PENTICTON FOUNDRY

FOR-CAST ARMOURED PIPE

OIL SANDS

HIGH CHROME WHITE IRON

FUELLED BY INNOVATION

Penticton Foundry specializes in high chrome white iron (HCWI) castings, providing industry-leading wear solutions for the Oil Sands. With decades of expertise, we manufacture durable, high-performance components designed to withstand the most abrasive and high-impact conditions in mining and processing.

PROUDLY CANADIAN MADE

- **Manufactured in Canada** – designed and produced to meet the toughest industry standards
- **Supporting Canadian industries** – supplying top Oil Sands and mining companies
- **Built for harsh environments** – engineered for extreme wear conditions in Alberta's Oil Sands

OIL SANDS SOLUTIONS

- **Spools and piping solutions** – lined with abrasion resistant HCWI
- **Pump components** – closed impellers, suction liners, and casing liners
- **Crusher parts** – gyratory, jaw, and impact crusher components
- **Custom wear solutions** – cyclones, nozzles, and chute liners

WHY CHOOSE PENTICTON FOUNDRY?

- **Proven performance** – extended wear life in extreme conditions
- **Cost savings** – fewer replacements, reduced downtime
- **Engineering support** – custom designs for optimized performance
- **Quality assurance** – rigorous testing for consistent, high-quality castings

SERVING THE OIL SANDS AND BEYOND

With a track record of success in Alberta's Oil Sands, Penticton Foundry is the trusted partner for reliable, long-lasting wear solutions.

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PENTICTON FOUNDRY

UNDERSTANDING WEAR CHALLENGES IN OIL SANDS OPERATIONS

Oil Sands processing exposes equipment to **extreme abrasion, impact, and erosion**, leading to **frequent part failures** and **high maintenance costs**.

Key challenges include:

- **Slurry erosion** – high-velocity particles accelerate wear on pipes, pumps, and fittings
- **Impact damage** – large material chunks cause chipping and structural fatigue
- **Frequent replacements** – downtime from worn-out components slows production

HOW PENTICTON FOUNDRY ADDRESSES THESE CHALLENGES

We specialize in **high-performance alloys and engineered wear solutions** to extend the lifespan of critical equipment. Our approach includes:

- **Material selection** – optimizing alloys like **high chrome white iron (HCWI)** for extreme wear conditions
- **Custom design and precision casting** – tailored solutions to match existing systems
- **Advanced manufacturing processes** – ensuring consistent quality and durability

SUCCESS IN THE FIELD

Oil Sands operators using Penticton Foundry wear parts have reported:

20X

Up to 20x longer component lifespan

$

50%+ reduction in maintenance costs

Increased equipment reliability and uptime

HIGH CHROME WHITE IRON (HCWI) THE ULTIMATE WEAR SOLUTION

WHAT IS HIGH CHROME WHITE IRON?

High chrome white iron alloys outperform chromium carbide overlay (CCO) and AR400 plate in wear applications involving abrasion and impact. Their combination of carbides and martensite provide superior durability.

Penticton Foundry's HCWI castings are built to outlast and outperform, helping our clients reduce downtime and maximize productivity.

KEY BENEFITS OF HCWI IN THE OIL SANDS

- **Unmatched wear resistance** – outperforms CCO (chromium carbide overlay) by up to 20x
- **Impact and abrasion protection** – engineered to handle slurry transport, crushers, and pumps
- **Extended equipment life** – reduces maintenance costs and downtime
- **Optimized metallurgy** – custom alloy blends for specific applications

MATERIAL	WEAR RESISTANCE	IMPACT STRENGTH	TYPICAL APPLICATION
HCWI (ASTM A532)	●●●●●	●●●●●	Pumps, spools, crusher parts, liners, GET
Chromium Carbide Overlay (CCO)	●●●○○	●●○○○	Liners, chutes, low-abrasion spools
Ni-Hard	●●○○○	●●●○○	Low-impact wear parts
Mild Steel	●○○○○	●●●●○	Structural components

