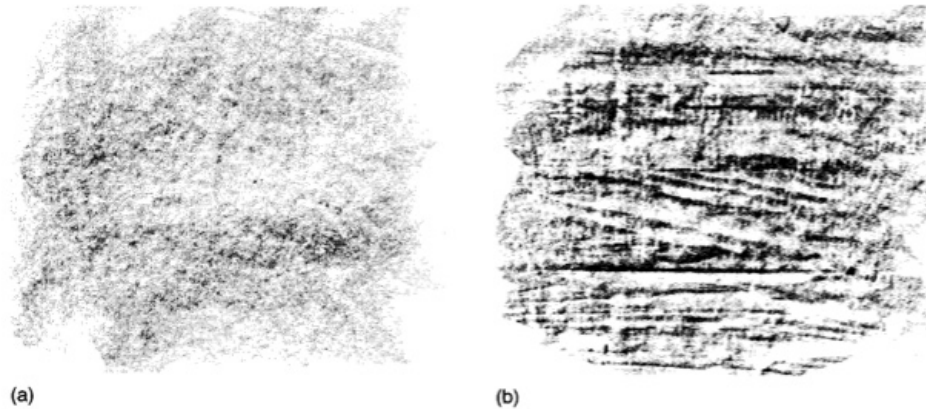


# Tools

## Lecture 2

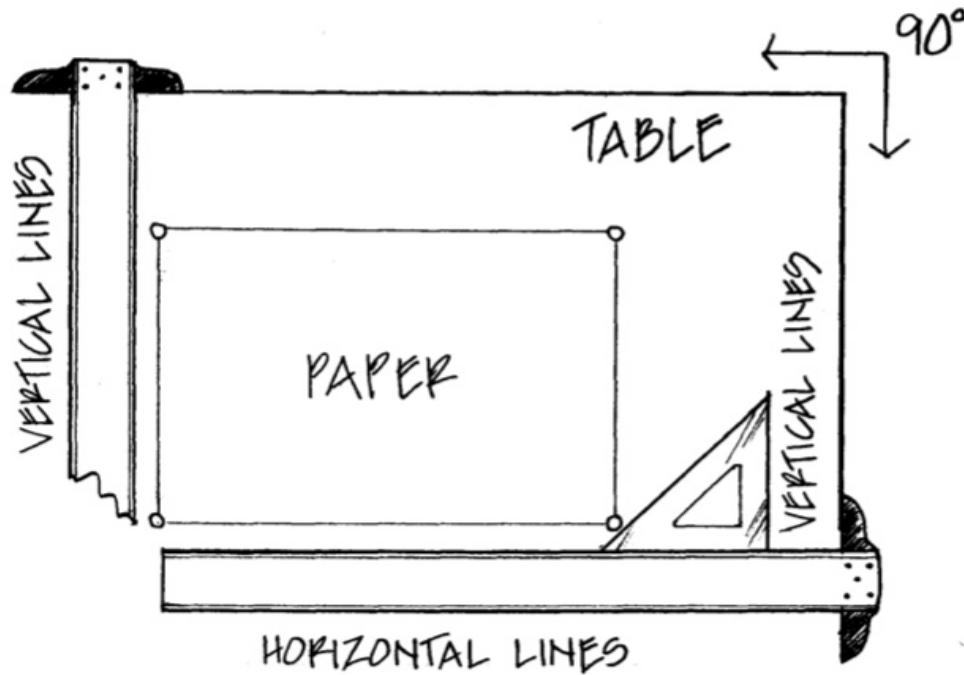
### Drawing Surface (Essential)

Any table will do the job for a drawing surface as long as it has two important characteristics. The first is a *smooth surface* with no cuts or bumps. Inconsistencies in the drawing surface will show in the paper and ruin lines (Figure 1). The second is a *straight edge* to slide a T-square along and draw horizontal lines (Figure 2). If the drawing surface has a square corner (90 degrees) with straight edges across the top and down the side, then the 'T-square can be used to draw vertical lines that are perpendicular to the horizontal lines.

