



Pressure Vessel Components

Massive Capacities. Innovative Technologies.



edmonton exchanger
group of companies



Our Vision

Edmonton Exchanger's vision is to consistently meet and exceed the expectations of our customers by providing top quality, custom fabricated steel products in a safe and timely manner. We endeavor to continually increase our production capacities and capabilities through innovative use of leading edge engineering, planning and production technologies.



Overview of Services

Pressure Vessel Components

Edmonton Exchanger features a wide range of products and services for applications in various industries including oil and gas, petrochemical and power generation.

We offer the most extensive one-stop head forming and shell rolling capabilities in North America, and one of the largest inventories of SA 516-70 N steel plate in the world.

We specialize in the fabrication of large-scale pressure vessel components and feature some of the largest steel forming capacities available.

Our steel plate forming capabilities range up to 8" in thickness for pressure vessel heads and shells. Heads are formed up to 28'-6" in diameter and shells up to 144" in length.



Head Forming Types for Pressure Vessels and Tanks

- _ Semi-Elliptical 2:1
- _ Hemispherical
- _ Torispherical Flanged and Dished
- _ Flanged Only and Dished Only

Steel Plate Rolling

- _ Shells for Pressure Vessels and Tanks
- _ Eccentric and Concentric Cones
- _ Rolled Repads
- _ Rolled Rings for machining applications
- _ Custom Rolling



Overview of Services

Profile Cutting

_ Available for almost any pattern or shape imaginable from plate up to 17'-0" x 40'-0" in size (5,182 mm x 12,192 mm).

Additional Services

CNC Machining for Heat Exchanger Tube

Sheet Drilling Applications

_ Table-size drilling capacity of 200" x 120" x 30" (5,080 mm x 3,048 mm x 762 mm), and up to 17" (431.80 mm) thick.

Large-scale Machining

_ Vertical and horizontal milling machines available, with the largest vertical machine featuring material handling capacities of up to 24'-0" in diameter x 10'-0" high (7,315 mm x 3,048 mm). Our horizontal mill handles material up to 13'-0" high x 30'-0" long (3,962 mm x 9,144 mm).

Field Services

_ Provide on-site plant maintenance services for the petrochemical industry, fertilizer plants and refineries. Our services range from portable field machining and controlled bolting, to complete turn-key plant and refinery shutdown projects.

Heat Exchanger Services

_ Manufacturing, repair and refurbish any size and type of heat exchangers. We are supported by a diverse inventory of materials and heat exchanger equipment that enables us to quickly adapt to specialized customer requirements.



Head Forming

Hot Pressed Heads

We are able to hot press heads up to 192" (4,877 mm) I.D. and up to 8" (203.20 mm) thick with our 1,200 ton and 3,000 ton head presses. Each press was custom designed and constructed by Edmonton Exchanger.



A section of a die on the 3,000 ton head press (above), spinning of a large stainless steel head (below).



Semi-Elliptical Heads: from 8 $\frac{5}{8}$ " (219 mm) O.D. to 192" (4,877 mm) I.D.

ASME Code Flanged and Dished Heads: from 48" (1,219 mm) I.D. to 96" (2,438 mm) I.D.

Hemispherical Heads: from 8 $\frac{5}{8}$ " (219 mm) O.D. to 144" (3,658 mm) I.D.

Flanged Only Heads: from 31" (787 mm) O.D. to 76" (1,930 mm) I.D. (various dies available, can custom build dies for a specific size)

Dished Only Heads: from 10" (254 mm) O.D. to 120" (3,048 mm) O.D.

Typically, carbon steel heads are hot formed at 1,650°F (899°C). Stainless steel heads are hot formed at approximately 1,900°F (1,038°C).

Chromium molybdenum steel heads are usually hot formed at 1,650°F (899°C) and tempered at 1,350°F (732°C).

Clad heads are formed at temperatures suitable to the material. Various forming temperature requirements and additional heat treatments can be accommodated upon request.

Head Forming

Dished and Spun Heads

Our dishing and spinning equipment enables us to cold form heads up to 1¼" (31.75 mm) x 342" (8,687 mm) in diameter. Hot spinning allows us to manufacture heads up to 2¼" (57.15 mm) thick.

Semi-Elliptical Heads: from 96" (2,438 mm) O.D. to 288" (6,096 mm) I.D.