WHY OIL SANDS OPERATORS CHOOSE HIGH CHROME WHITE IRON

- ✓ **Proven in the field** – case studies show millions saved in maintenance costs
- ✓ **Custom solutions** – engineered for specific site conditions
- ✓ **Backed by expertise** – decades of foundry experience in metallurgy and design

FOR-CAST ARMOURED PIPE®
ENGINEERED FOR SUPERIOR WEAR RESISTANCE

REBUILDABLE FOR LONG-TERM VALUE

Cost-effective maintenance: Once the internal liner wears out, the pipe can be rebuilt for approximately 60–70% of the original cost, extending the lifespan of the outer shell and reducing the total cost of ownership.

Sustainable design: The ability to reuse the steel casing and re-cast a new liner minimizes waste and supports sustainability goals.

UNMATCHED DURABILITY IN SEVERE SLURRY APPLICATIONS

- **Robust construction:** FOR-CAST ARMOURED PIPE® combines a high chrome white iron liner, conforming to the ASTM A532 standard, with a steel pressure boundary, ensuring exceptional abrasion resistance.
- **Extended service life:** In slurry systems, high chrome white iron significantly outperforms traditional materials like chromium carbide overlay (CCO) and rubber, leading to reduced maintenance and operational costs.

CUSTOMIZABLE FEATURES FOR ENHANCED PERFORMANCE

- **Tailored solutions:** Each pipe is customizable to meet specific application requirements, including options for various diameters, lengths, and end configurations.
- **Integrated wear sensors:** Optional ultrasonic testing (UT) sensors allow for in-situ thickness measurements, enabling proactive maintenance scheduling and minimizing unexpected downtime.

PERFORMANCE BENEFITS

- ✓ **Significantly longer wear life** – compared to AR400 plate, AR600 plate and rubber-lined spools
- ✓ **Reduced maintenance costs** – fewer replacements mean lower expenses
- ✓ **Minimized downtime** – increased reliability and operational efficiency

CUSTOM WEAR SOLUTIONS FOR THE OIL SANDS

At Penticton Foundry, we understand that no two operations are the same. That's why we offer custom-engineered wear solutions designed to meet the unique demands of Oil Sands mining and processing.

TAILORED TO YOUR NEEDS

- **Custom alloy blends** – optimized for specific wear challenges
- **Precision machining** – ensuring exact fit and performance
- **Application-specific designs** – engineered to maximize wear life
- **Collaboration with clients** – we work closely with operators to develop long-lasting solutions

WHERE CUSTOM SOLUTIONS MAKE A DIFFERENCE

- **Slurry transport systems** – custom spools, pipes, and elbows for high-abrasion applications
- **Crusher components** – enhanced liners, jaw plates, and impact bars to extend crusher lifespan
- **Pump parts** – custom impellers, volutes, and casings for optimized performance
- **Wear liners and chutes** – engineered for maximum wear resistance and impact absorption

REAL-WORLD SUCCESS

We don't just make parts—we solve problems. Our custom HCWI solutions have helped Oil Sands clients:

Reduce downtime by 50%

3X

Increase component lifespan by 3x or more

$

Save millions in maintenance costs

MATERIAL COMPARISON: CHROME WHITE IRON VS. CCO VS. RUBBER

To help Oil Sands operators choose the best wear material, we have compared **chrome white iron (CWI), chromium carbide overlay (CCO), and rubber** across key performance metrics.

PROPERTY	PENTICTON FOUNDRY CHROME WHITE IRON (CWI)	CHROMIUM CARBIDE OVERLAY (CCO)	RUBBER
Abrasion Resistance (G65 Test)	Superior (Typical Mass Loss: 0.08g)	Moderate (Typical Mass Loss: 0.15g)	Moderate
Slurry Jet Erosion	Typical Volume Loss (0.8 mm^3 at 90° impact)	High Volume Loss	Not Suitable
Lifespan in Oil Sands Applications	3-20x longer than CCO, 4+ years	Shorter than CWI, 1-2 years	1-3 years
Application Suitability	Pumps, Spools, Crushers, Feedbox, Liners	Chutes, Liners	Seals, Gaskets, Less High-Wear Spools
Thickness	32mm or greater	8–16mm	Varies

WHY CHROME WHITE IRON OUTPERFORMS OTHER MATERIALS?