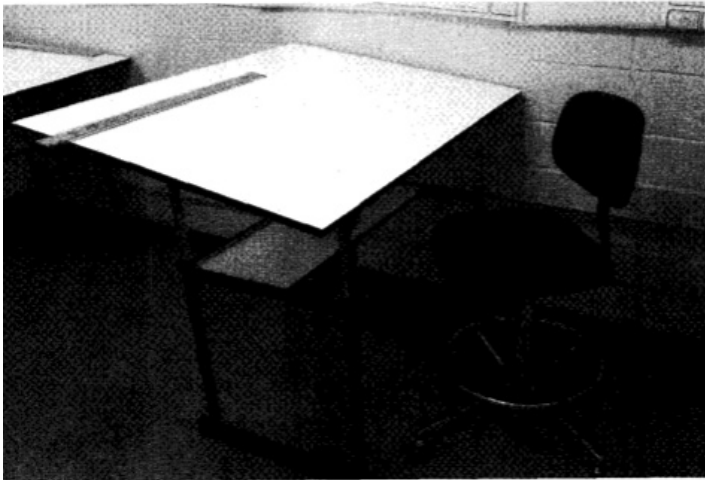


**Figure 1 Drawing Surface** Coloring over the drawing surface with an art stick reveals the smoothness, which can affect the quality of drawing. (a) Drafting table; (b) kitchen table.

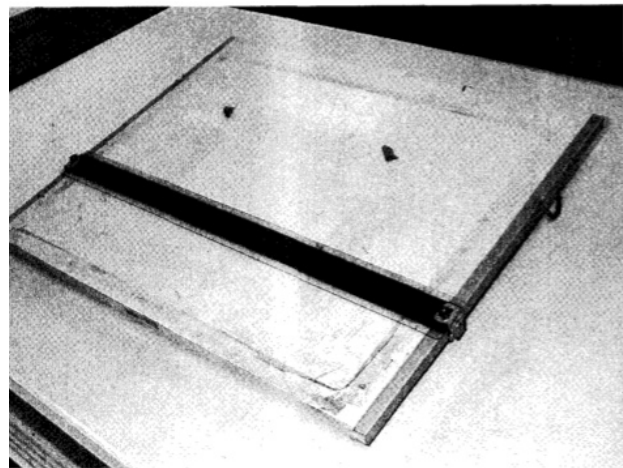
**Drafting** tables are preferred by many designers because tools can be stored in the tray at the bottom edge of the table and the desktop can be raised, lowered, or tilted for comfort (Figure 3). Some drafting tables will have a **drafting** mat used to cover the drawing surface to protect it. **Drafting** desktops that are portable are also an option (Figure 4).



**Figure 2 Table Edge** Square corners and straight edges are important to draw horizontal and vertical lines with a T-square and triangle.



