


 **The Pearls:**

Increasing Productivity in 32 Millimeter Cabinetmaking

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Introduction

As a cabinetmaker of not a few years, I have had the “opportunity” to stand behind my saw, as many of you do, and in my mind, scream: “There’s *got* to be an easier way to do this stuff!” The object of this writing is to reply, “YES! There’s a *much* easier way.”

Pearl Diving

Let me tell you now, I did not invent the ideas written in here, but rather found them here and there in my travels working for an excellent hardware manufacturer, Julius Blum Inc. My job took me out of the confines of a shop, and into the world of cabinet manufacturing. I’ve visited now, thousands of shops of every size and stature. In these shops, I’ve seen first-hand how the minds of many diligent woodworkers have produced a wealth of knowledge. Unfortunately, most of that knowledge stayed right where it was found, never to be shared with the folks who needed it most—other cabinetmakers! Day after day I stumbled onto bits of genius waiting to be put to use in everyday cabinet making. This is why I called this piece *The Pearls*. Each shop I entered was like opening another shell in search of some new idea or “pearl of wisdom” to share with my customers. As I found these “pearls,” I jotted them down in a notebook for future reference. I could never have imagined where this all would lead.

Putting It All Together

As I traveled, I noticed that shop after shop had a great idea or two. Maybe it was a layout, or how to drill shelf holes, but *nobody had all the little pieces in one spot!* Real estate people, doctors, and even attorneys have monthly periodicals to update them in their craft. Cabinetmakers seemed to have books full of ads but none with answers to everyday questions! The only way to learn something new in a shop was to bring in new blood; that is, fire someone and rely on the guy’s replacement to have new ideas! That’s *crazy!*

Taking it to the Street

One day, I put all the notes under my arm and went to visit a customer of mine. I showed him the “bag of pearls” I had in my notebook. The results were astounding: The shop documented a **40% increase in productivity within 24 hours!** What used to take eight hours to build now takes only five. What’s amazing is that this increase came without hiring additional help, or buying additional machinery. In fact, the only thing that changed was the *method* they used to build the same cabinet they always built!

Three years and many 32 millimeter seminars later, the list of successful shops and happy cabinetmakers goes on and on. These ideas now travel state-to-state with the other Blum representatives in an effort to give our customers the “edge” they need to be the best at their craft!

Happy pearl diving,

Charlie Karp
Blum Inc.

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Board Products

- Use two-sided to optimize usage of fall-off.
- Higher grade and density of substrate to hold weight, screws, and hardware.

Board Thicknesses

- 3/4" (19mm) for W.I.C. (Woodworking Institute of California) or personal preference due to type of fasteners etc.
- 5/8" (16mm) is used in residential applications because of cost and weight savings. Due to minimum thickness, you should have boring, doweling, and clamping, capabilities for assembly. 5/8" is *not* W.I.C. approved.

Hardware

- Hardware, such as concealed hinges, shelf pins, drawer slides, and etc.*, is designed for use in the 32mm system. This means it can be installed directly into the 5mm adjustable shelf holes or *system holes*. Since the hardware is located in these holes, the *layout of these holes is critical*.
- Drawer Systems should be bought or cut to specifications that will accommodate the 32mm system. The Blum, Metabox system* is a drawer system that is becoming increasingly popular because it is 32mm "sound." It is put together in the shop quickly, with minimum skill level, defects, or labor cost, yet it is a very "high-end" drawer in both durability and visual appeal. Wooden drawers can also work nicely using the "bottom mount" type runners* or the new concealed runners such as the Blum Tandem Drawer.* Bottom- and side-mounted full-extension guides are a breeze to install using this system.
- Assembly screws or dowel construction will depend on your equipment capabilities in the shop. (See the Construction Section).

* See your "Blum Functional Hardware" handbook available from your distributor rep or by calling Julius Blum, Inc. at (800) 438-6788.

Layout Stick

- A layout “*stick*” (story pole) will be used here to help us understand how to lay out the cabinets from top to bottom, using the in-line bored holes or *line boring*.

Remember that the 5mm holes accommodate not only shelves, but the hardware as well. Accurately locating the line boring is critical! Line bore 37mm from the *front* edge, and let the holes run the length of the stick. (Stick to be at least 2"x36"<) This stick now represents the front, inside edge of an end panel, and will be laid out in full scale from now on.



IMPORTANT! Line boring is your “Anchor in the Sea.” This means that ALL *vertical* measurements for your cabinet layout will originate from the center line of a 5mm hole. Even the drawer and drawer front dimensions, door heights and box heights are determined *by measuring from the center of the holes*.

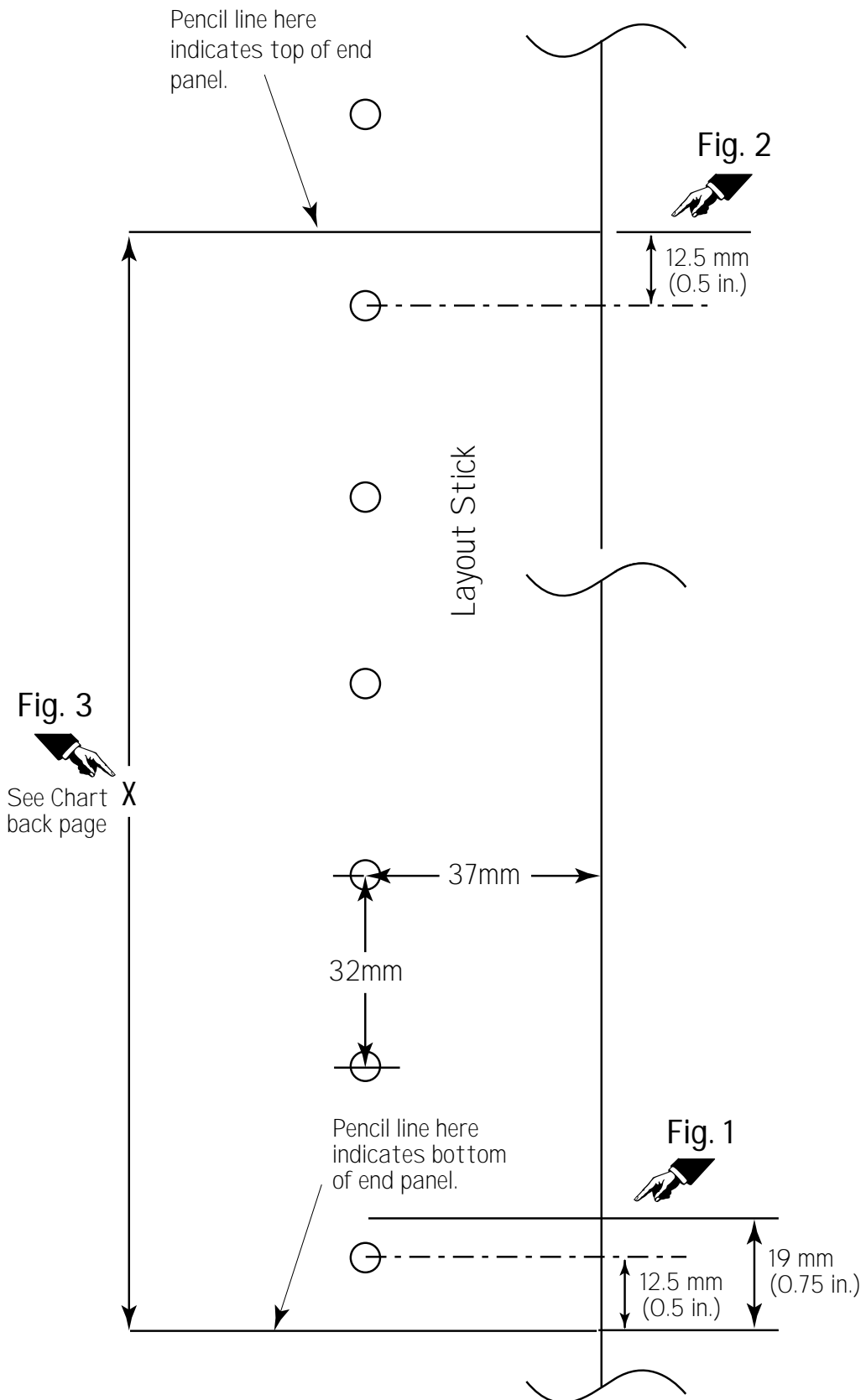
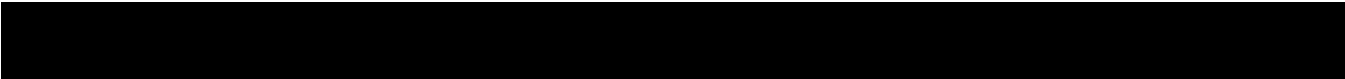
↔ Layout from left to right. Mark LEFT as the bottom. ↔

