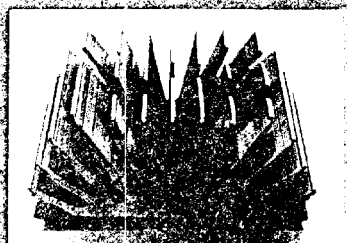


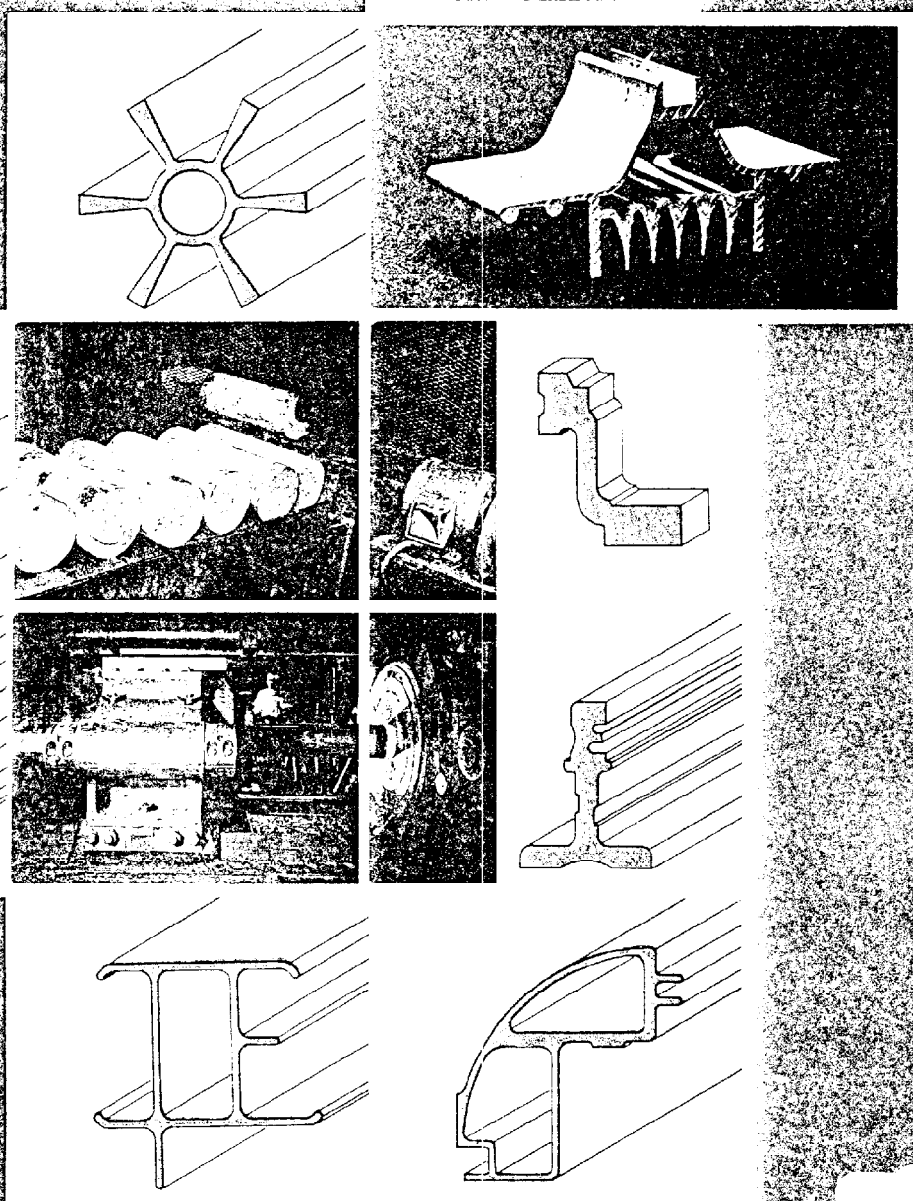
A guide to aluminum extrusions

6

the Aluminum Association
Incorporated



A guide to
aluminum extrusions



The Aluminum Association, Inc. Extruded Products Division

Alcan Aluminum Corp.
P.O. Box 6977, Cleveland, OH 44101
Alumax, Inc.
1701 E. Woodfield Rd., Schaumburg, ILL. 60172
Aluminum Company of America
P.O. Box 500, Lafayette, Ind. 47902
Anaconda Aluminum Company
P.O. Box 32860, Louisville, KY 40232
Consolidated Aluminum Corp.
P.O. Box 14448, St. Louis, MO 63178
Cressona Aluminum Company
Cressona, PA 17929
Ethyl Corp.
P.O. Box 428, Newnan, GA 30263
Extruded Metals, an Indian Head Co.
21800 Greenfield Road, Detroit, MI 48237
General Extrusions, Inc.
P.O. Box 2687, Youngstown, OH 44507
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P.O. Box 629, Terrell, TX 75160
Jarl Extrusions, Inc.
1300 N. Federal Highway, Boca Raton, FL 33432
Kaiser Aluminum & Chemical Corp.
300 Lakeside Drive, Oakland, CA 94643
Magnode Corporation
P.O. Box 292, Trenton, OH 45067
Martin Marietta Aluminum Inc.
6801 Rockledge Dr., Bethesda, MD 20034
Minalex Corp.
Coddington Road, White House Station, NJ 08889
National Aluminum Corp., sub of National Steel Corp.
2800 Grant Building, Pittsburgh, PA 15219
National Northeast Corp.
65 Manchester St., Lawrence, MA 01840
New Jersey Aluminum, Inc.
P.O. Box 73, North Brunswick, NJ 08902
Norandex, Inc.
7120 Krick Road, P.O. Box 46310, Cleveland, OH 44146
Norsk Hydro Aluminum, Inc.
100 Gus Hipp Boulevard, Rockledge, FL 32955
Pimalco
P.O. Box 5050, Chandler, AZ 85224
Precision Extrusions
720 E. Green Avenue, Bensenville, ILL 60106
Revere Copper & Brass, Inc.
605 Third Avenue, New York, NY 10016
Reynolds Metals Company
6601 W. Broad Street, Richmond, VA 23261
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1510 Investment Bldg., Cleveland, OH 44114
Tower Extrusions, Inc.
111 West Port Plaza, St. Louis, MO 63141
V.A.W. of America, Inc.
Ellenville, NY 12428
Warner Mfg. Corp.
265 Watessing Avenue, Bloomfield, NJ 07003
Wells Aluminum Corp.
P.O. Box 77, South Bend, Ind. 46624
R.D. Werner Company, Inc.
P.O. Box 580, Greenville, PA 16125

