

Terms and Conditions of Sale

1. **FOB POINT / PRICES:** Products are sold F.O.B. point of origin. Any taxes are in addition to the prices and may be invoiced later.
2. **SHIPPING SCHEDULE:** The shipping schedule is our current estimate of delivery dates and we agree to use reasonable efforts to comply with the schedule.
3. **WARRANTY:**

(a) Any D-M-E trademarked or tradenamed product or part thereof manufactured by or for us which, under normal operating conditions in the plant of the Buyer thereof, proves defective in material or workmanship, as determined by our inspection, within 12 months from the date of shipment will be replaced or repaired free of charge to Buyer.

This warranty is contingent upon the following conditions: that we promptly receive notice of the defect; that Buyer establish that the product has been properly installed, maintained, and operated within the limits of related and normal usage as specified by us; and that, upon our request, Buyer will return to us at our expense the defective product or part thereof.

(b) The terms of this warranty do not in any way extend to any product or part thereof which have a life, under normal usage, inherently shorter than 12 months.

(c) The conditions of actual production in each end user's plant vary considerably. Therefore, descriptions of the production or performance capabilities of any product or software materials are estimates only and are not warranted.
4. **EXCLUSIONS OF WARRANTIES:** THE WARRANTIES TO REPAIR OR REPLACE DEFECTIVE PRODUCTS OR PARTS AS SET FORTH IN PARAGRAPH 3, AND ANY ADDITIONAL WARRANTY EXPRESSLY STATED TO BE A WARRANTY AND SET FORTH IN WRITING AS PART OF THESE TERMS HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
5. **LIMITATION OF REMEDIES AND LIABILITIES:** UNDER NO CIRCUMSTANCES SHALL WE OR ANY AFFILIATE OF OURS HAVE ANY LIABILITY WHATSOEVER FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES HOWSOEVER CAUSED OR ARISING (INCLUDING CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE), such as, but not limited to, loss of profit or revenue; loss of use of the product, part thereof; cost of capital; cost of replacement equipment; or claims resulting from contracts between Buyer, its customers and/or suppliers. Unless expressly provided for herein, in no event shall we or any affiliate of ours assume responsibility or liability for (a) penalties, penalty clauses or liquidated damages clauses of any description, (b) certifications or (c) indemnification of Buyer or others for costs, damages or expenses arising out of or related to the product or part thereof.
6. **CANCELLATION:** Unless otherwise agreed, Buyer may cancel all or any part of the order by written notice received by us before our completion of the order or applicable portion of the order. On receipt of such notice, all work on the order or part thereof canceled will be stopped as promptly as is reasonably possible. Buyer will then be invoiced for and will pay to us a cancellation charge. For completed items, the charge will be equal to their established prices. For items not completed, the charge will be equal to our full cost plus a premium in addition to a charge for any packing and storage and less a credit for the balance of the material as scrap.
7. **PAYMENT TERMS:** Payment is due in accordance with any applicable progress, advance or other agreed upon payment schedule, or, if no such schedule has been agreed to, upon Acceptance as specified in Paragraph 8, but in no event later than 30 days from the date of invoice. No cash discount is provided. If, in our judgment, Buyer's financial condition changes, we may stop work until financial arrangements satisfactory to us are made.
8. **ACCEPTANCE OF PRODUCT:** Each such product shall be deemed to be accepted within seven days after delivery of the product to the Buyer, unless we receive written notification of rejection for cause from Buyer within the seven day period.
9. **PATENT INDEMNITY:** We shall defend any suit or proceeding brought against Buyer and pay all costs and damages awarded against Buyer provided that:
 - (a) The suit or proceeding is based upon a claim that the product or part thereof is an infringement of any claim of a presently existing U.S. patent;
 - (b) The claim of infringement is not based, directly or indirectly, upon (i) the manufacture, use, or sale of any product furnished by us which has been modified without our consent; or (ii) the manufacture, use, or sale of any combination of a product furnished by us with products not furnished by us; or (iii) performance of a patented process using a product furnished by us or production thereby of a patented product; and,
 - (c) We are notified promptly and given information and assistance (at our expense) and the authority to defend the suit or proceeding. We shall not be responsible hereunder for any settlement made without our written consent nor shall we be responsible for costs or expenses incurred without our written consent. If our product is adjudicated to be an infringement and its use in the U.S. by Buyer is enjoined, we shall, at our own expense, either:
 - (i) procure for Buyer the right to continue using our product;
 - (ii) replace it with a noninfringing product;
 - (iii) modify it so it becomes noninfringing;
 - (iv) remove the product or part thereof and refund Buyer's net book value and transportation costs attributable to it.

