



# **Specialty Products** **North America**

**Our Innovation. Your Advantage.**





# What We Do

Bradken is a full-service steel foundry and machining organization with a longstanding reputation for producing the most complex engineered steel castings in the world.



Split Case Pump Shells

## Registered Trademarks.

All company names, logos, product names, and identifying marks used throughout this publication are the property of their respective trademark owners. They are used for descriptive purposes only and are protected by the relevant laws of the countries in which the trademarks are registered.

With over 100+ years of foundry experience to build from you can be assured Bradken will deliver the solution you require for your most demanding projects.



## Support Services

Global energy and resources companies partner with Bradken because they know we will leverage our extensive design and engineering capability to solve their specific operational challenges with high quality solutions that exceed expectations.



## Reliability and Quality

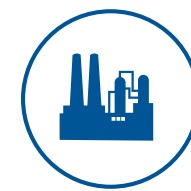
From engineered concept to finished product, we provide value for our customers by making high quality, complex engineered castings up 30,000 kilograms/65,000 pounds.

Bradken utilizes leading edge technology coupled with extensive industry experience and value add offerings to provide the best solution for our customers.



## Safety

With dedicated focus on safety, Bradken prides itself on creating safety excellence with compliance and training. Bradken's Arrive Safe, Leave Safe program is our commitment to ensuring our people and our customers return home safely everyday.



## Experience and Expertise

With over 150 years' experience in the foundry business and with world-class manufacturing facilities, Bradken has a longstanding reputation for producing the most complex engineered castings in the world.



## Total Acquisition Costs

Bradken provides value added opportunities as part of its core business allowing for lower total acquisition costs. Turnkey solutions remove the need to rely on multiple subcontractors to complete your project. Value added services include design engineering, machining, assembly, non-destructive testing and more.

# What We Offer

From engineered concept to finished product, Bradken produces high quality, complex, engineered steel castings utilizing leading edge technology, coupled with extensive industry experience.

**Bradken provides a ‘turn-key’ solution to its customers by offering start to finish services and solutions including:**

## ✓ Patterns and Tooling

Bradken offers in house pattern and tool manufacturing at multiple facilities. We offer CNC produced tooling in Wood, Foam, Urethane and other materials. Bradken's pattern and engineering support can assist with improving castability and design.

## ✓ Castings

Carbon/Stainless and specialty steel grades. We also offer Duplex Stainless & Nickel based steel casting alloys and a variety of irons.

## ✓ Testing

Bradken has extensive in house Non Destructive Testing capabilities. Cobalt X-Ray, Linatron™ X-Ray, Ultrasonic, Magnetic Particle, Liquid Penetrant and visual. We offer a full range of material and mechanical test reporting as well. We have an extensive subcontractor base for many specialized forms of testing.

## ✓ Machining

Specialty products offers rough machining, finish machining and some light assembly. Much of this is “in house” and in some cases partner shops in our supply chain. In many cases we can offer turnkey finish machined castings.

## ✓ Global Supply Chain

Bradken has a global footprint. For some opportunities, we are able to call on production facilities from other regions of the world to produce castings for our customers. We appreciate the opportunity to solve challenges and examine fits within the greater Bradken organization.

