I-TRAY™ DESIGNER

Use this site to design and place orders for your custom trays. You create a tray design which you purchase by adding it to your shopping cart and checking out.

Designing your new tray on i-Tray™ Designer is easy because the tool does most of the work automatically. You begin by entering the size of your component (bare die or other device), select the size tray you want, and let the tool do the rest. You have options that allow you to work in either inches or millimeters, select the material of your choice, and change a variety of attributes to give you the end result you need. You view the results of your changes by clicking the "Continue" button. You may "Request a Quote" or click on the "Add to Cart" button and you are ready to order your new tray.

If you are not ready to purchase your new tray but don't want to lose your design input, once the tray has been added to the shopping cart you may add all items to a list by clicking on "Add all Items to List". Lists can be shared via email with other email addresses — accounts are not required to receive a list.

I-TRAY DESIGN GUIDE

The i-Tray Designer was developed to handle the design requirements common to most custom trays. Certain components require trays that are too complex to be designed with this tool. Contact Entegris for alternate designs that go beyond the parameters of i-Tray Designer.

When designing a new tray it is important to understand standard tray orientation. The upper left corner of the tray is the one with the 45° corner chamfer. This feature is used as an orientation reference in automated manufacturing equipment. By convention, this site uses X for horizontal dimensions, Y for vertical dimensions, and Z for depth dimensions.

Dimensional accuracy is limited, and consistent with manufacturing process capability. Measurements in inches are kept to three decimal places of precision. Measurements in millimeters are kept to two decimal places. Example: If you enter 8.153 mm, it will be rounded to 8.15 mm.

Tray Attributes

You can design your tray in one of two sizes, H20 or H44, and either can be made in a variety of materials. Different materials are used because of their different chemical, electrical, and thermal properties.

H20 trays are 2.000" by 2.000" and H44 trays are 4.000" by 4.000". Trays made of STAT-PRO® 150, however, shrink slightly more during manufacturing of the tray and so have slightly different dimensions:

	H20	H44
STAT-PRO® 150	50.67 mm (1.995") square	101.35 mm (3.990") square
All others	50.80 mm (2.000") square	101.60 mm (4.000") square

You can specify your pocket dimensions in one of two ways. The most common way is to tell us the maximum dimensions of your component. We add a tolerance and clearance (which depend on the tray size and material) to this to get a nominal pocket size. Note that it's important for you to specify the maximum component dimensions to ensure proper fit.

You can also specify your nominal pocket dimensions directly. You should be sure to add any desired clearance between the pocket and the maximum size of your device. Standard manufacturing tolerances will be added to establish a nominal pocket size.

The diagram below shows how X (horizontal), Y (vertical), and Z (depth) are defined.
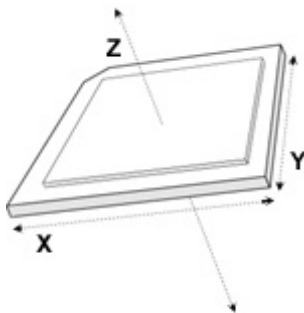
Note: i-Tray Designer limits you to square and rectangular pockets and pocket arrays. Contact Entegris for alternate designs that go beyond the parameters of i-Tray Designer.

Draft

Draft Angle is the angle marked "A" on the diagram below. A small draft angle, usually 7°, is needed to ensure that the mold can separate from the part during manufacturing. "A" must be between 7° and 30° inclusive.
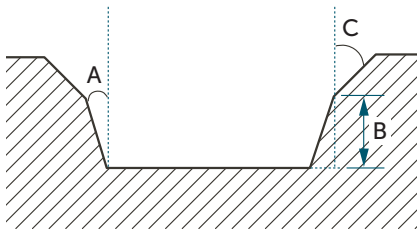
Chamfer Angle is the angle marked "C". A chamfer may help lead the component into the pocket. "C" must be no less then "A" and no more than 45°. Chamfer height is marked "B" on the diagram. Chamfers are optional.

Corner Relief

Corner relief (see illustration below) is an optimal feature used to provide clearance for fragile device corners.
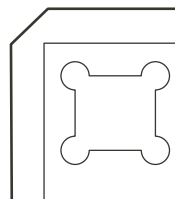

Corner reliefs are circular with their centers at the pocket corners. For both H20 (2") and H44 (4") trays, the diameter will be .025" (0.64 mm). Pockets must be at least .045" (1.14 mm) to support corner reliefs.