The foregoing states our entire liability with respect to any patent infringement by our products or any parts thereof. To the extent that our product or any part thereof is supplied according to specifications and designs furnished by Buyer, Buyer agrees to indemnify us in the manner and to the extent set forth above insofar as the terms thereof are appropriate.
10. **FORCE MAJEURE:** We shall not be liable for any delay in performance or nonperformance which is due to war, fire, flood, acts of God, acts of third parties, acts of governmental authority or any agency or commission thereof, accident, breakdown of equipment, differences with employees or similar or dissimilar causes beyond our reasonable control, including but not limited to, those interfering with production, supply or transportation of products, raw materials or components or our ability to obtain, on terms we deem reasonable, material, labor, equipment or transportation.
11. **ACCEPTANCE OF ORDERS:** Buyer agrees that all orders, including any arising from our Proposal, shall include these terms and conditions only, notwithstanding any different or additional terms that may be embodied in Buyer's order. All orders are subject to our acceptance and we reserve the right to reject orders as, in our sole judgement, mandated by business conditions. We reserve the right to not proceed with any order until all necessary information is received from Buyer.
12. **MERGER CLAUSE:** This Agreement entirely supersedes any prior oral representations, correspondence, proposal, quotation, or agreement. This writing constitutes the final and total expression of such agreement between the parties, and it is a complete and exclusive statement of the terms of that agreement.
13. **ASSIGNMENT:** Neither party may assign this Agreement without the written consent of the other party, except that we may assign this Agreement to a third party that acquires substantially all of our assets or we may assign the flow of funds arising out of this Agreement.
14. **GOVERNING LAW:** This Agreement shall be governed by and construed in accordance with the laws of the State of Michigan.

Sales and Ordering Information

U.S.A.

TERMS AND CONDITIONS OF SALE: See previous page.

PHONE ORDERS – TOLL FREE: 800-626-6653. D-M-E's Customer Service Dept. operates Monday through Friday from 8 a.m. to 8 p.m. E.S.T. Calls can be made from anywhere in the continental U.S. and Puerto Rico (Puerto Rico: use "137" prefix instead of "1"). Our Customer Service Representatives will be happy to answer your questions on D-M-E products or services, provide on-the-spot feedback on product availability and shipping details, or take any messages you wish relayed to your local D-M-E sales, manufacturing or technical service representatives.

MAIL ORDERS: If you prefer to order by mail, please address your order to:

- D-M-E Company, 29111 Stephenson Highway, Madison Heights, Michigan 48071-2330
ATTN: Customer Service Dept.

FAX: You may fax your order to:

- D-M-E Customer Service
248-398-6174 • 888-808-4363

CHECKS OR MONEY ORDERS: When paying invoices by check or money order, please make payable to *D-M-E Company*. Include remittance copy of invoice and mail to:

- D-M-E Company, Department Lock Box 78242, P.O. Box 78000, Detroit, Michigan 48278-0242

WALK-IN ORDERS, PICK-UPS AND RETURNS: If desired, ordered products in stock at your nearest D-M-E Service Center can be picked up rather than shipped. Walk-in orders at Service Center locations can also be processed while you wait. Products being returned for repair or exchange should be processed through Customer Service prior to being returned.

SPECIAL MACHINING SERVICES: Prints for quotation on special machining work can be sent by EDI to dme_cad@dme.net or mailed to the Estimating Department of the D-M-E manufacturing location nearest you. Call our toll-free number if desired to clarify location which serves your area.

Estimating locations are:

- 70 East Hillis Street, Youngwood, Pa 15697, FAX: 724-925-2424
- 1117 Fairplains Street, Greenville, MI 48338, Tel. 616-754-4601, FAX: 616-225-3924
- 3275 Deziel Drive, Windsor, Ont N8W 5A5, Tel. 519-948-5001, FAX: 519-948-4652
- 464-466 Windy Point Drive, Glendale Heights, IL 60139, Tel. 630-469-4280, FAX: 630-469-4740 (estimating only)

Please add "D-M-E Company" and "Attn: Estimating Dept." to above addresses when mailing prints. To obtain prices and delivery on special mold base orders or to check status of special work in progress please contact Customer Service.

CANADA

TERMS AND CONDITIONS OF SALE: See previous page.