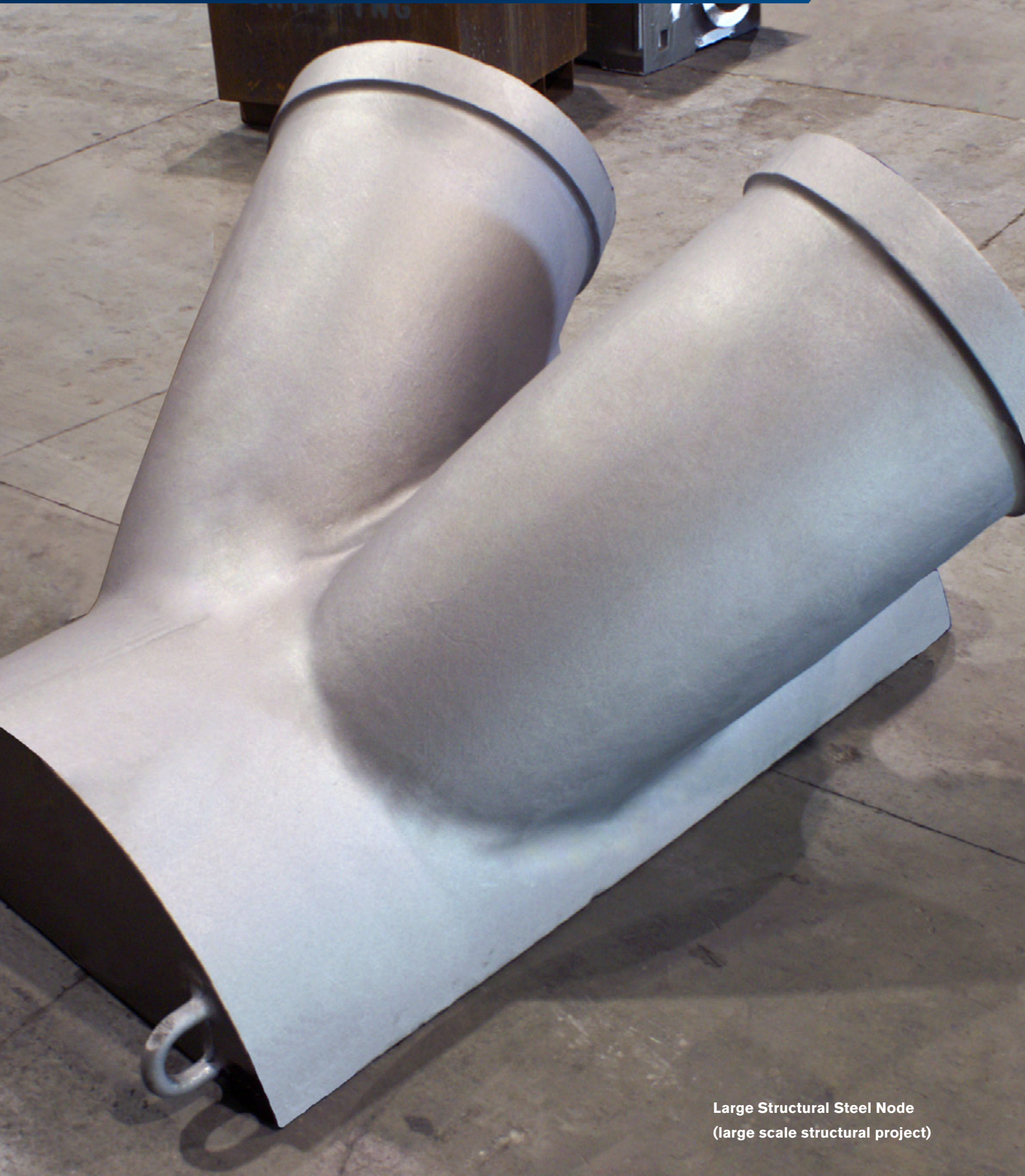
**“From casting design to the production of machined complete castings Bradken’s manufacturing plants have the highly skilled personnel and world class equipment”**



# Differentiated Supplier

**Bradken's Specialty Products division is a genuine differentiated steel casting supplier with an extensive capability offering. Including the following:**

- Large steel, high alloy, low alloy and stainless steel castings greater than 65,000lbs/30,000 kg.
- AOD refining for metallurgy requiring additional processing.
- Assisted engineering for fabrication to casting conversions
- Solidification modeling and castings simulation software
- Full scope supply: patterns, castings, machining, subassembly
- In-house Level III certified inspectors offering visual inspection, liquid
- Value added painting and testing services
- Industry and customer related certifications ensuring qualified supply.



Large Structural Steel Node  
(large scale structural project)



Bradken uses leading edge technological tools which allow us to collaborate with a wide variety of solid models, drawings and print files. We are able to work with these files and use powerful solidification modeling to prove our castability and guidance for the first article processes.

In addition, these solid models and CAD files can be used to produce precise CNC machined patterns and tooling ensuring accuracy during the translation of data from one process to another.

