Reply

FRANCIS K. DAVIS AND HERMAN NEWSTEIN

Drexel Institute of Technology, Philadelphia, Pa.

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In the article we were concerned generally with the direction and magnitude of the change of gust factors and not with actual values. For this reason we did not push the analysis of data beyond curve fitting by linear regression. As we noted on p. 376 this can result in gust factors < 1 , especially when such an analysis is extended to the point of extrapolating the curve up to speeds of 100 kt from highest observed speeds of 40 kt. We feel that the analysis made was adequate justification for the conclusions which we drew in the summary on p. 378.

Prof. Gill is, of course, correct in his contention that

the gust factor cannot actually be less than unity in any individual case. Furthermore, we agree that there is a real need by design engineers for curves or tables defining definite numerical values of the gust factor. The curves included in our article, however, were intended to illustrate the trend and direction of variations, and not actual values.

In view of the practical need of such values, we are considering the data more carefully by fitting more accurate curves. We intend to summarize the gust factors in tabular form, and submit the results for publication.

Comparison of Two Methods for Determining Infrared Emittances of Bare Soils¹

SHERWOOD B. IDSO AND RAY D. JACKSON

U. S. Water Conservation Laboratory, Phoenix, Ariz.

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The recent note of Fuchs and Tanner (1968) raises a question relative to the accuracy of Buettner and Kern's (1965) method for determining infrared emittances of bare soils as compared to their method (Fuchs and Tanner, 1966). Since the accurate measurement of surface temperature by means of infrared thermometry requires good emittance data, and since such temperatures are essential to studies of evaporation from bare soil surfaces utilizing a Dalton-type equation (Conaway and Van Bavel, 1967), we felt it important that this question be resolved.

Our consideration of the theory involved in both methods did not indicate that either was markedly

superior to the other. The discrepancy noted by Fuchs and Tanner (1968) between emittances obtained by Buettner and Kern with their "emissivity box" and those obtained from integrations of spectral emittance curves disappeared when the true spectral sensitivity of the infrared thermometer they used was included in the calculations. Thus, we concluded that we would have to compare the methods experimentally.

To accomplish this comparison, we acquired the apparatus essential to both methods and followed their outlined procedures to determine the infrared emittances of four bare soils. These procedures are described in detail in Fuchs and Tanner (1966) and in Conaway and Van Bavel (1966). Our results are presented in Table 1. Based upon this evidence, we conclude that both methods give essentially the same results, and that both are thus equally good.

¹ Contribution from the Soil and Water Conservation Research Division, Agricultural Research Service, U. S. Department of Agriculture.

TABLE 1. Emittances ϵ of four soils determined by the Buettner and Kern (BK) and Fuchs and Tanner (FT) methods with a Barnes IT-3 infrared thermometer. Each value is the average of 5 measurements.

Method	Silica sand $\epsilon \pm \text{std. dev.}$	Superstition sand $\epsilon \pm \text{std. dev.}$	Pine silty clay $\epsilon \pm \text{std. dev.}$	Adelanto loam $\epsilon \pm \text{std. dev.}$
BK	0.893 ± 0.005	0.945 ± 0.003	0.968 ± 0.006	0.964 ± 0.007
FT	0.893 ± 0.005	0.952 ± 0.008	0.963 ± 0.004	0.969 ± 0.007
BK—FT	$+0.000 \pm 0.010$	-0.007 ± 0.011	$+0.005 \pm 0.010$	-0.005 ± 0.014