Chapter 4

PVC WINDOW MANUFACTURE

R. G. Bruce Mitchell

Glass & Glazing Federation, London, UK

SUMMARY

This chapter is primarily concerned with the manufacture of windows with frames manufactured from hollow, unplasticised PVC profiles although a brief review of other, more traditional, systems is included. The particular requirements for PVC and its associated additives are discussed together with the relevant manufacturing technology. Because of the high quality and long life associated with uPVC windows, quality control testing has been discussed in some detail. Compounding and extrusion are then described and this chapter then concludes with a detailed discussion of the frame fabrication process.

1. INTRODUCTION

A well designed, well made and properly installed PVC window frame is an aesthetically pleasing, technologically efficient and cost effective building component. Window frames made from rigid unplasticised PVC have already achieved a proven record of performance in a demanding role, but despite this the technology is relatively new to the UK. PVC window manufacture involves the use of specially developed PVC resins, new compound formulations, sophisticated extruder designs, specialist
calibration and ‘Downstream’ equipment, unique fabrication techniques and new test methods. In addition it has been necessary for new skills to emerge in designing PVC window frame profiles. The performance and service life of the finished product is dependent upon every stage of manufacture and this chapter follows the process through from the polymerisation stage to the installation of the window.

The following pages describe the materials and processes for the manufacture of window frames from hollow profiles. PVC is also used for sheathing timber profiles for window frames and in both solid and cellular form in combination with aluminium. Such processes of manufacture are however highly specialised techniques usually developed by individual companies and they are only briefly described in this chapter.

2. MARKET SIZE AND STRUCTURE

The size of the potential market for PVC windows is already encouraging manufacturers to invest in the not-inconsiderable costs of extrusion plant and dies for window frame profiles. Figure 1 is a forecast of the anticipated growth of the demand for PVC windows in comparison with other materials, and justifies the investment in manufacturing plant.

2.1. The UK Market

In 1980 the number of PVC window frame units installed has been estimated at nearly 3% of the total market. This will have required about 3000 tonnes of profile. If the market share reaches 20% then the demand for profile could reach 20000 tonnes. In 1980 virtually every PVC window installed in the UK was wholly or partially made from imported components or raw materials.

The technology of PVC window manufacture, pioneered in Germany, has been well documented and the whole subject was reviewed at a conference held in Stuttgart in June 1979 entitled ‘Twenty years of the PVC window’. Many of the data in this chapter are therefore inevitably based on German expertise. German-made polymers and other additives are imported into the UK as well as the extruded profiles. Imported profiles are also brought in from Belgium, Denmark and Italy.

Overseas manufacturers operate in either of two ways in the UK. Some companies establish a sales office or agent to sell in this country.