1. Draw a line indicating “Bottom of Cabinet” on the left end at: 12.5mm (1/2") down (left), from a 5mm hole. (See Figure 1 on the next page)
2. Find the height of your cabinet by measuring up (right) from this line, to the *nearest hole* to the panel height you want. Place your pencil in the hole nearest this measurement.
3. To create a center-bored or balanced end panel, the distance from the top of the panel to the first hole should be the same as the distance from the bottom to the first hole. Mark your layout 1/2" up from the hole your pencil is placed in to arrive at the top of your end panel. (See figure 2)
4. The distance between these two lines is your end panel height (see figure 3). The distance from the top down to the first hole and the bottom to the first hole up, *should be the same*. (1/2") This is now a ***balanced*** or ***generic****, end panel! On a base unit, the end panel closest to the typical 31 1/4" end panel, figures out to 31.22" or 793mm as a balanced or generic end panel.

For other balanced panel height dimensions, refer to the chart at the end of this booklet. Each dimension listed in this chart produces a balanced panel height when line bored to proper dimensions (e. g. 1/2" [12.5 mm] from top and bottom).



***NOTE:** By “GENERIC,” I mean that the end panel *has no top or bottom; no right or left* hand, and can be used to make several different configurations of cabinets with the same *panel layout!* This eliminates many common mistakes made in production. ALSO, the dimension from the bottom of the panel to the first hole NEVER CHANGES, so a stop on the line bore set up can be set once and never moved! This creates a high degree of accuracy in the shop and eliminates doubt or question as to the location of the stops for any particular job.



Find your Blum Metabox layout cards

- We will use these cards to learn how to locate the drawers in the cabinet, and to find where to attach the front to the drawer so the fronts will fall in their correct overlays and spacing.



IMPORTANT! The layout card represents the *minimum space needed*, for a particular drawer. A drawer opening can be taller than the card, but not smaller than the card. REMEMBER, drawers ALWAYS “split” across from a system hole. (See Figure 5 on the next page). The black circled hole is the hole your slide will mount in! Make sure this hole lands on a system hole.

Locating the Drawer in the case

- By placing the cards on the stick, you can arrive at the space needed for each drawer. Remember, we are laying out our cabinet in *full scale*, so “what you see is what you’ll get.”
1. Place a 320M card as close to the top of the “end panel” layout as you can with out letting the card overlap the top line. This is your top drawer. Mark the slide location with an “S.”
 2. Place a 320H card at the bottom. This is the bottom drawer location. Mark your slide location. (Black circle)
 3. To make a four-drawer bank, you can split the remaining holes up to suit yourself on the layout. Count two holes above the bottom card. Mark your split. Repeat.

Locating The “Split”

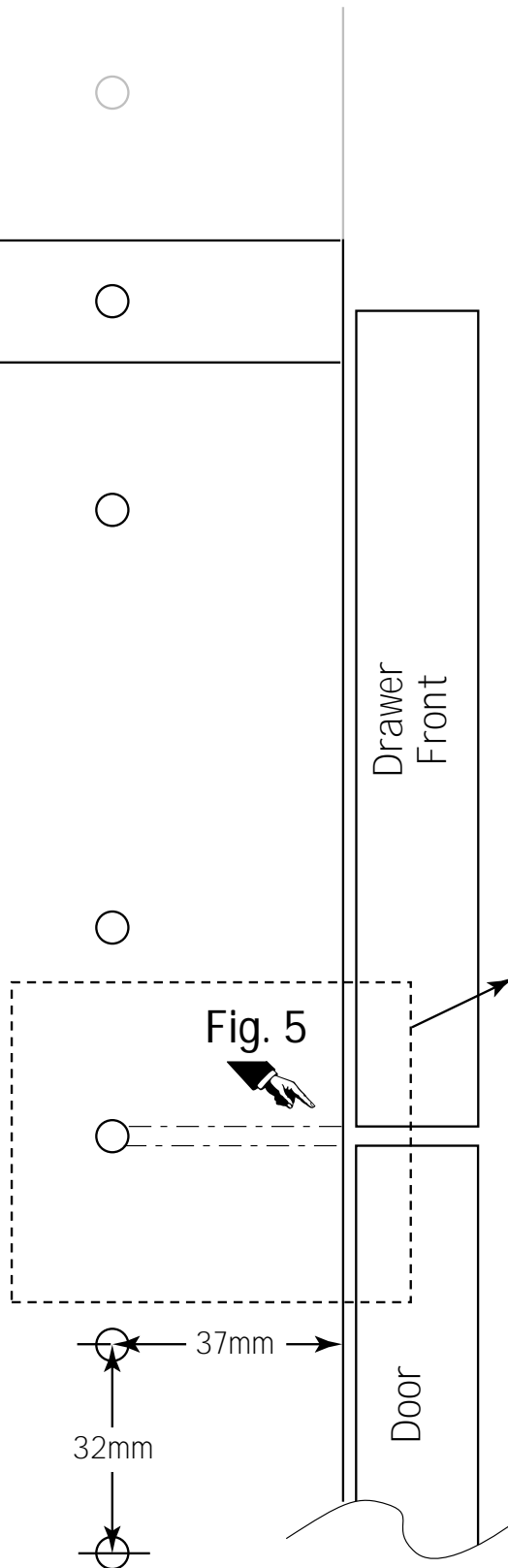
4. The “*split*,” or space allowed between drawers, is indicated on the stick by drawing a line 1.5mm up and 1.5mm down from the **centerline of the 5mm hole**. (See “The Split,” on the next page.)
5. Remove your pencil, and draw a “split” across from this hole.
6. Place the 320H card ABOVE the split, then count two more holes above the card again. Mark a split on this hole. Move the 320H card above this split. Mark the “S” for slide.
7. The third drawer up from the bottom should leave room for a split just under the top drawer. This will also leave room for a “spreader” or cleat under the top drawer as well. Experiment with other combinations of cards, to accomplish the type of drawer configuration you want.

Challenge

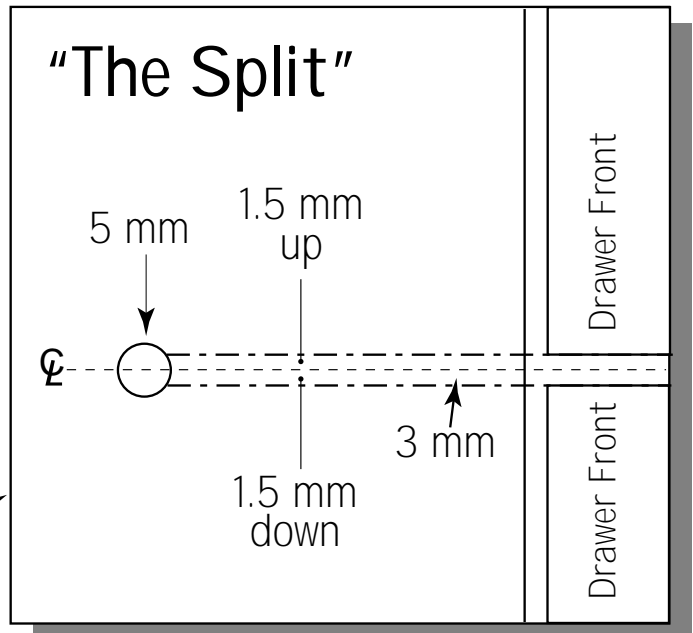
On your own, try to lay out an eight drawer bank, using the method shown here, in a 793mm (31.22”) panel. Use the 320N cards. Start at the bottom and work up, marking the “splits” and moving the card up the panel.