**Bradken  
has over  
150 years of  
casting and  
machining  
experience.**



# Rail and Transit



**Bradken provides innovative cast steel solutions for Transit and Locomotive Truck Assembly applications. We offer several service-proven proprietary transit truck designs as well as locomotive components and sub-assemblies.**

Bradken has been serving the North American rail industry for 100+ years. Our in-house design engineering group has an extensive understanding of steel castings which allows us to deliver a finished product optimized for performance.

Specialty Products possess manufacturing and design engineering support for the locomotive and transit markets, providing product improvement and cost saving opportunities.

Our robust infrastructure offers responsive engineering support when called upon and will provide onsite field support should the need arise. Bradken understands the unique demands required to serve the rail and transit markets.

## **Products supplied, but not limited to, include:**

- Locomotive and transit castings and machined components.
- Truck assemblies/bogie assemblies
- Traction pins
- Bolster assemblies
- Journal bearing housings
- Axle bearing housings
- Traction motor ends, primary suspension components
- Secondary suspension components (castings and finished components).



**Bradken offers service proven proprietary designs in Rail and Transit markets. Bradken maintains AAR certification.**



# Defense

Bradken has a rich history in the Industrial & Custom Casting market possessing the technical tools, infrastructure, and expertise to manufacture the most challenging steel and stainless-steel castings to the most intense specifications.

As the premier foundry group in North America, Bradken has been producing high integrity steel castings for customers around the world for more than a century. Our sites employ state-of-the-art technology to produce complicated components with stringent metallurgical and quality requirements.

Products supplied, but not limited to, include:



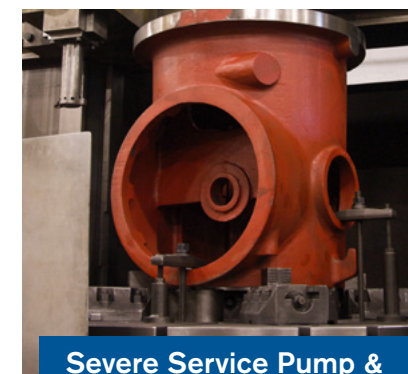
Structural Steel Castings



Machining



Marine & Defense



Severe Service Pump & Valve Castings



Press & Steel Industry



Aggregate & Material Handling



Certified by the military to produce specially qualified steel castings, Bradken has special qualifications for military and naval applications. We are certified by US/Canadian government agencies and maintain a wide variety of specialty customer certifications.



# Construction & Mining



Transmission Case for  
Construction & Mining

Bradken serves the Heavy Equipment market through a wide range of capabilities supplying complex large steel castings, patterns, as well as tooling and machining services. In addition to our core manufacturing capabilities Bradken has an extensive amount of experience in fabrication to casting projects, design support and sub-contractor project management.

Bradken utilizes vast industry experience and resources to ensure quality products are delivered on time to customer specifications.

Bradken understands the Mining and Construction markets and the impact of global influences. Our extensive experience and capabilities allow us to meet our customers' ever-changing demand conditions.

## Products supplied, but not limited to, include:

- Mining truck suspension components,
- Differentials,
- Gear cases and sub-assemblies,
- Heavy construction equipment.

All components can be supplied rough and finish machined (castings and finished components).



# Pumps & Valves

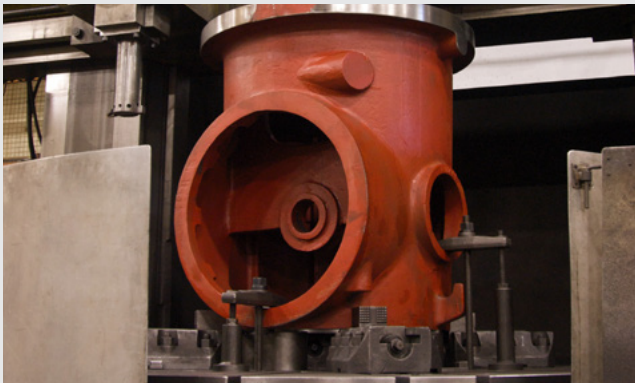
Bradken's Tacoma, Washington foundry has a rich history producing Pump and Valve castings for its customers in applications worldwide. The technical tools, infrastructure and expertise are in place to manufacture steel castings to the most challenging specifications.