PHONE ORDERS: Contact our Mississauga, Ontario office at 800-387-6600, FAX: 800-461-9965.

MAIL ORDERS: Send to: D-M-E of Canada, Ltd., 6210 Northwest Drive, Mississauga, Ontario L4V 1J6.

CHECK OR MONEY ORDERS: Make payable to *D-M-E of Canada, Ltd.* Include remittance copy of invoice and mail to Mississauga address above.

WALK-IN ORDERS, PICK-UPS, RETURNS, AND SPECIAL MACHINING: Contact our Mississauga office.

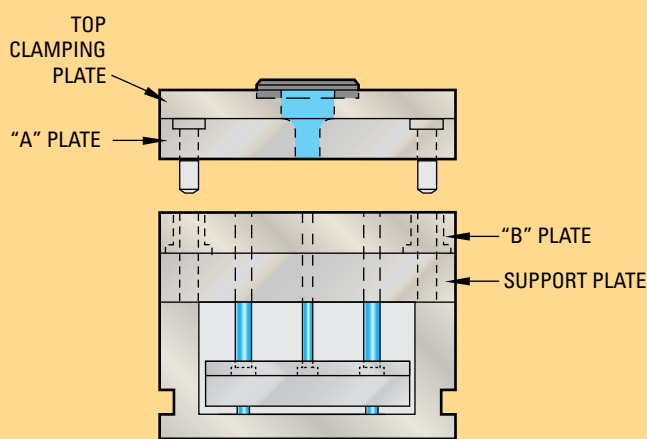
Mold Bases: What Every Molder Should Know

Today's mold-building process is a complex one for the molder, who must grapple with a long list of design details before placing a tooling order. It's understandable that much of the buyer's attention goes to the "heart" of the injection mold, the core and cavity inserts, since they have the most visible influence on the molded part. Yet all sorts of ancillary tooling components, to which the molder might not be inclined to give much thought, can also make or break a mold.

One item that sometimes gets lost in the shuffle is the mold base, even though the wrong one can severely limit a mold's productivity. Rather than an afterthought, mold base selection should be considered critical to the profitability of the entire molding project.

When selecting a mold base for a particular job, first ask a few key questions about the part's design and processing demands: What kind of ejection does it need? Does it have a cam action or some other mold-action device? What are the volume requirements? What type of machine will it run on?

Answer these design and processing questions, and you'll be well on your way to picking the standardized or special-purpose mold base best suited to your application.



A-Series Mold Base Assembly

The most frequently used standard assembly, the "A" Series Mold Base, is available in 43 sizes from 7.875 x 7.875 to 23.75 x 35.5.

Standard Mold Base Styles

For most applications, a standard mold base will fit the bill. The most common of these is the "A-style," which has the flexibility to fit into the widest variety of molding applications.

A-style models have a four-plate design: (from top to bottom) top clamp plate, A-plate, B-plate, support plate, ejector retainer, ejector bar, and ejector housing. Mold makers using an A-style mold base typically machine through pockets in the "A" and "B" plates to accept just about any kind of core and cavity insert.

The B-style mold base represents an economy version of the A-style. The B-style's two-plate design combines the top clamp plate and the "A" plate into one component called the "A-Clamping Plate" or ACP. Likewise, a beefed-up "B" plate eliminates the need for a support plate on the core side of the mold.

Molders can use the less-costly "B" Series when the part design allows the cavity and core to be machined directly into the cavity plates. If the mold will be used with cavity inserts, they must be machined into blind pockets. The compactness of the "B" series mold base also makes it applicable whenever overall mold height must be limited in order to fit the tool in a given molding machine.

"Core and cavity inserts ... have the most visible influence on the molded part yet ... mold base selection should be considered critical to the profitability of the entire molding project."

Special-Purpose Machines

Mold action and ejection requirements will often dictate the use one of three special-purpose mold bases instead of the simpler A- and B-styles.

One of these is the X-style, or stripper-plate, mold base. Sandwiched between the “A” and “B” plates, its stripper (“X”) plate engages the edge of a part and pushes it off the core. Typically, the X-style sees use with round parts like cups, caps, and containers. This style of mold base comes in both five- and six-plate styles- -with the six-plate version including a support plate.

The AX-style mold base is used for parts requiring core detail in the cavity side of the mold. When the mold opens, that core detail is pulled so that the part remains on the ejector side of the mold. The AX-style is essentially an A-style mold base with an “X-1” plate, located between the “A” and “B” plates but attached to the top half of the mold so that it can pull the part off the core detail.

