

DESIGNER

HANDBOOK

with Directory of
Stainless Steel
Structural Producers

STAINLESS

STEEL FOR

STRUCTURAL

APPLICATIONS



TABLE OF CONTENTS

INTRODUCTION	1
GENERAL INFORMATION ON STAINLESS STEEL	2
Alloys	
Condition	
Product Forms	
STAINLESS STEEL STRUCTURES	3
Fabrication	
Connections	
CONCRETE REINFORCEMENT	4
FABRICATED COMPONENTS (Angles, I-Beams, Boxed Structures)	5
ROLLED ANGLES	6
EXTRUDED ANGLES	6
TUBULAR COMPONENTS	7
BARS AND RODS	8
FRAMES	9
INVESTMENT CASTINGS	9
WALL TIES AND ANCHORS	10
EXTRUSIONS	11
REFERENCES	12
ACKNOWLEDGMENTS	12
DIRECTORY OF STAINLESS STEEL STRUCTURAL PRODUCERS	inside back cover

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INTRODUCTION

Stainless steel is not a single alloy, but rather the name applies to a group of iron based alloys containing a minimum 10.5% chromium. Other elements are added and the chromium content increased to improve the corrosion resistance, improve heat resisting properties, enhance mechanical properties, and/or to improve fabricating characteristics. There are over 50 stainless steel grades that were originally recognized by the American Iron and Steel Institute (AISI). Three general classifications are used to identify stainless steel. They are: 1. Metallurgical structure. 2. The AISI numbering system (200, 300 and 400 series numbers). 3. The Unified Numbering System, which was developed by the American Society for Testing Materials (ASTM) and the Society of Automotive Engineers (SAE) to apply to all commercial metals and alloys.

The various types of stainless steel are detailed in a designer handbook, "Design Guidelines for the Selection and Use of Stainless Steel" available from the Specialty Steel Industry of North America (SSINA). Several other publications are also available, including: "Stainless Steel Fabrication," "Stainless Steel Fasteners," "Stainless Steel Finishes," "Stainless Steel Specifications," and "Stainless Steel Architectural Facts," to mention a few.

GENERAL INFORMATION ON STAINLESS STEEL

ALLOYS

The following grades of stainless steel are often used in structural applications:

304 has an austenitic metallurgical structure. It is the basic "18-8" alloy (18% chromium, 8% nickel UNS S30400), is the most readily available grade, and is often specified for "all-purpose" applications. It has excellent corrosion resistance and unusually good formability.

316 is basically a 304 grade with the addition of 2 to 3% molybdenum. It has greater corrosion resistance than 304 and is usually preferred for long term service in aggressive industrial, chemical and seacoast atmospheres.

409 has a ferritic metallurgical structure. It is a straight chrome alloy (11 to 12% chromium UNS S40900). It has good ductility and corrosion resistance. It is mainly used for internal applications.

410-3 is a dual phase alloy (UNS S41003) with micro alloy element control that permits welding in up to 1 1/4 inches (30mm).

2205 has a duplex structure which is typically about equal parts of austenite and ferrite (21% chromium, 4.5% nickel, 2.5% molybdenum UNS S32304). It has excellent corrosion resistance and exhibits about twice the yield strength as conventional grades.

CONDITION

Stainless steel is usually available in the "Hot Rolled and Annealed" condition and has a yield strength of about 42 ksi. The austenitic grades can be hardened by cold working the material. 301, a modification of 304, (with the chromium and nickel lowered slightly to increase the work hardening rate), can be supplied in various "tempers" up to full hard with a yield strength of 140 ksi.

The American Society of Civil Engineers (ASCE) has a standard ANSI/ASCE -8 -90 "Specifications for the Design of Cold Formed Stainless Steel Structural Members,"¹ which details the design information on "cold formed" stainless steel.

Table 1 CLASSIFICATION OF STAINLESS STEEL PRODUCT FORMS*

Item	Description	Dimensions		
		Thickness	Width	Diameter or Size
Sheet	Coils and cut lengths: Hot Rolled No. 1	under 0.1875" (4.76mm)	24.000" (609.6mm) and over	—
	Cold Rolled No. 2D, 2B, Bright Annealed, TR	under 0.1875" (4.76mm)	24.000" (609.6mm) and over	—
	Polished No. 3, 4, 6, 7 & 8	under 0.1875" (4.76mm)	24.000" (609.6mm) and over	—
Strip	Coils and cut lengths: Hot Rolled No. 1	under 0.1875" (4.76mm)	under 24.000" (609.6mm)	—
	Cold Rolled No. 2D, 2B, Bright Annealed, TR	under 0.1875" (4.76mm)	under 24.000" (609.6mm)	—
	Polished No. 3, 4, 6, 7 & 8	under 0.1875" (4.76mm)	under 24.000" (609.6mm)	—
Plate	Coils and cut lengths: Hot Rolled, annealed & pickled	0.1875" (4.76mm) and over	over 10.000" (254mm)	—
	Polished available for special applications	0.1875" (4.76mm) and over	over 10.000" (254mm)	—
Bar	Straight lengths: Hot finished rounds, squares, octagons and hexagons	—	—	0.250" (6.35mm) and over
	Hot finished flats	0.125" (3.18mm) and over	0.250" (6.35mm) to 10.000" (254mm)	—
	Cold finished rounds, squares, octagons and hexagons	—	—	0.062" (1.59mm) and over
	Cold finished flats	—	0.375" (9.53mm) and over	—
Rod	Hot Rolled coils may be annealed and/or descaled	—	—	0.200" (5.4mm) and over
Wire	Cold finishes only: Rounds, squares, octagons and hexagons	—	—	0.500" (12.7mm) and under
	Flat wire (coils only)	0.010" (0.254mm) to under 0.185" (4.76mm)	0.062" (1.59mm) to under 0.375" (9.35mm)	—
Pipe & Tube	Several different classifications with differing specifications are available. For more information on standard sizes, consult your local Steel Service Center or the SSINA.			
Extrusions	Not considered "standard" shapes, but available. Currently limited in size to approximately 6.50" (165.1 mm) diameter circle, or structurals to 5.00" (127 mm) diameter.			

*Ingots, Slabs, Hot Bands, Angles and Rolled Shapes are also available.

PRODUCT FORMS

The forms of stainless steel used in structural applications are: plate and sheet (often fabricated into structural shapes), extrusions, forgings, preformed products (tubes and angles), bar and rod, wire, and castings.

Plate:

Plate is defined as material that has a thickness of 3/16" or greater (Table 1). It is usually available in widths of 48, 60, 72 and 96". It can be supplied as individual flat plates or in "coil" form (some limits on thickness and width). Many structural shapes are produced by fabricating the plate into beams, angles and other components. For information, contact the "Steel Plate Fabricators Association" (708-298-0880).

Sheet:

Sheet is defined as material that has a thickness of less than 3/16" (Table 1), and is usually supplied in either 48 or 60" wide coils.

Extrusions:

Stainless steel can be extruded into several complex shapes as detailed in the Designer Handbook "The Selection and Use of Stainless Steel."

Also contact: Al Tech Specialty Steel Corporation (716-366-1000), Plymouth Tube Company (1-800-323-9506).

