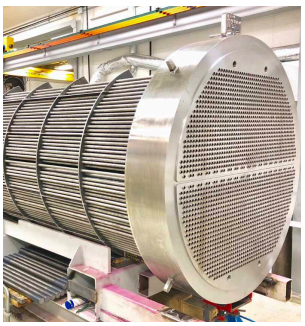

HEAT EXCHANGER SERVICES

Edmonton Exchanger
Heat Exchanger Services Shop
8539 Argyll Road NW
Edmonton, Alberta

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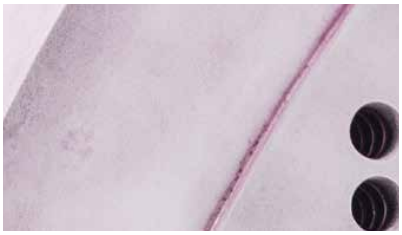

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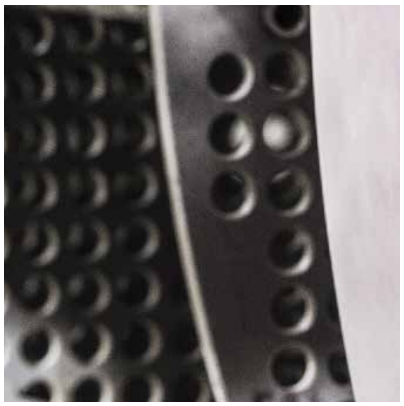
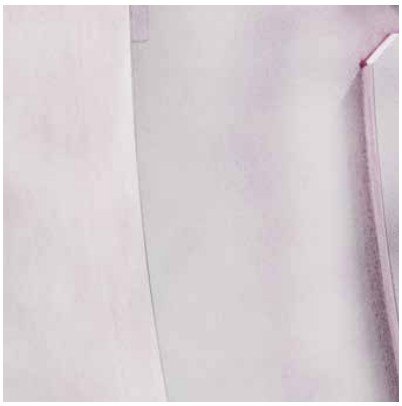
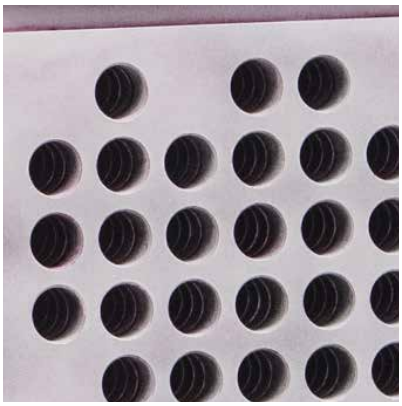
CONTACT
Irvin Godina
Heat Exchanger Division General Manager
Heat Exchanger Services Shop
8539 Argyll Road NW Edmonton
Tel: 780 468 6722 ext. 420



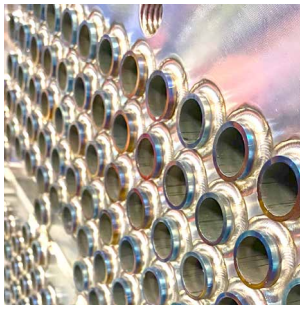





HEAT EXCHANGER SERVICES

HEAT EXCHANGER FABRICATION AND REPAIR

Specializing in heat exchanger fabrication and repair, Edmonton Exchanger's Heat Exchanger Services facility stocks a diverse inventory of materials and heat exchanger equipment that allows us to quickly adapt to your project's specialized requirements and specifications.

This facility fully supports our field operations for all heat exchanger services required, and upon customer request, will schedule shop time in preparation for field projects in order to ensure an expedited turnaround time for field maintenance work.



HEAT EXCHANGER SERVICES: MANUFACTURE, REPAIR, REFURBISHMENT

Whatever shape or size your heat exchanger may be, we're the ones for the job. Edmonton Exchanger can supply heat exchanger components in addition to supporting clients with their bundle fabrication. We manufacture, repair and refurbish any size and type of heat exchangers including:

- Shell and Tube Bundles
- Straight-tubed Heat Exchangers
- U-bundle Heat Exchangers

QUALITY CONTROL INSPECTION PRIOR TO SHIPMENT

Prior to shipment, all of our manufactured components undergo thorough Quality Control inspection to ensure conformance to ASME codes Sec. VIII Div. 1 and 2. All heat exchangers can be certified to CSA, ABSA or ASME stamped.

