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SHORTER COMMUNICATIONS

COMMENT ON "HEAT TRANSFER FROM SLOTTED FINNED TUBES" BY F. CHEERS AND J. N. LILEY

B. GEBHART

Sibley School of Mechanical Engineering, Cornell University, Ithaca, New York

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This comment concerns the communication of Cheers and Liley which reported tests for the effect upon heat transfer of slotting disc fins which were applied to round tubes. The slots were made in the fin surface upstream and downstream of the tube. The conclusion was reached that no improvement could be expected from fin slotting.

The purpose of this discussion is to suggest that this conclusion, while justified for the type of fins and slotting used in this excellent study, should not come to be considered generally valid. The present writer has reported* an investigation, which considered continuous plate type fins in particular, in which the following conclusions were justified for fin deformation and fin slotting.

(1) In general, changes in heat transfer rates must be considered in conjunction with the resulting change in flow losses. An "effectiveness ratio" must be defined which is the ratio of the heat transfer and flow loss effectiveness of the heat exchanger configuration. Changes in this ratio are then considered.

(2) Fin deformation and slotting has a highly variable effect, depending upon exactly how it is done. Tests showed that substantial improvements upon flat fin performance were possible.

(3) High levels of turbulence (usually present in actual exchangers and usually absent in laboratory setups) may drastically change the performance of any given configuration. Tests were carried out up to turbulence intensities of 5·0 per cent.

Some of the effects of deforming and slotting plate fins may be seen in Fig. 1 in which the "effectiveness ratio" is plotted against wind tunnel Reynolds number (per foot) for coils having the fin designs shown in Fig. 2. Curve A is the flat fin and the overall heat transfer coefficient is calculated on the basis of the same area for all coils. The curves for fins B, G, H, I, J, and K are for 2 per cent turbulence intensity and the points are for 5 per cent.

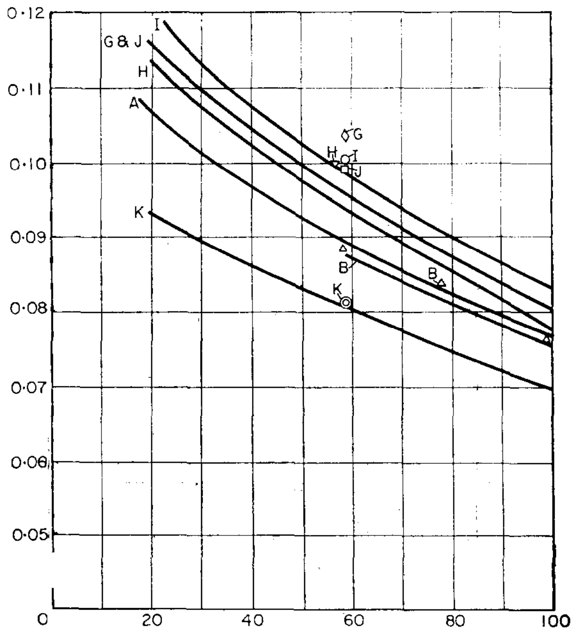

FIG. 1. Effectiveness ratio versus Reynolds number per foot (vertical axis). Effectiveness ratio (horizontal axis) Reynolds number per foot $\times$ 10^{-3}.

* Presented on February 13, 1961, at the Semi-annual Meeting of the American Society of Heating, Refrigerating and Air-Conditioning Engineers and to be published in the Transactions of that Society. See also ASHRAE Journal, May 1961.

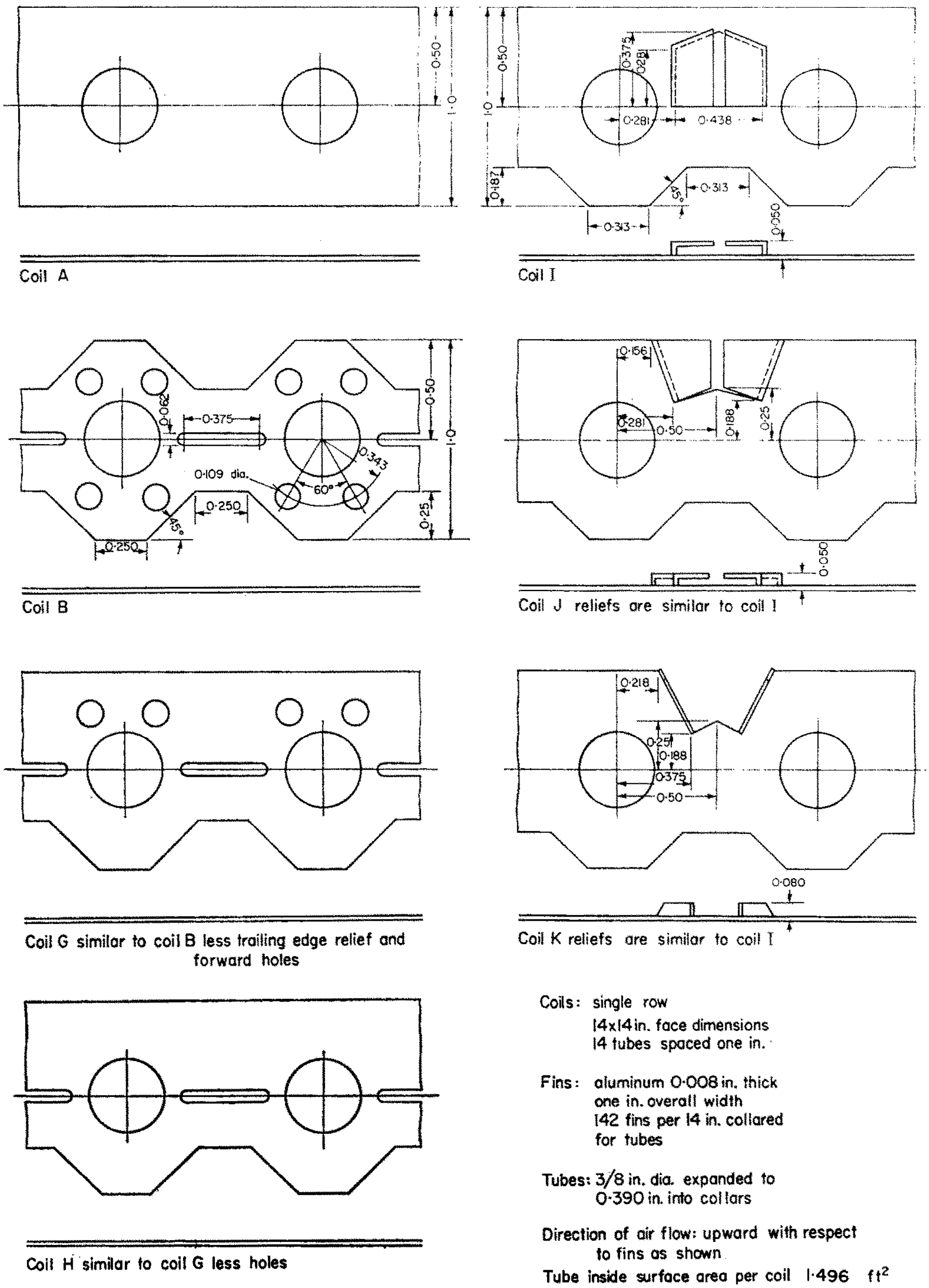

FIG. 2. Fin designs.