Aluminum Extruders Council

Aerolite Extrusion Company
4605 Lake Park Rd., Youngstown, OH 44512
Alcan Canada Products Div., Alcan Aluminum Corp.
P.O. Box 269, Toronto-Dominion Centre, Toronto, Ontario M5K 1K1 Canada
Alexandria Extrusion Company
Alexandria, MN 56308
Alexco, Inc.
Box 667, Niles, OH 44446
Almag Aluminum, Ltd.
345 Munster Ave., Toronto, Ontario M8Z 3C6, Canada
Alisco Anaconda Aluminum, Inc.
1 Anaconda Dr., Gnaadenhutzen, OH 44629
Alumax Extrusions, Inc.
1701 E. Woodfield Rd., Schaumburg, IL 60172
Aluminio Boliviano (Alubol) S.A.
P.O. Box 420, La Paz, Bolivia, South America
Aluminum Company of America
1501 Alcoa Bldg., Pittsburgh, PA 15219
Aluminum Extrusion Corporation
P.O. Box W, Canovanas, PR 00629
Aluminum Div., Hoover Universal, Inc.
530 West Lovett St., Charlotte, MI 48813
Aluminum Shapes, Inc.
9000 River Rd., Delair, NJ 08110
Amarlite Anaconda Aluminum, Inc.
4785 Fulton Industrial Blvd. S.W., Atlanta, GA 30336
Ametek/Aluminum
P.O. Box 351, Watsonville, CA 95076
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P.O. Box 32860, Louisville, KY 40232
Anodizing, Inc.
7933 NE 21st Ave., Portland, OR 97211
ARA Aluminum Extrusions, Inc.
3724 Union St., Mineral Ridge, OH 44440
Arizona Aluminum Company
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ATEC Industries
Box 296, Canfield, OH 44406
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1070 N. Grove, Anaheim, CA 92806
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25 Bonnell St., Newnan, GA 30264
Briteline Extrusions, Inc.
Box 339, Summerville, SC 29483
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930 Sandusky St., Fostoria, OH 44830
California Custom Shapes
12360 Edison Way, Garden Grove, CA 92641
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Cardinal Extrusions Company
P.O. Drawer A, Louisville, KY 40219
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Burlington, N.C. 27215
Central Aluminum Company
108 Broehm Rd., Columbus, OH 43207
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210 North "A" St., Albion, IA 52531
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Cuprum S.A.
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Custom Aluminum Products, Inc.
414 W. Division St., So. Elgin, IL 60177
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P.O. Box 277, Newton Falls, OH 44444
Daymond Ltd.
2441 Royal Windsor Dr., Mississauga, ON L5J 4C7, Canada
Esasco Aluminum Corp.
706 S. State St., Girard, OH 44420
E.I. Du Pont De Nemours & Co.
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Elixir Industries
20410 Industrial Parkway, Elkhart, IN 46514
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P.O. Box 50696, Tucson, AZ 85703
Extruded Alloys Corp.
800 X St., Bedford, IN 47421
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21800 Greenfield Rd., Detroit, MI 48287
Extruders, Inc.
Box 799, Wylie, TX 75098
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2770 North Perris Blvd., Perris, CA 92370
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1210 E. Maple Rd., Troy, MI 48064
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Box 1506, Clearfield, UT 84016
General Extrusions, Inc.
4040 Lake Park Rd., Youngstown, OH 44512
Girard Extrusion Div., Esasco Aluminum Corp.
706 S. State St., Girard, OH 44420
Guaranteed Products Div., D.G. Shelter Products Co.
355 N. Vineland Ave., City of Industry, CA 91746