- ✓ **Proven performance** – real-world testing shows CWI lasts up to 20x longer than CCO
- ✓ **Minimal wear loss** – industry-leading 0.08g mass loss in G65 tests
- ✓ **Optimized for harsh conditions** – handles abrasive slurries better than CCO and rubber

Recent experiments confirm that the wear resistance of 3 chrome white iron alloys significantly outperform AR400 in the Oil Sands industry.

CASE STUDY

CHROME WHITE IRON ELBOW SPOOL SAVES MILLIONS

THE CHALLENGE

A major Oil Sands operator was experiencing frequent failures in their CCO-lined elbow spools due to extreme abrasion from high-velocity slurry. These failures resulted in:

- **Frequent replacements (every 2000 hours)**
- **High maintenance costs**
- **Unplanned downtime affecting production**

THE SOLUTION

Penticton Foundry designed and supplied a high chrome white iron (HCWI) elbow spool, specifically engineered to withstand severe wear conditions.

- **Chrome white iron in the ASTM A532 standard** for maximum wear resistance
- **Optimized casting thickness** to handle extreme impact and abrasion
- **Custom-engineered design** to fit existing piping systems

WHY IT WORKED

- ✓ **HCWI's superior abrasion resistance** – outperformed CCO-lined elbows
- ✓ **Precision manufacturing** – ensured a perfect fit with no modifications needed
- ✓ **Proven durability** – successfully handled high-volume slurry transport in extreme conditions

> *This success story is just one example of how Penticton Foundry's expertise in **chrome white iron can transform operational efficiency and reduce costs**.*

THE RESULTS

4X
WEAR LIFE

The HCWI elbow lasted 48 weeks compared to just 12 weeks for the previous solution

$ MILLIONS
IN SAVINGS

Reduced replacement frequency, cutting maintenance and labor costs significantly

UPTIME
INCREASED

Less downtime meant higher production efficiency

CASE STUDY

CHROME WHITE IRON CASTING OUTLASTS CCO BY OVER 58X

THE CHALLENGE

An Alberta Oil Sands operator was struggling with short service life and frequent shutdowns of their primary separation cell (PSC) lower sump cone made of chromium carbide overlay (CCO). This resulted in some key challenges:

- **Reduced wear life:** 1,000 hours (~6 weeks)
- **Frequent maintenance:** Required weld repair every 6 weeks
- **Downtime costs:** Repairs needed complete vessel shutdown and draining

THE SOLUTION

Wear Resistant Chrome White Iron Casting

- **Custom design** – engineered to fit the existing vessel with no modifications
- **Enhanced coverage** – protected both the cone base and vulnerable inlet hole edge
- **High chrome white iron (ASTM A532)** – industry proven material

WHY IT WORKED

- ✓ **Massive reduction in downtime**
- ✓ **Dramatically lower maintenance costs**
- ✓ **Improved equipment uptime**
- ✓ **Drop-in replacement minimized installation time**
- ✓ **Potential for 19,650 hours (117 weeks) of service life**

> *Final outcome: The high chrome white iron casting far surpassed initial projections and **lasted over 58x longer than the original CCO solution.***

THE RESULTS

58X
IMPROVED WEAR LIFE

EXTENDED OPERATION:

Scheduled removal after 13,000 hours (78 weeks)

FINAL OUTCOME:

Casting lasted over 58x longer than CCO (the original projection was 20x)

LIFECYCLE INTEGRATION:

Scheduled replacement aligned with next major outage

CASE STUDY

PREMATURE VESSEL FAILURE

THE CHALLENGE

A leading Oil Sands producer was experiencing wear issues in their blending vessel. Both the lower portion of the vessel and 4 outlets were of particular concern. It was determined that the **AR Plate** used in the blending vessel **was wearing prematurely**. Penticton Foundry was asked to help design a solution.