CERTIFICATE OF COMPLIANCE

All materials are supplied with a Certificate of Compliance showing material type, size, order numbers, heat numbers, minimum thicknesses and Mill Certification Specifications.

MANPOWER

Permanent Shop Labour: 20-25 (Allocated to Heat Exchanger Services Division)

KEY PERSONNEL

Name	Position	Years with Firm
Irvin Godina	Heat Exchanger Division General Manager	34
Peter Taschuk	Heat Exchanger Division Support	27
Chris House	Dayshift Shop Foreman	17
Sarath Ou	Night Shift Shop Foreman	27
Michael Godina	OGTAW Welding Supervisor	17
Mijo Renic	CNC Operator Lead Hand	11
Randy McGlennon	CNC Mechanic / Shop Maintenance	13

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HEAT EXCHANGER SERVICES

CNC DRILLED COMPONENTS

Edmonton Exchanger offers the following array of drilled components: tube sheets, baffles, flanges and other miscellaneous items. These are fabricated for in-house use, and in addition they are supplied to our many other industry clients. All CNC drills are annually calibrated. Calibration certificates are available upon request.

CNC TUBESHEET DRILLING

We have seven CNC machines of various sizes and capabilities available for tube sheet drilling applications.

QUICKDRILL 200 CNC

Our QuickDrill 200 CNC features drilling, ring grooving, milling along with boring services, it will also circular interpolate off center. With a drilling footprint of 200” (5,080 mm) x 120” (3,048 mm) x 30” (762 mm), it accommodates material up to 29” (736.60 mm) in height.

The QuickDrill 200 CNC has recently been upgraded. The spindle has a 30” programmable stroke in the Z-Axis (one stroke). The low range spindle speed is 0-1150 RPM and the high speed range is 1151-6000 RPM. The maximum torque is 662 Nm and the minimum torque is 166 Nm.

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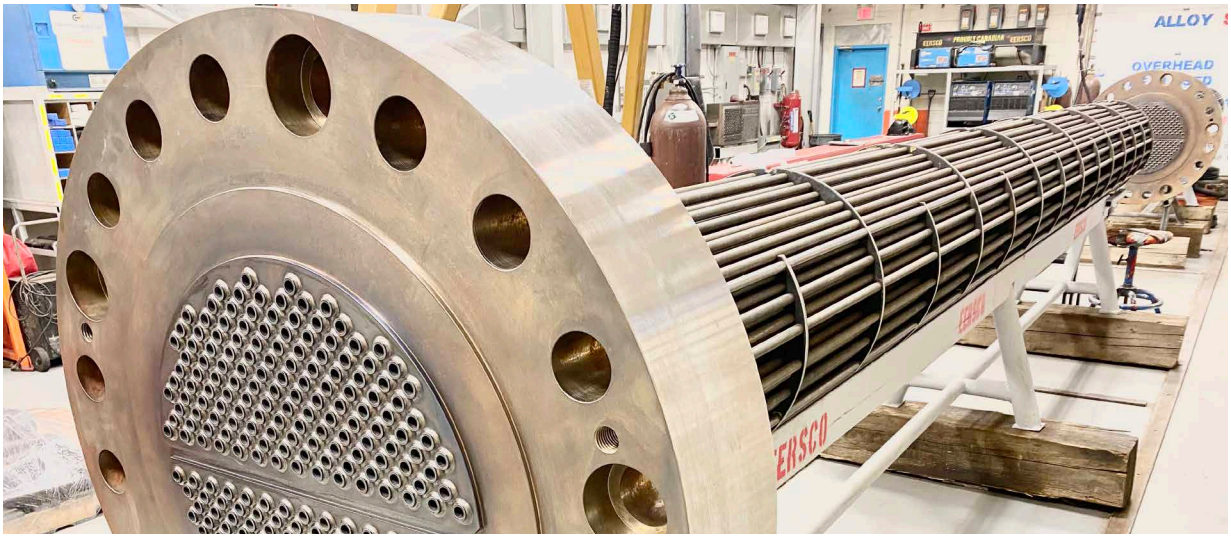
HEAT EXCHANGER SERVICES

CNC DRILLED COMPONENTS



QUICKDRILL 120 CNC

Edmonton Exchanger has (2) QuickDrill 120 CNC machines available that offer a wide range of drilling, ring grooving, milling and boring services, and will also circular interpolate off center. They boast a drilling footprint of 120" (3,048 mm) x 120" (3,048 mm) x 15" (381 mm), and can accommodate material up to 141" (3,581.40 mm) x 154" (3,911.60 mm) in size. They have a maximum drilling hole depth of 11.625" (295.28 mm) deep in one cycle.