Drawer Front Layouts

Layout Stick



Door and drawer fronts must ALWAYS split across from a hole.



The Standard

- **Standard** or “**S**” indicates a measurement from the centerline of any two 5 mm holes in the vertical line (a multiple of 32mm). S is determined by counting the **spaces** between the holes and multiplying that number by 32mm. (See Figure 4 on the next page.)
- All calculations used in determining the vertical dimensions for doors, drawer fronts, hardware applications, etc. must begin with the S dimension. Read on...



Notice that all fronts “split” across from a hole! Please remember this important rule! (Next page, Figure 5)

1. Drawer Height Dimensions (intermediate) can be found by finding “S” (standard), and subtracting 3mm for your drawer front clearances or “*splits*.” Do this by subtracting 1.5mm from the top and 1.5mm from the bottom of the drawer face (Figure 6, next page).



“S” - 3 = DRAWER FRONT HEIGHT

2. Use the Blum drawer layout cards now, to arrive at different drawer numbers and configurations to get a feel for how this system works.

Example: Use the drawing on the next page to arrive at a drawer front’s vertical dimension. A front covering four spaces can be found as follows:

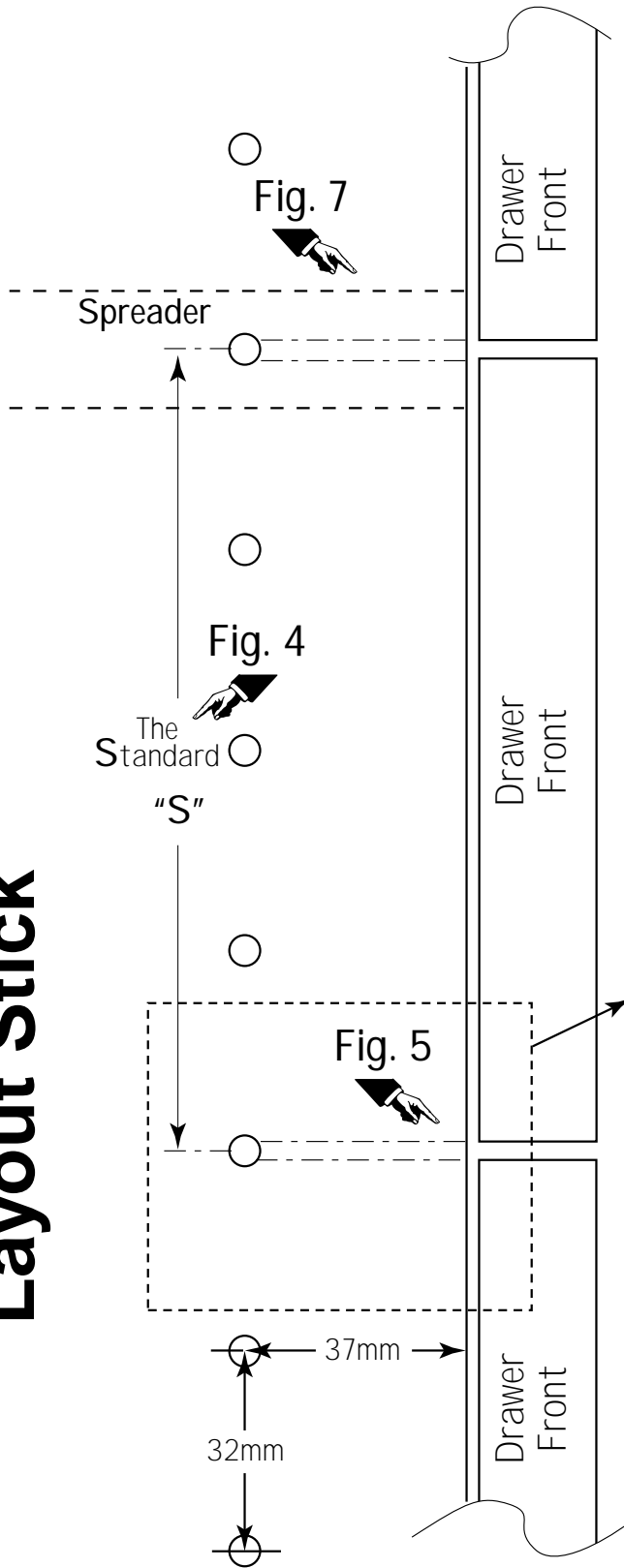
$$4 \text{ spaces} \times 32\text{mm} = 128\text{mm(S)} - 3\text{mm (3mm “split”)} = 125\text{mm}$$

(Front height of typical top drawer in a base unit.)

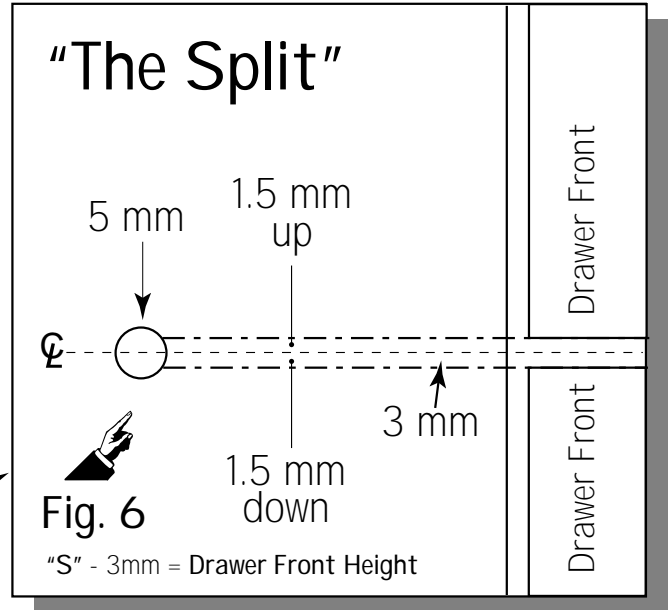
Using this simple method to arrive at this dimension, instead of a tape measure, eliminates a vast margin of error. Differences between tape measures and the possibility of mismeasurement are no longer a problem. Math is pure, and by using it to arrive at your dimensions, you greatly increase your accuracy throughout the shop.

- Since a split between drawers and doors always occurs across from a hole, (see Split Rule above) a **spreader** or “**web cleat**” always locates centered on a hole as well. (See Figure 7 on the next page.)

Layout Stick



Door and drawer fronts must ALWAYS split across from a hole.



Using The Bottom Rule

- **The Bottom Rule** or “**The B Rule**” applies when calculating a drawer/door front vertical dimension on a part that overlays the bottom of the case. Increasing your dimension by 14 mm causes the front to overlay the bottom shelf completely. The B Rule applies to calculating any part that overlays the “Bottom.” Follow steps 1 through 3 on the next page.

EXAMPLE: (S = 160) S - 3 = 157 + 14 (B) = 171mm Your bottom drawer dimension for 3/4" material.



IMPORTANT: *All calculations must begin with “The Standard” “S” and follow the same path of calculations to arrive at a dimension.* This rule will all but eliminate mistakes in communication between office and shop. Anything added or subtracted from a dimension, must be added or subtracted from the “Standard” dimension *in order*.

