

From: Carol Manetta [mailto:carolmanetta44@gmail.com]
Sent: Saturday, December 14, 2013 9:27 AM
To: Gene Giacomelli
Subject: A good reference site for your students

I ran across this British company that makes polycarbonate sheeting, and their Q and A section is quite informative for people unfamiliar with this type of greenhouse material. Hope you or others find it useful:

<http://www.rockwellsheet.com/faq.aspx#1>

I'll be in touch soon regarding developments in our greenhouse program.
Thanks,

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The image shows the Rockwell Glazing Solutions logo, which consists of a stylized 'R' inside a square frame followed by the text 'Rockwell' in a large, bold, blue font and 'GLAZING SOLUTIONS' in a smaller, blue font below it. Below the logo is a navigation menu with four items: 'Products', 'Projects', 'What we do', and 'Downloads'. The 'Downloads' item is highlighted with a grey background. Below the navigation menu is a grey banner with a telephone icon and the text 'Phone Free' and '0800 977 5390'.

Product Range

- [System 655](#)
- [Pitched 655/16](#)
- [Curved 655/16](#)
- [Vertical 655/16](#)
- [Module 500](#)
- [Module 500/40](#)
- [Module 500/16](#)
- [Corrugated Sheets](#)
- [Profiled Multiwall](#)
- [Single Skin Sheets](#)
- [Flat Sheets](#)

- Multiwall PC
- Solid PC
- Acrylic/PETG
- Other Products
- Glazing Bars
- Lining Products
- Dynogrid
- Rockwood - WPC



FAQ's

[Downloads - Click here for more](#)

Polycarbonate Sheet Frequently Asked Questions

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- Q. How much sound insulation does polycarbonate sheet provide?**
- Q. Does condensation affect the performance of polycarbonate sheet?**
- Q. Can polycarbonate be recycled?**

Q. What is the minimum pitch for a polycarbonate roof?

A. It is good practice to work to a minimum pitch of 10°, especially for long slopes. Lower angles are possible with some sheet products and systems e.g. 5° which still allows adequate rain water run off. Some glazing systems will accommodate angles down as low as 2.5°, on all low pitches sufficient flashing or sealants should be used to waterproof the top junction of the roof. Also consider a more frequent cleaning regime to remove any dirt left by ponding water. Always ensure the flutes of multiwall polycarbonate sheets run down the slope direction on pitched roofs, or vertically when used for

external glazing to allow drainage of any moisture.

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Q. How heavy is polycarbonate sheet?

A. Solid polycarbonate sheet is approximately half the weight of the equivalent thickness of glass. In general the weight is 1.2 x thickness (mm) e.g. 4mm solid polycarbonate sheet = 4.8 Kg/m². Multiwall polycarbonate sheet is far lighter, although it varies slightly depending on the structure design, usually 10mm sheet is c.1.7 Kg/m², 16mm sheet is c.2.7 Kg/m² and 25mm sheet c.3.5 Kg/m².

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Q. Can you walk on polycarbonate sheet?

A. While high static and impact loads can be withstood by polycarbonate roof structures it is advisable to never walk directly on solid or multiwall sheets. Always use a crawling board or similar placed across two or more supports of the structure. Some systems have been tested for non-fragility to **ACR(M)001:2005** - this simulates resistance to people accidentally falling on rooflights but does not mean it is advisable to walk directly on sheets.

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Q. How do you cut polycarbonate sheets?

A. Polycarbonate sheets can be cut with standard tools used for cutting metal and wood. A fine tooth circular saw or hand saw held at a shallow angle give best results. It will be necessary to support the sheet close to the cut and to hold it firmly to prevent excessive vibration and movement, especially if using a jigsaw. Dust and swarf should be blown or sucked out of the multiwall sheet chambers after cutting.

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Q. How do you fix and seal polycarbonate sheets? How much allowance for expansion and contraction should be made?

A. Polycarbonate is best fixed in suitable glazing profiles which clamp the edges of the sheet whilst still accommodating thermal movement. Glazing profiles should incorporate compatible gaskets for weatherproofing, and on the cut ends of multiwall sheets suitable sealing tapes such as aluminium foil or breather tape should be used before fitting within profiles or frameworks.

Polycarbonate sheets have a linear thermal expansion figure of around $6.6 \times 10^{-5} \text{m/m}^\circ\text{C}$ (DIN 53328/53752, VDE 0304/1), almost 3 times as much as aluminium. Over a typical working temperature range it is generally necessary to allow around 3mm per linear metre for thermal expansion of polycarbonate sheet.

If fixing directly through polycarbonate sheet carefully drill holes oversize in relation to the collar, screw or bolt shank diameter to accommodate expansion. Ensure a large compatible washer is used around the fixing point and make sure the

hole location is greater than 40mm away from the sheet edge.

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Q. How do you clean polycarbonate sheets?

A. In general dirt, dust and moss can all be removed from the surface of polycarbonate quite easily. Gentle cleaning once or twice a year with non-abrasive cloths or sponges and warm soapy water is all that is required to get the best possible performance from polycarbonate sheets. Remember to rinse sheets well after using cleaning agents.

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Q. What sealants can be used with polycarbonate?

A. All silicone sealants must be low modulus (flexible), neutral cure and polycarbonate compatible. Check on the tube or with manufacturer for compatibility before using general purpose silicones etc. All sealing tapes, breather tapes and gaskets should be made of a compatible material such as aluminium foil, EPDM or neoprene rubber.