It is one of only a few foundries in North America qualified to make castings for nuclear applications (ASME certified since 1974).

Our sites employ state-of-the-art technology (including a fully staffed Linatron Radiograph facility) to produce complicated components with stringent metallurgical and quality requirements.

### Key Products:

- Control Valve Castings - Steam
- Pump Castings – Cooling and Pressure
- High Pressure Steam Turbine Castings
- Steam Chest Castings
- Structural Castings



# Turbines & Compressors

Bradken is a major supplier of compressor body and turbine castings utilized in a wide range of applications throughout production, processing and pipeline transfer. Whether it is natural gas, oil or another chemical we have the capability and experience to manufacture the size and material casting required.

### Key Products:

- Large Gas Transmission Compressor Body Castings
- Compressor Body Castings
- Expander Castings
- Combustion Turbine Castings
- Steam Turbine Castings
- Diffuser Castings
- Volute Castings
- Bearing Housing Castings
- Discharge Cone Castngs



# Products and Services

Bradken's focused facilities are positioned as the preferred supplier for patterns, high integrity ferrous castings, machining, cast/fabrication, fabricated and tested components.

End Market	Market Segment	Products
Oil & Gas	Exploration	<ul style="list-style-type: none"><li>■ Offshore platform structural components: Deck nodes, tendon porches, receptacles, load rings, lug shrouds, riser baskets, Subsea wye bodies, diverless clamps, and hot taps</li><li>■ Oil tool, land based and offshore rigs</li><li>■ Mud pumps and assemblies</li></ul>
	Transporation	<ul style="list-style-type: none"><li>■ Pumps</li><li>■ Valves</li><li>■ Gas compressors</li><li>■ Pipe connectors</li></ul>
	Refinement	<ul style="list-style-type: none"><li>■ Pumps</li><li>■ Severe service valves</li><li>■ Gas compressors</li><li>■ Refining apparatus</li></ul>
Power Generation	Municipal power plants (fossil)	<ul style="list-style-type: none"><li>■ Steam turbine cases, steam chests</li><li>■ Stop &amp; control valves – steam</li><li>■ Steam boiler, dryer, &amp; piping components</li><li>■ Pumps</li><li>■ Gas turbine cases, blade rings, inlet housings</li></ul>
	Nuclear power plants	<ul style="list-style-type: none"><li>■ High pressure steam turbine cases, steam chests</li><li>■ Control valves – steam</li><li>■ Control valves</li><li>■ Pumps, cooling and pressure</li></ul>
	Hydro electric	<ul style="list-style-type: none"><li>■ Runners, wicket gates, pelton wheels, crowns, bands and blades</li></ul>
	Plant power & apparatus	<ul style="list-style-type: none"><li>■ Steam turbines</li><li>■ Severe Service Valves (Specializing in C12A, AOD refined material)</li></ul>
Chemical	Processsing	<ul style="list-style-type: none"><li>■ Pumps</li><li>■ Valves</li><li>■ Compressor cases and nozzles</li></ul>
Military – Naval	Ship structures	<ul style="list-style-type: none"><li>■ Beams, hatches &amp; ports, HY80</li><li>■ Rudder &amp; steering systems</li><li>■ Missile silo conversions</li><li>■ Elevator rails</li></ul>
	Ship propulsion	<ul style="list-style-type: none"><li>■ Steam turbine components</li><li>■ Pump casings and impellers, nuclear</li><li>■ Valves, nuclear</li><li>■ Heat exchangers</li><li>■ Couplers &amp; rotors</li></ul>
	Ship generators	<ul style="list-style-type: none"><li>■ Steam turbine components</li></ul>

Lean manufacturing process are employed to continuously assess and improve all aspects of our business to ensure we exceed our customers' expectations. The essence of our success must be delivering reliable components on time with superior service and exceptional value.