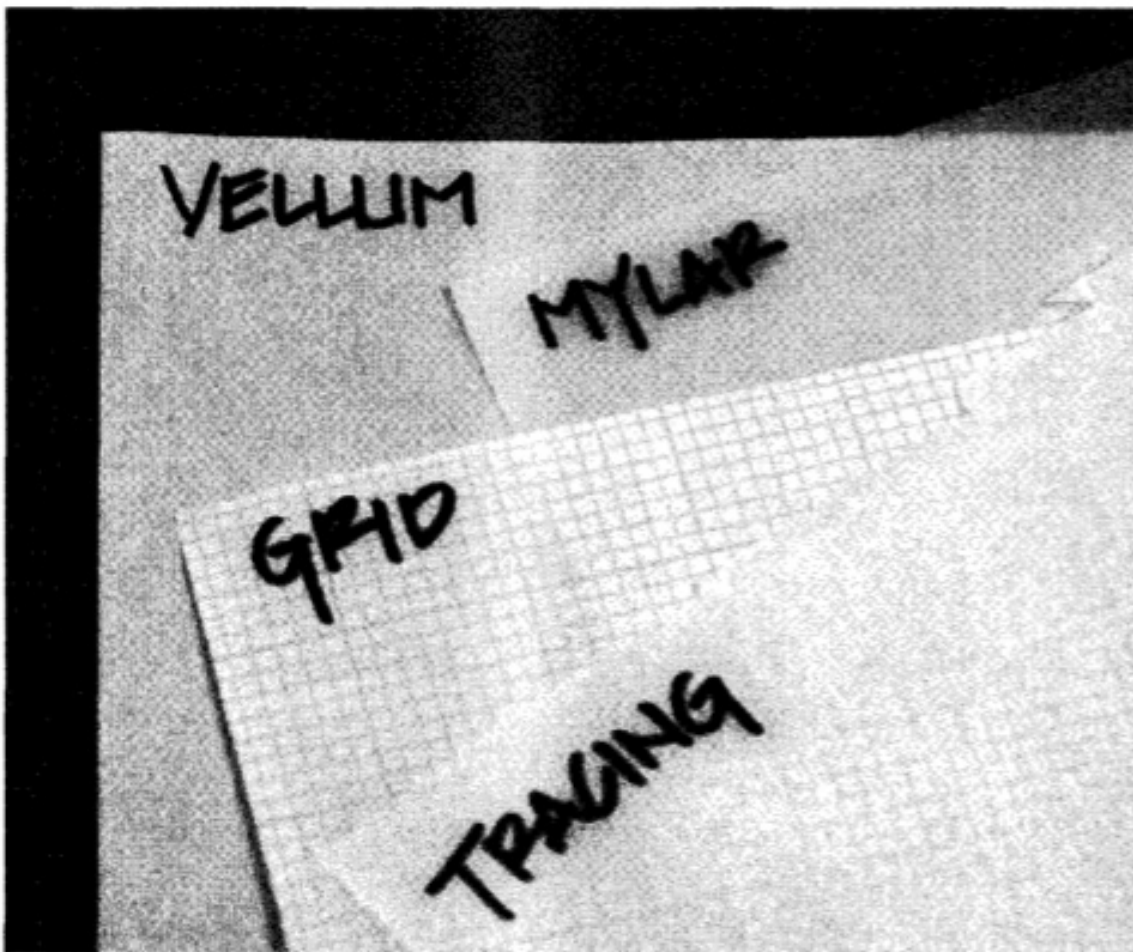
**Figure 3 Drafting Table**  
Smooth drawing surface and adjustable height and angle.



**Figure 4 Portable Drafting Table**  
Drawing surface can be easily transported.

## Paper (Essential)

There are several kinds of drafting paper (Figure 5). Tracing paper, sometimes called **trash** paper, onionskin, is a thin, translucent paper used to sketch ideas. It is a *low-quality paper* that comes in white, yellow, or buff and is often placed over the site plan to work out different designs in the initial phases such as an analysis or a concept plan. It is sold in rolls 12" to 36" wide. It is the least expensive paper and lots of it should be kept on hand.



**Figure 5 Paper** *Trash*, or *tracing*, paper used to work out ideas and take notes; *vellum* paper, high-quality paper used for lead drawings; *Mylar*, high-quality film used for ink drawings.

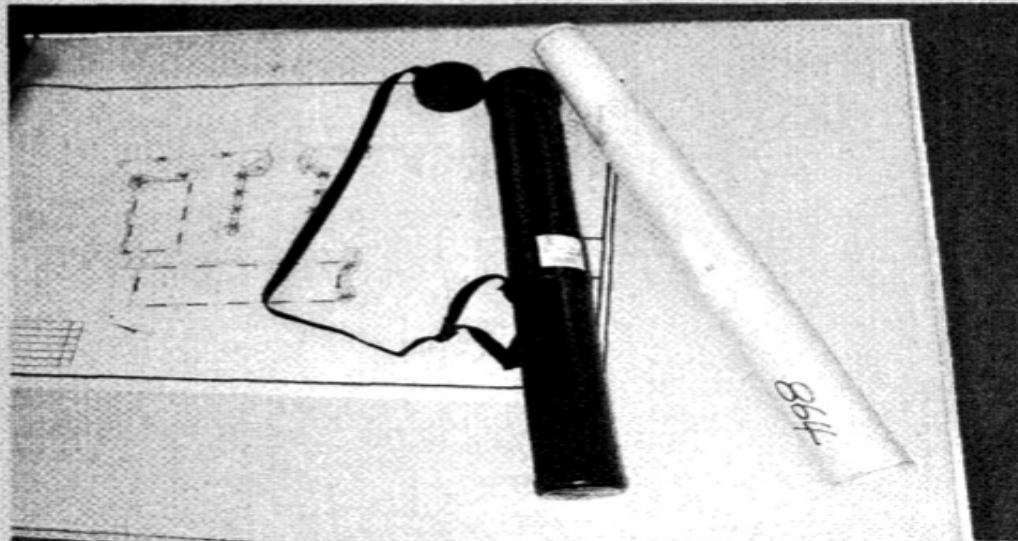
*High-quality paper* is preferred for the final draft because it has better reproduction quality and longevity. **Vellum paper**, or rag vellum, is translucent and can be placed over previous drawings to trace. It is more expensive than tracing paper and can be purchased in individual sheets or in rolls. *Vellum is primarily used for lead drawings* because ink does not erase easily.

