Kennametal Stellite is a global provider of solutions for wear, heat, and corrosion problems, and is a world-class manufacturer of Cobalt- and Nickel-based materials, coatings application equipment, and components.

Solid Cobalt- and Nickel-based alloy castings, coatings, and overlay materials provide protection for critical components in the operations of our customers in virtually all industries where high temperatures and wear are present. Our coatings application equipment may be added to your production facilities for added operational flexibility and control.

**Industries Served**
Kennametal Stellite offers its proven heat, wear, and corrosion experience and customized solutions to a broad range of industries, including:

- Aerospace
- Oil & Gas
- Automotive
- Power Generation
- Steel
- Lumber
- Glass
- Other Process Industries
Kennametal Stellite Professional Surfacing

Kennametal Stellite brings you the most competitive professional surfacing solutions with state-of-the-art hardfacing equipment and high quality component surfacing services. Together, Kennametal and Kennametal Stellite offer the ultimate in component surfacing competence, providing customers with efficient and effective surfacing solutions. By adding value to our customers’ components and process equipment, we support their increased performance, quality, and productivity.

We bring over 100 years of experience to bear on your difficult high heat, wear, and corrosion problems. We have direct experience in a broad range of industry segments, and we have the knowledgeable staff standing by who can help to reduce your problem-to-solution cycle. Kennametal Stellite coatings provide:

- Extended component life.
- Reduced friction, wear, and corrosion.
- Increased production equipment productivity.
- Improved engine efficiency.
- Reduced service cost for power generation equipment.
Partner for Productivity

For more than 100 years, we have worked with the leading companies in a variety of industrial segments. This has allowed us to improve our offering through continuous alloy and applications technology development.

From solution engineering to finish-machined coated component production, we are your partner of choice in selecting coating materials, coating and machining services, and coatings application equipment installed in your production facility.
When we become your surfacing service provider, we strive to meet your high quality standards and your production schedule by expanding our capacity and capability, as required.

Meeting your high quality standards AND your production schedule.

When we become your surfacing service provider, we strive to meet your high quality standards and your production schedule by expanding our capacity and capability, as required.

More than shipping you state-of-the-art equipment.

When adding surfacing technology to your shop, we do more than ship you state-of-the-art equipment. We can assist with engineering knowledge and surfacing equipment production planning advice. In addition, we can make our in-house surfacing service available to you during your production ramp.
In most regions of the world, automotive emissions and fuel consumption legislation are tightening. Often, smaller engines with higher performance are called upon to meet these legislated changes.

**Higher performance through increased fuel efficiency and extended engine lifetime.**

Kennametal Stellite can help you achieve this excelled performance with smaller engines through improved component technology, and surface application of Stellite materials — which increase fuel efficiency and engine lifetime.

Surfacing services at your local Kennametal Stellite production facility are also offered, along with installation of PTA surfacing technology equipment right in your own production facility.

**Valve Star PTA Surface Application Equipment**

Valve Star PTA surface application equipment improves production cost with improved cycle times, and has increased valve seat quality and reliability. Proprietary alloys are available for superior valve seat performance.
Steam Flow Regulation

Power generating facilities that utilize steam to drive a turbine will benefit from Kennametal Stellite surface technology in flow control devices, such as steam control and stop valves, and pump components.

Whether steam is generated in a coal or bio-mass-fired boiler, in a combined cycle gas turbine plant, in a nuclear power plant, or in a geothermal plant, reliable and complete flow control is required. Steam conditions vary significantly from sub-critical to ultra-supercritical, from dry to wet, from clean to dirty, and from continuous operation to infrequent start and stop cycles.

Kennametal Stellite can be of assistance in all of these environments by reducing valve component cost through replacement of solid cast alloy components with less costly surface solutions, and by reducing wear in steam valves, therefore increasing planned maintenance cycles. Wear performance can also be improved by selecting or developing the most appropriate materials and applications technology.
Kennametal and Kennametal Stellite are involved in virtually all aspects of the upstream oil and gas industry. We provide a vast array of surface technologies and applications equipment through solid cast components, working with industry leaders to improve the performance and reliability of their:

- PDC and tri-cone drill bits.
- Fracking pump, manifold, and safety valves.
- MWD and LWD tools.
- Hardbanding and Stabilizers.
- Surface and SAGD Oil Sands extraction equipment.
When you install Kennametal Stellite surface technology application equipment in your facility, you get more than just state-of-the-art equipment and materials. You maintain the applications knowledge for your application in-house, and gain production flexibility — allowing batch or one-piece flow to suit your operations. You also receive ongoing support for fixtures, materials selection/development, and component design changes, as well as assistance with first part trials and production stabilization at volume.