The Himmel Brothers Co.
1409 Dixwell Ave., Hamden, CT 06514
Howmet Aluminum Corp.
475 Steamboat Rd., Greenwich, CT 06830
Indalex, Div. of Indal Limited
61 Arrow Rd., Weston, Ontario M9M 2L6, Canada
Indiana Aluminum Extrusion Corp.
23841 Reedy Dr., Elkhart, IN 46514
International Extrusions, Inc.
5800 Venoy Rd., Garden City, MI 48135
Jarl Extrusions, Inc.
1300 N. Federal Highway, Boca Raton, FL 33432
The Jordan Companies
4661 Burbank, Memphis, TN 38181

Kaiser Aluminum & Chemical Corp.
300 Lakeside Drive, Oakland, CA 94604
Keymark Aluminum Corp.
Fonda, NY 12068
Kil Non Ferrous Metal Industries, Ltd.
Box 210, K. Motzkin, Israel 26114
Krestmark Industries, Inc.
P.O. Box 386, Lewisville, TX 75067
Light Metals Corp.
2740 Prairie SW, Grand Rapids, MI 49509
The Loxscreen Company, Inc.
P.O. Box Drawer 4, West Columbia, SC 29169
Macklanburg-Duncan Company
P.O. Box 25188, Oklahoma City, OK 73125
Magnode Corporation
P.O. Box 292, Trenton, OH 45067
Martin Marietta Corp.
6801 Rockledge Dr., Bethesda, MD 20034
Metal Industries, Inc.
P.O. Box 4490, Clearwater, FLA 33518
Mideast Aluminum Industries, Div. of Indal Limited
U.S. Rt. 130, Dayton, NJ 08810
Midwest Aluminum Co.
7696 W. Michigan Ave., Kalamazoo, MI 49009
Mid-States Aluminum Corp.
834 W. Scott St., Fond du Lac, WI 54935
Minalex Corp.
Coddington Rd., White House Station, NJ 08889
National Aluminum Extrusion Div., National Steel Corp.
P.O. Box 66, Murrysville, PA 15668 & 5800 Massachusetts Ave., Indianapolis, IN 46218
National Northeast Corp.
P.O. Box 959, Lawrence, MA 01842
New Jersey Aluminum Company, Inc.
P.O. Box 73, North Brunswick, NJ 08902
Noranda Aluminum
23200 Chagrin Blvd., Cleveland, OH 44122
Norsk Hydro Aluminum, Inc.
100 Gus Hipp Blvd., Rockledge, Fla. 32955
Pacific Aluminum Corp.
P.O. Box 6301, Modesto, CA 95355
Peerless of America, Inc.
5800 Pulaski Road, Chicago, IL 60646
Penn Aluminum International
3837 W. 20th St., P.O. Box 8188, Erie, PA 16505
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P.O. Box 5050, Chandler, AZ 85224
PPG Industries, Inc.
P.O. Box 930, Kokomo, IN 46901
Precision Extrusions, Inc.
720 E. Green Ave., Bensenville, IL 60106
Ravens Metal Products, Inc.
P.O. Box 1163, Parkersburg, WVA 26101
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2550 Walnut Hill, Dallas, TX 75229
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605 Third Ave., New York, NY 10016
Revere Extruders, Inc.
3255 Pomona Blvd., Pomona, CA 91766 & 14323 South Outer Rd., Chesterfield, MO 63013
Reynolds Metals Company
Reynolds Metals Bldg., Richmond, VA 23218
Samaran Aluminum Co.
P.O. Box 826, Warren, OH 44482
Season-All Industries, Inc.
Indiana, PA 15701
Taber Metals, Inc.
P.O. Box 1418, Russellville, AR 72801
Temroc Metals, Inc.
2735 Cheshire Lane, Minneapolis, MN 55441
Texas Extrusion Corp.
P.O. Box 99, Rockwall, TX 75087
Trim Alloys, Inc.
Trim Way, Randolph, MA 02368
Universal Alloy Corp.
2871 La Mesa Ave., Anaheim, CA 92806
Universal Aluminum Extrusion Corp.
P.O. Box 467, Pleasantville, NJ 08232
V.A.W. of America, Inc.
Ellenville, NY 12428
Warner Manufacturing Corp.
265 Watessing Ave., Bloomfield, NJ 07003
Wells Aluminum Corp.
P.O. Box 77, South Bend, IND 46624
R.D. Werner Company, Inc.
P.O. Box 580, Greenville, PA 16125
Western Extrusions Corp.
1735 Sandy Lake Road, Carrollton, TX 75006
Winnabago Industries, Inc.
Forest City, IA 50436

