

Fig. 1. Plans for applicator.

however, in many circumstances the application of the sample as a band offers the advantage of better resolution. This is due in part to the fact that, with the band, the solvent flows through the sample instead of through and around it as happens with spots; in the latter case, trailing frequently occurs. The band can be formed by the merging of a large number of drops delivered with a microsyringe, but this is a tedious and time-consuming procedure. This note describes a device for conveniently applying the sample to the chromatoplate in the form of a thin band.

The device (Fig. 1) consists of a trough, made of two stainless steel blades ( $7 \times \frac{21}{32} \times 0.05$  inch, or  $178 \times 17 \times 0.05$  mm) soldered to two end plates ( $\frac{13}{16} \times \frac{43}{64} \times 0.05$  inch, or  $21 \times 17 \times 1.3$  mm) of the same material. The long plates form an angle of  $15^\circ$  with one another; the free edges form a gap 0.004 inch (0.1 mm) wide. The external surface of each long plate is beveled to an angle of approximately  $75^\circ$  in order to limit the thickness of each edge to approximately 0.008 inch (0.2 mm). This free edge is  $\frac{6}{32}$  inch (4.8 mm) shorter than the body of the blade,  $\frac{3}{32}$  inch (2.4 mm) having been cut away from each side.

The sample, contained in 50–100  $\mu$ l of an organic solvent [methylene chloride or chloroform-methanol 2:1 (v/v)] can be placed between the blades of the applicator by means of a microsyringe or a micropipette; the fluid rapidly extends to the whole length of the free edges, bridging the gap. When the free edges are carefully brought into contact with the surface of a thin-layer plate (Fig. 2), the fluid is immediately transferred to the adsorbent and forms a narrow, uniform band. The layer of adsorbent is not appreciably disturbed by this maneuver. If the sample is soluble in methylene chloride, this solvent is to be preferred since its rapid

Reported to the National Heart Institute on 24 February 1965.

### Device for applying samples as a narrow band to thin-layer chromatograms

ALBERTO ACHÁVAL and RALPH D. ELLEFSON

*Mayo Graduate School of Medicine, University of Minnesota, and Section of Biochemistry, Mayo Clinic and Mayo Foundation, Rochester, Minnesota*

**SUMMARY** An applicator for the rapid transfer of samples in the form of a narrow band to thin-layer chromatograms is described. The entire sample, dissolved in a small volume of solvent, can be applied in 30 sec to a band 18 cm long.

**KEY WORDS** thin-layer chromatograms · band applicator

**THE APPLICATION OF SAMPLES TO THIN-LAYER CHROMATOGRAMS IN THE FORM OF SPOTS IS A TIME-HONORED PROCEDURE;**

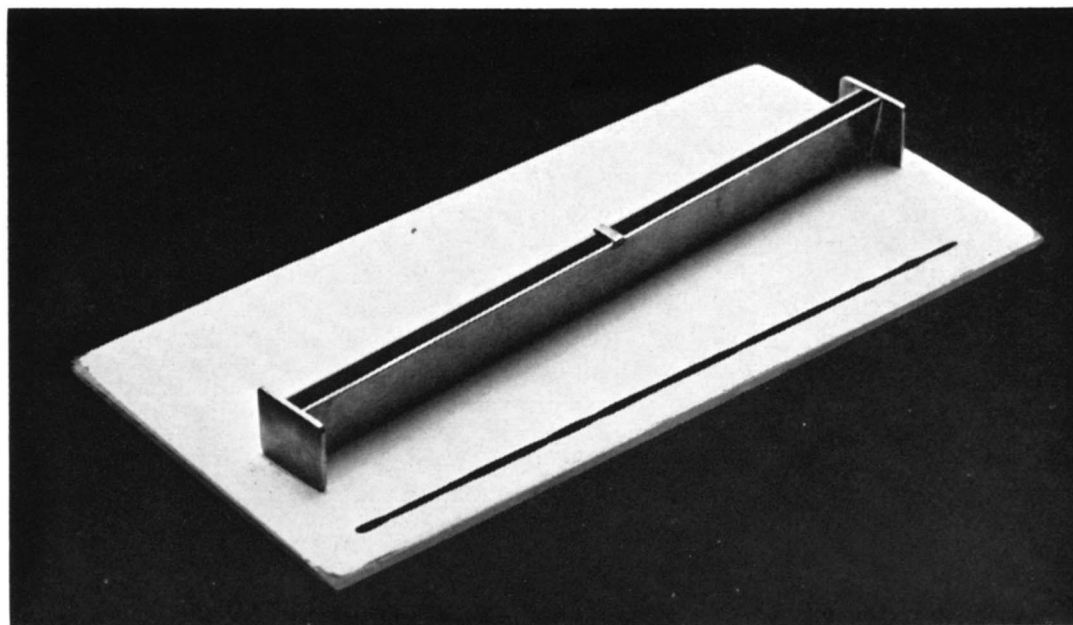


FIG. 2. Applicator and example of band it produces (small plate used for demonstration picture).

evaporation will allow the formation of a narrower band. The slightly wider band which results when the solvent is chloroform-methanol has in general no detrimental effect on the developed chromatogram; if necessary, widening can be prevented by gently preheating the plate to 40–50°C.

More than 95% of the sample can be transferred to the plate if the maneuver described above is followed by a single rinsing of the microsyringe and the applicator with an equal volume of pure solvent.

Morgan (1) described an applicator which eliminates some of the inconvenience presented by “streaking” with a microsyringe, but it is more complex and more difficult to use than is the one herein described. An “electromechanical streaking device” is also commercially available (Desaga-Brinkmann Instruments, Westbury, N.Y.); it is more complex and expensive than the one here described. The “wide band streaking

pipette,” which can be obtained from the same source, is simpler but has several disadvantages: it has a limited capacity, it forms a band only 60 mm wide, and the silica layer can be easily damaged. In addition, since the device must be immersed in the sample for loading, the volume of sample must be large.

We have tried the described applicator only in the thin-layer chromatography of lipids; we see no reason why it could not be equally useful in the separation of other classes of compounds. Chromatograms of excellent quality can be obtained and the time of transfer of small volumes to a plate is reduced to less than 30 sec.

*Manuscript received 10 September 1965; accepted 11 November 1965.*

#### REFERENCE

1. Morgan, M. E. *J. Chromatog.* **9**: 379, 1962.