Forging:

Stainless steel forging are also available in several shapes. For information, contact the "Forging Industry Association" (216-781-0102).

Preformed Products:

Angles are available as a hot rolled product. Contact Slater Steel Corporation (219-432-2561).

• **Hot rolled and cold rolled shapes**, as well as **cold-drawn "shapes"** can also be made from stainless steel as detailed in the Designer Handbook "The Selection and Use of Stainless Steel."

• **Tubular products** are commonly used for structural applications either in round or square sections. Further information is available for the Specialty Tubing Group (202-342-8400).

• **Bar and Rod:** Bar is defined as hot finished or cold finished rounds, square, octagons and hexagons and flats (Table 1).

Wire:

Wire is cold finished only, produced in coils, as round, square, octagon, hexagon, and flat wire (Table 1).

Castings:

Stainless steel casting can be produced for structural applications. For information, contact the "Steel Founders' Society of America" (847-299-9160).

STAINLESS STEEL STRUCTURES

Fabrication:

Stainless steel can be fabricated by methods similar to those used for carbon steel. However, other considerations must be taken into account because of the difference in material properties, such as yield strength and rate of work hardening. The SSINA Designer Handbook "Stainless Steel Fabrication,"² has several suggestions on techniques for cutting, bending, forming and finishing the austenitic and ferritic stainless steels. For example, 304 requires 50% more power to bend it than carbon steel.

Duplex grades like 2205 have roughly twice the yield strength of 304 or 316. Once the yield strength is exceeded, the plastic deformation takes place just as easily as with the austenitic material.

Heavy gauge material (over 3/16") is usually fabricated into structural com-

ponents such as "I" beams and angles. Tubular products are available in round tubes or square hollows.

Table 2 shows the relative fabrication characteristics of the various grades of stainless steel.

Connections:

Stainless steel structures must be connected by using stainless steel fasteners. The SSINA has a Designer Handbook "Stainless Steel Fasteners A Systematic Approach to Their Selection" which details a method of selecting stainless steel fasteners.

Stainless steel is also readily "welded," although the welding rods and techniques are different from that of mild steel. The American Welding Society (800-443-WELD) and the Nickel Development Institute (416-591-7999) have information available on welding stainless steels.

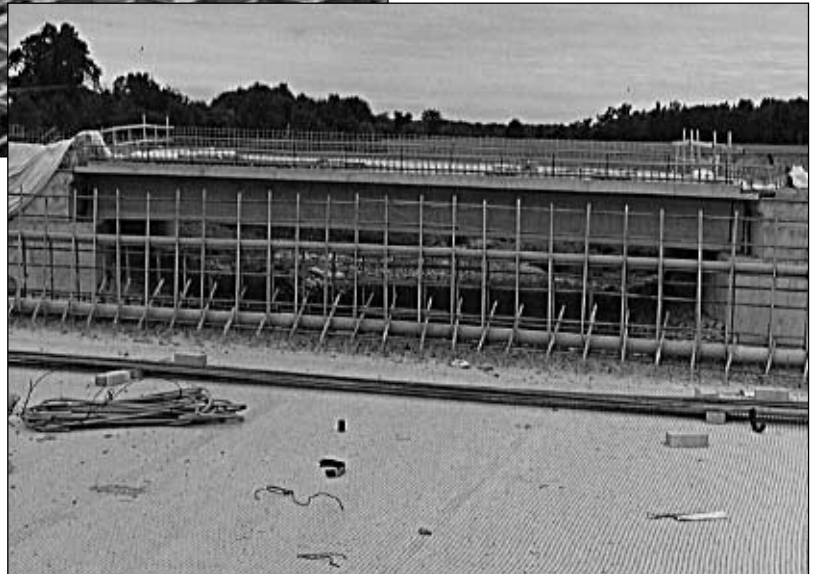
Characteristic	Austenitic 304	Austenitic 316	Ferritic 409	Dual Phase 410-3	Duplex 2205
Bending	E	E	G	G	G
Deep Drawing	E	E	E	E	P
Hot Forming	G	G	G	G	G
Cold Forming	G	G	G	G	F
Punching	F	F	F	F	F
Shearing	F	F	F	F	F
Welding	E	E	F	G	G
Machining	F	F	G	G	P

Code: E = Excellent G = Good F = Fair P = Poor

CONCRETE REINFORCEMENT



Stainless steel rebar
being installed in a
bridge on highway 407
in Ontario, Canada



Preformed rebar for columns

Applications for Rebars:

- Supports for reinforced concrete (i.e., bridge decks)
- Marine construction, piers and wharfs
- Balconies and frames for front-elevation units
- Anchorages and any kind of joints
- Off-shore platforms
- Framers and anchorages for damp environments, tunnels, underpasses and subways
- Bridges, viaducts, overpasses
- Cement frameworks with amagnetic characteristics
- Frameworks which are prone to breaking up due to frost or because of low temperatures
- Concrete slabs for drainage in environments with corrosive agents
- Supports/restoration for statues, monuments, cement, stone and marble works

FABRICATED COMPONENTS

Stainless steel is becoming the material of choice for concrete reinforcement. It has a high resistance to corrosion particularly in chloride bearing concrete (from de-icing salts or seacoast exposure). Significant reductions in maintenance and repair will result in applications where the structure is subject to adverse corrosion.

An article, published in the May 1995 issue of "Concrete International,"³ by D. B. McDonald; M. R. Sherman; D. W. Pfeifer, and Y. P. Virmani, concludes that both "field and laboratory data have shown that stainless steel rebars are capable of maintaining excellent corrosion resistance in severe chloride environments," and that "the chloride tolerance for stainless steel was shown to be significantly greater than that of mild steel." This article also concludes that the "use of stainless steel may be warranted when guaranteed long-term corrosion resistance is required. The



Ladders and walkways and rails fabricated by ENERFAB a Bishopric Company



Entrance hall of an all-stainless steel building in Japan⁴



A showroom of an all-stainless steel building in Japan



Arches, strut light covers and traffic signal poles (not in photo) were fabricated from 316L Stainless steel by the Offenhauser Company. The project is in the Galleria area in Houston.

Applications for Fabricated Components:

- Columns and Pillars
- Walkways, Railings and Ladders
- Arches
- Storage Units
- Processing Vessels
- Structural Supports
- Wall and Ceiling Panels

ROLLED ANGLES

overall cost increase due to the use of stainless steel reinforcing bars is considered to be reasonably low."

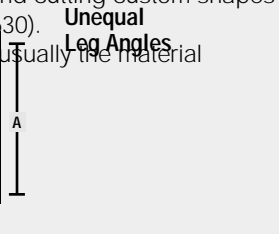


Stainless angles were used to construct a Bar Screen (Series 1000 from Envirex, INC) for a water treatment application.