QUICKDRILL 96 CNC

Our QuickDrill 96 CNC machine features drilling, ring grooving, milling and boring services and will also circular interpolate off center. It offers a drilling footprint of 96" (2,438.40 mm) x 96" (2,438.40 mm) x 14.5" (368.30 mm), and a maximum drilling hole depth of 11.625" (295.28 mm) deep in one cycle.

QUICKDRILL 60 CNC

We also have (3) QuickDrill 60 CNC machines that feature drilling and ring grooving capabilities. They offer a drilling footprint of 60" (1,524 mm) x 60" (1,524 mm) x 14.5" (368.30 mm), and a maximum drilling hole depth of 5" (127 mm) deep in one cycle.

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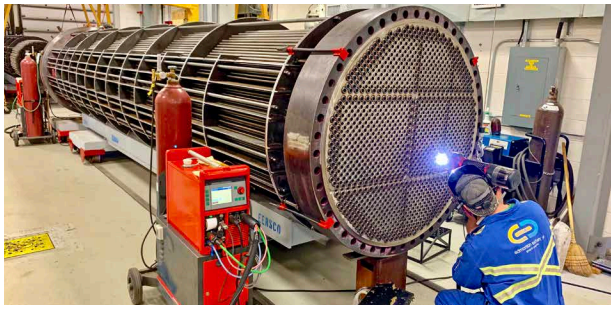
HEAT EXCHANGER SERVICES

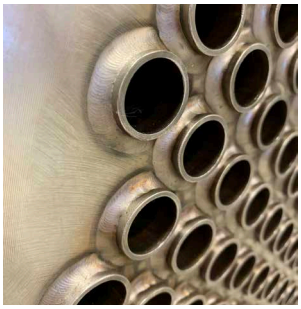
ORBITAL WELDING TECHNOLOGY

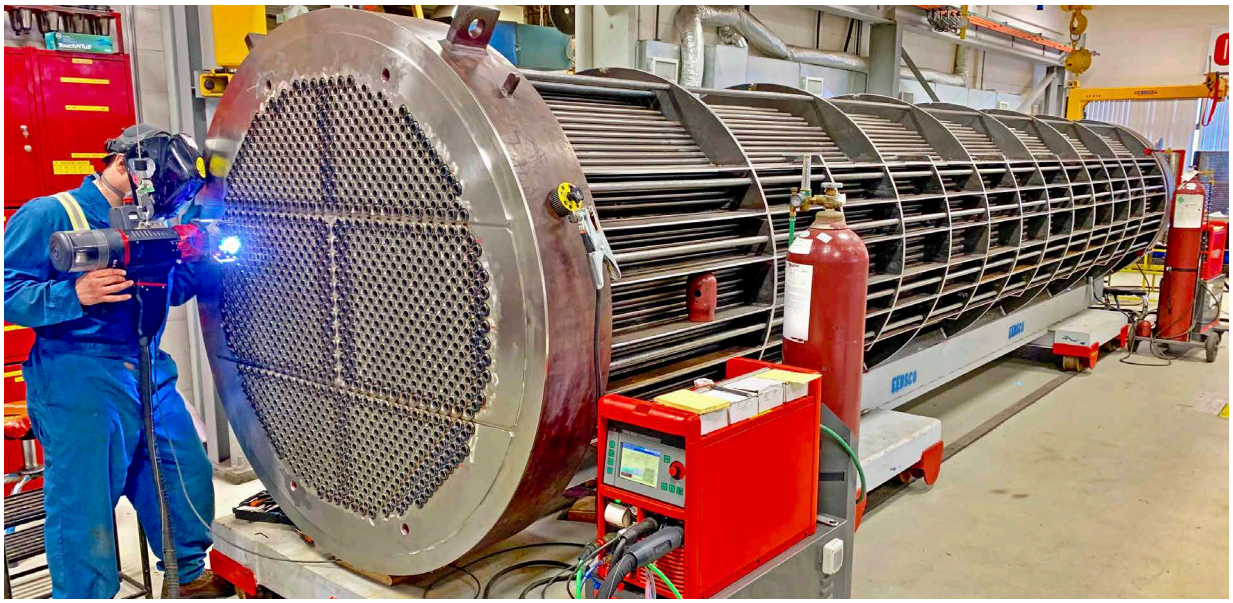
Edmonton Exchanger utilizes proprietary, industry leading, orbital welding technology in the fabrication of heat exchanger tube bundles. Per client requirements, tube to tube sheet joints can be strength or seal welded. All tube to tube sheet joint welding will be performed with multiple weld passes produced by automated, (orbital) gas tungsten arc welding (OGTAW), using filler material producing homogenous welds. Autogenous welds are not be produced or permitted. Start/stop locations for each weld pass are staggered. Orbital welding produces high quality extremely reproducible welds. **Tube ends are not consumed during this automated welding process.**

