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Hull and his cell

D. R. Gabe*

Richard O. Hull can almost be said to be a one invention man, but the invention is such that he is known universally in the metal finishing field for it. As a businessman, he can be said to have had his greatest influence through a technical invention.

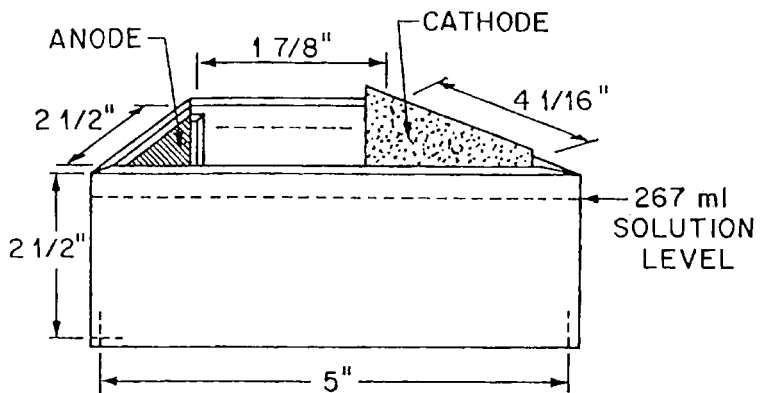
Born in the USA, he was groomed for a position in the family chemical company which had been established in Cleveland, Ohio to manufacture and stock speciality chemicals for what we now know as the surface technology industries. By 1935, the company was supplying additives for the surface engineering industries under the name of R O Hull and later RohCo. The company was best known for supplying corrosion inhibitors to the chemical and oil industries: such chemicals had surface-active characteristics and it was not long before Hull realised that they could be used as additives for electrochemical processes notably electroplating and this discovery was the driving force for most later activities.



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The Hull cell

Business instinct told him that he needed a test to assess 'macro throwing power' or current density ranges for optimum performance. The same instinct took him to a simple plating cell with a varying anode-cathode spacing and its launch in 1939 was first, as a patent,¹ and then, as a conference technical paper for the American Electroplaters Society.² Its simplicity as a test which operatives could use was obvious and soon its virtue was being widely extolled. It can be made of Perspex, Lucite or polypropylene and the dimensions are Imperial not Metric; the depth was chosen such that its volume allows for a 1 g addition of additive being equivalent to the following in a large tank:

267 ml cell (2 1/2" in depth) = 1 oz
per US gallon

320 ml cell (3" in depth) = 1 oz
per Imp. Gallon

The claims for the Hull Cell were fourfold:

- to optimise current density range
- to optimise additive concentrations
- to recognise impurity effects
- to indicate macro-throwing power capabilities.

At first the company made the cells itself but, as its business focus was always chemicals, not hardware, manufacture was licensed so that they have become available from a number of suppliers. Nevertheless, updating patents were taken out^{3,4} but the definitive book of its time was written by a user and not the

originator.⁵ A patent from the same period, for a corrosion testing rig utilising salt spray mists,⁶ shows that corrosion inhibitors were an equally vital part of the business.

Although Hull clearly recognised the cell's limitations, for example in an adaptation to allow suspension of the cell in the plating vat,³ the developments to meet the need for a linear distance/current density scale on the panel and the need to incorporate heaters and agitation, etc. have been taken up by many others.^{7,8}

Richard Hull himself lost control of the company in the 1950s when it was bought by the Lubrizol Corporation, whereupon the business became redirected towards the oil and chemical industries. The electroplating interests were merged as McGean-Rohco Inc. which in turn was absorbed into Atotech in the 1990s. Richard Hull's lasting legacy is the most important test method the electroplating industry has ever had.

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