EXTRUDED ANGLES

Stainless steel can be fabricated into several structural components from sheet, plate, bars or strip. There are many fabrication shops that are experienced in fabricating stainless steel (for more information contact the Steel Plate Fabricators Association 708-562-8750). Steel service centers also can perform some fabrication services such as brake forming and cutting custom shapes and sizes (contact the Steel Service Center Institute 216-694-3630).
 Usually the material



A	B	C	Approx. Wt. Lbs. per Ft.
2	1-1/2	3/16	2.12
2-1/2	2	3/16	2.75
3	2	3/16	3.07
1-1/2	1	1/4	1.92
2	1	1/4	2.34
2	1-1/2	1/4	2.77
2-1/2	1-1/4	1/4	2.85
2-1/2	1-1/2	1/4	3.19
2-1/2	2	1/4	3.62
3	1-1/2	1/4	3.51
3	2	1/4	4.10
3	2-1/2	1/4	4.50
3-1/2	2-1/2	1/4	4.90
3-1/2	3	1/4	5.40
4	3	1/4	5.80
3	2	5/16	5.00
3-1/2	2-1/2	5/16	6.10
4	3	5/16	7.20
2-1/2	1-1/2	3/8	4.70
2-1/2	2	3/8	5.30
3	1-1/2	3/8	5.30
3	2	3/8	5.90
3-1/2	2-1/2	3/8	7.20
3-1/2	3	3/8	7.90
4	3	3/8	8.50
5	3	3/8	9.80
3	1	1/2	6.01
3	1-1/2	1/2	6.85
3	2	1/2	7.70
3-1/2	1-1/2	1/2	7.64
3-1/2	3	1/2	10.20
4	3	1/2	11.10
5	3	1/2	12.80

A	B	C	Approx. Wt. Lbs. per Ft.
1-1/2	1-1/2	3/16	1.80
1-3/4	1-3/4	3/16	2.12
2	2	3/16	2.44
2-1/2	2-1/2	3/16	3.07
3	3	3/16	3.71
1-1/4	1-1/4	1/4	1.92
1-1/2	1-1/4	1/2	2.34
1-3/4	1-3/4	1/4	2.75
2	2	1/4	3.19
2-1/2	2-1/2	1/4	4.10
3	3	1/4	4.90
3-1/2	3-1/2	1/4	5.80
4	4	1/4	6.60
2	2	5/16	3.92
2-1/2	2-1/2	5/16	5.00
3	3	5/16	6.10
3-1/2	3-1/2	5/16	7.05
4	4	5/16	8.20
2	2	3/8	4.70
2-1/2	2-1/2	3/8	5.90
3	3	3/8	7.20
3-1/2	3-1/2	3/8	8.50
4	4	3/8	9.80
2-1/2	2-1/2	1/2	7.70
3	3	1/2	9.40
3-1/2	3-1/2	1/2	11.10
4	4	1/2	12.80

of choice in the food, beverage, pharmaceutical and chemical industries, but is often specified where long life and attractive appearance are desired in other applications. For example, stainless steel is often used as a column "cover" where the outer skin is stainless; however, it can also be used as the load bearing member.

TUBULAR COMPONENTS

Stainless steel angles are produced by hot rolling, annealing, blast cleaning and chemical passivation. Angles can be formed from sheet and plate or rolled from billets creating various structural components. A popular use involves bending the angle into a ring and welding the ends together for use as an outer strengthening component.



Tubular sections form the La Grande Arch structure in Paris.



Stainless steel trusses (20 meters) for bracing and end frames for skylight supports.



Structural tubes, filled with water, used as an external fire prevention system.

Applications for Tubular Components:

- Space frames
- Trusses
- Bracing and end frames
- Lattices
- Load bearing member
- Light poles
- Overhead signs

BARS AND RODS

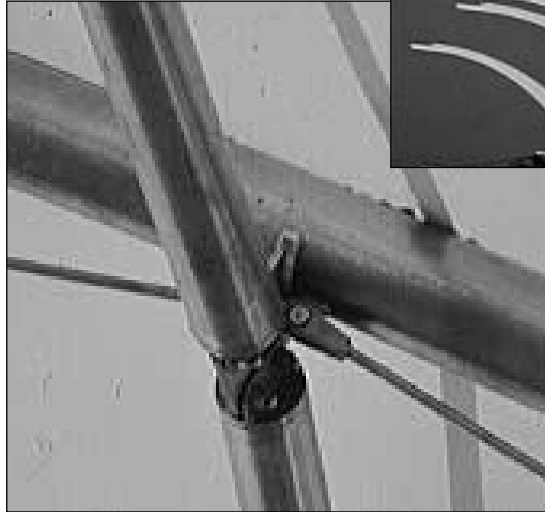
cylindrical structures. Typical sizes are listed in Table 3.



(photo, above)
Stainless steel was used to support a lightweight PTFE coated glass fiber woven fabric roof (not yet installed).



The Minnesota Department of Transportation replaced conventional low alloy steel with stainless steel hinge pins and hangers on the Blatnik Bridge in Duluth, Minnesota.



(photo, left)
Stainless steel tie rods linked to stainless steel tubular columns to maintain the roof membrane in tension.



A continuous reinforced concrete slab supported by 44 stainless steel rods provides pedestrians and cyclists a bridge over the Humber River in Toronto.

Applications for Bars and Rods:

- Structural members in tension
- Load transfer devices
- Tie rods
- Bridge pins

FRAMES

Stainless steel has been specified in bus and rail cars for internal frames and for the entire structure.



Rail coal carriers fabricated from stainless steel.



Truck mirror frame.



Tubular supports for the roof structure of the Canadian Archives Building.

INVESTMENT CASTING

Table 3 **ANGLES**

Slater is able to produce the following sizes of angles in the Hot Rolled, Annealed and Descaled condition:

1 x 1 x 1/8	2 x 2 x 1/4
1 x 1 x 3/16	2 x 2 x 5/16
1 x 1 x 1/4	2 x 2-3/8
1-1/4 x 1-1/4 x 1/8	2-1/2 x 2-1/2 x 3/16
1-1/4 x 1-1/4 x 3/16	2-1/2 x 2-1/2 x 1/4
1-1/4 x 1-1/4 x 1/4	2-1/2 x 2-1/2 x 5/16
1-1/2 x 1-1/2 x 1/8	2-1/2 x 2-1/2 x 3/8
1-1/2 x 1-1/2 x 3/16	3 x 3 x 1/4



Complex stainless steel investment casting connecting the tubular structure with the glass wall.

Applications for Frames:

- Bus and transit frames
- Coal cars
- Space frames
- Mirror mount frames

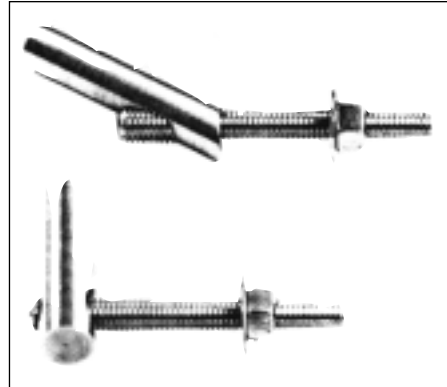
Applications for Castings:

- Anchors
- Support housings
- Joints

WALL TIES AND ANCHORS

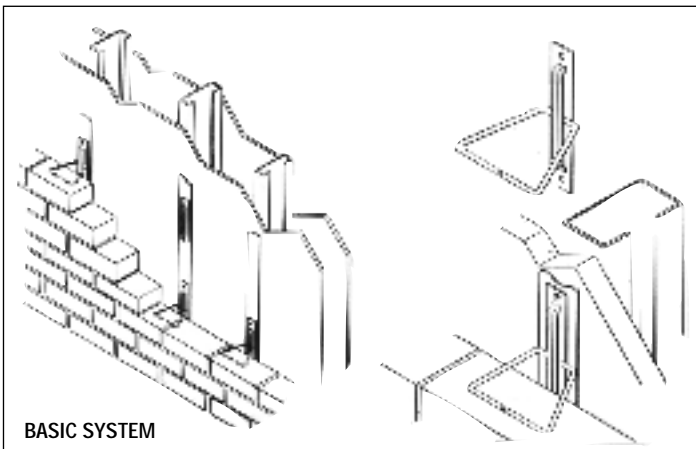
1-1/2 x 1-1/2 x 1/4 3 x 3 x 5/16
 2 x 2 x 1/8 3 x 3 x 3/8
 2 x 2 x 3/16

Tolerance information is as follows:
 Leg Tolerance (length)....+1/8"
 Weight Tolerance.....+7-1/2%
 Right Angle Tolerance.....+2°
 Straightness or Camber...1/8" in 5 feet

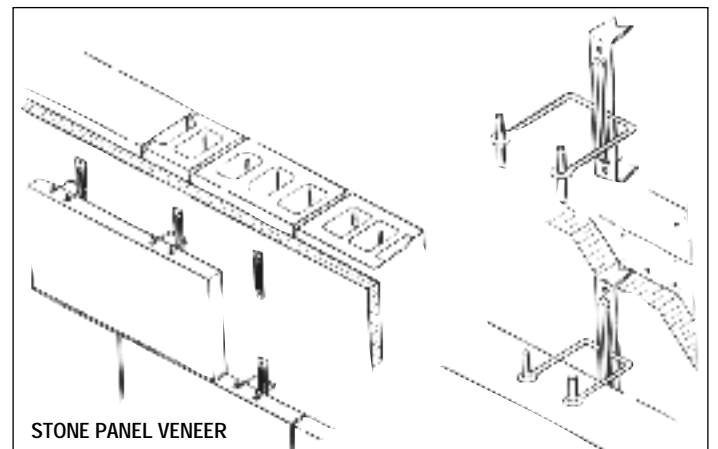


Lewis bolts (top) and threaded inserts for hanging stone (bottom) show variety of stainless steel fastening devices used in stone and concrete anchoring systems.

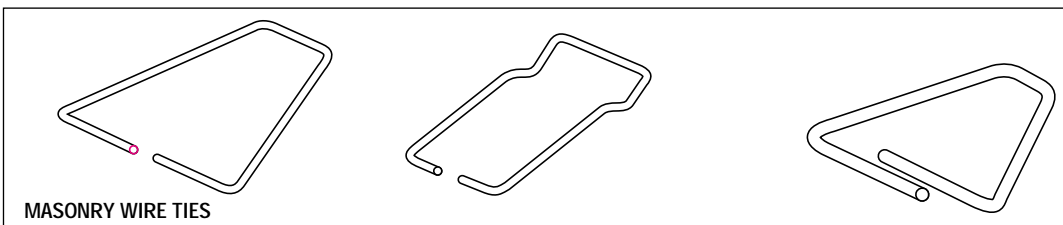
Stainless steel tie bar.



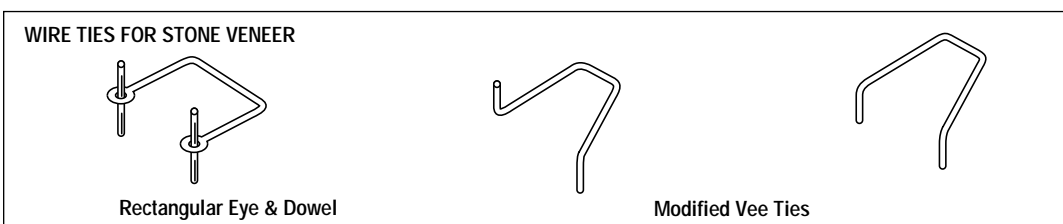
BASIC SYSTEM



STONE PANEL VENEER



MASONRY WIRE TIES



WIRE TIES FOR STONE VENEER

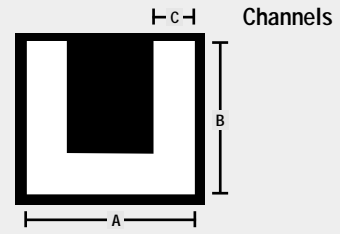
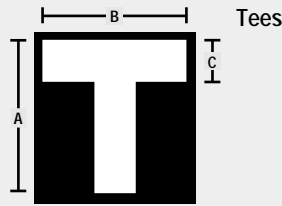
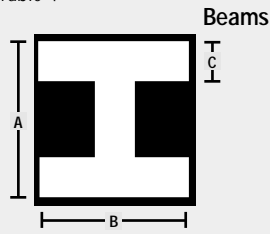
Rectangular Eye & Dowel

Modified Vee Ties

EXTRUSIONS

Stainless steel can be extruded in many shapes including angles. Angles are produced with parallel surfaces on the legs. Typical sizes are listed in Table 4.

Table 4



A	B	C	Approx. Lbs. per Ft.
1-1/2	1	3/16	2.02
1-1/2	1	1/4	2.64
2	1-1/4	1/4	3.43
2-1/2	1-1/2	1/4	4.22
3 (T)	2-3/8	1/4	6.60
4 (T)	2-3/4	1/4	8.44

(T) standard tapered sections

A	B	C	Approx. Wt. Lbs. per Ft.
1-1/4	2	3/16	1.94
1-1/2	1-1/2	3/16	1.65
1-1/2	2	3/16	2.09
1-1/2	2-3/8	3/16	2.37
2	2	3/16	2.44
1	1-1/4	1/4	1.69
1-1/2	1-1/2	1/4	2.34
1-1/2	2	1/4	2.75
2	1-1/4	1/4	2.57
2	2	1/4	3.19
2-1/2	1-1/2	1/4	3.19
2-1/2	2-1/2	1/4	4.10
3	3	1/4	4.91
1-1/2	1-1/2	3/8	3.60
2	2	3/8	4.70
2-1/2	2	3/8	5.29
2-1/2	2-1/2	3/8	5.90
2-1/2	3	3/8	6.70
2	2	1/2	6.38

A	B	C	Approx. Wt. Lbs. per Ft.
1-1/2	3/4	3/16	1.75
2 (T)	9/16	3/16	1.85
2	3/4	3/16	2.02
2 (T)	1	3/16	2.60
2-1/2 (T)	5/8	3/16	2.40
3 (T)	1-3/8	3/16	4.19
1-1/4	1	1/4	2.33
1-1/2	1	1/4	2.57
2	5/8	1/4	2.37
2	1	1/4	3.15
2-1/2	1	1/4	3.57
3	1-1/2	1/4	4.75
4 (T)	1-3/4	1/4	6.69
5 (T)	1-7/8	3/8	10.43

(T) standard tapered sections

Specifications:

The following specifications can be applied to structural products:

- ASTM A276 QQS-763
- ASTM A479

Grades:

- 304 316 304L 316L

Other grades available upon request.
Not all sizes available in all grades.