ASME Code Flanged and Dished Heads: from 96" (2,438 mm) O.D. to 342" (8,687 mm) I.D.

80:10 Flanged and Dished Heads: from 90" (2,286 mm) O.D. to 330" (8,382 mm) I.D.

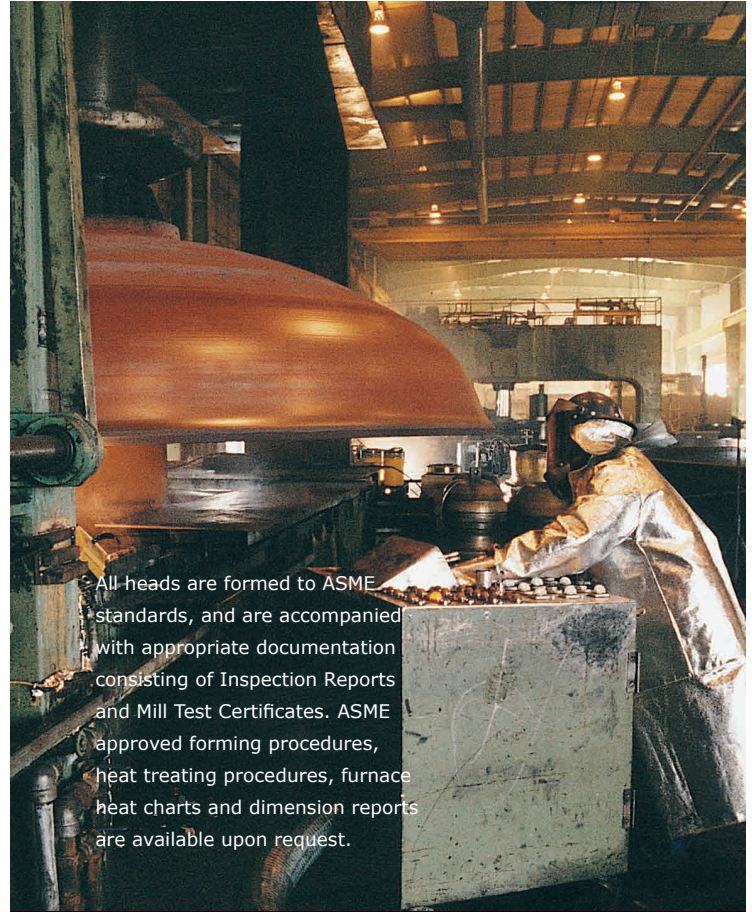
Flanged Only Heads: from 72" (1,829 mm) O.D. to 168" (4,267 mm) I.D.

Dished Only Heads: from 120" (3,048 mm) O.D. to 360" (9,144 mm) O.D.

Heads can be formed from our own steel plate inventory, from special material we order in (such as clad plate) or from customer supplied material.

Carbon steel and chromium molybdenum steel heads are delivered in the as-formed condition. Stainless steel and clad heads are delivered in the pickled or sandblasted condition.

Edmonton Exchanger can supply heads either "untrimmed" or "trimmed and beveled" (single or double bevel) as per client requirements.



All heads are formed to ASME standards, and are accompanied with appropriate documentation consisting of Inspection Reports and Mill Test Certificates. ASME approved forming procedures, heat treating procedures, furnace heat charts and dimension reports are available upon request.

An operator hot spinning a large head (above).



Steel Plate Rolling

Our four sets of plate rolls enable us to roll plate into shells, rolled rings, cones (both eccentric and concentric), and repads. These components can be fabricated from our own plate inventory or from customer supplied material.

Dimensional Rolling Capacities

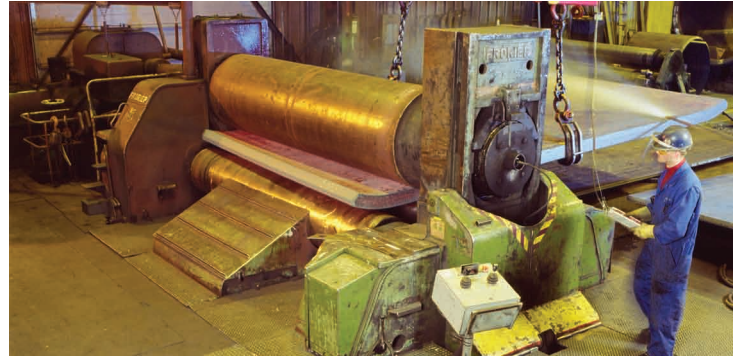
Minimum Diameter: 16" (406 mm) I.D.