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A guide to aluminum extrusions

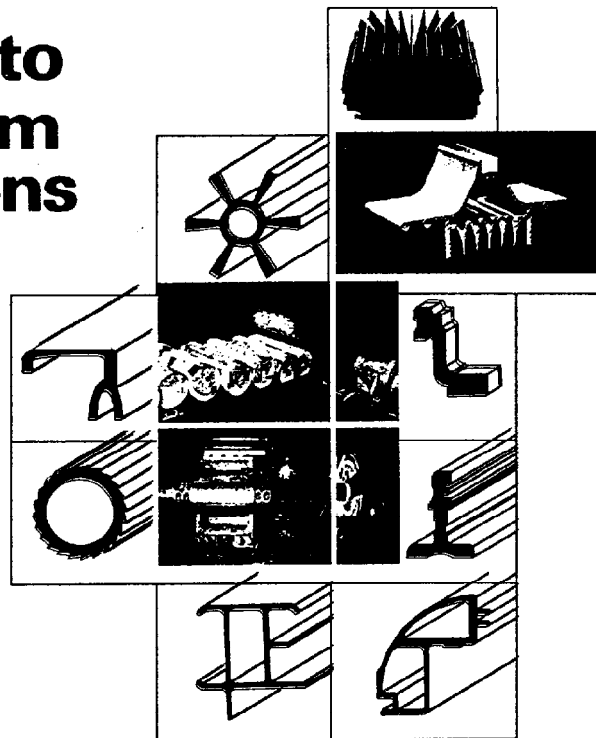


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Introducing Aluminum Extrusions

A heated aluminum extrusion ingot is placed in an extrusion press and forced through a shaped opening—much the way toothpaste is forced out through the opening when you squeeze the tube. The aluminum takes on the shape of the steel die and an extrusion is formed. But the very special thing about the extrusion process is that die inserts can form a wide array of voids and openings inside the extrusion. A seamless tube, for example, is a single cavity hollow extrusion.