The details of a project completed for one of our Field Services clients are as follows:

- Orbital tube to tube sheet strength welding
- Material P1w/P10H backing to P10H
- SA-789, UNS# S31803 tubes, strength welded to SA-240 UNS S31803 clad tube sheets
- No consuming of tube ends and 100% homogeneous welds
- Edmonton Exchanger performed Visual Examination, MACRO Examination, Liquid Penetrant, Ferrite Fisher Feritscope and Corrosion Test to ASTM G48 Method A







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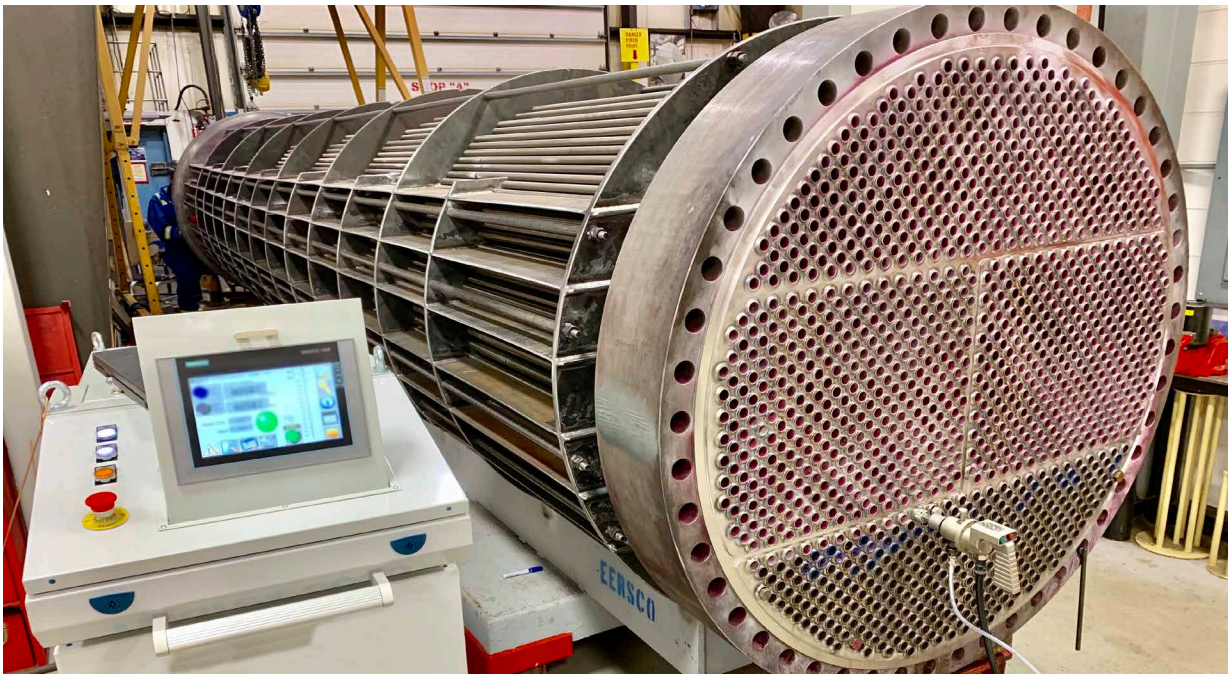
HIGH PRESSURE HYDRAULIC TUBE EXPANSION

In addition to manual and computer controlled tube rolling and expanding capabilities, Edmonton Exchanger also offers High Pressure Hydraulic Tube Expansion.

