

1960's

Contact Aligner

~ Equipment & Materials Table of Contents ~

The first wafer exposure method in IC manufacturing was a method of transferring patterns to photoresist coated on a wafer with a step-and-repeat camera. Since the productivity was low due to the repetitive exposure by step-and-repeat cameras, a batch exposure method came to be adopted in which a photomask was directly contacted to the wafer and the chip patterns were exposed on the whole wafer at one time using mercury lamp irradiation. The photomask was made by repetitive transfer of inverted chip patterns on a transparent glass plate by a step-and-repeat camera, resulting in the set of inverted chip patterns to cover the whole wafer. The re-inverted photomask patterns were transferred on the resist on the wafer. Since the photomask was brought into direct contact with the photoresist on the wafer, it was called contact exposure.

At first, each individual semiconductor manufacturer built exposure apparatuses for its in-house use, but with the expansion of the semiconductor market, Kuliche & Soffa started to sell the equipment 1965, followed by Kasper, Cobilt and others (Fig. 1). The equipment was for irradiating mercury lamp light through the projection lens device, and it was equipped with the mechanism for flatly fixing the wafer with a vacuum chuck, a mechanism for bringing the photomask into close contact with the wafer, manual moving mechanism of the fixing base in the XY directions, and a divided field microscope for alignment. From its function to align multiple photomasks, it was also called an aligner.



Figure 1 Kasper Aligner