Pocket corners without corner relief have a very small radius in the corner, about .005" (0.13 mm).

Through Holes

Through holes, sometimes called wash holes, are used for a variety of purposes — fluid flow, vacuum retention of the device, and optical sensing of device presence. Pockets must be at least a minimum size to support a through hole. A pocket in an H20 (2") tray must be .015" (0.38 mm) or larger in both X and Y directions, and a pocket in an H44 (4") tray must be .038" (0.97 mm) or larger before it can have a through hole.
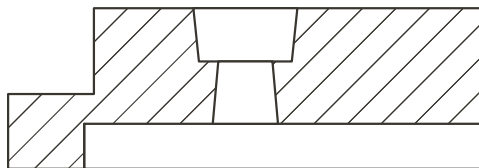
*Scroll down for more information about through holes.*
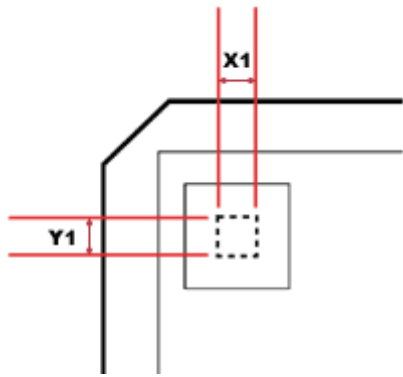
Through holes are square or rectangular with a width and a height. The minimum and maximum through hole sizes are shown below.

Tray Size	Pocket Size	Min. Hole Size	Max. Hole Size
H20	.015" (0.38 mm) – .030" (0.76 mm)	.010" (0.26 mm)	⅔ pocket size
H20	.030" (0.76 mm) – .090" (2.29 mm)	⅓ pocket size	⅔ pocket size
H20	.090" (2.29 mm) or greater	.030" (0.76 mm)	⅔ pocket size
H44	.038" (0.97 mm) – .240" (6.10 mm)	⅓ pocket size	⅔ pocket size
H44	.240" (6.10 mm) or greater	.080" (2.03 mm)	⅔ pocket size

Cross Slots

Cross slots (see illustrations below) are used for a variety of purposes. A common use is to allow tweezers to pick up the device. Cross slots also help fluid drainage.
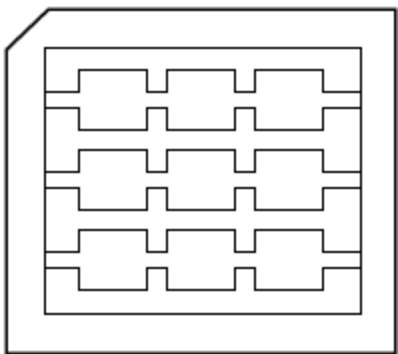
*Break through cross slots in X dimension*
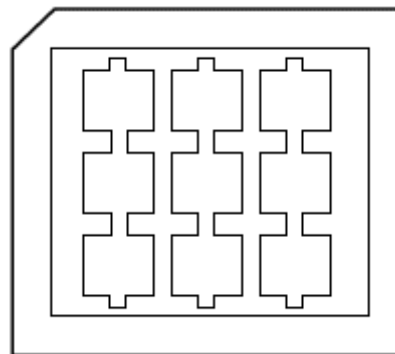
Cross slots in Y dimension without break through

Cross slots can be added in the X direction, the Y direction, or both. Each slot has a width and a depth. The default depth (indicated by 0) is the depth of the pocket. The table below summarizes the minimum and maximum values for both H20 (2") and H44 (4") trays.

Series	Min. Width	Max. Width	Min. Depth	Max. Depth
H20	.015" (0.38 mm) + draft angle	⅔ pocket span	.005" (0.13 mm)	.060" (1.52 mm)
H44	.015" (0.38 mm) + draft angle	⅔ pocket span	.005" (0.13 mm)	.145" (3.68 mm)