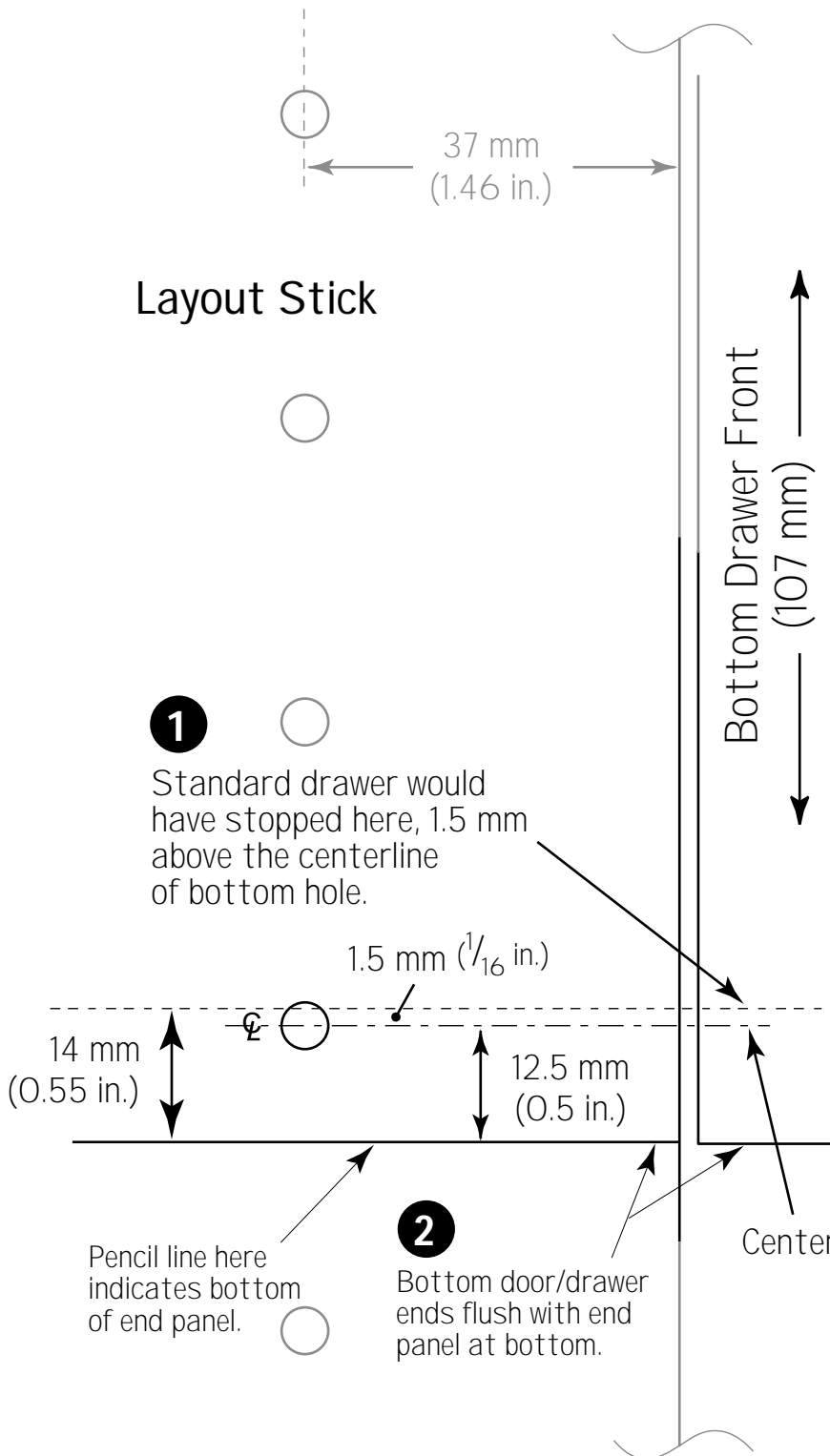
EXAMPLE: I need to subtract 10mm from the top of my top drawer, to allow for a large tile ‘V’ cap overlay at the top.

$$\begin{array}{rclclcl} (5 \text{ X } 32 \text{ mm S}) - \text{GAP} & = & \text{DH} & -\text{CLRNC} & = & \text{STDA} \\ (S = 160) 160 & -3 & = & 157 & -10 & = & 147 \end{array}$$

(Special Top Drawer Application.) Notice I still subtract 3mm for clearances and follow the same path as I calculate.

Challenge

On your own, try to arrive at the dimension for a *door* in this configuration.



Layout Stick

Bottom Drawer Front
(107 mm)

1 Standard drawer would have stopped here, 1.5 mm above the centerline of bottom hole.

14 mm (0.55 in.)
1.5 mm (1/16 in.)
12.5 mm (0.5 in.)

Pencil line here indicates bottom of end panel.

2 Bottom door/drawer ends flush with end panel at bottom.

Center of bottom hole.

3 Drawer/door front height is **increased** 14 mm over the "standard" or intermediate size to compensate for the bottom overlay.



The "B" Rule:

ALWAYS add 14 mm to height calculation of door or drawer fronts that overlay flush to the bottom of the cabinet. This rule only applies to bottom overlays!

"S"	split	B Rule	Face Ht.
96	- 3	+ 14	= 107

This Example

Sizing and Placing Doors

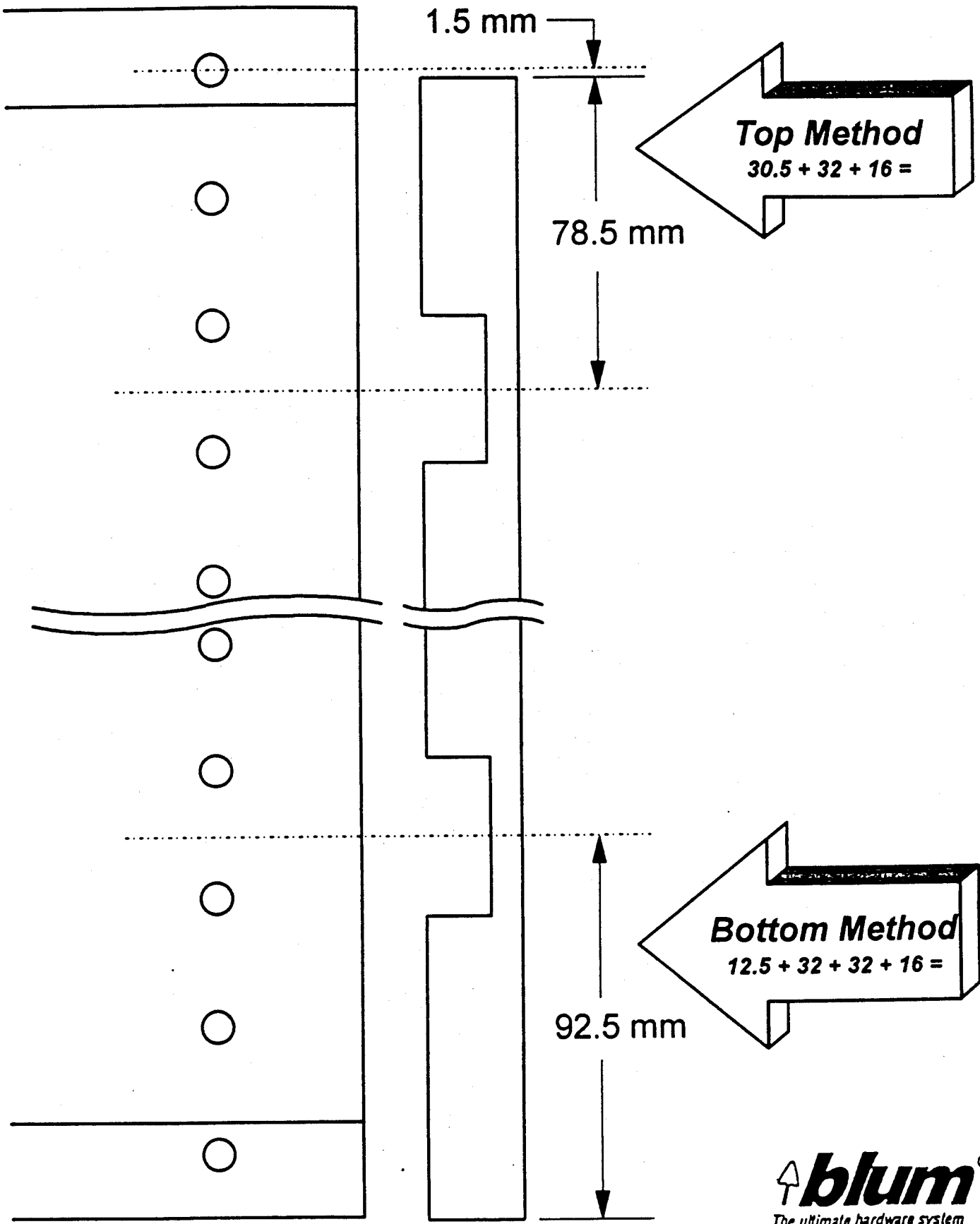
- Size a *door* vertically by using the same rules previously mentioned. Keep in mind that a door overlays the bottom shelf, so the B Rule applies.

