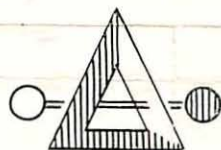


REG'D

SERIES

PICK-UPS & CARTRIDGES



## Tracking 2000g at 10 grammes maximum stylus pressure

THE LISTENING PUBLIC is inclined to take technical achievements for granted—to assume, for instance, that the increasingly exacting requirements of microgroove records can automatically be met by pick-up manufacturers. This is not the case. There is nothing automatic about it. The technical progress made by record manufacturers is, in effect, a challenge to pick-up manufacturers—a challenge which Cosmocord, whose slogan “Always well ahead” really does mean something, are always ready to take up. Sometimes the record manufacturers set us a problem, to which the solution is “impossible” and therefore takes quite a time to provide.

Such a problem is involved with regard to pick-up tracking capabilities which now have to be of a substantially higher order than those for 78 r.p.m. records, and are likely to become even more critical.

Cosmocord, with the very helpful co-operation of The Decca Record Company have recently made a detailed examination into the optimum tracking requirements that **could** arise in modern types of microgroove records. This was done in order to establish a basis for the design of pick-ups that would not only satisfy the requirements of all records at present available to the public, but if possible anticipate future developments within the limits as set out in the recently published British Standard Specification (B.S. 1928:1953).

### THREE FACTORS

The three important factors that had to be considered by Cosmocord in designing such a pick-up were minimum groove width, maximum lateral displacement and maximum stylus tip acceleration.

The minimum groove width as laid down by the British Standard Specification is .002". The conditions existing in a record giving up to thirty minutes playing time per

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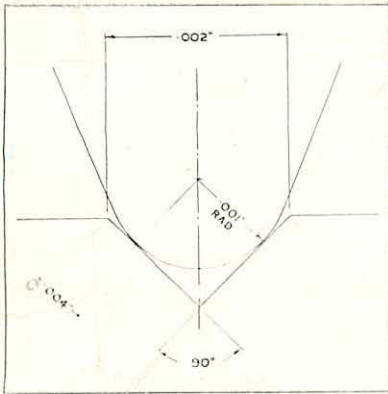


FIG. 1

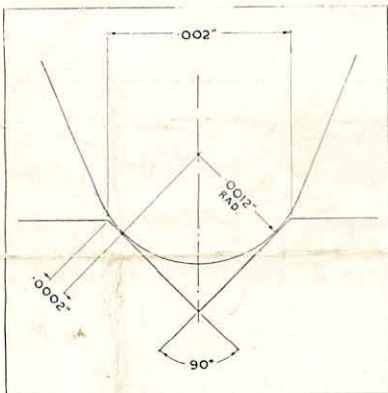


FIG. 2

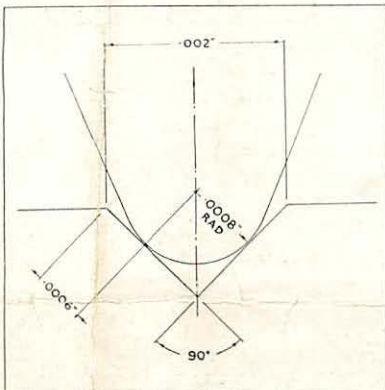


FIG. 3

twelve inch side are well demonstrated in the accompanying scale drawings. For simplicity's sake, the groove angle has been shown as 90° and the radius at the bottom of the groove has been left out, as at .0003" maximum it has no effect. Three pick-up stylus radii are shown, the nominal .001" radius (Fig. 1) and its upper and lower limits of .0012" and .0008" (Figs. 2 and 3 respectively) according to British Standard Specification. It can be seen that the .001" radius has .0004" wall above its point of contact, whilst the .0012" radius has no more than .0002". This does not take into account the pinch effect which can reduce the margin by .0002" at 5,000 cps.

## PRACTICAL CONSIDERATIONS

In order to arrive at maximum possible displacement, some assumptions have to be made that are dictated by practical considerations. Working on the basis of 200 grooves per inch the maximum possible displacement is .003". At a frequency of 40 cps, this displacement corresponds approximately to a maximum velocity of 2 cm./sec. ( $v = 2 \pi f .003''$ ).

Accepting the recording characteristics of the Decca Long Playing test record No. LXT 2695 as typical for commercially produced long playing records, the maximum velocity and corresponding acceleration at 10,000 cps. can be calculated. According to the record specification the recording pre-emphasis at 10,000 cps. relative to 40 cps. is +24.4 db. and this gives a velocity of 51.6 cm./sec. and a corresponding displacement of .0002" ( $e = \frac{v}{2\pi f}$ ). It further follows that expressed in gravitational units the acceleration at 10,000 cps. may be as high as 2,000 g. ( $g = \frac{ef^2}{10}$  where  $e = \text{displacement} = .0002''$  and  $f = 10,000 \text{ cps.}$ ).

## WHAT OF THE FUTURE ?

The examination, as can be seen even from this simplified statement, has brought to light conditions that appear to be incredible at first sight. They are, however, far from being purely hypothetical and it may be only a question of time before they appear on commercially produced records. Even now there are a few odd records on the market which come very close to these limiting conditions.

It can be seen that the problem set by the record manufacturers in this matter was a formidable one. Cosmocord have answered it so completely with their Acos "Hi-g" series of pick-up cartridges that they already meet, here and now, any likely future development of gramophone records within the B.S. 1928:1953 specification.

Acos "Hi-g" pick-ups and cartridges have a prefix "H" in their code, i.e., HGP-33, HGP-35 etc., for easy identification.