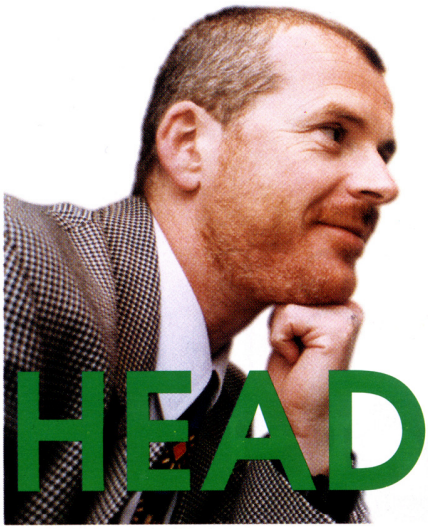
HEAD TO HEAD



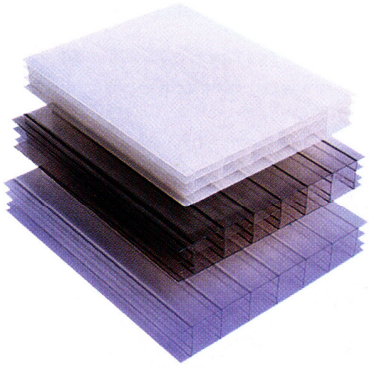
In this Head To Head article, Ultraframe's technical support engineers, Bill Kenyon and Mick Rowley discuss the theory of heat build up in conservatories and how the correct specification of polycarbonate glazing can remedy it.

Light is composed of a number of spectra, the light wavelengths in each having different properties. Most well known of these is ultra violet, which is short wavelength light, responsible for producing sunburn, and causing material to fade or yellow.

At the opposite end of the wavelength range is infra red, long wavelength heat-bearing radiation, which is responsible for solar heat gain in buildings such as greenhouses and conservatories. Between the ultra violet and the infra red lies the visible light spectrum.

The process of solar gain is not always clearly understood, but can be explained in fairly simple terms. Sunlight entering a building is absorbed by its surfaces and contents, and reflected back again. In the course of this absorption and reflection, there is a partial shift to longer wavelengths, i.e. more infra red light is produced. However conservatory roof glazing materials, such as polycarbonate reflect a large proportion of this back into the conservatory. Heat is therefore being effectively trapped, and it builds up inside – the process of solar gain.

The choice of colours for furnishing and floor coverings within a conservatory play an



important part in minimising the ability of their materials or surfaces to absorb light and reflect it with increased infra red content.

Dark coloured surfaces, black in particular, will absorb more and proportionally re-radiate more heat than white surfaces, which absorb less, therefore re-radiate less, therefore cause less heat build up. To grasp this principle one only has to think of the traditional houses in the Middle East or Mediterranean Coast which are heavily white washed and highly reflective outside, relatively cool inside.

Polycarbonate manufacturers have adopted several strategies to inhibit excessive heat build up within conservatories, using standard products:

First strategy is to fit bronze tinted sheets. Bronze, being dark, absorbs light and reflects more back outwards as infra red instead of allowing it to enter. (Indeed bronze polycarbonate can be warm to touch)

Second strategy is to fit opal tinted sheet. Opal reduces the total amount of light entering, and also diffuses or scatters that light, including its infra red component over the interior surfaces. There is less possibility of there being a "hot spot" in a south facing conservatory, and there is created a very pleasant soft internal environment.

The third strategy is to use dual colour bronze-opal polycarbonate. When initially launched, the inner opal layer was intended primarily for aesthetic effect, softening the darker tone of the outer bronze layer. The important practical effect of combining the reflective function of the bronze and the diffusing function of the opal was, however, soon realised.

The most recent development has been a product with more selective reflection properties. This has been achieved by introducing a metallic based pigmenting agent into the polycarbonate. This Heatguard

material reflects a very large proportion of the incoming solar energy, reducing the solar gain effect by up to 50%, produces a well diffused light internally, and the perception of a pleasantly cool environment. Research and development effort will continue to be focused on this type of product as it offers many favourable properties.

Whilst we have concentrated in this article on polycarbonate glazing, in a future issue of Head to Head we will review the various specifications of solar control glass sealed units.

Thermal efficiency and light transmittance data

Glazing Options		'U' value* W/m²K	Light Transmittance %
16mm triple wall	Clear	2.4	82
	Opal	2.4	51
	Bronze	2.4	31
	Bronze/Opal	2.4	30
	Heatgaurd	2.4	22
25mm five wall	Clear	1.6	68
	Opal	1.6	30
	Bronze	1.6	15

* 'U' value is a measure of thermal efficiency; the lower the rating, the more efficient. For comparison, double glazed units have a typical 'U' value of 3.0 W/m²K