In a project for a client, we utilized a maximum pressure of 5,000 bar (72,500 psig), and expanded 1.00” O.D. 14 BWG min wall SA-789, UNS# S31803 tubes, employing 10.5” long probes during tube expansion.



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HEAT EXCHANGER SERVICES

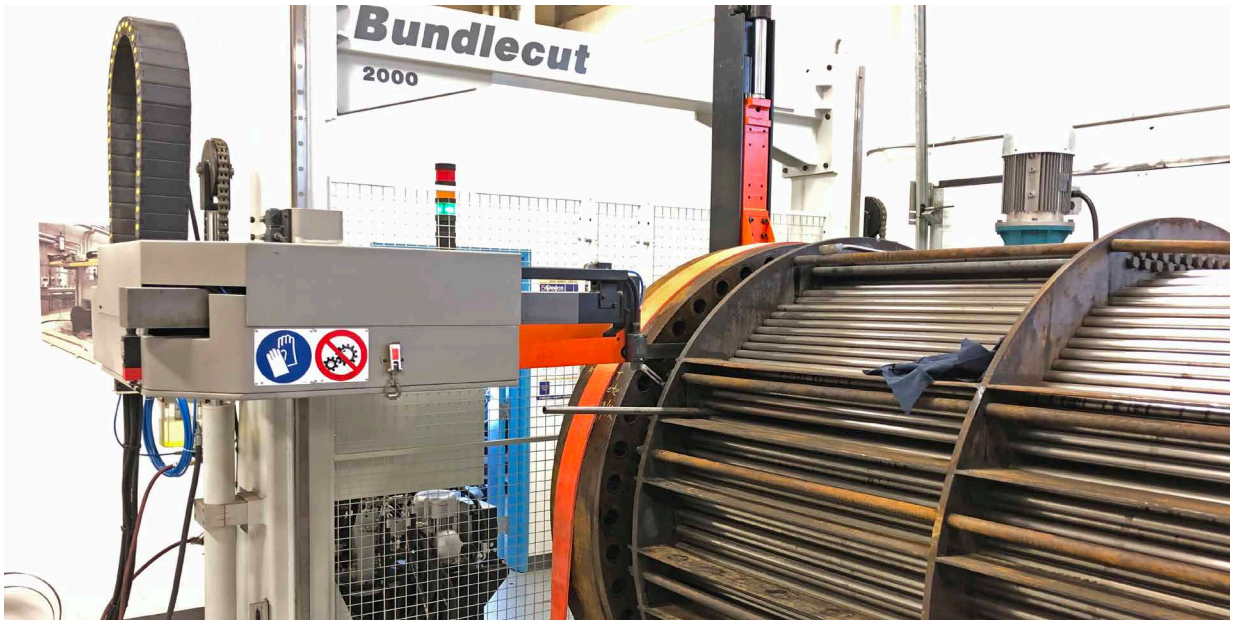
TUBE BUNDLE SAW TECHNOLOGY

On a high priority repair job for a Field Services client, Edmonton Exchanger saw-cut four tube sheets 11" thick from two tube bundles containing SA 789 S31803 / S32205, 1.00" OD x 14 BWG tubes.

Upon completion of this process, each tube sheet was easily removed from the baffle cage with precision. As there were no burrs or rough cuts created, this procedure saved a significant amount of time when compared to traditional, more labour-intensive methods of tube sheet removal.

Tube Bundle Saw Capacities:

- Maximum tube bundle diameter is 78"
- Maximum tube sheet thickness is 23"



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HEAT EXCHANGER SERVICES

HIGH NICKEL ALLOY CLAD, SHELL AND TUBE HEAT EXCHANGER FABRICATION

On the project illustrated below, Edmonton Exchanger completed the fabrication of a high nickel alloy clad, shell and tube heat exchanger that weighed in at 110,000-pounds.

All of the shell components were formed by Edmonton Exchanger from explosion bond clad material. The tube sheets and flanges for the heat exchanger were weld overlayed and then precision CNC drilled in-house.

