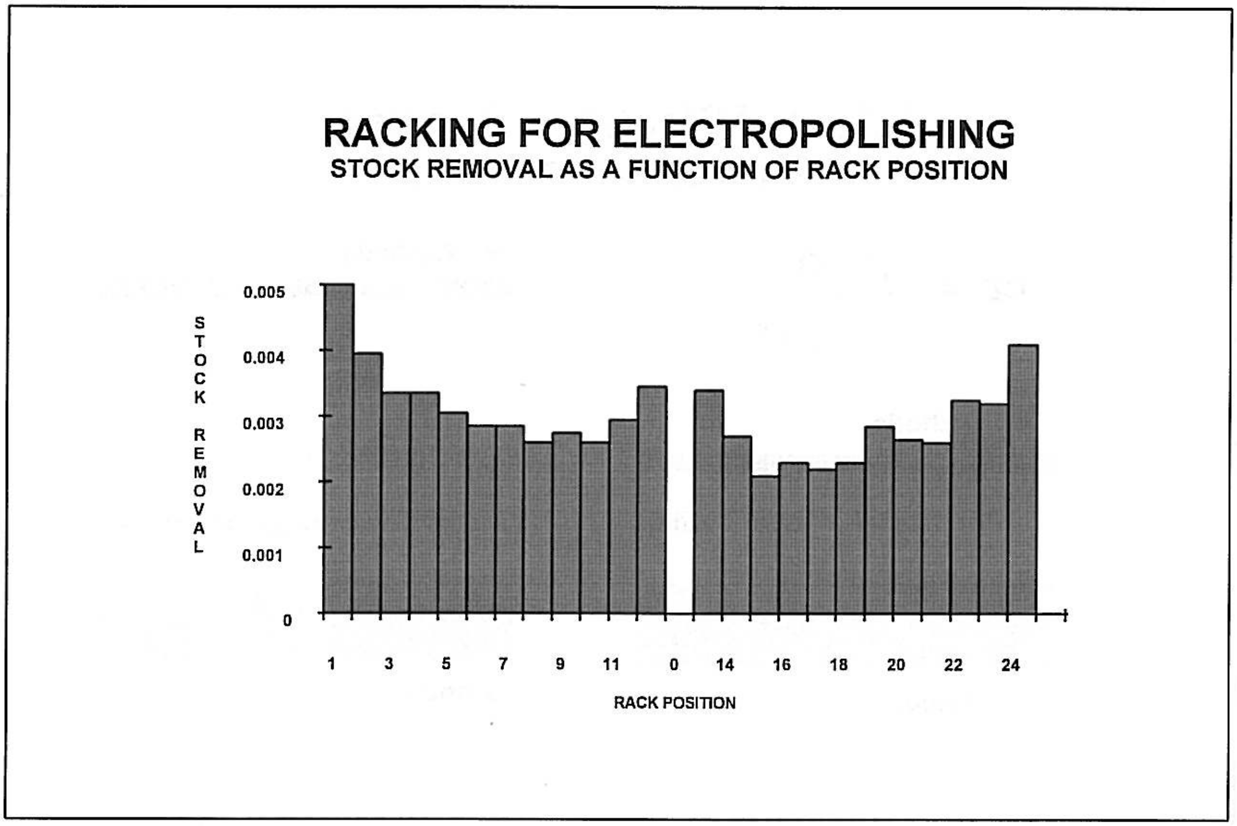
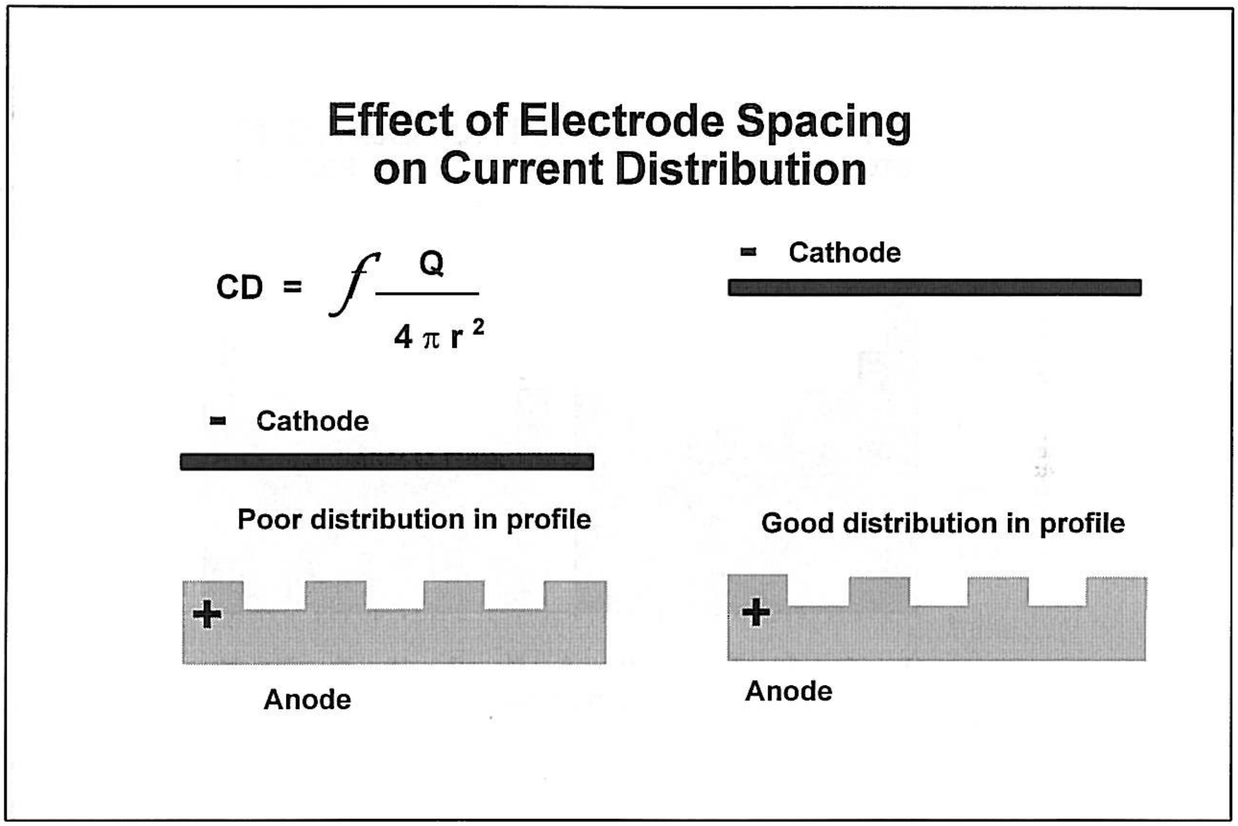


RACKING FOR ELECTROPOLISHING

The current density around any given part varies with the part geometry, and is seldom uniformly distributed. Electropolishing racks also have patterns of current distribution which must be taken into account.

The graph above illustrates the amount of metal removed for each of 24 parts mounted on a rack. The pattern suggests that metal removal is highest at the extremities and at the central point, where the rack spline is connected to the anode rail. Thus, the system tends to treat the rack as though it were a large part, with its own tendency to produce high and low current density areas based on the geometry of the rack.

In the case illustrated, unequal metal removal could not be tolerated, and the rack design had to be changed to produce more uniform parts.



EFFECT OF ELECTRODE SPACING ON CURRENT DISTRIBUTION

The current density at any point is a function of the voltage applied and the inverse square of the distance between the anode and cathode. This principle can be used to advantage in the case of complex geometric shapes which have a tendency to polish poorly.

The use of close cathodes may be unsuccessful in electropolishing a complex shape. If the cathode is very close, the difference in distance between the high points and the recesses with respect to the cathode is relatively large, and the relative difference in current density may be quite large because of the squared factor in the denominator.

In such cases, it is often helpful to increase the distance between the anode and cathode, so that the difference in the distances becomes relatively smaller. The result is a more uniform distribution of current density.