Applications for Titanium in Modern Military Systems
- Fortune 500 Company with $8 billion and over 27,650 employees
- More than 189 facilities in 23 states and 16 countries
- Markets served include Aerospace, Defense, Power Generation, and Medical
Investment Casting
Investment Cast Solutions for the Military

- Performance
- Ability to prototype
- Simplify part count
- Near net shape
- Strength to weight ratio
- Production capacity
- Material utilization
- Customized quality requirements
Investment Casting in Modern Weaponry

Some Popular Defense Applications

- Airframe Center Bodies
- Suspension and Chassis Components
- UAV Landing Gear
- Lightweight Howitzer Components
- Landing Gear Doors
- Missile Housings / Bodies
- Armament and Gun System Structures
- Drive Train Housings and Cases
- Afterburner Flaps
Castings vs. Fabrications

Typical Success Story – Titanium Structural Casting

75 Pre-Prepared Component Parts in a Welded Fabrication

One Piece PCC Casting
## M777 Casting vs. Fabrication
### Weld Reduction

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Original # of welds</th>
<th>Production # of welds</th>
<th>Original weld length (ft)</th>
<th>Production weld length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>697</td>
<td>359</td>
<td>431</td>
<td>257</td>
</tr>
<tr>
<td>Base</td>
<td>430</td>
<td>68</td>
<td>229</td>
<td>33</td>
</tr>
<tr>
<td>Lower</td>
<td>1331</td>
<td>56</td>
<td>813</td>
<td>44</td>
</tr>
<tr>
<td>Total Structures</td>
<td>2458</td>
<td>483</td>
<td>1473</td>
<td>334</td>
</tr>
</tbody>
</table>

- **80% Reduction in # of Welds**
- **77% Reduction in length of Welds**
M777 Lightweight Howitzer Castings

Part Count Reduced from 290 to 7

Trail Castings

Spade Blades

Stabilizers
Benefits of Titanium Investment Castings

5 Piece Cast Titanium Base PCC Supplies Ready for Fabricated Assembly

Steel M198 = 16,000 lbs
Titanium M777 = 9,000 lbs

6 Separate Bolt on Cast Titanium Castings PCC Supplies Assembly Line Ready
Drive Train Castings
PCC Suspension Castings

Suspension Components
Titanium 6-4
31’ x 31”
60 lbs compared to 110 lbs in cast iron

Suspension Components
Titanium 6-4
31’ x 31”
34 lbs compared to 60 lbs in cast iron
Casting Sections of A One Piece Titanium 6-4 Vehicle Frame
45” x 70”
140 lbs
Other Structural Casting Applications

Frame Structure
Material: Ti 6-4
Weight: 34 lb
Length: 53”

Frame Structure
Material: Ti 6-4
Weight: 135 lb
Length: 47”

Frame Structure
Material: Ti 6-4
Weight: 110 lb
Length: 95”
Other PCC Defense Applications

Rapid Prototype Pattern

One Piece Body
Titanium 6-4
105” x 28”
450 lbs
Complex Structural Castings

Structural Pod Casting
Titanium 6-4
72” x 26” x 26”
218 lbs
B2 Access Doors
Summary

• Significant savings to the military customer in material, time, and money during the manufacture process
• Decrease in fuel expenditures during deployment/while maneuvering in theater; Increase in speed and maneuverability in theater
• Less injuries to service people charged with adjusting weaponry, such as howitzers, by hand
• Increased durability for weaponry and vehicles, decrease in corrosion, longer life cycle
Thank You

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