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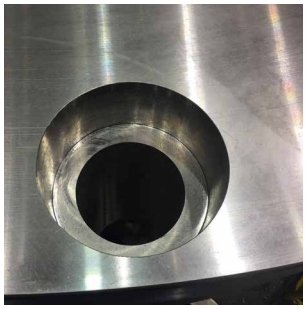
HEAT EXCHANGER SERVICES

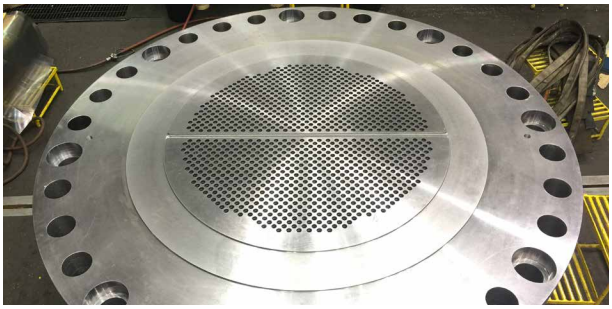
FLIP DRILLING FOR HEAVY TUBE SHEET FABRICATION

When a project required a tube sheet to be fabricated out of super thick material, Edmonton Exchanger employed flip drilling technology to successfully and precisely complete the job.

The project entailed us to fabricate a tube sheet that was made out of 14” thick, SA-350-LF2 CL1 material, and required the drilling of (1,182) tube holes. The holes measured 0.759” (+0.001, -0.003), and the ring grooves measured 1/8” by 3/8” by 1/8” by 1/64” deep. The bolt holes were 3.875” O.D. and the counterbore was 5.5” thick.

Edmonton Exchanger flip drilled this tube sheet and had a 100% success rate for every hole drilled. The tolerances were met to +0.001, -0.003”.





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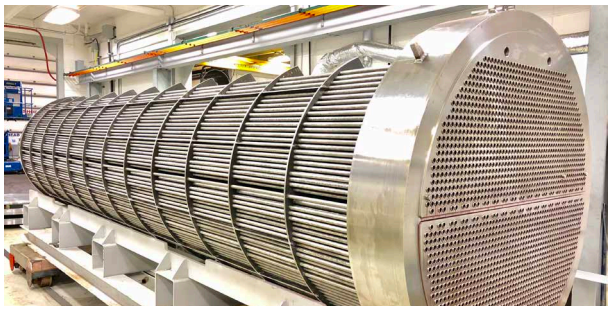
HEAT EXCHANGER SERVICES

HEAVY ALLOY U-BUNDLES WITH THICK TUBE SHEET AND WELD OVERLAY PROJECT

On this project, Edmonton Exchanger fabricated the U-bundles, drilled the tube sheet and baffles and performed the weld overlay. All of the work was completed in-house by Edmonton Exchanger.

The tube sheet measured 10.6875" thick, and was made of SA-266 Gr. 2N material with a 0.625" thick weld overlay (N06686). The U-tube material used was SB-622 (UNS N10276). All of the CNC drilling of the tube sheet and baffles was completed with 100% accuracy.



