Plate Processing

Cost Savings & Solutions

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ASTM A-36 HOT ROLLED PLATE
A-36 is a structural quality carbon steel used for a variety of general construction applications including; bolted, riveted, or welded construction of bridges and buildings. Minimum yield point is engineered at 36,000 psi. In addition to greater strength than A-283, A-36 plates can be used to design structures and equipment lighter in weight with better weldability.

ASTM A1011/A1018 CS TYPE B
Hot rolled commercial quality steel is suitable for many applications where normal surface imperfections are not objectionable. Heat treatment and other processing operations must be properly performed so as to not detrimentally affect the properties of the steel. Commercial quality will meet the bend test requirements of ASTM E290.

C1020 HOT ROLLED PLATE
The controlled carbon range of C1020 improves the machinability of this grade. Good formability and weldability are also characteristic.

C1045 HOT ROLLED PLATE
C1045 is silicon filled with a higher carbon content for greater strength. Strength can be improved in the lighter and medium thicknesses by heat treatment. Machinability is good, while forming and welding properties are limited.

ASTM High Strength Low-Alloy Grades

100XF TEMPER LEVELED PLATE
100XF steel plate has been developed for applications where increased strength-to-weight ratios are required. It has physical properties similar to those of ASTM A514 even though its manufacturing process does not require heat treatment.

100XF is available as temper leveled, cut-to-length plate. Temper leveling improves flatness and surface quality, and eliminates coil memory, all of which enhance laser and plasma cutting quality. It also offers good weldability, formability, toughness, and weathering resistance. This excellent combination of properties is possible because of the low-carbon chemistry and the thermo-mechanical controlled processing used in the manufacture of 100 XF.

ASTM A-514 PLATE
(Grade B, Grade H, Grade F, Grade Q)
The A514 plate steels are a group of quenched and tempered alloys with attractive advantages and characteristics. The most important are high yield strength at 90 or 100 ksi minimum, weldability, and good toughness at low atmospheric temperatures. Designed for a wide range of structural uses as well as machinery and equipment, these alloy steels offer help with selecting the optimum in strength, toughness, corrosion resistance, impact-abrasion resistance, and long-term economy.

Alro stocks grade B, H, F & Q and pattern sizes of A514 Plate in 1/4” - 6”.

ASTM A-572 Grade 50
This high strength, low alloy steel plate offers an optimum combination of strength, weldability and notch toughness with economy. Applications include; bridges, buildings, automotive and truck parts, railroad cars, cargo containers, tote boxes, construction equipment, structural tubing, lighting standards and transmission poles.

ASTM A-588 Grade A/B
ASTM A-588 Gr. A/B steel plate offers all the advantages of ASTM A572-50 but is produced with elevated levels of copper to add corrosion resistance. This "weathering" grade is often used in unpainted applications such as bridges, utility sign/poles and highway structures and guardrails because of the self-repairing, natural oxide patina greatly reduces maintenance.

ASTM A-656 Grade 80
ASTM A-656 Gr. 80 combines outstanding toughness, ease of fabrication and positive strength to cost relationships when compared to A572-50 and A-36. These translate into real savings in applications such as telescopic cranes, truck trailers, railroad cars, construction equipment and transmission towers; or any other extreme load-bearing job where the economy of superior strength and weight are paramount.
Pressure Vessel Grades, ASME

ASTM A-516 Gr. 70 (PVQ)/ASME SA516-70
Intended primarily for service in welded pressure vessels where improved notch toughness is required, this grade of ASTM A516/ASME SA516-70 is normally found in moderate and lower temperature applications. Supplementary testing such as Charpy Impacts, Ultrasonic Examination and Carbon Equivalency are available.

Free Machining Plate

1144 MODIFIED
1144 Modified offers high strength and hardness and is applicable where resistance to deformation and wear are essential. It may be flame hardened to further enhance surface properties. It is frequently used as an economical replacement for more expensive quenched-and-tempered alloy grades.