The “T” style, or three-plate, mold base is used when the molder would like to separate the part from the runner in the tool. “T” series mold bases consist of an “A” clamping plate, “X-1” plate, “X-2” plate, “B” plate, and the ejector assembly and housing. Unlike the other mold bases, the “T” series operates with two parting lines. The first parting line, which occurs between the X-1 and X-2 plates, separates the part from the gate prior to opening the main parting line. The main parting line then opens and the X-1 plate is actuated to pull the runner from the sprue-puller pin, thereby freeing the runner and allowing it to be ejected separately from the part being produced.

See page 11 for illustrations of standard mold base types.

Choosing A Steel

Steel selection is an important aspect of specifying the right mold base. Generally there are four standard grades of steel available. See page 8 for mold and die steel descriptions.

Molding Machine Considerations

After you’ve picked the right style and steel for your mold base, it’s time to consider variables related to the molding machine: the locating-ring style, sprue bushing, and clamp slots.

The mold maker must select the type of locating ring that will match the platens of the machine in which the mold will

be running. Locating rings are available in a wide variety of configurations to fit most injection machines, but the most common locating ring has a 3.990 in. outside diameter.

Sprue bushings must also match the machine, so be sure to determine the proper orifice and radius of the sprue bushing so it will match the machine nozzle. The most common type of sprue bushing is made from 6145 steel that has been hardened, ground, and polished for sprue release. In some applications it is desirable to use a high-conductivity copper-alloy sprue bushing.



“High-performance sprue bushings cool the sprue quickly when either the sprue weight is greater than the part weight, or a rigid target is needed for a robotic sprue picker ...”

These “high-performance” sprue bushings can cool the sprue quickly when either the sprue weight is greater than the part weight, or a rigid target is needed for a robotic sprue picker, or when scrap would result from a hot sprue coming in contact with a finished part. High-performance sprue bushings are fully interchangeable with the standard bushings.

A number of different clamp-slot styles are available. Whatever the style, make sure it’s compatible with the thickness of the top clamping plate on your mold base (ACP, “A” plate, or AX plate).

Finally, the molder needs to determine the correct mold base height in relation to the maximum space available in the press. A mold base that won’t run in the appropriate size of press can turn potential profit into loss. In addition, be aware of the maximum stroke required to eject the part for the mold.

Mold and Die Steels

STEEL DESCRIPTIONS

Three Steels for Structural Sections

D-M-E NO. 1 STEEL

No. 1 Steel is a medium carbon (SAE 1030) or equivalent, silicon-killed forging quality steel with approximately 25% greater tensile strength than typical low-carbon warehouse steels. It machines easily, but is not "sticky," permitting a faster and smoother cut.



D-M-E NO. 2 STEEL

No. 2 Steel is an AISI 4130 or equivalent type steel. It is supplied pre-heat treated to 28-34 HRC (271-321 Bhn). A high strength steel, it is ideal for cavity and core retainer plates, clamping plates and support plates in molds and dies.

D-M-E NO. 7 STEEL

No. 7 Steel is a modified AISI 400 or equivalent series stainless steel for holder block applications. It is supplied pre-heat treated to 32-36 HRC (302-340 Bhn). This stainless steel offers corrosion-resistance and exceptional machinability but cannot be further hardened (see D-M-E No. 6). For humid environments, corrosive plastics, "clean room" or "100% stainless" applications, it is an ideal choice for all structural (non-cavity/core) mold plates.

Three Steels for Cavities and Cores

D-M-E NO. 3 STEEL

No. 3 Steel is a P-20 AISI 4130 (modified) type cavity steel. Exceptionally clean, it is pre-heat treated to 28-34 HRC (271-321 Bhn). It provides high hardness, good machinability and exceptional polishability for both plastics molds and die cast dies.

D-M-E NO. 5 STEEL

No. 5 Steel is a thermal shock resistant, hotwork die steel (AISI-SAE H-13 type) or equivalent. Supplied fully annealed 13-20 HRC (approx. 200 Bhn) for easy machinability, it can be subsequently heat treated to the desired hardness with a minimum of deformation.

Mainly used for die cast dies, it is also suitable for plastics molds with exceptional hardness or polishability requirements.