REFERENCES:

- ¹ American Society of Civil Engineers: ANSI/ASCE 8-90: "Specification for the Design of Cold Formed Stainless Steel Structural Members"
- ² Specialty Steel Industry of North America: Designer Handbook Series: "Stainless Steel Fabrication"
- ³ Concrete International: May 1995: "Stainless Steel Reinforcing as Corrosion Protection": D.B.McDonald; M.R.Sherman; D.W. Pfeifer, and Y.P.Virmani.
- ⁴ Steel Today & Tomorrow: News of Japanese Steel Jan.-Mar. 1996: Page 9 "A New Steel Structure — Stainless steel Buildings"

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and *Mr. Ranjit S. Reel*

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(NY) 516-825-5965

ANCHOR STAPLE & NAIL COMPANY
(RI) 800-237-5555

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(PA) 717-633-7750

CUYAHOGA BOLT & SCREW COMPANY
(OH) 216-341-3800

CWR MANUFACTURING COMPANY
(NY) 315-437-1030

H-O-T DRILL SCREWS
(NY) 800-645-2212

HAYDON BOLTS, INC.
(PA) 215-537-8700

HOHMAN & BARNARD & WARD CORP.
(NY) 800-645-0616

LAKE ERIE SCREW CORP.
(OH) 216-521-1800

RUSSELL, BURDSALL & WARD CORP.
(OH) 216-692-7100

SANTA FE FASTENERS
(CA) 714-523-3100

STANDARD NUT & BOLT COMPANY
(RI) 401-722-6700

ST. LOUIS SCREW & BOLT COMPANY
(MO) 314-389-7500

BOLTS, CONCRETE ANCHOR

ACROW-RICHMOND
(Canada) 416-245-4720

ANCHOR-FAST COMPANY
(NY) 516-825-5965

DYNAMIC FASTENER SERVICE, INC.
(MO) 800-821-5448

FASTEN-IT CORPORATION
(NJ) 732-745-8050

ITW RAMSET/RED HEAD
(IL) 708-350-0370

RAWLPLUG COMPANY, INC.
(NY) 800-524-3244

SIMPSON STRONG-TIE COMPANY, INC.
(CA) 800-999-5099

BRAKE FORMING

ABBAKA
(CA) 800-548-3932

ACORN ENGINEERING
(CA) 800-488-8999

ATLAS MARINE SERVICES & FABRICATION
(FL) 305-594-7433

BECKETT ELEVATOR, LTD.
(Canada) 416-752-9045

COPPER SALES, INC.
(MN) 800-426-7737

COUTURIER IRON CRAFT, INC.
(MI) 616-784-6780

CREATIVE METAL INDUSTRY, INC.
(IN) 800-845-7671

CUSTOM MANUFACTURING & POLISHING, INC.
(MO) 800-742-8043

CUSTOM METAL, INC.
(GA) 800-850-9144

CUSTOM PANEL INDUSTRIES, LLC
(CA) 909-829-8618

DYNASTY METALS, INC.
(NJ) 800-225-3962

ENVIRONMENTAL INTERIORS, INC.
(NH) 603-889-9290

EVANSVILLE METAL PRODUCTS
(IN) 812-423-5632

GALLERY BRASSWORKS INTERNATIONAL
(Canada) 905-795-0808

JASON SHEET METAL COMPANY
(NJ) 609-788-3100

K.S. METAL SPECIALTIES
(Canada) 613-822-6729

LAURIE PANELS
(WI) 800-558-9150

METAL-ERA, INC.
(WI) 800-558-2162

METAL STAMPING DIVISION
(WI) 414-251-8800

MICHAELS DIVISION
(PA) 215-724-8640

MILGO BUFKIN
(NY) 800-472-4544

M. P. METAL PRODUCTS, INC.
(WI) 920-261-9650

NIKO CONTRACTING COMPANY
(PA) 412-687-1517

POHL, INC.
(MA) 617-639-2662
(GA) 404-516-0086

PREMIER METAL PRODUCTS, INC.
(GA) 770-949-2351

RIVERSIDE GROUP
(Canada) 519-945-1321

ROBERGE ARCHITECTURAL METALS
(WA) 206-762-3311

ROOFING & SHEET
(PA) 412-281-5606

R.P.S. ENGINEERING, INC.
(IL) 800-931-1950

SBC INDUSTRIES
(FL) 800-228-2580

STEEL FABRICATING, LLC
(WI) 888-783-5322

STRUCTURAL GLASS DIVISION
(TX) 800-932-0272

TORNQVIST
(NJ) 973-772-1472

UNA-CLAD PRODUCTS
(MN) 800-426-7737

UNITED MECHANICAL
(CA) 510-537-4744

CHANNELS

AK Steel
(PA) 412-255-9800

AMEREX
(PA) 800-949-4151

BEVEL STAMPING COMPANY
(Canada) 416-742-9485

CUSTOM MANUFACTURING & POLISHING, INC.
(MO) 800-742-8043

DYNASTY METALS, INC.
(NJ) 800-225-3962

EMPIRE SPECIALTY STEEL INC.
(NY) 800-456-1989

FEMCO METAL PRODUCTS, LTD.
(Canada) 416-364-2044

CHANNELS (continued)