Maximum Thickness: cold rolled 4" (101.60 mm), hot rolled 8" (203.20 mm)

Maximum Length: 144" (3,658 mm)

The chart below illustrates variables for guideline purposes only. As diameters increase and lengths decrease, thicknesses can exceed those stated.

Thickness		Various Examples		Diameter		Length	
7/8"	x	18" O.D.	x	18" O.D.	x	10'-0"	
1 1/4"	x	18" O.D.	x	18" O.D.	x	4'-0"	
1/2"	x	20" O.D.	x	20" O.D.	x	12'-0"	
1"	x	20" O.D.	x	20" O.D.	x	10'-0"	
2"	x	20" O.D.	x	20" O.D.	x	3'-0"	
3/4"	x	24" O.D.	x	24" O.D.	x	12'-0"	
2 3/4"	x	24" O.D.	x	24" O.D.	x	10'-0"	
3"	x	24" O.D.	x	24" O.D.	x	5'-0"	
3 1/4"	x	30" I.D.	x	30" I.D.	x	10'-0"	
4 1/2"	x	30" I.D.	x	30" I.D.	x	5'-0"	
6 1/8"	x	48" I.D.	x	48" I.D.	x	12'-0"	
7"	x	60" I.D.	x	60" I.D.	x	12'-0"	
8"	x	84" I.D.	x	84" I.D.	x	10'-0"	



Steel Plate Rolling

Shells are rolled to ASME code specifications and are usually rolled to our own head strappings, however we will also roll to customer supplied strapping dimensions.

Shells can be supplied with square cut or beveled circumferential and long seams. Long seams can be provided tack welded or fully welded. We can also provide welded circumferential seams by welding together multiple courses.

Concentric cones can be rolled up to a thickness of 4" (101.60 mm) and a length of 10'-0" (3,048 mm). Diameters can be from 24" (610 mm) O.D. to 168" (4,267 mm) O.D. They are rolled in one piece with only one long seam when plate layout allows it.

We can provide the cones square cut or beveled with long seams tack welded or fully welded. Eccentric cones can be rolled up to a thickness of 1" (25.40 mm) and a height of 48" (1,219 mm).

Components rolled from our plate inventory are accompanied with Mill Test Certificates. In the case of hot rolled items, Furnace Heat Charts can be provided upon request.

Fully welded shells and cones come complete with necessary nondestructive examination and the applicable inspection forms.