Clean-Cut 20®/LFM 20/FM 15®/1119 Modified
The Clean-Cut/LFM 20 families of plate steel were developed for improved machining. Produced by a special calcium treatment and a controlled sulphur process, Clean-Cut steels contain sulfide inclusions which are predominately calcium modified to make them smaller and more uniformly distributed. The result: enhanced machinability. The economy of Clean-Cut steels can be realized in reduced wear and breakage of machine tools, a reduction in machining time and increased productivity. Also, the improved internal quality of Clean-Cut produces a superior machined surface compared to free machining carbon steels.

Abrasion Resistant Grades

ABRASION RESISTING PLATE
Abrasion Resisting Steel was designed to satisfy the demand for a grade of steel that would give prolonged service life where abrasion is the primary cause of failure. The surface hardness of Abrasion Resisting Steel will vary by grade from 200-500 BRINELL.

MANGANESE PLATE (11% - 14% Manganese)
Manganese plate is a nonmagnetic steel that work hardens to a 650 Brinnel. It is a 12-Mn austenitic steel with an exceptionally high level of wear-resistance when subject to work-hardening by shocks or high pressures in service.

ARMOR PLATE
MIL-A-46100 (e)
A popular high hardness armor grade (HHA), 46100 is selected for use by all departments and agencies of the Department of Defense. This grade is produced to 2 inches (51mm) thick with hardness requirements of 477-534 BHN and Charpy Impact testing on every plate.
Available thicknesses include: 1/4” • 5/16” • 3/8” • 1/2” • 5/8”

Alloy Grades

AISI 4140
This medium carbon alloy grade is widely used for many general purpose parts requiring high tensile strength and toughness. 4140 contains chromium and molybdenum as alloying elements and may be heat treated over a wide range to give the combined advantages of proper hardness, strength and ductility. In conditions where localized hardness may be required, this steel is readily flame or induction hardened.

AISI 8620
Carefully controlled proportions of chromium, nickel and molybdenum are responsible for the extensive use of 8620 as a carburizing alloy steel. Valuable features of this grade include extreme surface hardenability and internal strength.

AISI 6150 - ANNEALED
An electric furnace melt of chrome vanadium steel possessing the following characteristics: oil-hardening, high resistance to vibratory stress, standard deformation, medium hardness, high torque strength and bright polish.
Advantages:

- No heat affected zones
- No mechanical stress
- Allows for more accurate cutting
- Produces a near finished part
- No problems with reflective materials
- Thicker cutting without distortion
- Reduces or eliminates secondary machining operations
- Cost savings through greater material utilization and better control of your job

Waterjet processing complements Alro’s extensive inventory:

- Carbon Steel
- Tool Steel
- Stainless Steel
- Alloys
- Aluminum
- Red Metals
- Plastics
- Cast Iron

Laser cutting offers superior, tight tolerances and the best cut surface when compared to other flame cutting processes.

The maximum plate capacity for our laser cutting process is 80” X 159”. Thickness range for cutting carbon steel plate is 24 ga - 1”.

Laser cutting technology is an excellent process for carbon steel, stainless steel and aluminum.

Other advantages include:

- High quality cuts
- High precision cut parts
- Higher speeds than precision plasma under 1/8 inch
- Minimal clean up
- Narrow kerf width
- Smallest heat affected zone

<table>
<thead>
<tr>
<th>Thickness (inches)</th>
<th>Tolerance (inches)</th>
<th>Minimum Hole Dia.</th>
<th>Carbon Steel</th>
<th>Stainless Steel</th>
<th>Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>+/-0.05</td>
<td>0.188*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3/8</td>
<td>+/-0.06</td>
<td>0.188*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1/2</td>
<td>+/-0.08</td>
<td>0.250*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5/8</td>
<td>+/-0.11</td>
<td>0.438*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3/4</td>
<td>+/-0.13</td>
<td>0.560*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7/8</td>
<td>+/-0.15</td>
<td>0.680*</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>+/-0.17</td>
<td>0.750*</td>
<td>0</td>
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</tr>
</tbody>
</table>
Alro’s Plasma Cutting System provides tighter tolerances, minimizes machining on finished parts and provides greater part accuracy. O2 Plasma means a smaller, heat affected zone and reduced edge cracking when forming. PC-based control technology increases control in shape cutting. Our cutting system can burn materials at up to 300” per minute on a 16’ x 50’ bed. The result is large volume projects completed with virtually no downtime.