# Capabilities

## Personnel

- Experienced journeymen pattern makers
- Foundry process engineers and solidification modelling experts
- Experienced and skilled Metallurgical Engineers, foundry technicians, skilled finishers/welders and qualified, highly skilled mold/melt crews

## Technology

- Solidification modelling and casting simulation software
- CAD/CAM capable, CNC pattern cutting
- Visual, Radiography, Ultrasonic, Liquid penetrant, Magnetic particle
- Linatron radiography
- Metallurgical and Sand testing

## Castings – Metals Cast – Cast Steels

- Austenitic-ferritic duplex to 65,000 lbs/30,000 kg
- Carbon steels to 65,000 lbs/30,000 kg
- Corrosion resistant steels to 65,000 lbs/30,000 kg
- Heat resistant steels to 65,000 lbs/30,000 kg
- Low alloy steels to 65,000 lbs /30,000 kg

## Other Non-ferrous Alloys

- Nickel-base to 55,000 lbs/25,000 kg
- Bradken alloy 864 and 865 (for specialized offshore oil applications not requiring post weld head treatment)
- Bradken alloys 804 and 806 (for specialized offshore oil applications)

## Irons

- Ni Hard
- Ni Resist
- Ductile Iron
- Wrought Grades

## Mold Process

- Flask-less and Flashed
- Air set/No Bake

## Equipment and Furnaces

- AOD Refining
- Large Arc Furnaces
- Coreless induction melting furnaces
- Heat treatment – Normalizing, stress relieving, stabilization, heat soak, annealing, quench and temper

## Patterns/Tooling – Engineered Castings – Fully Machined Components Milling – Horizontal (CNC)

- Maximum Length 244"/6,198 mm
- Maximum Width 100"/2,540 mm
- Maximum Height 140"/3,556 mm
- Maximum Part Weight 70,000 lbs/31,751 kg

## Manual

- Maximum Length 240"/6,096 mm
- Maximum Width 100"/2,540 mm
- Maximum Height 144"/3,658 mm
- Maximum Part Weight 70,000 lbs/31,751 kg

## Specialty

- Complex highly engineered castings
- Linatron Radiography for section thickness beyond 6.5"/165 mm
- Value added supply (Patterns, casting and machining)
- Alloy selection and AOD refining

## Welding Capabilities

- FCAW
- GMAW SAW
- GTAW SMAW
- Fabrications to 80,000 lbs/36,287 kg
- Capabilities include robotic production welding, large jobbing work, and mechanical assembly. Rig up, assembly, hydrostatic testing and paint capabilities
- Welders certified ASME, Sec IX, AWS D1.1, FCAW, GMAW, SAW, GTAW, SMAW
- Willing to accept responsibility for materials and provide turn-key parts

## Machining/Fabrication Personnel

- Experienced, skilled machinists, fabricators, programmers and operators

## Technology

- CNC Programming and tooling
- CMM Layout
- Faro Arm and Laser layout

## Equipment

- Maximum Lifting Capacity 65 Ton crane capacity (59,000 kg), facility dependant
- Multiple Cranes at all facilities

## Turning – Vertical (CNC)

- Minimum OD 24"/610 mm
- Maximum OD 168"/4,267mm
- Maximum Length 83"/2,108 mm
- Maximum Part Weight 70,000 lbs/31,751 kg

## Manual

- Minimum OD 24"/610 mm
- Maximum OD 132"/3,353 mm
- Maximum Length 69"/1,753 mm
- Maximum Part Weight 70,000 lbs/31,751 kg

## Turning – Horizontal (CNC)

- Minimum OD 8"/203 mm
- Maximum OD 29"/737 mm
- Maximum Length 29"/737 mm
- Maximum Part Weight 70,000 lbs/31,751 kg

## Milling – Vertical (CNC)

- Maximum Length 265"/6,73 mm
- Maximum Width 118"/2,997 mm
- Maximum Height 103"/2,616 mm
- Maximum Part Weight
- Maximum Part Weight 70,000 lbs/31,751 kg

## Quality Assurance Program

- ISO 9001
- API 610, 8C and 2SC
- ABS marine steel castings
- MMPS No. 5165
- ASME QSC-204
- ASTM
- NACE
- MR0103, MR0175
- DNV

## Other

- NAVSEA qualification for HY-80 and HY-100 materials



# Foundry Capabilities

Bradken is a full service steel foundry and machining organization. Producing **carbon, low alloy, stainless steel and specialty alloy castings** weighing as much as **65,000 lbs/30,000 kg**, we cover a wide range of materials and configurations.

