII. Research & Development

R&D Investment

<table>
<thead>
<tr>
<th>Unit</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D investment</td>
<td>2,312</td>
<td>2,593</td>
<td>4,198</td>
<td>5,174</td>
</tr>
<tr>
<td>R&amp;D expenditure/revenue</td>
<td>1.15</td>
<td>1.75</td>
<td>2.08</td>
<td>2.34</td>
</tr>
</tbody>
</table>

R&D Organization and R&D Personnel
The Technology Center of Baoshan Iron & Steel Co., Ltd. (including such centers in its subsidiaries): 1056 persons
Among them: Research staff: 739 persons
Technical staff: 213 persons
Administrative staff: 104 persons.

New Intellectual Property Rights Obtained in China in 2011

<table>
<thead>
<tr>
<th>Invention patents</th>
<th>Utility model patents</th>
<th>Software copyrights</th>
</tr>
</thead>
<tbody>
<tr>
<td>263</td>
<td>706</td>
<td>43</td>
</tr>
</tbody>
</table>
### Scientific and Technological Achievements

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Major achievements</th>
</tr>
</thead>
</table>
| 2008 | 166   | Comprehensive technologies for steel makers’ utilization and emission reduction of by-product gas  
Development of 3Cr series of oil casing with CO$_2$, H$_2$S corrosion resistant features  
Research and application of wide strip tandem cold rolling technique and its model control technology |
| 2009 | 105   | Development and application of tin plate for two-piece pop-top can  
(First prize, Metallurgical Science and Technology Award of China)  
Independent integration and innovation of process technology of annealing and coating line for non-oriented electrical steel  
(First prize, Metallurgical Science and Technology Award of China)  
Baosteel BPC: techniques and applications  
(First prize, Metallurgical Science and Technology Award of China) |
| 2010 | 251   | West-east natural gas transmission project technologies and their application  
(First prize, National Award for Science and Technology Progress)  
Independent integration and innovation of process technologies for baosteel's 1880mm hot rolling mill  
(First prize, China Metallurgical Science and Technology Award)  
R&D on flatness control technology of cold tandem mill  
(Third prize, China Metallurgical Science and Technology Award)  
Development of high-efficiency non-oriented electric steel B50AR500 and B50AR350  
(Third prize, China Metallurgical Science and Technology Award) |
| 2011 | 189   | Development and application of tin plate for two-piece pop-top can  
(Second prize, National Award for Science and Technology Progress)  
R&D on process and complete set of equipment for high speed tandem cold rolling of ultra-thin steel strip  
(Special prize, China Metallurgical Science and Technology Award)  
Research on independent integration of UOE welded pipe technology  
(First prize, China Metallurgical Science and Technology Award)  
Research, equipment development and application promotion of key technology for online spray marking of metallurgical products  
(Second prize, China Metallurgical Science and Technology Award)  
Blast furnace multi-statistics integrated testing and comprehensive system for energy saving and optimization  
(Second prize, China Metallurgical Science and Technology Award)  
Research and application of the model for 5-meter heavy plates  
(Third prize, China Metallurgical Science and Technology Award) |