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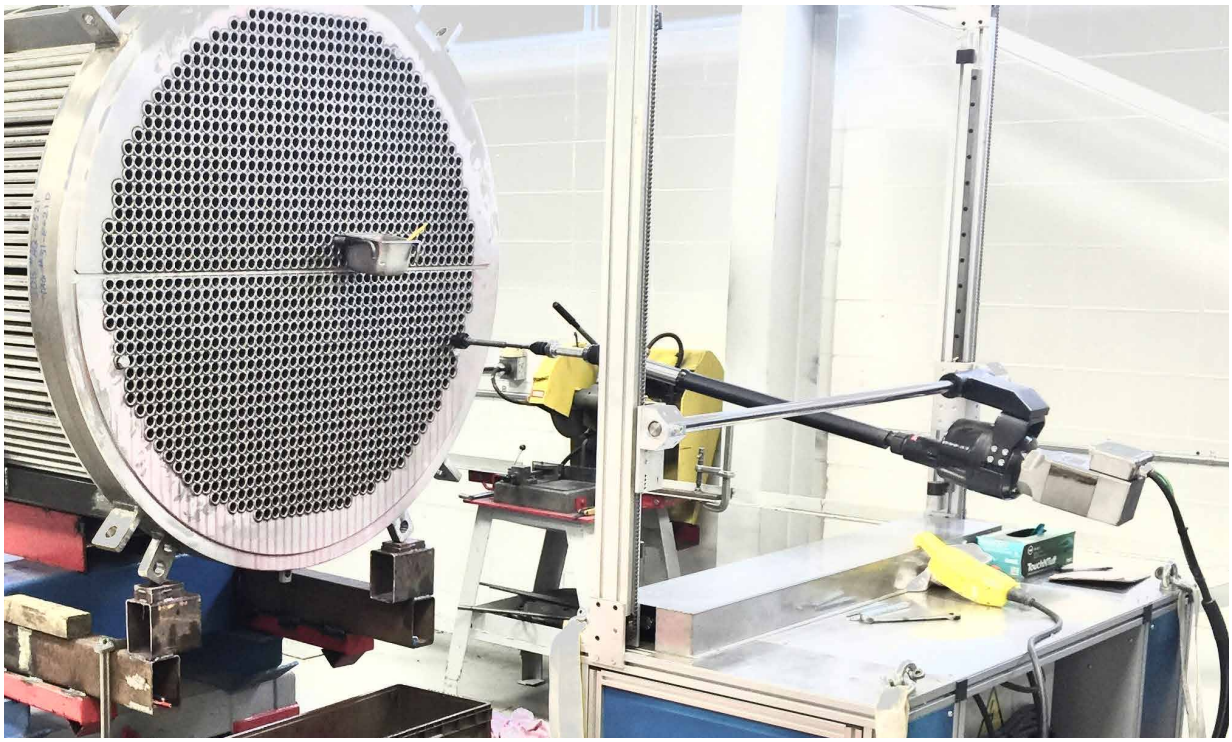
HEAT EXCHANGER SERVICES

MATEX ROLLING TECHNOLOGY

Edmonton Exchanger utilizes a computer controlled, variable speed Matex tube rolling system with a Siemens drive.

This technology allows us to ensure minimal tube thinning, thereby reducing ligament fatigue during expansion and avoiding convex distortion of the tube sheet faces. This process provides superior quality and greater longevity over methods used by our competitors.



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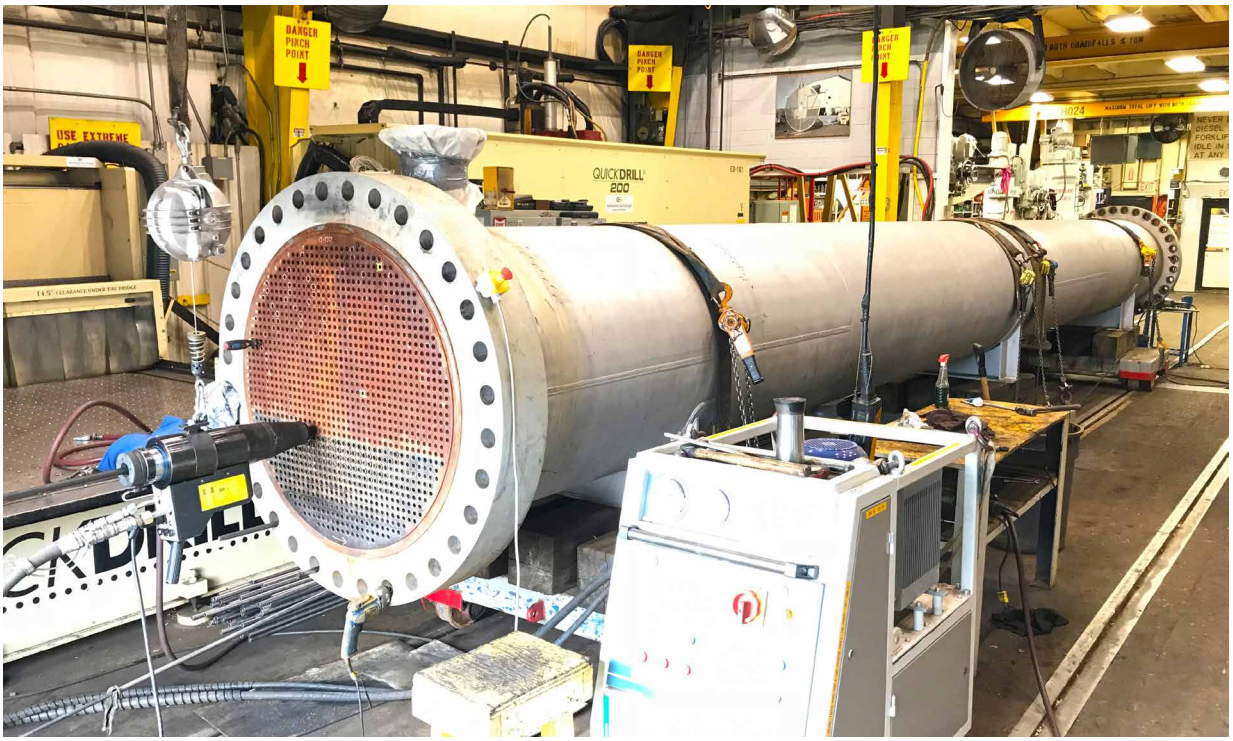
HEAT EXCHANGER SERVICES

