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**Consultancy Report**

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**Noise Measurements in Windy Conditions**

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## 9 Overall Conclusions from Wind Tunnel and Outdoor Measurements

The following observations and conclusions arise from the test data presented in Sections 6, 7 and 8.

The high-porosity (10 ppi and 20 ppi) windscreens generate higher noise levels at high frequencies than the control windscreen. This is presumed to be caused by noise generated by flow through the outer envelope. The 10/20 ppi screen materials can be excluded from consideration for this reason alone.

The lowest porosity (80 ppi) foam windscreen was included in the outdoor test series for completeness, although the 80 ppi material had already been excluded on the grounds of its excessive acoustic insertion loss (Section 4). It is evident that the 80 ppi foam provides no performance advantage over the 30 or 45 ppi foam at low frequencies. The 80 ppi windscreen did appear to reduce wind noise more effectively at high frequencies, even when the enhanced insertion loss is taken into account. However, the 60/80 ppi materials offer no significant performance advantage over the 30/45 ppi materials to offset the problems which would be involved in correcting for the high-frequency insertion loss of these materials.

The 30 and 45 ppi windscreens are equally effective in reducing wind noise, within the limits of experimental uncertainty. The 30 and 45 ppi materials are the most suitable, of those tested, as windscreen covers. The 45ppi material offers slightly better acoustic insertion loss characteristics.

The influence of windscreen diameter is quite small. The 400 diameter windscreen offers marginally better performance than the 300 and 200 diameter screens. With 30 or 45 ppi covers, the 300 mm windscreen generates slightly higher wind noise levels than the control windscreen at frequencies around 1 kHz, and is inferior to the 200 windscreen except at very low frequencies (below 160 Hz).

The 400 mm windscreen is quite cumbersome to transport, and presents considerable support problems in windy conditions.

**Overall, the preferred windscreen configuration of those tested is a two-layer windscreen, with an outer cover of 45 ppi foam, a diameter of 200 - 300 mm, and the standard UA 0237 or UA 0570/0393 as the inner screen. During the outdoor tests, these screens reduced wind noise, compared with the control windscreen, by approximately 15 dB in some one-third octave bands below 250 Hz, and by 6 dB(A), in a mean wind speed of approximately 6 m/s. The 300 mm windscreen provides greater wind noise reduction at low frequencies than the 200 mm windscreen, but is inferior at high frequencies.**