Steel Plate Services

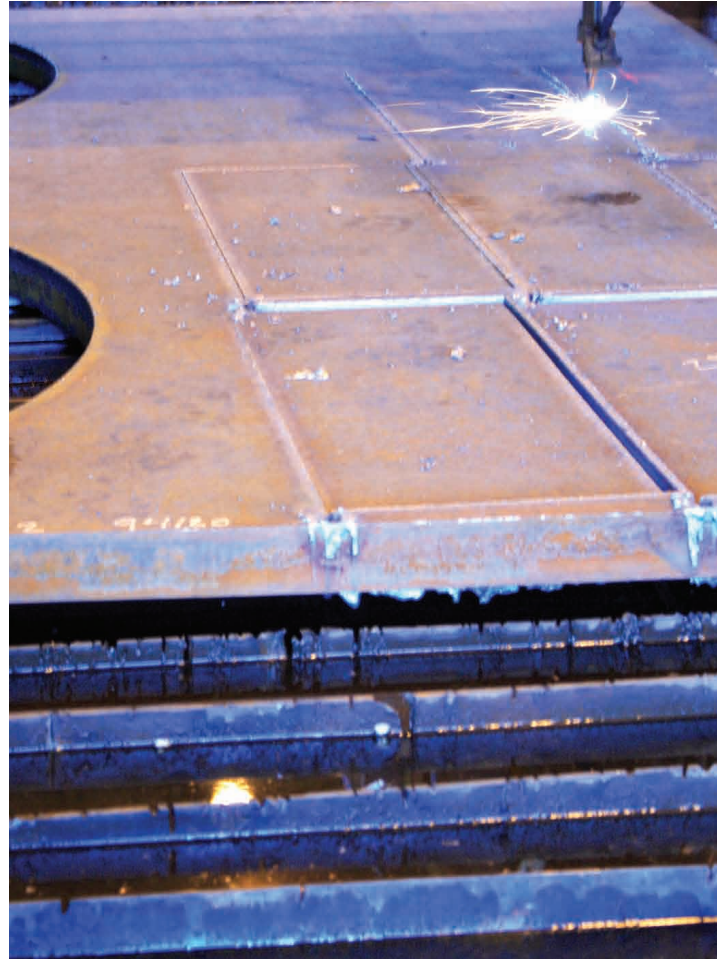
Plateland

Inspired by the immense quantity of steel plate, Edmonton Exchanger's plate inventory is commonly referred to as Plateland. All stocked steel plate complies with ASME code requirements and is accompanied by clearly legible Mill Test Certificates at time of shipment.

Carbon Steel

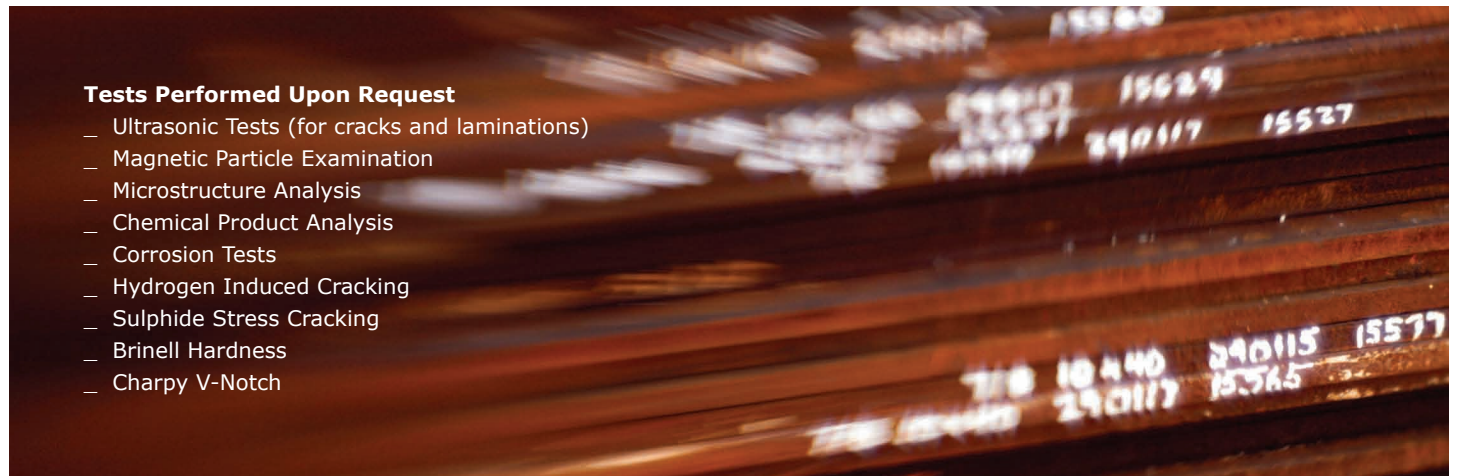
We stock one of the largest inventories of pressure vessel quality SA516-70 normalized in the world, ranging from ¼" (6.35 mm) to 12" (304.8 mm) thick. SA 516-60, SA 537 CL1 and A572-50 (all normalized) are also available.

Our extensive inventory includes plate that meets the most stringent specifications, including vacuum degassed, sulphide shape control, very low sulphur content and other extreme chemical restrictions. Testing to various specifications can be performed upon request (below).



Tests Performed Upon Request

- Ultrasonic Tests (for cracks and laminations)
- Magnetic Particle Examination
- Microstructure Analysis
- Chemical Product Analysis
- Corrosion Tests
- Hydrogen Induced Cracking
- Sulphide Stress Cracking
- Brinell Hardness
- Charpy V-Notch



Steel Plate Services

Stainless Steel

We stock stainless steel in the following grades:

- _ SA 240-304
- _ SA 240-304L
- _ SA 240-316
- _ SA 240-316L

Plate ranges in thickness from $\frac{3}{16}$ " (4.76 mm) to $2\frac{1}{2}$ " (63.50 mm).

Chromium Molybdenum Steel

We offer a large inventory of chrome moly steel (normalized & tempered) in the following grades:

- _ SA 387 Gr. 11 CL.2
- _ SA 387 Gr. 22 CL.2
- _ SA 387 Gr. 5 CL.2

Chrome moly steel plate is available from $\frac{1}{4}$ " (6.35 mm) to 2" (50.80 mm) thick.