From engineered concept to finished product, Bradken provides value for its customers by making high quality complex engineered castings on time. In order to support that claim Bradken employs leading edge technology, coupled with extensive industry experience and value added offerings.

- Assisted engineering (fabrication to cast, improving castability)
- Patterns & tooling
- Carbon/stainless & specialty steel castings
- Linatron x-ray capabilities for wall thicknesses beyond 6.5"/165mm
- Certified ASME nuclear material manufacturer
- Machining & value added services
- Global sourcing

## Foundry Process

Bradken is committed to providing all of its facilities the necessary equipment and technology needed to produce steel castings to the highest standards. Additionally, ongoing investments are made in staff training to assure processes are executed effectively.

### People

- Skilled foundry process engineers understand critical to quality cast components
- Quality personnel/metallurgists review and digest the specifications
- ARC Furnace, induction or AOD processed materials to meet required mechanical properties
- Experienced molders, melt crews and finishers process the components guided by electronic workflow travelers throughout the plant
- Skilled non-destructive testing, ASNT certified inspectors ensure the components comply with your defined specifications
- Certified ASME Section IX welders further assure that upgrading is performed with precision
- We speak the technical language of our customers.



# Certifications & Specification

Bradken possess the necessary qualifications required to meet the demanding standards of the energy market. Our facilities uphold many industry and customer certifications that are accompanied by our robust quality system management.

Bradken holds the following certifications:

- ISO9001
- Nuclear certification by ASME, QSC No. 204
- ASME – Section III, NCA 3800 2001
- CGP – Canadian government control goods program
- ABS – American bureau of ship building
- Navy Nuclear qualified to NAVSEA 250-1500
- Approved to manufacture HY-80 and HY-100 castings by the department of the Navy
- Off-shore oil & gas certified by numerous OEM's and countries with material qualified to EN 10225 and API RP2Z
- In house ASNT level III non-destructive testing specialists
- NACE
- ASTM



## Engineering

Bradken offers certified experience in the areas of:

- Pro/ENGINEER
- CAD/CAM software
- Solidification modelling

## Testing and Inspection

We offer a full complement of testing and inspection services including:

- Visual
- Dimensional
- Microstructure
- Charpy impact
- Chemical analysis
- Ultrasonic testing (UT)
- Radiographic testing (RT)
- Liquid penetrant testing (LP)
- Magnetic particle testing (MP)

Bradken's Radiographic testing facility is second to none and is capable of examining wall thickness of up to 20"/ 580mm.

Our Radiographic capability includes:

- One 8 MEV linear accelerator
- One 9 MEV linear accelerator
- One 249 curies Cobalt 60 radioactive source
- One 100 curies Cobalt 60 radioactive source
- One 100 curies Iridium 192 radioactive source





# Off Shore Oil Industry



Bradken is an experienced source for **complex engineered steel castings**, designed for the most critical surface and sub surface applications

## Why?

Bradken's Tacoma, Washington foundry has been in continuous operation since 1889 supplying critical use castings that meet all the demanding specifications that the Offshore Oil Industry requires.

- Extensive non-destructive testing including Linatron radiography for section thicknesses in excess of up to 20"/ 580mm
- Complete scope supply: assisted engineering, pattern/tooling construction, complex casting, machining, cast/fabrication inspection and testing
- Typical castings supplied including finish machining and special coatings are: tendon porches, roto latch receptacles, load rings, lug shrouds, nodes, pile transitions, riser baskets, trunion blocks, subsea wye bodies, diverless clamps, chain stoppers, latches, and hot taps.

## Hydro

Bradken has **extensive experience in the Hydro-Electric market and is well established as a full scope supplier.**

## Why?

- Supply scope: assisted engineering, pattern/tooling construction, complex casting, machining, cast/fabrication and testing
- Superior AOD refined and induction materials: Bradken casts a variety of stainless steels and duplex stainless steels to meet industry specifications
- Extensive non-destructive testing including Linatron radiography for section thicknesses in excess of up to 20"/ 508mm
- Typical castings supplied including finish machining are: crowns, bands, wicket gates, pelton runners, francis runners and francis blades



# Contact Bradken globally to find a solution for your business.



**Our Innovation. Your Advantage.**

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