

How thick should my film be when using the Film Maker?

From experience with using the Atlas Film Maker Accessories (either a P/N GS15640 or P/N GS15800), it is rare to produce an exact film thickness as stated by the thickness value on the spacer ring. The value is usually going to be the MINIMUM thickness value of film that you may be likely to achieve if you select that ring for pressing a sample. In many cases the film can be thicker than that stated on the spacing ring.

The quantity of sample placed into the film maker kit before melting and pressing is a major factor in the consistent thickness of film being produced. In addition the sample type, the load and the time that the load is applied to the sample (when the sample is cooling down) will all determine the overall thickness of the film to be produced.

As an example, two sample discs of a PTFE type material were prepared in an Atlas High Temperature Film Maker Accessory P/N GS15800. A temperature of 305°C was needed to melt the samples and they were compressed at a 1 ton load. The intention was to produce 0.1mm and 0.25mm thick films, therefore the 0.1mm spacing ring was used for one sample and the 0.25mm spacing ring for the other. Sufficient sample was placed into the kit so that on melting there was excess sample around the edge of the disc (acceptable overspill) for both thickness of discs. When the samples had cooled, their thicknesses were measured using an electronic micrometer.

Interestingly, the 0.1mm spacing ring produced a 0.07mm thickness film and the 0.25mm spacing ring produced a 0.18mm thickness film. These values are surprising because it was expected to produce the MINIMUM thickness allowable from the ring value chosen i.e. a 0.1mm film and a 0.25mm film. However, it is the nature of the PTFE sample to "shrink" on cooling and comparison of the rates of shrinkage shows a reduction of 0.1mm to 0.07mm equates with a reduction from 0.25mm to 0.18mm. (A factor of 0.7).

The experiment was repeated for both samples and the same film thicknesses were produced for both spacing rings as previously. It is possible whilst hot at their melting point temperatures, the films were pressed to 0.1mm and 0.25mm thicknesses respectively, but on cooling, the actual nature of the sample at ambient temperature, has meant that the film produced is thinner than expected.

Therefore, it is purely a matter of experience with sample types and a method of pressing that will determine the thickness of a film. Initially, the choice of spacing ring to use should be based on being closest to the film size you wish to achieve. If you find that the sample films subsequently being produced on a routine basis are either thicker or thinner than expected, then accordingly, a smaller or larger spacing ring should be used. The thickness value on the spacing ring could therefore be considered as "nominal".

Specac, River House, Cray Avenue, Kent, UK BR5 4HE