**Mylar** is high-quality paper that is actually drafting *film*. It is heavier than vellum and has better longevity and reproduction quality. It often comes with a glossy side and a rough (matte) side. Drawing is done on the rough finish. *Mylar is expensive and is primarily used for ink drawings* because it can be easily erased with an ink eraser.

**Grid paper** has non-photo blue lines laid out in squares over the paper. The grid can be used to draw to scale because the size of the boxes is consistent. For instance, the boxes may be 1/8" wide and tall, which would be convenient if the scale of the plan were 1/8" = 1'. The lines should not show up on a print. Some designers like to use grid paper in preliminary drawings because it is quicker to assess the scale.

**Bond paper** is standard-weight paper, like that used in home printers. It is primarily used for copies rather than the actual drawing.

**Tip Box: Carrying Tubes (Figure 2-6)**



**Figure 2-6 Carrying Tube**

Roll up drawing for easy transport. Use a professional carrying tube with strap or a simple postal tube.

Drawings are easily transported in **carrying tubes**, in which they can be rolled and inserted.

**Professional tubes** are made of plastic and have a carrying strap. An inexpensive solution is to use a cardboard **postal tube**.

**Tip Box: Rolling Drawing Facing Out (Figure 2-7)**



**Figure 2-7 Title Roll Drawing**

Roll the drawing *facing out*. This way, when the plan is unrolled it will not continue to roll up. To avoid smudging, wrap a blank paper around the outside once the drawing is rolled.

## Tape (Essential)

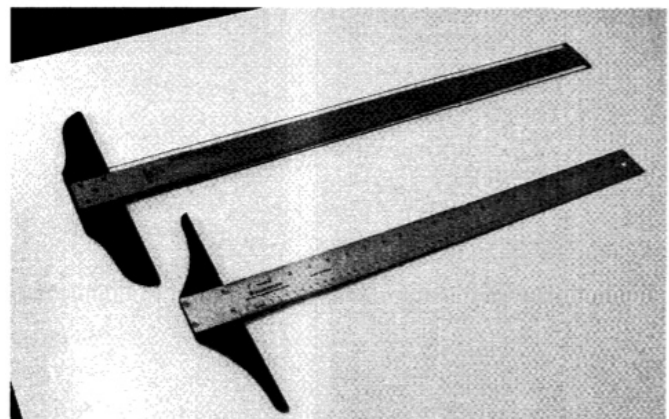
Drafting tape and drafting dots are used to anchor the corners of paper onto the design table (Figure 8). A small roll of masking tape can be used as well, although it tends to be very sticky and can rip the corners. Another disadvantage to using tape is it tends to roll over as the T-square is pulled over it.