INDIANA GRATINGS, INC.
(IN) 800-634-1988

JOHNSON BROTHERS METAL FORMING COMPANY
(IL) 708-449-7050

LINBLADE METALWORKS
(CA) 800-248-8886

MCDONALD STEEL CORP.
(OH) 216-530-9118

M. P. METAL PRODUCTS, INC.
(WI) 920-261-9650

NATIONWIDE ARCHITECTURAL METALS
(NJ) 800-851-5053

OAKLEY STEEL PRODUCTS COMPANY
(IL) 708-544-7970

PLYMOUTH TUBE COMPANY
(IL) 800-323-9506

SAMSON ROLL FORMED PRODUCTS COMPANY
(IL) 847-965-6700

SAMUEL MANUTECK, LTD.
(Canada) 905-457-9200

TEXAS WATERJECT & MACHINE
(TX) 800-443-7638

TITAN METALS, INC.
(CA) 800-903-5006

TORNQVIST
(NJ) 973-772-1472

UNITED ROLL FORMING
(IN) 219-294-2800

COLUMN/PILLAR COVERS

ALPLY, INC.
(MS) 601-743-2623

CONSPEC SYSTEMS, INC.
(PA) 717-546-5941

COPPER SALES, INC.
(MN) 800-426-7737

CUSTOM ENCLOSURES, INC.
(IL) 800-544-3783

DAWSON METAL COMPANY, INC.
(NY) 716-664-3811

EMBURY COMPANY
(Canada) 416-742-1212

FABMASTER, INC.
(GA) 404-422-5290

FORMNOUVO, INC.
(Canada) 905-458-5560

INDUSTRIAL BUILDING PANELS
(MI) 810-588-4710

LINEL, INC.
(IN) 317-834-3400

MM SYSTEMS CORP.
(GA) 770-938-7570

METAL SALES & SERVICES, INC.
(PA) 800-321-7816

MILGO BUFKIN
(NY) 800-472-4544

NEWCOURT, INC.
(TX) 903-838-0521

OVERLY MANUFACTURING COMPANY
(PA) 724-834-7300

PITTCO INDUSTRIES
(AZ) 800-637-7638

POHL, INC.
(MA) 617-639-2662

SAMUAL MANUTECK LTD.
(Canada) 905-457-9200

SURFACE DESIGN AND TECHNOLOGY, INC.
(FL) 800-537-1127

ZEPHYR ARCHITECTURAL METALS, INC.
(OK) 918-425-2300

FABRICATION, CUSTOM

ABBAKA
(CA) 800-548-3932

ALFAB, INC.
(AL) 334-347-9516

ARCHITECTURAL METAL WORKS
(FL) 813-942-1888

C.B. METAL INDUSTRIES
(Canada) 416-746-2380

C.D.A. INDUSTRIES, INC.
(Canada) 416-752-2301

CANADIAN ROGERS EASTERN, LTD.
(Canada) 416-762-7211

CITY SHEET METAL, LTD.
(Canada) 604-273-3909

CLEVELAND STEEL SPECIALTY COMPANY
(OH) 800-251-8351

CREATIVE METAL INDUSTRY, INC.
(IN) 800-845-7671

CUSTOM ENCLOSURES, INC.
(IL) 800-544-3783

CUSTOM METAL, INC.
(GA) 800-850-9144

DAWSON METAL COMPANY, INC.
(NY) 716-664-3811

ESKAY METAL FABRICATING
(NY) 800-836-8015

FABMASTER, INC.
(GA) 404-422-5290

FEMCO METAL PRODUCTS
(Canada) 416-364-2044

FULCRUM CUSTOM FABRICATORS, INC.
(Canada) 905-790-1355

GIESKE CUSTOM METAL FABRICATORS
(MO) 800-338-8142

H.M.L. MFG., LTD.
(Canada) 905-791-5409

HOHMAN & BARNARD, INC.
(NY) 800-645-0616

J. BROKAW & ASSOCIATES
(IL) 847-635-0344

MAF METAL ALLOY FABRICATION, LTD.
(Canada) 403-279-8958

MODERN RAILING & METAL CRAFT, LTD.
(Canada) 905-477-4411

MOMETAL, INC.
(Canada) 514-651-5802

PAN-TECH, INC.
(Canada) 905-738-5853

PITTCO INDUSTRIES
(AZ) 800-637-7638

PYRAMID MOULDINGS
(FL) 904-525-0025

RAYLIN MANUFACTURING, LTD.
(Canada) 403-451-4224

ROVICO ARCHITECTURAL PRODUCTS, LTD.
(Canada) 416-291-2805

STE-ALCO, INC.
(Canada) 905-281-8985

SARMAN CUSTOM METAL FABRICATION, LTD.
403-414-5430

SIMON CUSTOM METAL FABRICATION, LTD.
(Canada) 800-667-6816

SOHEIL MOSUN, LTD.
(Canada) 416-243-1600

TECHNIFORM METAL CURVING
(TX) 214-563-1774

TORONTO KITCHEN EQUIPMENT
(Canada) 416-745-4944

W.P. HICKMAN COMPANY
(NC) 828-274-4000

WILLIAMS BROTHERS CORPORATION OF AMERICA
(VA) 800-255-5515

FLAG POLES

AMERICAN FLAGPOLE
(VA) 540-628-4188

BAARTOL COMPANY, INC.
(OH) 800-537-4143

FLAGPOLES, INC.
(NY) 516-751-7788

POLE-TECH COMPANY
(NY) 800-633-6733

FLANGES

MOORE INDUSTRIAL HARDWARE
(OH) 800-543-1677

PAUL MOORE COMPANY
(OH) 800-882-4744

SHARPE PRODUCTS
(WI) 414-327-7738

TUBULAR SPECIALTIES MANUFACTURING, INC.
(CA) 310-515-4801

FLOOR PANELS, STAINLESS CLAD ON WOOD

CHICAGO METALLIC CORP.
(IL) 800-388-0111

FLOOR PLATE

RIGIDIZED METALS CORP.
(NY) 800-836-2580

GATES

CONTROLLED ACCESS, INC.
(OH) 800-942-0829

LMC CORP.
(NJ) 201-279-3573

LAWRENCE METAL PRODUCTS, INC.
(NY) 800-441-0019

PEREY MANUFACTURING COMPANY, INC.
(CT) 203-961-8444

TRI TECH, INC.
(GA) 404-941-0020

GRATINGS

ARDEN ARCHITECTURAL SPECIALTIES, INC.
(MN) 800-521-1826

KADEE INDUSTRIES, INC.
(OH) 800-321-3827

McNICHOLS COMPANY
(OH) 800-237-3820

SEIDELHUBER METAL PRODUCTS, INC.
(CA) 800-635-6948

WHEELING PITTSBURGH STEEL
(WV) 304-234-2300

HURRICANE OR GRIP CLIPS

MANASQUAN PREMIUM FASTENERS
(NJ) 800-542-1979

NEWPORT FASTENER COMPANY
(CA) 800-645-7811

I-BEAMS

ADF INTERNATIONAL, INC.
(FL) 954-340-8854

AMEREX
(PA) 800-949-4151

AU DRAGON FORGE (ADF)
(Canada) 450-965-1911

EMPIRE SPECIALTY STEEL INC.
(NY) 800-456-1989

INDIANA GRATINGS, INC.
(IN) 800-634-1988

OAKLEY STEEL PRODUCTS COMPANY
(IL) 708-544-7970

TITAN METALS, INC.
(CA) 800-903-5006

JOIST HANGERS

ACROW-RICHMOND
(Canada) 416-245-4720

CLEVELAND STEEL SPECIALTY COMPANY
(OH) 800-251-8351

KC METAL PRODUCTS, INC.
(CA) 408-436-8754

MANASQUAN PREMIUM FASTENERS
(NJ) 800-542-1979

METAL PRODUCTS
(CA) 909-354-7181

SIMPSON STRONG-TIE COMPANY, INC.