Advantages include:
- High quality edge cuts
- Higher precision than conventional plasma
- Minimal clean up
- Smaller kerf than conventional plasma
- Small heat affected zone
- Low cost per foot of cut

### Plasma Capabilities

<table>
<thead>
<tr>
<th>Thickness (inches)</th>
<th>Tolerance (inches)</th>
<th>Carbon Steel</th>
<th>Stainless Steel</th>
<th>Aluminum Sheet/Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 ga - 1/2”</td>
<td>+/- 1/32”</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>&gt;1/2” - 1”</td>
<td>+/- 1/16”</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Inquire on minimum hole capability. Inquire on all red metals capabilities.

### Bevel Cutting Capabilities

- Capable of cutting 2” thick carbon plate with less than 1 degree bevel
- Ability to adjust for bevel greater than 1 degree
- Can cut “K” bevels in 3/8” plate and up to 52 degree bevel in 2” plate
- HPR 400 Plasma torch (400 amp)
- 5 Axis bevel head
- Machining center with 2” hole capacity in 2” plate

To request a burning quote for your existing CAD drawing please send it along in an email, to: burnprints@alro.com
Stress Relieving diminishes the residual stress in steel caused by working the material (i.e. flame cutting, forming, rolling, casting, machining, welding, bending, straightening). This is accomplished by reheating the steel then cooling it at a slower rate.

Benefits:
- Stress Relieving can be performed before grinding on parts that require light machining
- Often used on weldments

Normalizing is accomplished by heating the metal above the transformation temperature, then cooling it in still or slightly agitated air.

Benefits:
- Refines/reduces the grain size of steels that have been subjected to high temperatures
- Prepares steel for heavy machining
- When machined, provides a better surface finish

Annealing is accomplished by heating the metal just below the transformation temperature, then cooling in a controlled cycle which limits the cooling rate and brings the temperature down slowly.

Benefits:
- Softens metal
- Changes mechanical/electrical properties
- Aids in dimensional stability
- Greatly improves forming and bending

Flame Cutting Capabilities

<table>
<thead>
<tr>
<th>Thickness (inches)</th>
<th>Tolerance (inches)</th>
<th>Carbon Steel Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4” to 3”</td>
<td>+/- 1/16”</td>
<td></td>
</tr>
<tr>
<td>3-1/8” to 6”</td>
<td>+/- 3/32”</td>
<td></td>
</tr>
<tr>
<td>6-1/8” to 8”</td>
<td>+/- 1/8”</td>
<td></td>
</tr>
<tr>
<td>8-1/8” to 10”</td>
<td>+/- 3/16”</td>
<td></td>
</tr>
<tr>
<td>10-1/8” to 14”</td>
<td>+/- 1/4”</td>
<td></td>
</tr>
</tbody>
</table>

Inquire on minimum hole capability.

Flame Cutting

Alro produces flame cut pieces (rectangles, ID, OD’s and per print items) in 16 locations from Michigan to Florida including the Mid-West.

Our CNC machines allow us to flame cut carbon plate as thin as 3/16” up to 14” thick.

Advantages include:
- Low capital investment
- Low operating cost
- Good edge quality
- Thick material capability

Flame Cutting Capabilities

<table>
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<td>10-1/8” to 14”</td>
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<td></td>
</tr>
</tbody>
</table>

Inquire on minimum hole capability.

Thermal Processing

Stress Relieving

Stress Relieving diminishes the residual stress in steel caused by working the material (i.e. flame cutting, forming, rolling, casting, machining, welding, bending, straightening). This is accomplished by reheating the steel then cooling it at a slower rate.

Benefits:
- Stress Relieving can be performed before grinding on parts that require light machining
- Often used on weldments

Normalizing

Normalizing is accomplished by heating the metal above the transformation temperature, then cooling it in still or slightly agitated air.