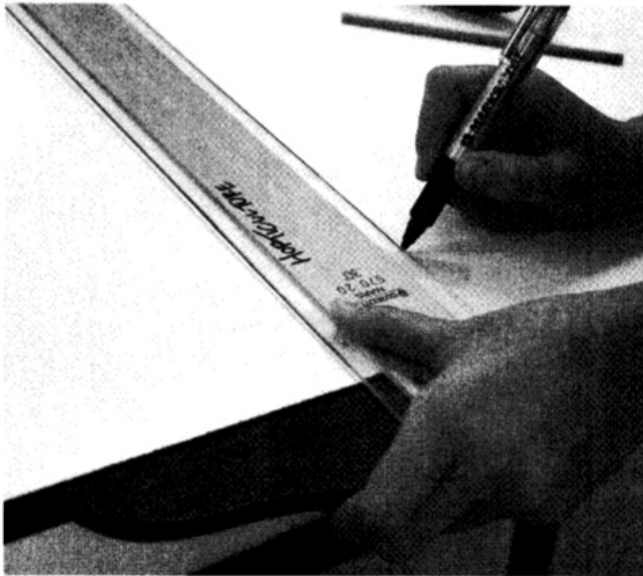
**Figure 8 Drafting Dots** Tape (bottom) or dots (top) used to anchor the corners of drawing.

## T-Square (Essential)

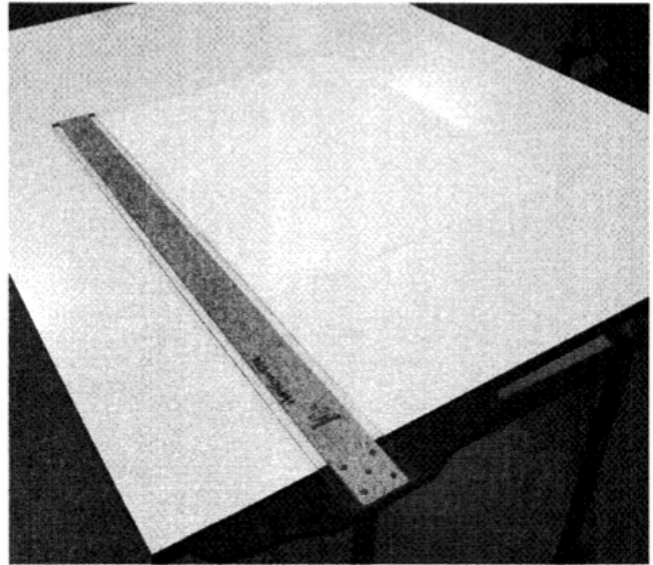
The T-square provides a *horizontal line* by placing the head of the T-square on the edge of the drafting table and sliding it up and down (Figure 9,10,11). Consistent horizontal and vertical lines can be quickly drawn with this tool. By placing the head of the T-square across the top of the table, it can be used to draw *vertical lines*.



**Figure 9 T. Square** Steel and wooden T-squares.



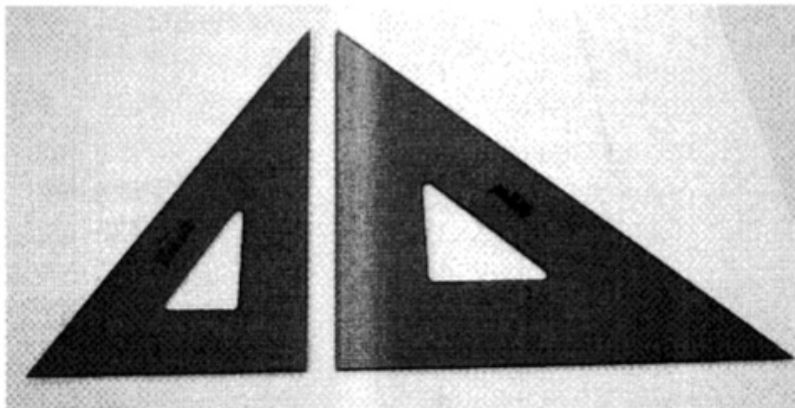
**Figure 11 Squaring Paper** Square the paper to the T-square so that the lines are drawn parallel to the edge of the paper.



**Figure 10 Holding T-Square** Hold the head firmly with the nondrawing hand.

## Triangles (Essential)

There are two standard triangles: 45/45-degree and 30/60-degree (Figure 12). Triangles are made of transparent material to see the paper below. They are very handy as a straight-edge because of their smaller size, and they provide a 90-degree corner to draw square corners.