MAUS RUN-PULL TECHNOLOGY

Edmonton Exchanger employs Maus run-pull equipment for most shell and tube re-tube projects. This equipment eliminates the need for manual tube removal, and minimizes tube breakage or tube sheet damage during the re-tubing process.

As each tube is automatically pulled from the bundle, the tube holes and ring grooves are reconditioned in situ, and a new replacement tube is installed.



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ADDITIONAL SERVICES

Pressure Vessel Components

Whatever your pressure vessel component requirements, Edmonton Exchanger has your solution. Our steel fabrication division builds a full range of pressure vessel component sizes and thicknesses, and features the most extensive one-stop head forming and shell rolling capabilities in North America. Our steel fabrication operations are supported by our immense inventory of pressure vessel quality carbon steel plate (one of the largest in the world). Large quantities of stainless and chrome moly steel plate are also stocked.

Shop Location: 5545-89 St. NW, Edmonton, Alberta

Field Services

With over 45 years of experience, Edmonton Exchanger provides on-site plant maintenance services for the petrochemical industry, refineries and fertilizer plants.

Our services range from specialized field machining and controlled bolting to complete turn-key plant and refinery shutdown projects.

Office Location: 5325-93 St. NW, Edmonton, Alberta

Pipe Spool Fabrication

Edmonton Exchanger's pipe fabrication facility constructs mechanical piping systems to ASME and client specifications.

Because we hold over 1,000 weld procedures, we have welded most materials required in Alberta. We can accommodate a wide variety of materials ranging from carbon and stainless steel, to low and high alloy materials.

Shop Location: 5325-93 St. NW, Edmonton, Alberta

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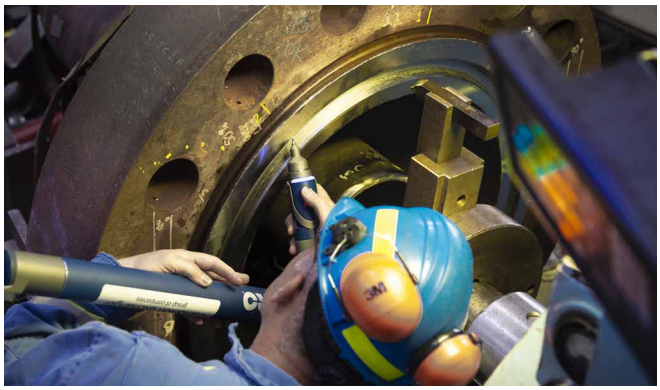
ADDITIONAL SERVICES

Custom Fabrication

Edmonton Exchanger has extensive experience in the custom fabrication and repair of pressure related components. These include replacement vessels and exchangers on a "low volume" and urgent basis, often in support of our field operations. In order to get a plant process back up and running, we can provide expedited fabrication and repair of large and small pressure related components such as pressure vessels, heat exchangers and other items on an "as needed" basis.

Shop Location: 8915-58 Ave. NW, Edmonton, Alberta



Large-scale Machining Services

Edmonton Exchanger's large-scale machining facility is located in close proximity to our main plant and offers a wide variety of machining services.

It was specially designed to handle large diameter components and boasts equipment that is some of the largest of its kind.

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