

Technical Reference

Topic: Uniform Film Build

The tubular geometry of the TECTRON™ Cell delivers optimum current flow at the lowest possible voltage, especially to large and complex workplaces.

The shape of both the anode and the cathode in an e-coat tank directly affect the flow of electrical current. Current is drawn first toward the edges of a cathode; conversely, it flows first from the edges of an anode. This natural behavior of electrical current can either help or hinder the performance of a paint system.

Film build is directly related to current flow. The effect of current flow on film build can best be visualized by examining a flat-surfaced cube (the cathode) as it travels through the paint tank. (See Figure 1.) The edges of the cube are painted first, because the current flow is attracted first to the edges. Once the edges are painted, the current flow will go toward the flat surfaces of the cube, eventually painting the entire cube. In automotive applications, the even flow of electrical current (and thus desired film build) can be difficult to achieve because of the complexity of the pieces being painted. Often the sides receive too much film build and the roof too little.

The geometry of a car body (the cathode) is relatively fixed; however, it is possible to achieve

desired film build by changing the shape of the anode cell.

More current flows from the edges of an anode. A box cell will have more current flow off its edges, and less current flow from its flat center region. (See Figure 3.) This effect is similar to the cathodic cube receiving more current at the edges than at the center. Even though a box cell covers a larger portion of the tank wall, its vast inner area contributes relatively little throwpower. The uneven flow of current in box cells can be illustrated by looking at a box anode cell in your tank. Chances are you will find the stainless steel thinner at the edges of the plate, where more current has flowed and the anode has eroded.

Because it is tubular, the TECTRON Cell is, in effect, one large "edge." Current flows more evenly off the TECTRON Cell's entire surface. (See Figure 2.) The even flow of current from the TECTRON Cell is much more effective in building a uniform film coating on a complex cathode, such as a car body.

Uniform film build is important. Excess or insufficient paint application is costly. By design, the TECTRON Cell delivers optimum current, which leads to desired film build at desired costs.

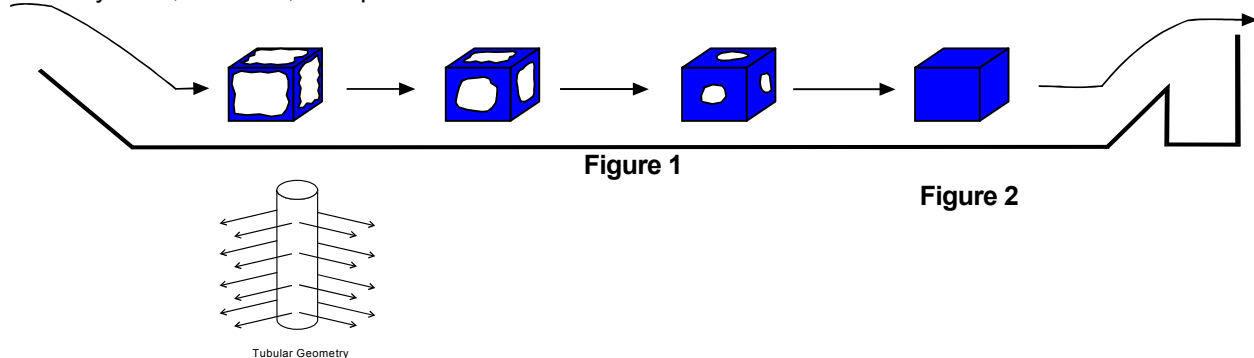
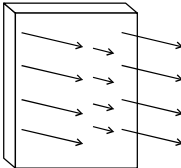


Figure 1

Figure 2



Flat Plate Geometry

Figure 3