In this manner, one push of the ram, which supplies a force as high as 14,000 tons, can change an ingot of aluminum into an almost limitless variety of one-piece shapes with external and internal ribs, channel curves,

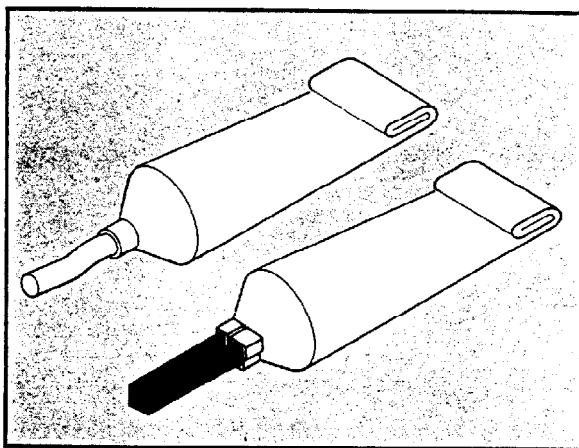
flats, slots, grooves and oddly shaped openings.

The resulting part has excellent grain structure, uniform alloying element distribution and all the desirable characteristics inherent in wrought metal.

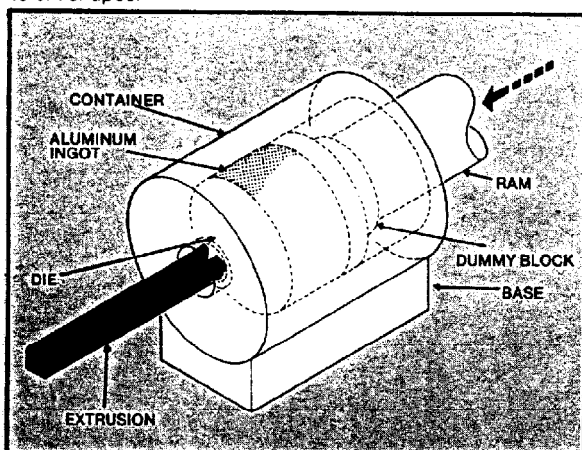
The ingots of aluminum are heated to between 800 and 1000°F. prior to extrusion and the dies are also heated.

The strength of extruded shapes in some alloys may be modified by a variety of heat treating processes to meet customer specifications.

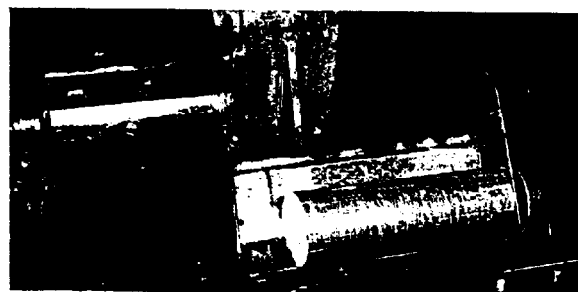
Aluminum extrusions, like all forms of aluminum, can be bent, formed, machined, welded, brazed, soldered, adhesively joined, painted, etched and anodized.



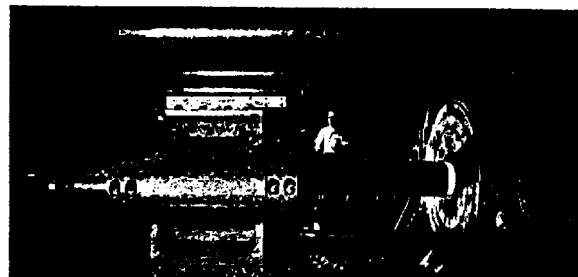
1. Toothpaste tubes showing how different openings create different shapes.



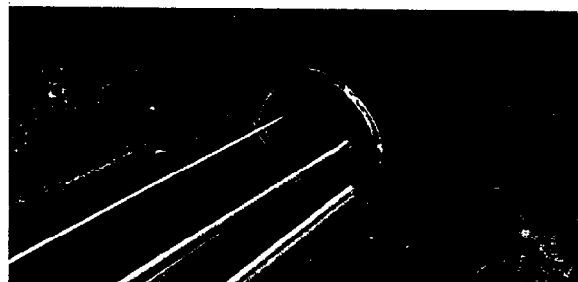
2. Schematic drawing of an extrusion press showing a hydraulically powered ram forcing the heated metal through the die.



A. Cast aluminum ingots are heated prior to entering the press.



B. A hydraulic press forces heated aluminum ingots through die.



C. Extrusion emerging from die with custom shape.

Advantages of Aluminum Extrusions

When a designer specifies an aluminum extrusion, he gets two sets of advantages—first the extrusion process and second those inherent in aluminum.

The extrusion process is usually the most economical way to make parts that have a constant cross section, because the designer can put the metal "where he wants it." Often, extruding is the only method that can be used.