(CA) 800-999-5099

LIGHT POLES

AMERICAN FLAGPOLE
(VA) 540-628-4188

FLAGPOLES, INC.
(NY) 516-751-7788

MESH, BUILDING

CHINA NATIONAL METALS & MINERAL
(NJ) 201-461-3750

**CLEVELAND WIRE CLOTH &
MANUFACTURING COMPANY**
(OH) 216-341-1832

GREENING DONALD COMPANY, LTD.
(Canada) 519-941-1920

MESH, EXPANDED METAL

ALABAMA METAL INDUSTRIES CORP.
(AL) 205-787-2611

McNICHOLS COMPANY
(FL) 813-289-4100

PERFORATED STAINLESS STEEL

CUSTOM ENCLOSURES, INC.
(IL) 800-544-3783

CUSTOM METAL, INC.
(GA) 800-850-9144

DIAMOND MFG. COMPANY
(PA) 800-233-9601

**HARRINGTON & KING PERFORATING
Co., THE**
(IL) 800-621-3869

McNICHOLS COMPANY
(FL) 813-289-4100

POHL, INC.
(GA) 404-516-0086

PIPE SQUARE STRUCTURAL

ADF INTERNATIONAL, INC.
(FL) 954-340-8854

AU DRAGON FORGE (ADF)
(Canada) 450-965-1911

DAMASCUS BISHOP TUBE COMPANY
(PA) 412-646-1500

JULIUS BLUM & COMPANY, INC.
(NJ) 800-526-6293

ROMAC METALS
(NC) 704-528-4531

RAILINGS, CUSTOM

C.B. METAL INDUSTRIES
(Canada) 416-746-2380

CITY SHEET METAL, LTD.
(Canada) 604-273-3909

CRANE VEYOR CORP.
(CA) 800-423-4180

LMC CORP.
(NJ) 201-279-3573

LAVI INDUSTRIES
(CA) 800-624-6225

MAF METAL ALLOY FABRICATION, LTD.
(Canada) 403-279-8958

MODERN RAILING SYSTEMS & METAL CRAFT, LTD.
(Canada) 905-477-4411

NEWMAN BROTHERS
(OH) 513-242-0011

R&B WAGNER, INC.
(OH) 800-786-2111

RIPPEL ARCHITECTURAL METALS, INC.
(IL) 312-772-0600

SRS STAIN-RAIL SYSTEM, INC.
(NJ) 732-548-6630

STE-ALCO, INC.
(Canada) 905-281-8985

SOHEIL MOSUN, LTD.
(Canada) 416-243-1600

TRIPYRAMID STRUCTURES, INC.
(MA) 508-369-5353

TRI TECH, INC.
(GA) 404-941-0020

WILSON RAILING & METAL
(IL) 847-662-6668

RAILINGS, GLASS/ STAINLESS STEEL

ACI GLASS PRODUCTS
(CA) 800-285-3677

ARCHITECTURAL METAL WORKS
(FL) 813-942-1888

JULIUS BLUM & COMPANY
(NJ) 800-526-6293

LIVERS BRONZE COMPANY, INC.
(MO) 816-833-2828

MILGO BUFKIN
(NY) 800-472-4544

NEWMAN BROTHERS
(OH) 513-242-0011

RIPPEL ARCHITECTURAL METALS, INC.
(IL) 312-772-0600

SRS STAIN-RAIL SYSTEMS, INC.
(NJ) 732-548-6630

TEMPGLASS, INC.
(OH) 800-537-4064

TRITECH, INC.
(GA) 404-941-0020

REBARS (REINFORCEMENT)

ATLAS SPECIALTY STEELS
(Canada) 905-735-5661

EMPIRE SPECIALTY STEEL INC.
(NY) 800-456-1989

REPUBLIC TECHNOLOGIES INTERNATIONAL
(OH) 330-670-3000

RIVETS

ANCHOR-FAST COMPANY
(NY) 516-825-5965

ANCHOR STAPLE & NAIL COMPANY
(RI) 800-237-5555

CWR MTG., Co.
(NY) 315-437-1030

J. BYLER RIVET SUPPLY, INC.
(TX) 800-325-3147

MARSON/CREATIVE FASTENER, INC.
(MA) 800-451-1760

SANTA FE FASTENERS, INC.
(CA) 714-523-3100

WINK FASTENERS, INC.
(VA) 800-935-2051

ROD

BYRAM STEEL TRADING COMPANY, INC.
(NJ) 201-831-0052

EMPIRE STEEL TRADING COMPANY
(NY) 212-344-9700

GULF & NORTHERN TRADING CORP.
(NJ) 609-784-8200

ROLL FORMING

AK STEEL
(PA) 412-255-9800

BEVEL STAMPING COMPANY
(Canada) 416-742-9485

CREATIVE METAL INDUSTRY, INC.
(CA) 800-845-7671

FEMCO METAL PRODUCTS, LTD.
(Canada) 416-364-2044

J. BROKAW & ASSOCIATES
(IL) 847-635-0344

MILGO BUFKIN
(NY) 800-472-4544

SAMUAL MANUTECK LTD.
(Canada) 905-457-9200

TECHNIFORM METAL CURVING
(TX) 214-563-1774

TELEDYNE RODNEY METALS
(MA) 800-955-7655

TOMEN BUILDING COMPONENTS, INC.
(CA) 909-428-1600

UNITED ROLL FORMING
(IN) 219-294-2800

SCREWS, DECKING

BUILDING FASTENERS, INC.
(DE) 800-955-0671

MCFEELY'S SQUARE DRIVE SCREWS
(VA) 800-443-7937

Screws, Self Tapping

ATLAS BOLT & SCREW COMPANY
(OH) 800-321-6077

DYNAMIC FASTENERS SERVICES, INC.
(MO) 900-821-5448

IDEAL BUILDING FASTENERS
(PA) 800-670-5767

IDEAL SECURITY, INC.
(Canada) 514-363-1030

WINK FASTENERS, INC.
(VA) 800-935-2051

Screws, Sheet Metal

ATLAS BOLT & SCREW COMPANY
(OH) 800-321-6977

FORD FASTENERS, INC.
(NJ) 800-272-3673

H-O-T DRILL SCREWS
(NJ) 800-645-2212

IDEAL BUILDING FASTENERS
(PA) 800-670-5767

IDEAL SECURITY, INC.
(Canada) 514-363-1030

METALTITE CORP.
(CT) 800-638-8483

TRIANGLE FASTENER CORP.
(PA) 412-321-5000

SLATE HOOKS

EVERGREEN SLATE COMPANY, INC.
(NY) 518-642-2530

FRANCOSTEEL CORP.
(NY) 212-633-1010

VERMONT SLATE & COPPER SERVICES, INC.
(VT) 888-766-4273

STONE & BRICK REINFORCEMENT

A-J MANUFACTURING COMPANY
(MO) 800-247-5746

ALFAB, Inc.
(AL) 334-347-9516

BAILEY METAL PRODUCTS, LTD.
(Canada) 905-738-6738

BLOK-LOK, LTD.
(Canada) 416-749-1010

DUR-O-WAL, INC.
(IL) 708-577-6400

DUR-O-WAL, LTD.
(Canada) 416-798-2000

EMPIRE SPECIALTY STEEL INC.
(NY) 800-456-1989

FRANCOSTEEL CORP.
(NY) 212-633-1010

HECKMANN BUILDING PRODUCTS, INC.
(IL) 312-826-8564

KEYSTONE FLASHING COMPANY, INC.
(PA) 800-526-8348

MASONRY REINFORCING CORP. OF AMERICA
(NC) 800-849-6722

RAWLPLUG COMPANY, INC.
(NY) 800-524-3244

ROBERGE ARCHITECTURAL METALS
(WA) 206-762-3311

SOUTHERN CONSTRUCTION PRODUCTS, INC.
(AL) 800-821-9296

STRUCTURAL COMPONENTS, MISC.