Profile Cutting of Steel Plate

_ Almost any pattern or shape imaginable from plate up to 17'-0" x 40'-0" in size (5,182 mm x 12,192 mm).

_ Discs and rings for flange production up to 12" (304.80 mm) thick.

_ Plasma-cutting of stainless steel up to 3" (76.20 mm) thick.

_ Oxy-fuel / plasma cutting of carbon steel up to 12" (304.80 mm) thick.

_ Plasma-cutting of chromium molybdenum steel up to 6" (152.40 mm) thick.

For additional information, please refer to the inserts at the back of this brochure.



Quality Control Procedures

Prior to shipment, all manufactured components undergo thorough quality control inspection to ensure conformance to ASME codes and / or other international codes and standards. Upon request, we will also perform inspections to ensure compliance to specific customer requirements.

Where applicable, pressure vessel heads, shells and other components are supplied with a Certificate of Compliance showing type, size, material type, order numbers, heat numbers and minimum thicknesses.



All material supplied from our plate inventory is checked for proper stamping of material type. Heat numbers are checked against original Mill Test Certificates on file to ensure compliance. Mill Test Certificates are provided at time of shipment.

Quality Control Procedures

For heads, the Certificate of Compliance also includes visual inspections done on heads (ie. roundness, form conformity, surface conditions, etc.), and certifies that the heads are made to meet the applicable standards, such as:

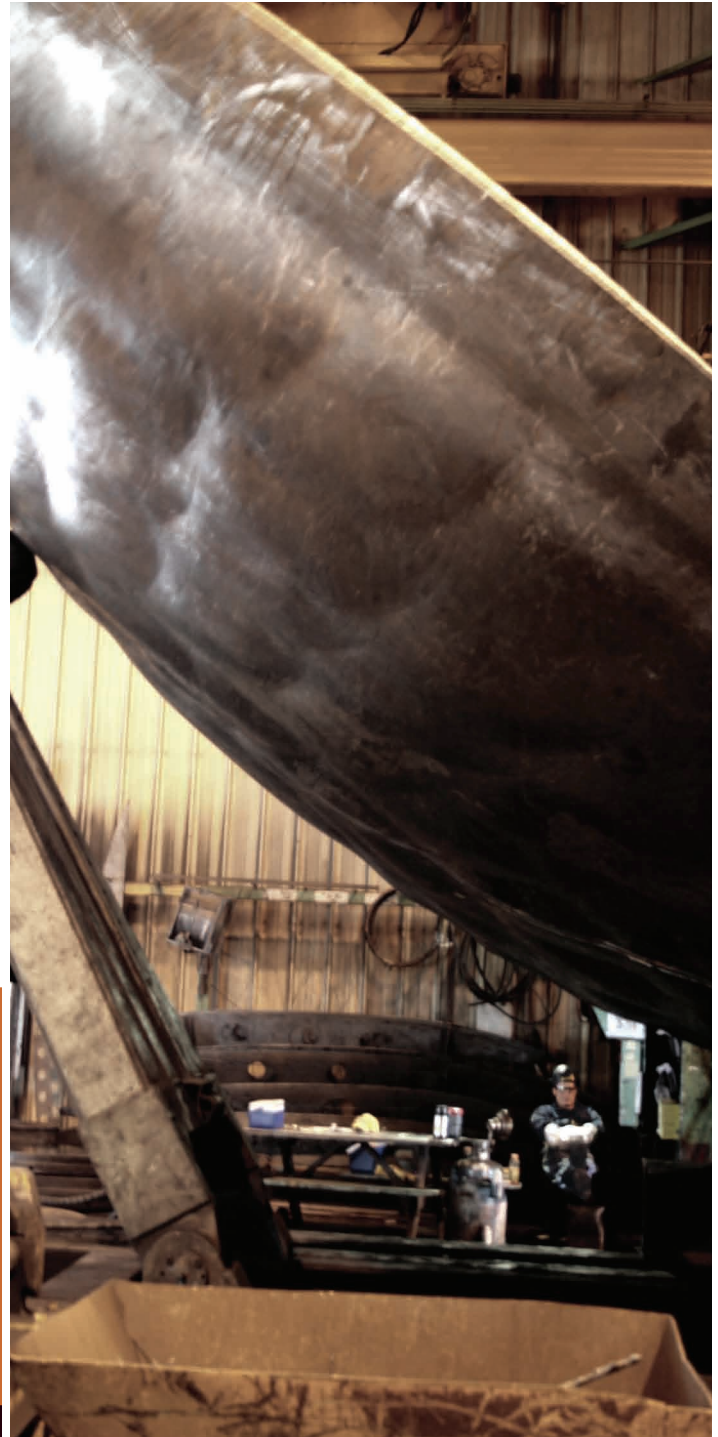
- _ ASME Sec. 1, PG-29
- _ ASME Sec. VIII, Div. 1, UCS-79(d), UG-80(b), UG-81
- _ ASME Sec. VIII, Div. 2, 6.1.2.1 & 4.3.2.2
- _ Registered Weld Caps to ASME SA234 WPB / ANSI B16.9
- _ Other international codes and standards