Machining many lengths of metal to a particular cross section is almost always more costly than extruding a similar number of pieces. Machining costs are additive; each additional piece requires almost the same amount of time and labor. Scrap resulting from machining often weighs more than the finished work.

Fabricating shapes by welding is also costly. Each work piece must be welded and costs do not go down much with volume. In some instances the cost of the necessary welding jigs is much higher than the cost of the extrusion die that would be necessary to produce the same shape.

The cost of roll forming dies is very high compared to extrusion dies. And roll forming cannot be used where wall thickness must be varied. The thickness of the metal remains the same after bending.

Sand and permanent mold casting results in parts that may need extensive finishing before use. Aluminum extruding produces a wrought structure with relatively close dimensional control. Casting mold costs rise far more rapidly than extrusion dies as part complexity increases.

Extrusion dies are comparatively inexpensive. Generally, a simple shape will cost only a few hundred dollars. Forming dies and casting molds generally run to thousands of dollars.

Most extruders stock many standard dies which the customer can use without a die service charge.

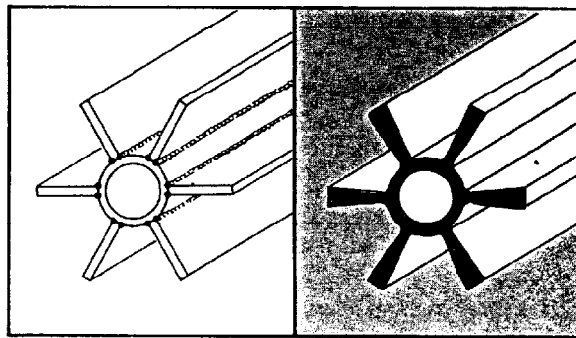
Extrusion dies can be finished with less lead time than forming dies and casting molds.

Aluminum extruders will also store and maintain the die without charge. Most aluminum extrusion dies can be installed in a press quickly, so set up charges are nominal. Extrusion die life is long.

While many metals can be extruded, aluminum is the best all around extrusion metal because of its unique combination of properties.

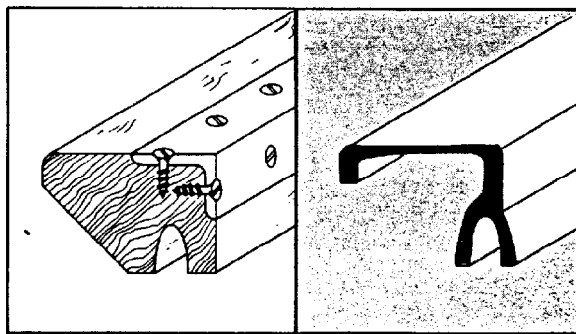
It would take a very lengthy metallurgical handbook to describe in detail all the properties and advantages of aluminum, but here is a brief look at its more outstanding characteristics:

High strength-to-weight Ratio—Because the extrusion process "puts the metal where it is needed," the



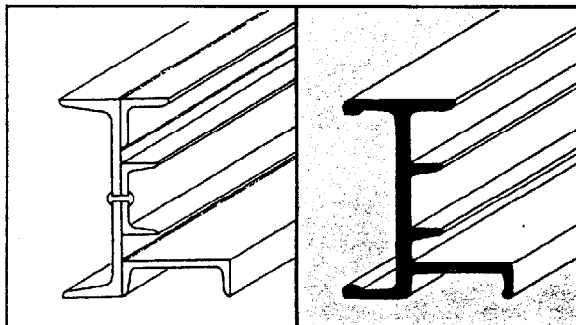
WELDED

EXTRUDED



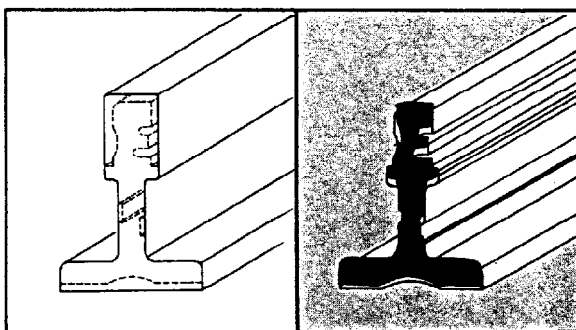
FASTENED

EXTRUDED



JOINED

EXTRUDED



CAST

EXTRUDED