**Figure 12 Triangles** (a) 45-degree triangle and (b) 30/60-degree triangle for drawing angles and straight lines.

## Lead (Essential)

Lead comes in *degrees of hardness and softness*. H lead is *hard lead* that draws thin, lighter lines. A number will come before H to give the degree of hardness. The higher the number, the harder the lead. The advantage to harder lead is that it requires infrequent sharpening and does not smudge. 4H is used for guidelines and 2H is often used to draw details and sometimes letters. H (without a number) is often used for general drawing.

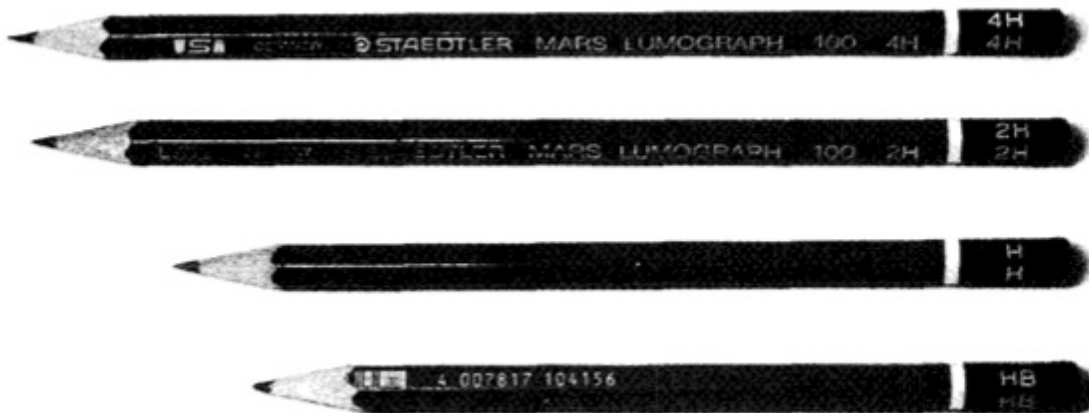
B lead is *softer lead* that draws thicker, darker lines. The higher the number, the softer the lead. It is used for heavy weight lines. Because it is softer, it requires frequent sharpening and smudges easily. HB is used to draw shadows and create contrast. HB is sometimes used for general drawing. Occasionally, 2B is used, but it should be used with caution because it smudges easily

## Types of Lead

Standard leads are made of *graphite*. Plastic leads are used to draw on Mylar film to avoid smudging.

## Pencils (Essential)

Any of the following tools can be used to draw with lead. Drawing pencils are a convenient way to draw (Figure 13). They are wooden pencils without an eraser at the end. They are inexpensive and easy to handle. Lead-holders operate like a mechanical pencil but hold larger sticks of lead that can be sharpened to a fine point and draw very sharp lines (Figure 14). Lead-holders are versatile because leads can be switched easily. Mechanical pencils hold various thicknesses of lead (from 0.5 mm to 0.9 mm) and do not need to be sharpened (Figure 15). Because the lead is thin, it tends to break when too much pressure is applied, especially when it is smaller than 0.5 mm.



**Figure 13 Pencils** Various leads are used to draw lighter or darker lines.





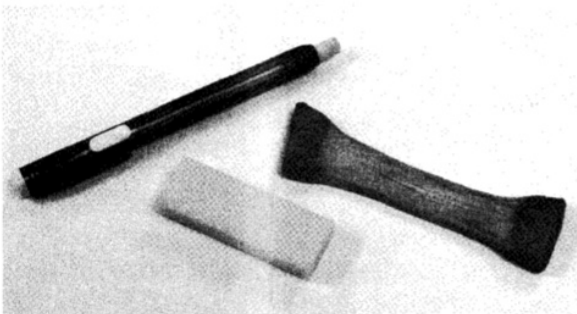
**Figure 14 Leads** Used to load into lead-holders.



**Figure 15 Mechanical Pencils and Lead** Lead hardness and thickness can be varied.

## Erasers

With any eraser, be careful when erasing lines drawn with soft lead because they smear and cause a smudge spot that is hard to remove (see eraser shield). Plastic erasers, which are commonly white, are frequently used to erase lead (Figure 16).



**Figure 16 Erasers** Various erasers