Making a ground glass surface property in TracePro

This note shows you how to make a transmitting diffuser (e.g. ground glass) for use in TracePro, using the ABg BSDF model. The diffuser will have the following properties:

1) Bell-shaped angular dependence of scattering.
2) Mostly transmitting, with some reflection.
3) Angular dependence of reflectively scattered light is the same as for transmissively scattered light.
4) No absorption.
5) No specular reflection.

The surface property can be created using the following sequence of steps.

1) Use the Excel spreadsheet DIFFUSER.XLS to determine the values of B and g that you desire. Increasing B makes the top of the bell wider, and increasing g makes the steep part of the bell steeper. In the spreadsheet we have set A=B in order to force the curve to be normalized, i.e., equal to one at zero degrees.
2) Guess at the total reflectance. A good guess is to use the Fresnel reflection coefficient, equal to

$$R = \frac{(n-1)^2}{(n+1)^2}$$

   for glass used in air, where n is the index of refraction of the glass. If you don't know the index, use R=0.05 and this should be close enough. The rest of the light is transmitted, or equal to 1-R.
3) In TracePro, open the Surface Property Editor and either open an existing surface property for editing (i.e. check the Edit Enable box) or create a new surface property.
4) Set the absorptance to zero.
5) Set the Specular Reflectance to R.
6) Set the B and g coefficients, for both the BRDF and BTDF, to the values you got using the spreadsheet.
7) Set the A coefficients to zero for both the BRDF and the BTDF.
8) Select Solve for: BTDF. This solves for A and leaves B and g unchanged.
9) Set the specular reflectance to zero.
10) Select Solve for: BRDF.
11) Exit the Surface Property Editor and save your changes.