Example: A base unit door covers 20 spaces.

$$20 \times 32\text{mm(S)} - 3 = 637\text{mm} + 14\text{(B)} = 651\text{mm (door height)}$$

- The doors also split on a hole.
- The next page shows the center of the top hinge between the third and fourth hole counted from the split or the top of the panel.
- The top hinge in a door is always located at 78.5mm on center from the top of the door.
- Subsequent hinges will always be distanced in multiples of 32 mm apart starting with the top hinge going down.

Hinge Location



Fasteners (Depending on your machinery and need)

- 8 mm construction screw (W.I.C.)
- 3 mm aggressive thread construction screw
- Dowels
- Sheetrock Screws

End panels

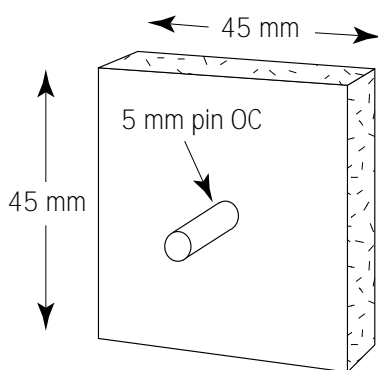
- End panels should pass through. NO intermediate panels.
- Cut end panels to length based on panel cutting guide. (See the table at the end of this booklet.)
- End panels should be “balanced,” meaning that the first and last 5mm hole are equal in distance from top and bottom of the end panel.
- Consult guides for distance to first 5mm hole etc.
- A “Generic End Panel” is a balanced panel that can be used for making many cabinet configurations from the same part. The panel has no top, no bottom, and no left or right handing.

Finished ends

- Applied finished ends usually match the doors and are applied to the cabinet at installation time. It is screwed on from the inside, attaching it to the end of the run of cabinets after scribing it to the wall. (Also called “*Plant On Ends.*”)
- Laid up or veneered ends are applied directly to the case, usually with contact adhesive. Part is attached oversized, then trimmed and scribed to the wall.
- Pre-finished ends are attached as a part of the cabinet assembly process, usually with dowel construction or biscuit joints. A press or clamps are required for this.

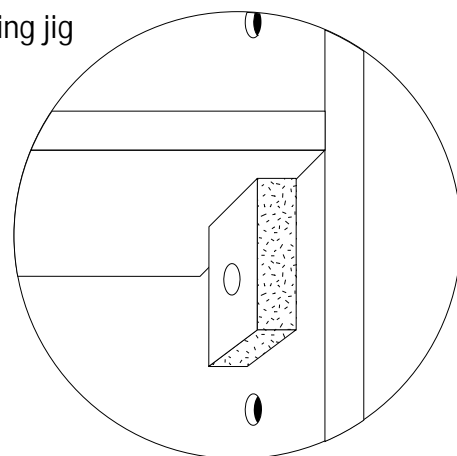
Spreader Cleats

- As shown below, use a jig to quickly locate and install spreader cleats. Placing the jig in the next hole down from the split location centers the cleat exactly in position without measuring.



Spreader cleat locating jig

Spreader cleat locating jig shown in position



Hardware

- Drawers should be a “Metrically Sound” drawer system. Blum Metabox meets all requirements for size, speed, quality, and meets W.I.C. specifications.
- ***Metrically sound*** means the drawer fixing bracket, or drawer box, can be drilled, or mounted, exactly the same, regardless of the box depth. This eliminates the need to change stops, risk calculation mistakes, or mis-aligning the drawer in the case.
- Using all full overlay hinges and plates keeps costs down, eliminates several Stock Keeping Units (SKUs), and keeps mistakes to a minimum. Use plates with screws attached to speed installation (e. g. Blum 175L8100). If used exclusively, full overlay applications eliminate machinery changes and confusion over which and how many plates to buy.
- Look for all other hardware which can be installed in the holes. Locating the hardware in the holes will speed installation and reduce mistakes dramatically. Tip-outs, pull-outs, even pocket doors, are now set up to use the system holes.
- Spacer blocks and zero protrusion hinges are available from Blum for use in pull-out tray applications.

Language



Develop a common language in the shop and office using the terms found in these pages. Such catch words such as ***Standard***, ***B-Rule***, ***Cleat***, and ***End Panel***, are a few examples. Measuring from a hole will be the rule, and “***from a hole***” always means *from the center* of the system hole.

8

Wood & Melamine Drawers

The following drawing shows the formula for the appropriate height of a wooden or melamine drawer box for all Blum drawer runner systems. These formulas allow you to use a "Generic" balanced panel as outlined on page 4 item 4.

The formulas allow for spreaders between each drawer. If no spreaders are used, then the drawer box heights can be increased accordingly.

EXAMPLE: Lets find the maximum drawer box height (BH) for the cabinet pictured on the following page, using a *Blum 230M* drawer runner.

- 1) The drawer front is covering 5 spaces (see dimension "S"), therefore

$$S = 5 \times 32\text{mm} \quad \text{or} \quad \underline{S = 160\text{mm}}$$

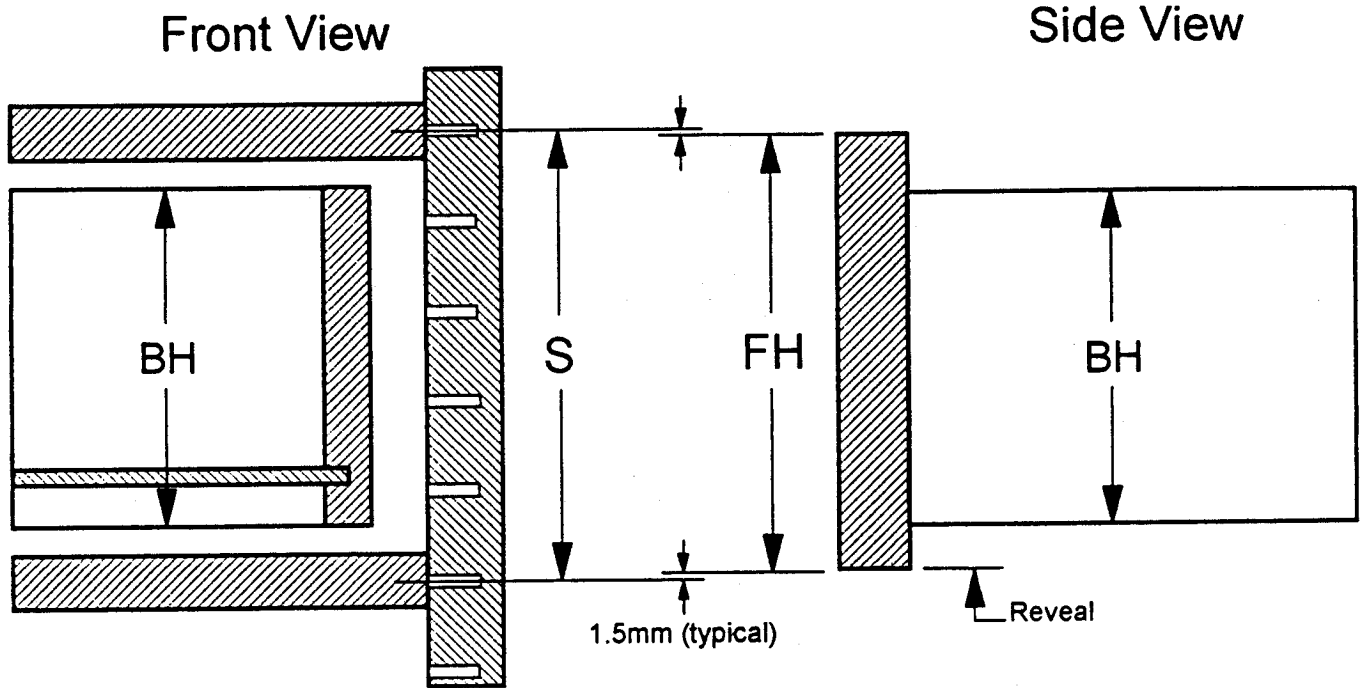
- 2) The maximum drawer box height will then be $S - 45\text{mm}$, therefore

$$\text{BH} = 160\text{mm} - 45\text{mm} \quad \text{or} \quad \underline{\text{BH} = 115\text{mm}}$$

You now make your drawer box a *maximum* of 115mm high for this example. The formula allows for top and bottom clearance and spreaders.