All welded components (ie. heads, shells, fittings, pipings) are welded using certified and approved welding procedures and the welders / operators are qualified to ASME code Sec. IX.

When required, partial data forms, Certificates of Compliance, and Jurisdictional Affidavits shall be supplied where applicable as follows:

- _ ASME Sec. 1, P4 Forms
- _ ASME Sec. VIII, Div. 1, U2 Forms
- _ ASME Sec. VIII, Div. 2, A2 Forms
- _ ASME SA-671, ASME SA-672
- _ CSA Z245.1
- _ CSA Z662
- _ SA-234, SA-420
- _ CSA Z245.11
- _ ASME Pressure Piping (PP)
- _ ASME B31.1 & B31.3

An operator forming a large head with our Dishing Press (right).



CNC Drilling Services

Our Quickdrill 120 CNC enables us to offer a wide range of drilling, slotting, milling, and boring services. It boasts a machining envelope of 120" x 120" x 15" (3,048 mm x 3,048 mm x 381 mm), and can accommodate material up to 141" x 154" (3,581.40 mm x 3,911.60 mm) in size.

Our Quickdrill 200 CNC features a machining envelope of 200" x 120" x 30" (5,080 mm x 3,048 mm x 762 mm), and will accommodate material up to 29" (736.60 mm) in height, and a drilling capacity of up to 17" (431.80 mm).

Face Milling

With up to a 6" (152.40 mm) face available, it is possible to mill any material size that will fit onto the large fixed table which spans an area of 120" x 120" (3,048 mm x 3,048 mm).

Boring Capabilities

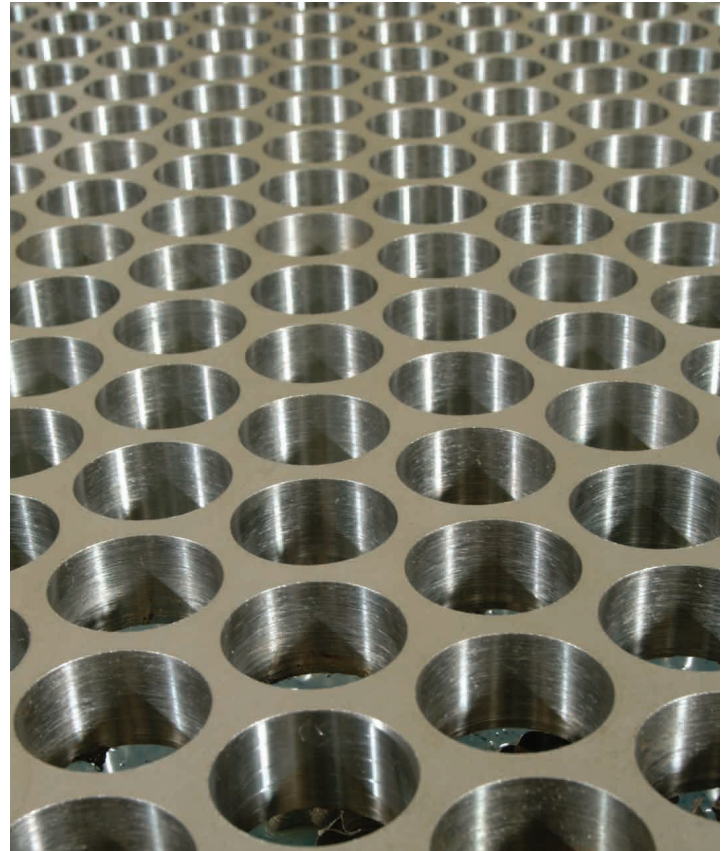
Any variation of hole can be bored up to a 5" (127 mm) diameter and a 6" (152.40 mm) depth. In the event that the required tooling is not immediately available for a specific job, it can be obtained upon customer request.