Pocket Surface

In most applications a smooth finish on the bottom of a pocket works well. Sometimes the surface tension between a smooth device and a smooth plastic surface allows the device to cling in the pocket. An EDM finish can minimize the chance of this happening. An EDM finish is a finely textured surface finish on the mold created in the Electrical Discharge Machining process.
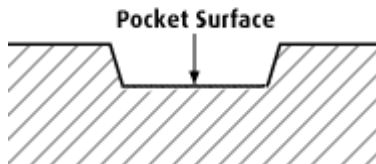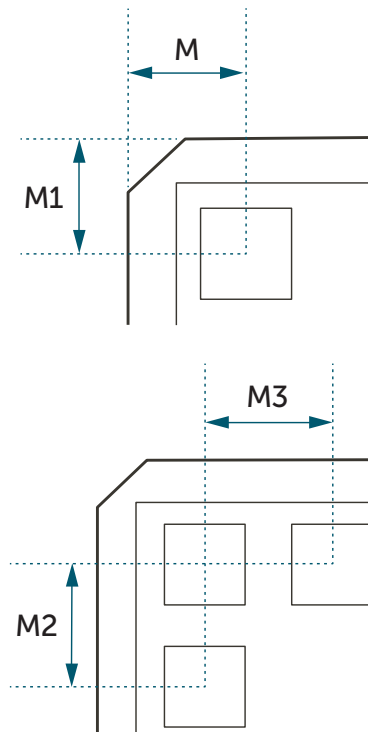

Pocket Array

Selecting Maximum Array allows the design tools to maximize the number of components in your tray. This is the usual choice. The maximum array is automatically limited to 400 pockets.

Sometimes, usually to accommodate manufacturing equipment and processes, you may want to specify the exact pocket grid. If you specify tray capacity, your design must stay within our design rules. Tray size, pocket size, pocket placement, corner relief, and draft all affect the amount of space available for pockets. If you ask for more pockets than will fit, i-Tray Designer will automatically adjust the array to not exceed 400 pockets.

You can specify the placement of your pockets in the tray, both the distance of the pockets from the edge of the tray as well as the distance between pockets. Depending on your level of automation, this may be important to you as you can match the coordinate locations of each pocket in a tray you are currently using. You can specify four different values as illustrated below.

You can specify your custom array by entering the number of pockets you want in the X and Y directions and let i-Tray Designer automatically center the pockets on the tray. To do this you will need to clear the entries for M, M1, M2, and M3.

The upper left corner of the tray is the one with the 45° corner chamfer. This feature is used as an orientation reference in automated manufacturing equipment. If your device is rectangular in shape, it is important to ensure your pockets have the proper orientation.

The minimum wall thickness is .030" (0.76 mm) for H20 trays and .070" (1.78 mm) for H44 trays.

Underside Detail *(H20 trays only)*

Trays can be stacked one on top of the other. This means that a tray can also be a cover for the tray beneath it in the stack. Sometimes the surface tension between a device and a smooth plastic surface allow the device to cling to the "cover," that is, the bottom of the tray above it in the stack.

To prevent this problem, the default underside detail is an EDM finish. An EDM finish is a finely textured surface finish on the mold created in the Electrical Discharge Machining process.

The rib matrix underside is a pattern of fine ribs that also prevents undesirable surface tension, and will keep a device in the pocket below. Rib matrix is not recommended when pockets are smaller than .030" (0.76 mm) as the device may not be held in the pocket if a tray is used as a cover.

Underside Detail
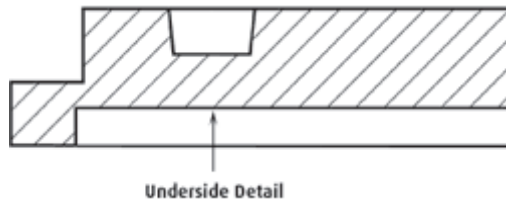
Stacking Option *(H44 trays only)*

Trays can be stacked one on top of the other. This means that a tray can also be a cover for the tray beneath it in the stack. This is called *Tray On Tray*. The opposite of *Tray On Tray* is *Tray With Cover*, which means that trays use separate covers.

If you choose *Tray On Tray*, Entegris will configure an underside that fits with your device grid. We evaluate each H44 tray-to-tray stacking application and incorporate an appropriate underside that holds your devices in place during transport and handling. This evaluation is a complex process that we have not yet built into this design tool.

If you choose Tray With Cover, you will need to purchase covers separately through the Bare Die/CSP Tray Accessories page.

If our design rules do not allow you the flexibility you need, or if you have special requirements, please contact Entegris and we will be happy to assist you.