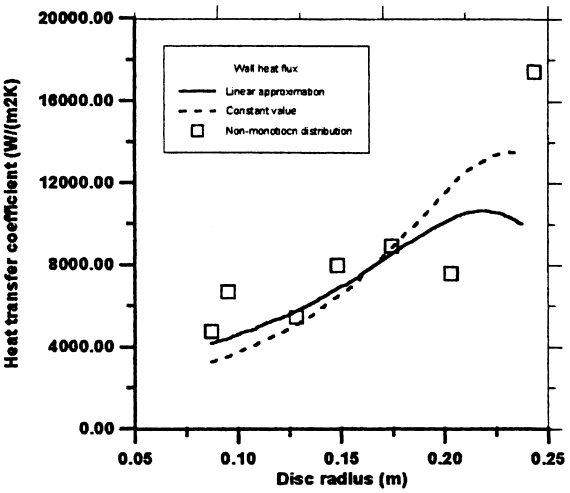

Fig. 2. Comparison of the model calculations against Aoune and Ramshaw data using various distributions of wall heat flux assuming $Q = 35$ cm^3/s, $\omega = 30$ s^{-1}.

obtained as in theories presented in the paper (Fig. 2). Therefore, the non-monotonic distribution of heat transfer coefficient is only due to the non-monotonic wall heat flux distribution and not due to specifics of liquid film spreading on the surface of the disc as the authors are trying to claim. One can draw a conclusion that using a more conductant material of the disc the authors will not encounter such unusual behaviour. I also suspect that such unusual distribution of experimental heat flux could be a result of the end effects existing in the experimental rig.

Therefore, it would be recommended that the experiment was repeated on a disc made of copper rather than brass, which would alleviate the problems with non-uniformity of the wall heat flux and probably will show only monotonic distributions of heat transfer coefficient.

I would be delighted to change my view on the authors contribution if I had some more details on the experiment. I believe that other readers would have similar feelings having a deficiency of information about the experiment.

I look forward to the authors' comments.

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1 October 1999

0017-9310/00/$ - see front matter
PII: S0017-9310(99)00327-0

Reply to Prof. Mikielewicz

The work reported in the paper represents some of the smooth disc experimental results which were obtained during a programme to develop a multi-disc absorption heat pump. It was recognised at the outset, that the generation of reliable heat transfer data would be facilitated if a uniform disc temperature could have been ensured. Because of this, a copper disc was considered in view of its relatively high thermal conductivity compared with that of the brass which was eventually selected (70% Cu, 30% Zn "CZ 108" grade). The reason for this choice was that previous work had shown that various surface profiles were capable of generating significant performance enhancements and these would ultimately require extensive machining of the smooth disc surface. It is well known that the machining characteristics of pure copper are very poor while those of brass are excellent. Results from the profiled disc were not reported for reasons of commercial confidentiality.

Fig. 7 was included in the paper only to indicate the typical relative temperature profiles of disc and liquid film. It was not intended to be a general basis for computing heat fluxes and hence heat transfer coefficients. The principal message to be conveyed by Fig. 7 was that the disc temperature was far from uniform, varying typically by 12 K and that the liquid/surface temperature difference varied from about 2 K at the inner radius and 0.5 K at the periphery. Even if copper had been used it was unlikely to ensure a uniform disc temperature which would generate a heat flux normal to the disc surface for transfer to the fluid flowing over the disc. In addition the close temperature approach at the periphery emphasised the accuracy needed for temperature measurement. As pointed out in the paper the accuracy of the disc temperature measurements was only ± 0.1 K while that of the liquid film (thermistor

values) was significantly better at ± 0.01 K. Heat fluxes were therefore estimated on the basis of the film temperature rises in successive radial increments, knowing the area involved and the corresponding liquid flows. This was deemed to be reasonable in view of the greater confidence in the liquid temperature. Again, as pointed out in the paper, the best estimate of disc surface temperature was obtained by extrapolating the data from thermocouples embedded at 1 and 9 mm from the surface. This procedure, of course, assumed a normal heat flux which, self evidently, was not achieved in view of the significant radial temperature profile. However it was better than merely relying upon the thermocouple at 1 mm depth.

It was very obvious during the progress of the project that more questions were raised than answered — notably the role of fluid properties and surface profile. It is hoped that others may be encouraged to explore these and thereby identify techniques for further performance improvements.

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29 October 1999

0017-9310/00/$ - see front matter
PII: S0017-9310(99)00328-2