D-M-E NO. 5 Steel meets or exceeds the acceptance criteria established by the NADCA as detailed in Technical Digest Number 01-80-01D

D-M-E NO. 6 STEEL

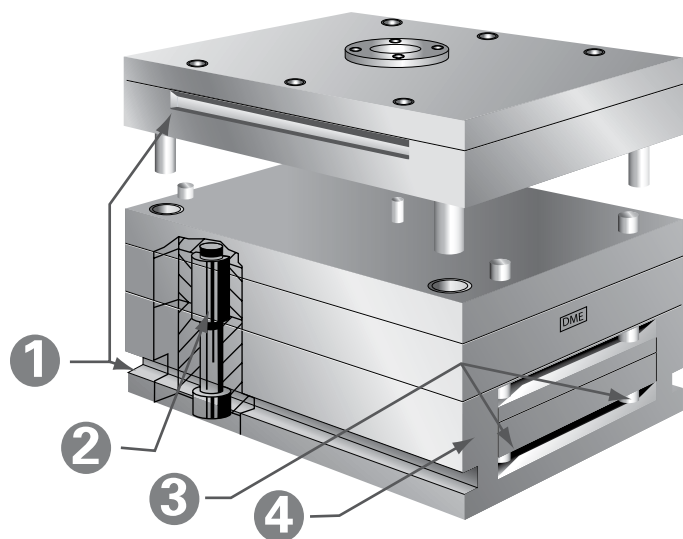
No. 6 Steel is T-420 type or equivalent stainless steel. It is supplied fully annealed to 8-23 HRC (179-241 Bhn), making it readily machinable. It can be used for injection, compression or transfer molds where the properties of the plastics materials or excessive condensation require a highly corrosion resistant cavity steel.

OTHER TYPES OF STEEL AVAILABLE ON SPECIAL ORDER. CONTACT D-M-E.

Benefits of Standard Mold Base Assemblies and Components

Seven major benefits of D-M-E Standard Mold Base Assemblies and Components

1. Made of high quality, pre-finished mold and die steels that give you more for your money; more metallurgical consistency; more cleanliness in cavity steels; more reliability.
2. Assemblies, plates and components are pre-engineered to give you the economic and technical benefits of interchangeability.
3. Manufactured with the most advanced, precision equipment — and quality control tested to give you reliable performance.
4. Gives designers more freedom and flexibility — more time to devote to the truly creative aspects of mold, die, and product design.
5. Gives mold and die makers more time to concentrate on cavities and cores — thus increasing productivity as much as 40%.
6. Gives molders more quality parts per hour, more profitability — with production proven construction that outlasts the longest runs.
7. Readily available as you need them. The more popular assemblies are always in stock for same-day service. Our nationwide network of Service Centers means you have the products and the people near you to help you save time, money and inventory costs.

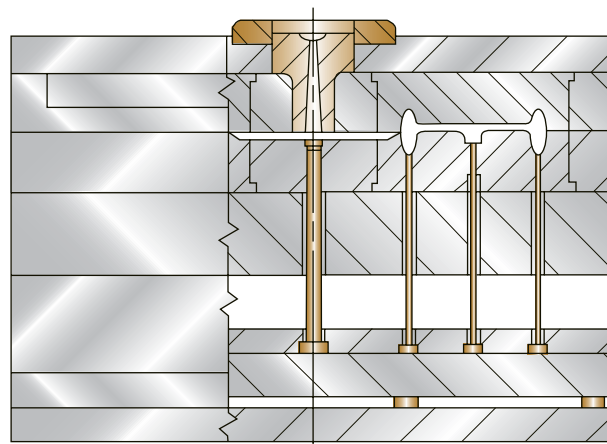


These four features have helped make D-M-E Standard Mold Bases the most frequently specified mold base assemblies in the world:

- 1 CLAMP SLOTS that save platen space and provide maximum cavity area
- 2 TUBULAR DOWELS that provide more room for waterlines
- 3 STOP PINS welded to ejector plate to prevent loosening and ejection interference
- 4 ONE-PIECE EJECTOR HOUSING that gives added strength and simplifies construction

INJECTION MOLDING

Injection molding is recognized as the single most important form of plastics processing. Beginning with just a handful of standardized mold bases and components in 1942, D-M-E now offers thousands of standardized mold base assemblies and a broad variety of mold components to satisfy the consistent need for high-quality injection molds. Primarily used for thermoplastics injection molding, most of our assemblies and components are readily adaptable for the injection molding of thermosets. Future product developments from D-M-E will include standardized components specifically designed for the injection molding of thermoset materials.