ADF INTERNATIONAL, INC.
(FL) 954-340-8854

ACME TUBE
(NJ) 732-560-8111

AU DRAGON FORGE (ADF)
(Canada) 450-965-1911

DAMASCUS BISHOP TUBE COMPANY
(PA) 412-646-1500

EMPIRE SPECIALTY STEEL INC.
(NY) 800-456-1989

MCDONALD STEEL CORP.
(OH) 216-530-9118

PHOENIX TUBE COMPANY
(PA) 800-526-2124

ROMAC METALS
(NC) 704-528-4531

SWPECO TUBE CORPORATION
(NJ) 973-778-3000

Suspended Ceiling Grid Systems

BEVEL STAMPING Co., LTD.
(Canada) 416-742-9485

C.G.C. INTERIORS
(Canada) 800-387-7920

CHICAGO METALLIC CORP.
(IL) 800-388-0111

**HUNTER DOUGLAS ARCHITECTURAL
PRODUCTS**
(GA) 800-366-4327

NATIONAL ROLLING MILLS, INC.
(PA) 800-346-7223

USG INTERIORS
(IL) 312-606-4000

Tees

ATLAS MARINE SERVICES & FABRICATION
(FL) 305-594-7433

INDIANA GRATINGS, INC.
(IN) 800-634-1988

MCDONALD STEEL CORP.
(OH) 216-530-9118

NATIONWIDE ARCHITECTURAL METALS
(NJ) 800-851-5053

PMAC, Inc.
(PA) 800-949-4151

Tubing & Pipe (Elbows)

SHARPE PRODUCTS
(WI) 800-879-4418

Tubing & Pipe (Endcaps)

SHARPE PRODUCTS
(WI) 800-879-4418

Tubing & Pipe (Ornamental)

ACME TUBE
(NJ) 732-560-8111

AMERICAN STAINLESS TUBING, INC.
(NC) 800-908-8823

BAARTOL COMPANY, INC.
(OH) 800-537-4143

CUSTOM MANUFACTURING & POLISHING, INC.
(MO) 800-742-8043

DAMASCUS BISHOP TUBE COMPANY
(PA) 412-646-1500

DYNASTY METALS, INC.
(NJ) 800-225-3962

**JOHNSON BROTHERS METAL
FORMING COMPANY**
(IL) 708-449-7050

JULIUS BLUM & COMPANY, INC.
(NJ) 800-526-6293

K.S. METAL SPECIALTIES
(Canada) 613-822-6729

NATIONAL COATING TECHNOLOGY
(IL) 800-284-8464

NATIONWIDE ARCHITECTURAL METALS
(NJ) 800-851-5053

PHOENIX TUBE COMPANY, INC.
(PA) 800-526-2124

PLYMOUTH TUBE COMPANY
(IL) 800-323-9506

POLISHED METALS LTD., INC.
(NJ) 800-526-7051

PRECISION TUBE COMPANY
(PA) 215-699-5801

ROMAC METALS
(NC) 704-528-4531

SHARPE PRODUCTS
(WI) 800-879-4418

TACO WEST, INC.
(WA) 800-325-7513

TELEDYNE RODNEY METALS
(MA) 800-955-7655

TITAN METALS, INC.
(CA) 800-903-5006

UNITED INDUSTRIES, INC.
(WI) 608-365-8891

Pipe & Tube (Rectangular)

CUSTOM MANUFACTURING & POLISHING, INC.
(MO) 800-742-8043

PRECISION TUBE COMPANY
(PA) 215-699-5801

TITAN METALS, INC.
3240 East 59th Street
(CA) 800-903-5006

VINCENT METALS GOODS
(MN) 800-328-7800

Pipe & Tube (Round)

AMEREX
(PA) 800-949-4151

AMERICAN STAINLESS TUBING, INC.
(NC) 800-908-8823

ARMCO SAWHILL TUBULAR DIVISION
(OH) 216-372-6611

BLUCHER-JOSAM
(PA) 215-339-5370

FELKER BROTHERS CORP.
(WI) 800-826-2304

**JOHNSON BROTHERS METAL FORMING
COMPANY**
(IL) 708-449-7050

PLYMOUTH TUBE COMPANY
(IL) 800-323-9506

PRECISION TUBE COMPANY
(PA) 215-699-5801

SWEPCO TUBE CORP.
(NJ) 973-778-3000

TITAN METALS, INC.
(CA) 800-903-5006

VINCENT METALS GOODS
(MN) 800-328-7800

Pipe & Tube (Square)

ADF INTERNATIONAL, INC.
(Canada) 954-340-8854

CUSTOM MANUFACTURING & POLISHING, INC.
(MO) 800-742-8043

DAMASCUS BISHOP TUBE COMPANY
(PA) 412-646-1500

**JOHNSON BROTHERS METAL FORMING
COMPANY**
(IL) 708-449-7050

JULIUS BLUM & COMPANY, INC.
(NJ) 800-526-6293

PRECISION TUBE COMPANY
(PA) 215-699-5801

ROMAC METALS
(NC) 704-528-4531

TITAN METALS, INC.
(CA) 800-903-5006

VINCENT METALS GOODS
(MN) 800-328-7800

Pipe or Tube (Rectangular)

ACME TUBE
(NJ) 732-560-8111

AMERICAN STAINLESS TUBING, INC.
(NC) 800-908-8823

BAARTOL COMPANY, INC.
(OH) 800-537-4143

**CUSTOM MANUFACTURING & POLISHING,
INC.**
(MO) 800-742-8043

DAMASCUS BISHOP TUBE COMPANY
(PA) 412-646-1500

DYNASTY METALS, INC.
(NJ) 800-225-3962

**JOHNSON BROTHERS METAL FORMING
COMPANY**
(IL) 708-449-7050

JULIUS BLUM & COMPANY, INC.
(NJ) 800-526-6293

K.S. METAL SPECIALTIES
(Canada) 613-822-6729

NATIONAL COATING TECHNOLOGY
(IL) 800-284-8464

NATIONWIDE ARCHITECTURAL METALS
(NJ) 800-851-5053

PHOENIX TUBE COMPANY, INC.
(PA) 800-526-2124

PLYMOUTH TUBE COMPANY
(IL) 800-323-9506

POLISHED METALS LTD., INC.
(NJ) 800-526-7051

PRECISION TUBE COMPANY
(PA) 215-699-5801

ROMAC METALS
(NC) 704-528-4531

SHARPE PRODUCTS
(WI) 800-879-4418

TACO WEST, INC.
(WA) 800-325-7513

TELEDYNE RODNEY METALS
(MA) 800-955-7655

TITAN METALS, INC.
(CA) 800-903-5006

UNITED INDUSTRIES, INC.
(WI) 608-365-8891

TURNBUCKLES

FEENEY WIRE ROPE & RIGGING, INC.
(CA) Toll-Free: 800-888-2418

FEHR BROTHERS INDUSTRY, INC.
(NY) 800-431-3095

MOORE INDUSTRIAL HARDWARE
(OH) 800-543-1677

PAUL MOORE COMPANY
(GA) 800-882-4744

SAYA INDUSTRIES, INC.
(NJ) 973-835-0882

US RIGGING SUPPLY CORP.
(CA) 800-624-1116

**WINDOW CLEANING
PLATFORM COMPONENTS**

WEATHERGUARD SERVICE, INC.
(GA) 770-422-4808

**This is a partial listing. There may be organizations with equivalent or substitute products or capabilities that have not been included because they have not been identified by or come to SSINA's attention. Anyone that manufactures stainless steel structural products is encouraged to send information to SSINA describing their products for possible inclusion in future editions of this guidebook and its directory.*