- 3) The drawer front (S-3) can now be attached to the drawer box according to the figures shown under **Reveal** on the following page. Note that the reveal for the top or intermediate drawers would be 16mm. The reveal for a bottom only drawer would be 30mm. This accounts for the 14mm bottom rule ($16\text{mm} + 14\text{mm} = 30\text{mm}$).

Drawer Specifications



Maximum Drawer Box Height (BH)

System	Max. Box Height	Reveal (Standard / Bottom)
✓ Tandem F/E	S - 37mm	19 / 33mm
Tandem	S - 37mm	19 / 33mm
Solo	S - 56mm	23.5 / 37.5mm
430	S - 30mm	18 / 32mm
230	S - 45mm	16 / 30mm

S = Multiples of 32mm or # of spaces in opening
 BH = Box Height Dimension
 FH = Front Height (S - 3)

- ✓ Note: Place spreader 3mm below centerline of a 5mm system hole for Tandem F/E.

Installation—Notes

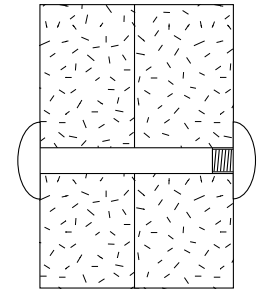
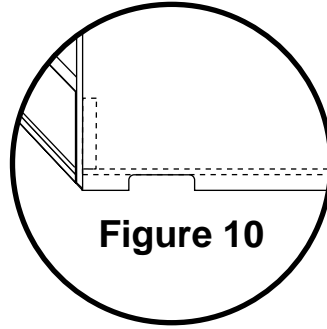
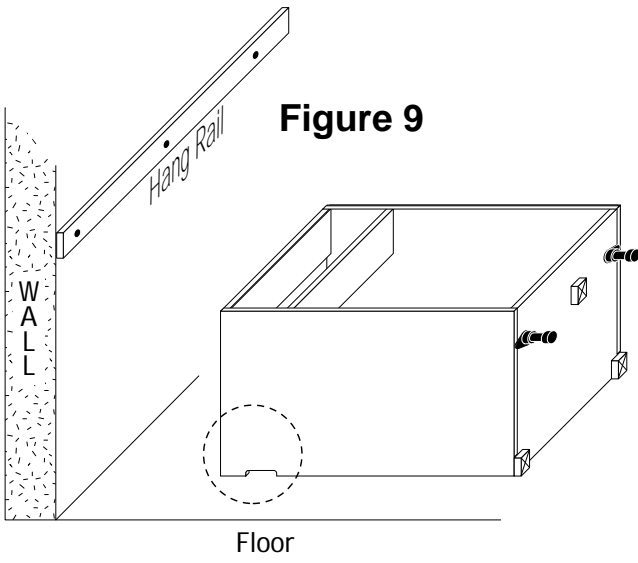
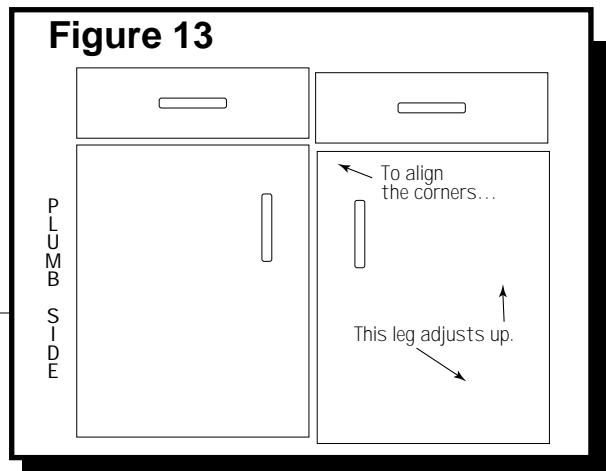
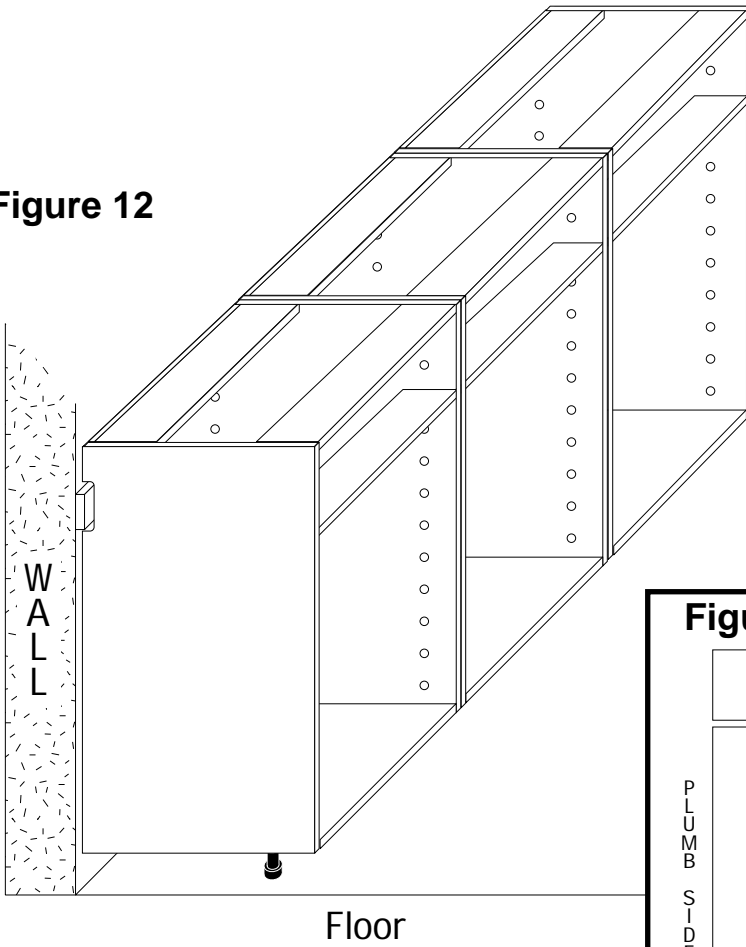