Benefits:
- Refines/reduces the grain size of steels that have been subjected to high temperatures
- Prepares steel for heavy machining
- When machined, provides a better surface finish

Annealing

Annealing is accomplished by heating the metal just below the transformation temperature, then cooling in a controlled cycle which limits the cooling rate and brings the temperature down slowly.

Benefits:
- Softens metal
- Changes mechanical/electrical properties
- Aids in dimensional stability
- Greatly improves forming and bending
Press Brake Services

With the addition of the 600 ton, 20’ bed, hydraulic style Accurpress Brake machine we now have the ability to bend thicker plate over a longer span including:

- Custom Angles
- Custom Channels
- Zee Shapes
- J-Channels

Imagine the time and cost saved obtaining formed parts from a company that:

- Stocks Sheet Metal and Plate Steel in a variety of thicknesses and grades.
- Is equipped to Laser Cut, Plasma Cut, Flame Cut or Shear parts into specified shapes.
- Has the ability to Thermal Process your parts to ensure proper workability.
- Can deliver your parts on time to your specified location.

Shearing

Shearing sheet metal and plate steel is performed in most of Alro’s steel warehouses. We’ll shear your order to your exact specifications, place your material on a skid for safe transporting and safe handling after your order is delivered to your specified location. Our shearing capabilities include:

- Carbon Steel
- Alloys
- Stainless Steel

We are capable of shearing plate up to 1/2” thick. Thickness capacities vary depending on the grade of the material. Please inquire.

Plate Sawing

Our plate saw cutting capabilities allow us to stock every Alro Steel warehouse and Alro Metals Service Center with wider and thicker flats. Wider flat bars are produced from plate steel stored in our own plate processing facilities. Making wider flats available significantly reduces your need for costly secondary operations.

Grades readily available include:

- C1018
- C1045
- C1119
- C1144
- Clean-Cut 20®
- A-36
- 4140 HRA
- 4140 HR HT
- 4140 HT DCF
- 8620
- 6150
- 6150
- A-2
- A-6
- D-2
- DC-53
- 6-1
- 6-6
- O-1
- O-6
- S-7
- H-13

Bars being produced from plate steel on a METL plate saw at one of our plate processing facilities.
Grinding

**Blanchard Grinding**: Alro’s Blanchard Grinding machines allow for great turnaround time and the capability of grinding metals with a 144” swing from corner to corner.

**Reciprocal Grinding**: For jobs requiring a smoother finish and a tighter tolerance, Alro offers Reciprocal Grinding with a surface capacity up to 24” x 120”

**Milling**: Up to 96” high x 60” wide x 144” long with the ability to machine larger by sliding.

**Alro Grinding can grind:**
- Aluminum
- Alloy Steel
- Carbon Steel
- Stainless Steel
- Tool Steel
- Table Tops
- Machine Bases
- Bolsters (Including Re-works)
- Weldments
- Die Parallels (Risers)

Product Clean-up Services

Our clean-up services are designed to save you time on deburring and to promote safety by removing sharp edges on flame burned pieces.

Smoked edges on production pieces leaves a safer product to handle.

Cleaning the edges of burn-outs is routine at Alro Steel.

After tumbling, parts are nearly burr free.

Packaging Services

At Alro Steel we realize the importance in safe, durable packaging. Your order is packaged for safe transport from our facility to yours and for safe handling once the order reaches your facility.

Your order is placed on a skid that is built to fit your order.

Ground plate is protected, top and bottom.

Small skid boxes are available for smaller orders.

Large skid boxes are available for larger orders.

alro.com
Alro Steel Processing Saves Time and Money

Our processing services eliminates many of the secondary operations necessary to complete your part including **sawing, milling, boring** and **heat treating**. Alro’s processing also reduces scrap and eliminates transporting parts from one processing station to the next.

Mechanical parts cut to your specification

We can process stainless aluminum alloys copper brass bronze

Press Brake forming available

Great processes for customized tooling

Our processing eliminates the need for drilling and punching

Holes can be cut to the proper size for tapping

We can produce a variety of bevel cuts including ID and OD bevels

**One Step Tube Laser Processing**

Cut slots

Miter cuts

Produce pipe joints and intersections to your specifications

Holes can be cut to the proper size for tapping

To contact the **Alro Steel** Service Center nearest you call:

888-888-ALRO

Visit [alro.com](http://alro.com) to Learn More About our Processing Capabilities

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How can e-Business with Alro reduce your total cost?