D-M-E Standard "A" Series Mold Base with Cavity Inserts

D-M-E Item Number System

The item number system employed by D-M-E not only prevents the duplication of item numbers, but helps lessen the chances of error in the writing and production of orders. This is accomplished by incorporating actual dimensional data into the item numbers as indicated below.

MOLD BASES — “A” AND “B” SERIES

The item numbers for Standard Mold Bases in the “A” and “B” Series combine the NOMINAL Size (width and length), the Series (A or B) and the thicknesses of the “A” (or “A”-Clamping) and “B” Plates.

Since all the standard mold plate thicknesses are a combination of a whole number and either $\frac{3}{8}$ or $\frac{7}{8}$, the designation 13 indicates 1 and $\frac{3}{8}$; 17 indicates 1 and $\frac{7}{8}$; 23 indicates 2 and $\frac{3}{8}$, etc.

For Example: 1016A-13-37 is the item number for a $9\frac{7}{8} \times 16$ “A” Series Mold Base with “A” plate $1\frac{3}{8}$ and “B” plate $3\frac{7}{8}$ thick.

MOLD BASES — “X” OR STRIPPER PLATE SERIES

The item numbers for the Stripper Plate Series Mold Base combine the NOMINAL Size (width and length), the letter “X” for Stripper Plate, the numeral 5 or 6 (plate series) and the “AX” plate thickness.

Since the “X” plate thickness is constant at $\frac{7}{8}$ or $1\frac{3}{8}$, and the “BX” plate thickness is constant at $\frac{3}{8}$, $1\frac{7}{8}$ or $2\frac{3}{8}$, depending on the mold base nominal size and number of plates in the assembly, these thicknesses are not represented in the item number.

For Example: 1818X-5-13 is the item number for a $17\frac{7}{8} \times 18$, 5-plate “X” series Mold Base with a $1\frac{3}{8}$ thick “AX” plate. (In this case, the “X” plate is $1\frac{3}{8}$ thick, and the “BX” plate is $2\frac{3}{8}$ thick).

“AX” AND “T” SERIES MOLD BASES

The item numbers for the “AX” Series Mold Bases combine the NOMINAL Size (width and length), the letters “AX” and the thickness of the “A” and “B” plates. The “X-1” plate thickness is specified when ordering and is omitted from the item number.

For Example: 1212AX-13-37 is the item number for an $11\frac{7}{8} \times 12$ “AX” Series Mold Base with a $1\frac{3}{8}$ thick “A” plate and $3\frac{7}{8}$ thick “B” plate. The “X-1” plate thickness (e.g. $\frac{7}{8}$) is then specified when ordering.

The item numbers for the “T” Series Mold Bases combine the NOMINAL Size (width and length), the letter “T” and the thickness of the “X-2” and “B” plates.

Since the thickness of the “A”-Clamping plate is constant at $1\frac{7}{8}$ or $2\frac{3}{8}$ and the “X-1” plate thickness is constant at $\frac{7}{8}$ or $1\frac{3}{8}$, depending on the nominal size of the mold base, these thicknesses are not represented in the item number.

For Example: 1012T-23-17 is the item number for a $9\frac{7}{8} \times 11\frac{7}{8}$ “T” Series Mold Base with a $2\frac{3}{8}$ thick “X-2” plate and $1\frac{7}{8}$ thick “B” plate. (In this case, the “A”-Clamping plate is $1\frac{7}{8}$ thick and the “X-1” plate is $\frac{7}{8}$ thick).

CAVITY RETAINER SETS

Since Cavity Retainer Sets are made up solely of an “A” and “B” plate, the item numbers combine the NOMINAL Size, and the “A” and “B” plate thicknesses. (The absence of the letter “A”, “B”, “AX”, or “T” distinguish these numbers from the item numbers of Standard Mold Bases).

For Example: 1215-33-47 is an $11\frac{7}{8} \times 15$ Cavity Retainer Set with “A” plate $3\frac{3}{8}$ and “B” plate $4\frac{7}{8}$ thick.

MOLD PLATES

The same principle used for numbering Cavity Retainer Sets is applied to Standard Mold Plates; however, only one plate thickness is required. (Since the item numbers for retainer sets will always indicate two separate plate thicknesses, the distinction between these two items is easily identified).

For Example: 1318-47 is a $13\frac{3}{8} \times 18$ Mold Plate, $4\frac{7}{8}$ thick.

NOTE: While an understanding of this item number system can be very helpful in identifying and referring to the various standard sizes, the D-M-E catalog should be consulted when ordering any standard item.