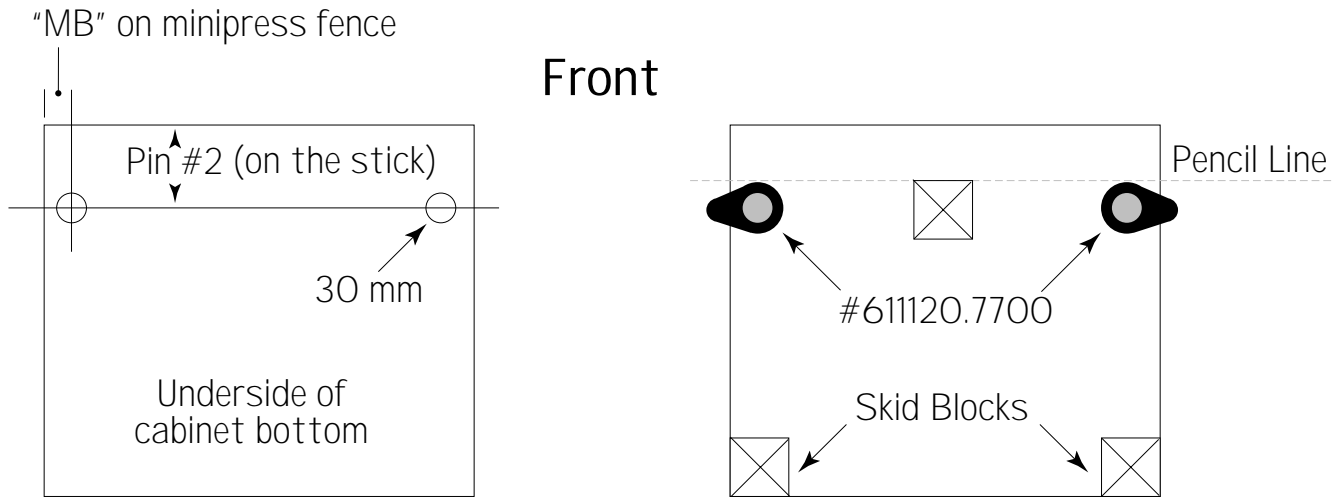
Figure 12



Preparation for Leg Levellers

1. Follow drilling instructions for press-in legs (see Figure 8). During shop assembly, place skid blocks under the cabinet. These double as kick supports in front, and help support wide kicker spans after cabinet installation.
2. Preparing your bottoms in this manner addresses five separate functions: Skidding in the shop, safe transport, backing for kicks in long spans, easy alignment of boxes on uneven surfaces, and easy alignment of doors and drawers. Leg levellers eliminate the manufacturing of “loose kicks” in the traditional sense.

Figure 8.



Installation—The Ledger System

1. Attach a ledger to the wall along a line that has been “snapped” 2” below the point where the top of the cabinet box is to be located. Use Blum part # 611120.7700 “press-in” leg-type levelers knocked into the bottoms of the base units. (Figure 9).
2. End panels should be notched to accommodate hang rail (Figure 10).
3. Hang your base units on the ledger. Before you slide the boxes together, drill through the top most and bottom 5mm hole in front and back of the line bored holes inside your box. Attach the boxes together in line using a through bolt or “sex bolt” (Figure 11). This will align your boxes together in one length (Figure 12) making it easier to plumb and align the boxes.
4. The back portion of the cabinets are level. Now, level each end. Attach doors and drawers and use them to align your cabinets by adjusting the legs until the corners match (Figure 13).
5. Attach kicks nail free using Blum part # 602180.7700 knocked into kerfs in back of toe kick, and assemble kicks on site. No sanding, nail holes, or putty!

Standard Drawer Front and Door Sizes

Metabox	# spaces	Standard S - 3 =	Bottom Only S - 3 + 14 =	Dwr Back Ht.
Drawer Front Heights				
N	3	93	107	39
M	4	125	139	71
K	5	157	171	103
H	6	189	203	135
H+1	7	221	235	
H+2	8	253	267	
H+3	9	285	299	
H+4	10	317	331	

Door Heights

11	349	363
12	381	395
13	413	427
14	445	459
15	477	491
16	509	523
17	541	555
18	573	587
19	605	619
20	637	651
21	669	683
22	701	715
23	733	747
24	765	779
25	797	811
26	829	843
27	861	875
28	893	907
29	925	939
30	957	971
31	989	1003
32	1021	1035
33	1053	1067
34	1085	1099
35	1117	1131

Balanced Panel Size Chart

32 mm Balanced Panel Sizes

spcs	mm	inches	spcs	mm	inches	spcs	mm	inches
2	89	= 3.50	28	921	= 36.26	54	1753	= 69.02
3	121	= 4.76	29	953	= 37.52	55	1785	= 70.28
4	153	= 6.02	30	985	= 38.78	56	1817	= 71.54
5	185	= 7.28	31	1017	= 40.04	57	1849	= 72.80
6	217	= 8.54	32	1049	= 41.30	58	1881	= 74.06
7	249	= 9.80	33	1081	= 42.56	59	1913	= 75.31
8	281	= 11.06	34	1113	= 43.82	60	1945	= 76.57
9	313	= 12.32	35	1145	= 45.08	61	1977	= 77.83
10	345	= 13.58	36	1177	= 46.34	62	2009	= 79.09
11	377	= 14.84	37	1209	= 47.60	63	2041	= 80.35
12	409	= 16.10	38	1241	= 48.86	64	2073	= 81.61
13	441	= 17.36	39	1273	= 50.12	65	2105	= 82.87
14	473	= 18.62	40	1305	= 51.38	66	2137	= 84.13
15	505	= 19.88	41	1337	= 52.64	67	2169	= 85.39
16	537	= 21.14	42	1369	= 53.90	68	2201	= 86.65
17	569	= 22.40	43	1401	= 55.16	69	2233	= 87.91
18	601	= 23.66	44	1433	= 56.42	70	2265	= 89.17
19	633	= 24.92	45	1465	= 57.68	71	2297	= 90.43
20	665	= 26.18	46	1497	= 58.94	72	2329	= 91.69
21	697	= 27.44	47	1529	= 60.20	73	2361	= 92.95
22	729	= 28.70	48	1561	= 61.46	74	2393	= 94.21
23	761	= 29.96	49	1593	= 62.72	75	2425	= 95.47
24	793	= 31.22	50	1625	= 63.98	76	2457	= 96.73
25	825	= 32.48	51	1657	= 65.24	77	2489	= 97.99
26	857	= 33.74	52	1689	= 66.50	78	2521	= 99.25
27	889	= 35.00	53	1721	= 67.76	79	2553	= 100.51

This is a list of "balanced" panel sizes based on the use of 3/4" thick end panels with the line boring starting at 12.5 mm from either the bottom or the top of the panel.

Note: Panels sized as follows (# spaces x 32) + 25 = Height

 **blum**[®]
The ultimate hardware system

"the stick"

Get on the stick today and see how much more productive you can be!

After setup, tape measures not required when using THE STICK!

Here is a jig that will save you time and mistakes.

Imagine having a fully indexed fence, 6 feet to the left and 6 feet to the right, with stops that are accurately centered 32 MM apart.

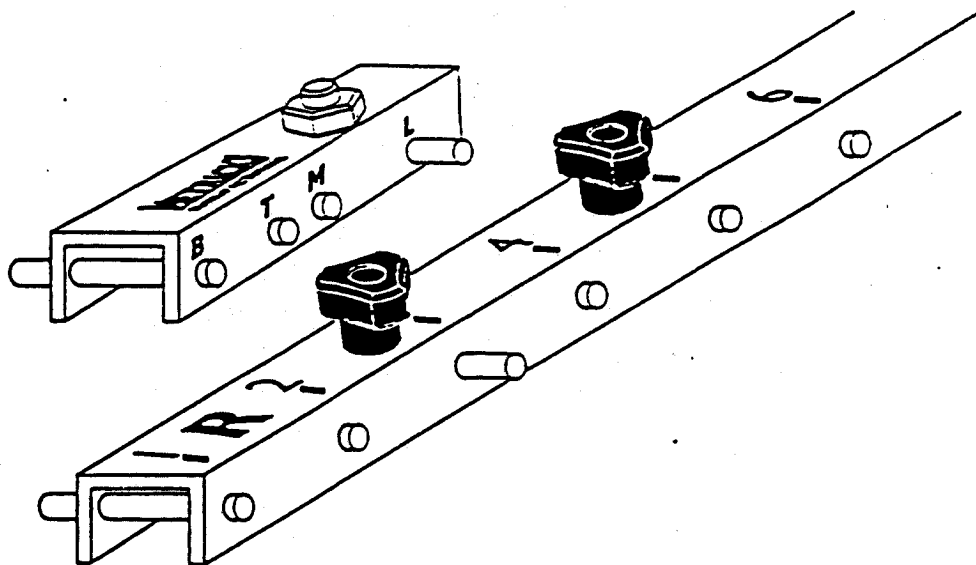
Revolutionize the way you build frameless

cabinets. Locate and bore system holes, Metabox drawers, and hinges with point to point accuracy.