- Eliminates or significantly reduces paperwork.
- Reduces on-hand material inventory levels.
- Reduces manual intervention and non-value added processes.
- Can automate routine business transactions and processes.
- Provides real-time access to critical business information.
- Maximizes the usage of existing technology investments.

Alro has made the technology investment for you, so you can start saving money today!

B2B - Business to Business

Alro’s computers automatically retrieve business information from Customer’s and Vendor’s computers via the Internet. During this process we can pick-up and deliver electronic business documents, including:

- Quotes
- Purchase Orders
- Material Releases
- Invoices
- Mill Certifications
- POD - Proof of Delivery
- ACH Payment Notifications

The Alro Online Store - Web Site Ordering

Alro customers can place orders, check stock and view business reports on our user friendly web site. This ordering method incorporates a shopping basket approach, simple navigation and lightning fast searches.

Alro’s SmartCell™ and Automated Inventory Replenishment

- Electronic Kanban
- SmartCell™
- Barcode Order Entry
- APOS - Alro Portable Ordering System

SmartCell™ is the latest technology from Alro Steel Corporation which provides tooling security, tracking and auto-replenishment at the point of use. SmartCell™ can drastically reduce your tooling usage and replenishment costs. With SmartCell™ stations residing in each cell, your operators never have to leave their work area for tooling. SmartCell’s™ combination of advanced features, ease of use and low cost can be found in no other tool vending solution.

Summary Billing

Spending too much time on invoice reconciliation activity?

Invoices can be summarized on a daily, weekly, bi-weekly or monthly basis and can be faxed, mailed or e-mailed to your attention. For your convenience, summary invoices can be sorted by: Customer Order Number, Release Number, Order Detail Number or Multiple Departments.

Electronic-Invoicing

Avoid the hassle of paper invoices and have your invoices e-mailed to your desktop.
Your One Stop Shop for Metals, Industrial Supplies & Plastics

About Alro

Integrity. Loyalty. Honesty. These principals have guided Alro Steel since our founding in 1948 by brothers, Al and Robert Glick. From a small garage in Jackson, Michigan, Alro Steel has grown to over 70 locations in 12 states. Alro distributes metals, industrial supplies and plastics. A wide variety of processing services are available including cut-to-size metals and plastics with next day delivery to over 25,000 customers in North America.

Focused on exceeding our customers’ expectations, we build relationships with all our customers, large and small. To learn more, visit alro.com.

Processing Services

Metals

<table>
<thead>
<tr>
<th>Alloy</th>
<th>Bar</th>
<th>Pipe, Tube</th>
<th>Plate, Sheet</th>
<th>Structural</th>
<th>Grating, Exp. Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Aluminum</td>
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<tr>
<td>Brass</td>
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<td>Bronze</td>
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<td>Carbon Steel</td>
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<tr>
<td>Cast Iron</td>
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<tr>
<td>Copper</td>
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<tr>
<td>Stainless</td>
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<tr>
<td>Tool Steel</td>
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</tbody>
</table>

Industrial Supplies

Abrasives | Gauging | Material Handling |
Brushes    | Grinding | MRO Supplies |
Coolant    | Hand Tools | Sanding |
Cutting Tools | Machinery | Tool Holding |
Die Supplies | Maintenance | Work Holding |

Plastics

ABS | Nylon | PTFE |
Acetal | Nylo® | Starboard® |
Acrylic | PEEK | TIVAR® |
Delrin® | Phenolics | Tuffak® |
Exten® | Plexiglas® | UHMW |
Fiberglass | Polycarbonate | Urethane |
Grating | Polypolylene | Vivak® |

Note: The symbols ® & ™ indicate a registered trade name.

Alro Metals Outlet

Alro Metals Outlet locations stock a broad range of metals and plastics in a convenient retail setting. Metals Outlet specializes in small to large orders, perfect for machine shops, do-it-yourself (DIY) and maintenance departments.

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888-888-ALRO