**Get more than just state-of-the-art equipment and materials.**

**Kennametal Stellite™ HVOF Equipment**
Kennametal Stellite’s HVOF equipment portfolio is provided under the Jet Kote™ brand name. Ask us about our range of equipment packages.

**Kennametal Stellite™ PTA Equipment**
Kennametal Stellite’s PTA equipment portfolio is provided under the Starweld™ brand name. The portfolio includes manual hand-held surfacing application through fully customized multi-axis/robot manipulation of the weld surface and application head.
# PTA Weld Deposition

## NOMINAL ANALYSIS OF POWDER

<table>
<thead>
<tr>
<th>ALLOY</th>
<th>Co</th>
<th>Cr</th>
<th>W</th>
<th>C</th>
<th>Ni</th>
<th>Mo</th>
<th>Fe</th>
<th>Si</th>
<th>Others</th>
<th>UNS</th>
<th>Hardness (HRC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COBALT-BASED ALLOY (GAS-ATOMIZED POWDERS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 1</td>
<td>Bal.</td>
<td>30</td>
<td>13</td>
<td>2.5</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30001</td>
<td>51–60</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 4</td>
<td>Bal.</td>
<td>30</td>
<td>13.5</td>
<td>0.7</td>
<td>&lt;2.5</td>
<td>&lt;1.0</td>
<td>&lt;2.5</td>
<td>&lt;1.0</td>
<td>R30404</td>
<td>40–50</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 6</td>
<td>Bal.</td>
<td>28.5</td>
<td>4.6</td>
<td>1.2</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30106</td>
<td>40–46</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 6LC</td>
<td>Bal.</td>
<td>29</td>
<td>4.5</td>
<td>1.1</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>38–44</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 6HC</td>
<td>Bal.</td>
<td>28.5</td>
<td>4.6</td>
<td>1.35</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>43–53</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 156</td>
<td>Bal.</td>
<td>28</td>
<td>4</td>
<td>1.7</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;0.5</td>
<td>&lt;2.0</td>
<td>—</td>
<td>46–54</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 12</td>
<td>Bal.</td>
<td>30</td>
<td>8.5</td>
<td>1.45</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30012</td>
<td>43–53</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 20</td>
<td>Bal.</td>
<td>32.5</td>
<td>17.5</td>
<td>2.55</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>52–62</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 21</td>
<td>Bal.</td>
<td>27.5</td>
<td>—</td>
<td>0.25</td>
<td>2.6</td>
<td>5.4</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30021</td>
<td>27–42 *</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 22</td>
<td>Bal.</td>
<td>28</td>
<td>—</td>
<td>0.30</td>
<td>1.5</td>
<td>12</td>
<td>&lt;3.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>41–49 *</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 25</td>
<td>Bal.</td>
<td>20</td>
<td>15</td>
<td>0.1</td>
<td>10</td>
<td>&lt;1.0</td>
<td>2</td>
<td>&lt;1.0</td>
<td>1.9%Mn</td>
<td>—</td>
<td>20–45 *</td>
</tr>
<tr>
<td>Stellite™ alloy 31</td>
<td>Bal.</td>
<td>26</td>
<td>7.5</td>
<td>0.5</td>
<td>10.5</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30031</td>
<td>20–35 *</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy F</td>
<td>Bal.</td>
<td>26</td>
<td>12.5</td>
<td>1.8</td>
<td>22</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30002</td>
<td>40–45</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 190</td>
<td>Bal.</td>
<td>26</td>
<td>14</td>
<td>3.4</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>R30014</td>
<td>55–60</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 250</td>
<td>Bal.</td>
<td>28</td>
<td>&lt;1.0</td>
<td>0.1</td>
<td>&lt;1.0</td>
<td>&lt;1.0</td>
<td>20</td>
<td>&lt;1.0</td>
<td>R30022</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 694</td>
<td>Bal.</td>
<td>28.5</td>
<td>19.5</td>
<td>0.9</td>
<td>5</td>
<td>—</td>
<td>&lt;3.0</td>
<td>&lt;1.0</td>