"the stick" is available through your cabinet hardware supplier

FEATURES

- ACCURATE AT EVERY HOLE POSITION
- FITS RIGHT INTO YOUR HINGE BORING MACHINE IN SECONDS
- ALL METAL CONSTRUCTION
- ASSEMBLED & READY TO USE
- MINIMIZES SETUP TIME
- QUICK AND ACCURATE CHANGES FOR HINGE, METABOX AND LINE BORING USING THE ALIGNMENT JIGS



How much time did you take adjusting doors and drawer fronts on the last job you installed? Using "the stick's" alignment jigs will reduce the amount of adjustment you have to do! If reliability and repeatability of hole drilling is important to you, you need "the stick"!

What The Pearls and Sticks Can Do!

LINEBORING

The Sticks locate the starting point (the first hole) and index every 7 holes thereafter when lineboring. You can linebore from either the top or the bottom, which allows the first hole to be constant even on unbalanced panels.

By using a single 5mm bit and the pin stops on *The Stick*, you can bore only the holes you need in the side panel (i.e. mounting plate holes) and still stay on 32mm spacing. Eliminating the extra holes gives a point to point look. By staying on 32mm spacing, you can still locate hinges and front fixing brackets with *The Stick*.

LOCATING HINGES

Working from the top or the bottom of the door, *The Sticks* can locate the first hinge and then space all subsequent hinges on the 32mm system holes.

To raise a hinge for pullout clearance, you move over 1 pin space on the stick for each 32mm space you want to raise the hinge.

If you must have doors with balanced hinges (same hinge location from the top and the bottom of the door), you can use a variation of *The Pearls*. *The Stick* will still locate the hardware perfectly, however, you will lose some space under drawers.

LOCATING METABOX FRONT FIXING BRACKETS

Working from the top of the drawer front, the first pin on *The Stick* locates the front fixing brackets for the 320 *N, M, K*, and *H*. Since you are working from the top of the drawer front, the same pin (#1) works for top, intermediate, and bottom drawers.

*Drawer fronts that are taller than the minimum required for each *Metabox* height, are increased by 32mm increments. For each 32mm increment the drawer front is increased in height, you move over 1 pin on *The Stick* (i.e. standard fronts use pin #1; add (1) 32mm space and use pin #2; add (2) 32mm spaces and use pin #3, ... etc.) to locate the bracket.

Working from the bottom of the drawer front, the first pin (#1) would locate the bracket on a standard (top or intermediate) 320 series *N* and *M* drawer. You would then use pin #2 for the *K* and pin #3 for the *H* drawer. The fence would then have to be readjusted for all bottom drawers (similar to the Blum *Ministick*). Since you are working from the bottom of the drawer front, you don't have to make any adjustments for drawer fronts that are taller than the minimum required for each drawer size. The bottom method offers a great advantage if you need to vary the top reveal of the drawer front to accommodate the overhang of different types of countertops.

On face frame cabinets, once *The Sticks* are adjusted for the correct overlay (i.e. 1/2", 5/8", ... etc.), they will locate the drawer front brackets from the top or the bottom. As seen in the example above, the brackets for all drawer fronts could be located from the top using pin #1, if the cabinet profiles were located from the top of the opening using the *Metatemps*.

METABOX BOTTOMS & BACKS

The bottom and back panels for *Metabox* drawers can be bored for system screws or for the new *C15* version using the alignment jigs that comes with *The Stick*.

Note: Leg levelers and RTA fittings can also be located with *The Stick*.

The "Stick" by Metricks

OPERATION	STICK SETUP	FENCE SETUP	GEARBOX SETUP	NOTES																																																												
<p>Line Boring</p>				<p>#7 Pin outside the "L" Pin Use Pin #1, #4, #7, etc. For best results, start from Top or Bottom of panel, and be consistent.</p> <p>ALTERNATE Use the MZK.1000*US 7 Spindle boring head (Minipress Only) and set the fence to 5mm. For best results, use the alignment template supplied with the boring head.</p>																																																												
<p>Hinging Top Method</p>				<p>#7 Pin outside the "S" Pin Use Pin #1 to locate, drill and insert the top hinge. Then slide the bottom of the door midway between pin #1 and pin #2 on the opposite stick. Push out the first available pin above the door and slide the door up to this pin. Now drill and insert the bottom hinge.</p> <p>Note: "MB" setting results in a boring (B) distance of 5mm. Add this to the hinges "X" distance to find OVERLAY. Example: 5 + 11 = 16mm(5/8") Overlay</p>																																																												
<p>Hinging Bottom Method</p>				<p>#7 Pin outside the "F" Pin Use Pin #1 to locate, drill and insert the bottom hinge. Then slide the top of the door to pin #1 on the opposite stick. Push out the first available pin below the door and slide the door down to this pin. Now drill and insert the top hinge.</p> <p>Note: "MB" setting results in a boring (B) distance of 5mm. Add this to the hinges "X" distance to find OVERLAY. Example: 5 + 11 = 16mm(5/8") Overlay</p>																																																												
<p>Metabox Drawer Front</p>				<p>#7 Pin outside the "M" Pin This table assumes a 14mm top reveal as per the "Peartie". Place the top of the drawer front at the appropriate pin.</p> <table border="1"> <thead> <tr> <th>Spaces</th> <th>Height</th> <th>Size</th> <th>Pin#</th> </tr> </thead> <tbody> <tr><td>3</td><td>93</td><td>320N</td><td>1</td></tr> <tr><td>4</td><td>125</td><td>320M +1</td><td>2</td></tr> <tr><td>4</td><td>125</td><td>320M</td><td>1</td></tr> <tr><td>5</td><td>157</td><td>320H +2</td><td>3</td></tr> <tr><td>5</td><td>157</td><td>320M +1</td><td>2</td></tr> <tr><td>5</td><td>157</td><td>320K</td><td>1</td></tr> <tr><td>6</td><td>189</td><td>320N +3</td><td>4</td></tr> <tr><td>6</td><td>189</td><td>320M +2</td><td>3</td></tr> <tr><td>6</td><td>189</td><td>320K +1</td><td>2</td></tr> <tr><td>6</td><td>189</td><td>320H</td><td>1</td></tr> <tr><td>7</td><td>221</td><td>320H +1</td><td>2</td></tr> <tr><td>8</td><td>253</td><td>320H +2</td><td>3</td></tr> <tr><td>9</td><td>285</td><td>320H +3</td><td>4</td></tr> <tr><td>10</td><td>317</td><td>320H +4</td><td>5</td></tr> </tbody> </table> <p>Note: Add 14mm to height for bottom drawers.</p>	Spaces	Height	Size	Pin#	3	93	320N	1	4	125	320M +1	2	4	125	320M	1	5	157	320H +2	3	5	157	320M +1	2	5	157	320K	1	6	189	320N +3	4	6	189	320M +2	3	6	189	320K +1	2	6	189	320H	1	7	221	320H +1	2	8	253	320H +2	3	9	285	320H +3	4	10	317	320H +4	5
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<p>Metabox Drawer Bottom</p>				<p>#7 Pin inside the "S" Pin Place front of drawer bottom at pin #1 to drill for the tabs on the Metabox C15 version. Also works for the original C version. Assemble using a #6 head 5mm system screw.</p>																																																												
<p>Metabox Drawer Back</p>				<p>For 16mm (5/8") Bottoms: #8 Pin inside the "F" Pin For 19mm (3/4") Bottoms: #8 Pin outside the "S" Pin Place bottom of drawer back at pin #1 to predrill for #6 head system screws. Use additional pins as necessary for taller backs.</p> <p>Back Heights 5/8" 3/4"</p> <table border="1"> <tbody> <tr><td>320N</td><td>39mm</td><td>36mm</td></tr> <tr><td>320M</td><td>71mm</td><td>68mm</td></tr> <tr><td>320K</td><td>103mm</td><td>100mm</td></tr> <tr><td>320H</td><td>135mm</td><td>132mm</td></tr> </tbody> </table>	320N	39mm	36mm	320M	71mm	68mm	320K	103mm	100mm	320H	135mm	132mm																																																
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