THE SOLUTION

Penticton Foundry supplied **ASTM A532 chrome white iron liners**, engineered to withstand extreme wear environments inside the vessel.

- **2 inch thick HCWI liner** for lower portion of the vessel
- **4 inch thick HCWI liners** for the 4 outlet holes
- **Design assistance** – ensured a seamless fit

WHY ASTM A532 CHROME WHITE IRON WAS THE BEST CHOICE

Inspection at the 1 year mark revealed:

- ✓ **The 2 inch liners had little to no wear**
- ✓ **The 4 outlets had small amounts of wear**
- ✓ **Significant cost savings** – ultimately no replacement needed until 6th year of service

> *Final outcome: By replacing the AR Plate with high chrome white iron liners in the blending vessel, the customer saw **significant cost savings and increased uptime.***

THE RESULTS

3X
LONGER WEAR LIFE

The HCWI components lasted three times longer than the previous AR plate solution

$
LOWER
MAINTENANCE COSTS

Reduced replacement frequency cut expenses

INCREASED
EQUIPMENT UPTIME

Improved reliability and production efficiency

A LEGACY OF EXCELLENCE IN WEAR SOLUTIONS

Founded in 1935 as Peach City Foundry, Penticton Foundry's commitment to innovation and quality has made us the leading supplier for companies seeking durable, Canadian-made, high-performance wear components. Today, Penticton Foundry is a modern, 120,000 square foot facility, creating specialty foundry products for a variety of industries throughout North America. We are proud of our long-standing relationships in the Oil Sands, mining, hydraulic fracturing and OEM industries.

OUR EXPERTISE

- Over 90 years of foundry experience
- Specialized in chrome white iron (ASTM A532)
- Advanced manufacturing and precision casting techniques
- Custom-engineered solutions for harsh environments

At Penticton Foundry, quality, performance, and customer satisfaction are at the core of everything we do.

WE ADHERE TO THE HIGHEST INDUSTRY STANDARDS, ENSURING EVERY CASTING MEETS:

- ASTM A532 wear resistance specifications
- ISO 9001 certified manufacturing
- Rigorous quality control and testing

OUR COMMITMENT TO SUSTAINABILITY AND CANADIAN MANUFACTURING

- **Locally made** – produced in Canada to support North American industries
- **Sustainable practices** – optimized processes to reduce waste and energy use
- **Durability = less waste** – longer-lasting parts mean fewer replacements

PARTNER WITH PENTICTON FOUNDRY FOR YOUR OIL SANDS WEAR SOLUTIONS

WHY WORK WITH US?

At Penticton Foundry, we are committed to providing high-performance wear solutions that help Oil Sands operators reduce costs, minimize downtime, and improve equipment reliability. Our expertise in chrome white iron and advanced metallurgy sets us apart.

- **Proven track record** – decades of experience supplying the Oil Sands industry
- **Innovative materials** – ASTM A532 chrome white iron engineered for extreme wear resistance
- **Custom solutions** – designed to fit existing equipment and enhance operational efficiency
- **Canadian-made quality** – manufactured in Canada, and built for the harshest conditions

OUR PRODUCT OFFERINGS

- ✓ **Pump components** – impellers, casings, and wear plates
- ✓ **Slurry transport solutions** – pipes, elbows, branches, nozzles, and spools
- ✓ **Crusher and grinding wear parts** – chutes, liners, crusher teeth, beam caps, and hammers
- ✓ **Custom castings** – designed for your specific operational needs

LET'S WORK TOGETHER

Whether you're looking to upgrade your wear parts, optimize your process, or solve a critical failure issue, we're here to help.

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"Switching to Penticton Foundry's chrome white iron extended our component life by over 3x, saving us millions in downtime and maintenance."

– Oil Sands Reliability Engineer

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