Tube Sheet Drilling

For CNC tube sheet drilling, please refer to the chart (right) for a breakdown of the hole size required for the corresponding tube size.

As an example, a ¾" tube requires a 0.759" hole to be drilled up to a 17" thickness in carbon steel material (SA 516-70 MT or SA 350-LF2).

Tube Size	Hole Size
¾"	0.759"
1"	1.008"
1¼"	1.260"
1½"	1.514"
2"	2.017"
2¼"	2.271"



Large-scale Machining

Edmonton Exchanger's large-scale machining facility is located in close proximity to our fabrication plant and offers a wide variety of machining services. It was specially designed to handle components with a large diameter.

To support our large-scale milling equipment, a 50 ton overhead crane spans the entire length of the machining facility and thus enables transport of large components throughout the shop.

Vertical Boring Mills

Three machines are available for turning, facing, and boring. Our smallest vertical boring mill handles material up to 68" diameter x 5'-0" high (1,727 mm x 1,524 mm).

A larger machine will handle material up to 13'-0" diameter x 10'-0" high (3,962 mm x 3,048 mm). Our largest vertical boring mill also has drilling and slotting capabilities. It can handle material up to 24'-0" diameter x 10'-0" high (7,315 mm x 3,048 mm) and a weight of 50 tons.

Horizontal Boring Mill

The horizontal mill has a travel of 13'-0" vertical and 30'-0" horizontal (3,962 mm V x 9,144 mm H). Its applications include facing, slotting, boring, drilling and tapping.

General Machining

- _ Lathe: 32" x 108" (813 mm x 2,743 mm)
- _ Drill Press: 72" (1,829 mm)

Our large capacity horizontal boring mill (left), and our largest vertical boring mill (right).



Field Services

Petrochemical Refinery Maintenance

Edmonton Exchanger's field services division provides on-site plant maintenance services for the petrochemical industry, refineries and fertilizer plants. Our services range from portable field machining and controlled bolting, to turn-key plant and refinery shutdowns projects.

Specialized On-site Services Controlled Bolting

Our state-of-the-art bolt torquing and tensioning equipment enables us to provide bolt torquing up to a 6½" nut size, and bolt tensioning up to a 4½" stud size.



Overview of On-site Services

- _ Turn-key plant and refinery shutdowns
- _ Furnace and boiler repair and erection
- _ Vessel erection / heavy lift execution
- _ Tray installation for towers and vessels
- _ Heat exchanger bundle extraction / installation
- _ Heat exchanger repair, re-tubing and fabrication
- _ Custom tube bending
- _ Piping fabrication, repairs and installation
- _ Crane and equipment rentals
- _ Strip cladding and weld overlay of vessel internals
- _ Specialized on-site services

Flange Facing

Our portable field machining capabilities enable us to machine flange faces ranging from 5" I.D. to 110" O.D.

Cold Cutting

Mobile equipment is available to cut and custom bevel pipe from 4" to 72" O.D.

Specialized Welding

Edmonton Exchanger offers over 500 certified weld procedures and has the ability to quickly obtain and implement new ones when required.

Heat Exchanger Services

Specializing in heat exchanger manufacturing and repair, our Heat Exchanger Services division stocks a diverse inventory of materials and heat exchanger equipment that enables us to quickly adapt to specialized customer specifications.

We manufacture, repair and refurbish any size and type of heat exchanger including:

- _ Shell and Tube Bundles
- _ Straight-tubed Heat Exchangers
- _ U-bundle Heat Exchangers
- _ Plate Exchangers
- _ Fin-fan Coolers
- _ Hairpin Exchangers
- _ Customer specified Tube Sheets (In all shapes, sizes and materials in accordance to CNC parameters).

Upon customer request, we will schedule shop time in preparation for field projects in order to ensure a fast turnaround for field maintenance work.





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*"Edmonton Exchanger offers the most extensive **one-stop** head forming and shell rolling capabilities in North America, and one of the largest pressure vessel quality steel plate inventories in the world."*







*Visit us online and explore how we
can assist you on your next project.*

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