<td>1%V</td>
<td>—</td>
<td>46–52</td>
</tr>
<tr>
<td>Stellite™ alloy 706</td>
<td>Bal.</td>
<td>29</td>
<td>—</td>
<td>1.25</td>
<td>&lt;2.0</td>
<td>4.5</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>39–44</td>
<td></td>
</tr>
<tr>
<td>Stellite™ alloy 712</td>
<td>Bal.</td>
<td>29</td>
<td>—</td>
<td>2.0</td>
<td>&lt;2.0</td>
<td>8.5</td>
<td>&lt;2.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>46–53</td>
<td></td>
</tr>
<tr>
<td><strong>ULTIMET™</strong></td>
<td>Bal.</td>
<td>26</td>
<td>2</td>
<td>0.07</td>
<td>9.4</td>
<td>5</td>
<td>3</td>
<td>&lt;1.0</td>
<td>R31233</td>
<td>20–45 *</td>
<td></td>
</tr>
<tr>
<td><strong>COBALT-BASED TRIBALOY™ ALLOYS (GAS-ATOMIZED POWDERS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tribaloy™ alloy T-400</td>
<td>Bal.</td>
<td>8.5</td>
<td>—</td>
<td>&lt;0.08</td>
<td>&lt;1.5</td>
<td>29</td>
<td>&lt;1.5</td>
<td>2.8</td>
<td>&lt;1.0</td>
<td>R30400</td>
<td>51–57</td>
</tr>
<tr>
<td>Tribaloy™ alloy T-400C</td>
<td>Bal.</td>
<td>14</td>
<td>—</td>
<td>&lt;0.08</td>
<td>&lt;1.5</td>
<td>27</td>
<td>&lt;1.5</td>
<td>2.8</td>
<td>&lt;1.0</td>
<td>—</td>
<td>51–57</td>
</tr>
<tr>
<td>Tribaloy™ alloy T-401</td>
<td>Bal.</td>
<td>17</td>
<td>—</td>
<td>0.2</td>
<td>&lt;1.5</td>
<td>22</td>
<td>&lt;1.5</td>
<td>1.3</td>
<td>&lt;1.0</td>
<td>—</td>
<td>45–50</td>
</tr>
<tr>
<td>Tribaloy™ alloy T-800</td>
<td>Bal.</td>
<td>17</td>
<td>—</td>
<td>&lt;0.08</td>
<td>&lt;1.5</td>
<td>29</td>
<td>&lt;1.5</td>
<td>3.7</td>
<td>&lt;1.0</td>
<td>—</td>
<td>53–61</td>
</tr>
<tr>
<td>Tribaloy™ alloy T-800</td>
<td>Bal.</td>
<td>18</td>
<td>—</td>
<td>&lt;0.08</td>
<td>16</td>
<td>23</td>
<td>&lt;1.5</td>
<td>2.8</td>
<td>&lt;1.0</td>
<td>—</td>
<td>48–55</td>
</tr>
<tr>
<td><strong>NICKEL-BASED SUPERALLOYS (GAS-ATOMIZED POWDERS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy “Super C”</td>
<td>—</td>
<td>23</td>
<td>—</td>
<td>0.1</td>
<td>Bal.</td>
<td>18</td>
<td>&lt;1.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>—</td>
<td>15–25 *</td>
</tr>
<tr>
<td>Nistelle™ alloy C</td>
<td>—</td>
<td>17</td>
<td>4.5</td>
<td>0.1</td>
<td>Bal.</td>
<td>17</td>
<td>6</td>
<td>&lt;1.0</td>
<td>0.3%V</td>
<td>—</td>
<td>17–27 *</td>
</tr>
<tr>
<td>Nistelle™ alloy C4C</td>
<td>—</td>
<td>16</td>
<td>—</td>
<td>—</td>
<td>Bal.</td>
<td>16</td>
<td>&lt;1.0</td>
<td>&lt;1.0</td>
<td>—</td>
<td>N86455</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy C22</td>
<td>—</td>
<td>&lt;2.0</td>
<td>21.5</td>
<td>3</td>
<td>—</td>
<td>Bal.</td>
<td>13.5</td>
<td>4</td>
<td>—</td>
<td>0.15%V</td>
<td>—</td>
</tr>
<tr>
<td>Nistelle™ alloy C276</td>
<td>—</td>
<td>15.5</td>
<td>3.7</td>
<td>—</td>
<td>Bal.</td>
<td>16</td>
<td>5.5</td>
<td>&lt;1.0</td>
<td>0.15%V</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy X</td>
<td>1.5</td>
<td>22</td>
<td>&lt;1.0</td>
<td>0.15</td>
<td>Bal.</td>
<td>9.1</td>
<td>18.5</td>
<td>&lt;1.0</td>
<td>&lt;1.0%</td>
<td>N86002</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy 305</td>
<td>—</td>
<td>42</td>
<td>—</td>
<td>—</td>
<td>Bal.</td>
<td>—</td>
<td>—</td>
<td>0.5</td>
<td>&lt;1.0%</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy 2315</td>
<td>—</td>
<td>20</td>
<td>—</td>
<td>—</td>
<td>Bal.</td>
<td>—</td>
<td>—</td>
<td>&lt;1.0</td>
<td>&lt;1.0%</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy 600</td>
<td>—</td>
<td>15.5</td>
<td>—</td>
<td>—</td>
<td>Bal.</td>
<td>—</td>
<td>8</td>
<td>&lt;0.5</td>
<td>&lt;1.0%</td>
<td>N86000</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy 625</td>
<td>—</td>
<td>21.5</td>
<td>—</td>
<td>&lt;1.0</td>
<td>Bal.</td>
<td>9</td>
<td>&lt;1.0</td>
<td>&lt;0.5</td>
<td>3.5% Nb</td>
<td>N86825</td>
<td></td>
</tr>
<tr>
<td>Nistelle™ alloy 718</td>
<td>—</td>
<td>&lt;2.0</td>
<td>21.5</td>
<td>3</td>
<td>—</td>
<td>Bal.</td>
<td>13.5</td>
<td>4</td>
<td>—</td>
<td>0.15%V</td>
<td>N07718</td>
</tr>
</tbody>
</table>

1 Nominal analysis is a guideline only for standard product. Does not include all incidental elements and may differ depending on the exact specification/standard used when ordering.
2 Undiluted weld metal.
3 Stellite™ Alloy F usually made to customer specification.
4 Depending upon the degree of work hardening.

**ULTIMET™** is a registered trademark of Haynes International.
Professional Surfacing

For customer service or to place an order contact:

AMERICAS SALES OFFICES
471 Dundas Street E
Belleville, Ontario
K8N 1G2
Canada
Phone: 1.613.968.3481
Fax: 1.613.966.8269
Email: americasales.stellite@kennametal.com

1201 Eisenhower Drive N
Goshen, Indiana 46526
USA
Phone: 1.574.534.2585
Fax: 1.574.534.3417
E-mail: americasales.stellite@kennametal.com

EUROPEAN SALES OFFICE
Zur Bergpflege 51 – 53
56070 Koblenz
Germany
Phone: 49.261.80.88.0
Fax: 49.261.80.88.35
Email: europesales.stellite@kennametal.com

Unit 3, Birch
Kembrey Business Park
Swindon SN2 8UU
UK
Phone: 44.1793.498500
Fax: 44.1793.498501
Email: europesales.stellite@kennametal.com

INDIA SALES OFFICE
Plot No. 20 Sector 3 IMT Manesar
Gurgaon Haryana 122050
India
Phone: 91.124.454.7211
Fax: 91.124.454.7299
Email: asiapacsales.stellite@kennametal.com

ASIA–PACIFIC SALES OFFICE
1799 Bao Jia Road
Shanghai
Jia-Ding District, 201800
China
Phone: 86.021.39523860
Fax: 86.021.39523810
Email: asiapacsales.stellite@kennametal.com

www.kennametal.com