See the [Sheet Working & Maintenance.pdf](#) for general guidelines on these topics.

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Q. What flashing can I use on a polycarbonate roof?

A. Metal flashings such as lead, steel, zinc and aluminium can be used with polycarbonate sheet. Also self-adhesive flashband/foilband products are simple to install sealing options - use butyl based products rather than bitumen based to allow for sheet movement.

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Q. What thicknesses and size of polycarbonate sheet are available?

A. Solid polycarbonate sheets start off at 2mm thick - thinner sheets, usually measured in microns are normally referred to as films and are produced on rolls for manufacturing purposes. Standard sizes for solid polycarbonate sheet are 3050 x 2050mm or 1220 x 2440mm though some thicknesses of sheet can be supplied up to 6000 x 2050mm. Solid polycarbonate sheets are available from Rockwell in the following thickness: 2mm, 3mm, 4mm, 5mm, 6mm, 8mm, 10mm, 12mm.

Standard multiwall polycarbonate sheets are available from Rockwell in the following thicknesses: 4mm, 6mm, 8mm*, 10mm, 16mm, 20mm*, 25mm, 32mm, 35mm & 40mm*. Standard multiwall sheets are normally extruded at a width of 2100mm and in lengths of 6m or 7m (* indicates non stock sizes - usually subject to min. order quantity/extended lead time).

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Q. Is it possible to obtain 20mm thick polycarbonate to replace the existing sheets in my conservatory roof?

A. Although 20mm thick multiwall is not a common thickness now and seldom found ex stock in the UK, Rockwell is able to supply 20mm thick six-wall sheets. Subject to special order lead time and a minimum purchase quantity of 12m² it can usually be supplied in clear or opal.

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Q. What colours of polycarbonate sheet are available?

A. Standard colours manufactured in both solid and multiwall polycarbonate are clear, opal and bronze. For special orders multiwall polycarbonate glazing systems and corrugated multiwall sheets can also be supplied in one of 10 colours. Regular multiwall sheets are also offered in bronze/opal and silver/opal heat reducing combination finishes in thicknesses of 16mm and over.

In addition to clear, opal and bronze solid polycarbonate can also be supplied in a grey tint as well as a clear textured/obscured finish. For glazing large areas it is possible for sheets to be manufactured in other vivid colours, contact Rockwell for further details. All solid polycarbonate colour productions typically require a minimum manufacturing quantity of between 2-3 tons and involve extended lead times.

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Q. What is the life span of polycarbonate sheet? How do UV rays affect it?

A. A 10 year warranty is the industry standard for polycarbonate sheet products though the working life is normally considerably longer. Actual performance depends on individual applications and local environmental factors, but 20 years and over is now becoming common. Most thermoplastic materials do suffer slow deterioration as a result of UV exposure, usually this initially manifest itself in a gradual yellowing of the sheet rather than a reduction in the mechanical properties. Build ups of moss and dirt will also lead to lower levels of light transmission and thus a lowering of performance.

Always ensure polycarbonate sheets are installed with the UV protected side on the top or outside elevation. This is clearly marked on the protective film and may also be discreetly printed along the side of the sheet. Sheets used in System 655 and the Module 500 systems have clear protective film on the on the outside face only.

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Q. How much light and UV rays do polycarbonate sheets transmit?

A. Up to 90% of daylight can be transmitted through polycarbonate sheet and up to 98% of harmful UV radiation can be stopped. Light transmission values will vary with thickness, cell structure and colour tint. Figures are given in the technical brochure for each glazing product or available on request.

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Q. What fire rating has polycarbonate sheet got?

A. Polycarbonate is described as a self-extinguishing material. When tested, the majority of Rockwell's polycarbonate products have achieved Class 1 (UK national class) or B-s0 d0 (European class) fire ratings - for further information please see individual datasheets or product pages within this web site or alternatively contact the Rockwell technical office.

Current building regulations state:

- When used in rooflights, a rigid thermoplastic sheet product made from polycarbonate or from un-plasticised PVC, which achieves a Class 1 (National Class) rating for surface spread of flame when tested to BS 476: Part 7: 1971, 1987 or 1997 'Surface spread of flame tests for materials', or Class C-s3 d2 (European Class) can be regarded as having an AA (National Class) designation.

- Multi-skinned rigid sheet made from un-plasticised PVC or polycarbonate which has a Class 1 rating when tested to BS 476: Part 7: 1971, 1987 or 1997; can be classified as TP(a) rigid.

Online copies of the current UK Building Regulations can be downloaded from:

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/>

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Q. How can I prevent glare and heat build up in rooms roofed with multiwall polycarbonate sheet?

A. To reduce heat and increase air flow consider installing commercially available roof vents or extractor fans which can usually be fitted within the polycarbonate panels or supporting framework. The use of solar reflective films and foil insert tapes are effective ways of decreasing the heat gain within a room although both involve a labour intensive installation process which should be considered along with the material cost.

For new build and renovation projects 25mm and 35mm thick bronze/opal or silver/opal heat reducing variants are available. Also for special productions solar reflective silver top surface coating can be applied to certain glazing systems. All these will lower glare, solar gain and infra-red ray transmissions and in most instances these are the best way to immediately reduce summer overheating whilst providing the best thermal insulation during the winter months.

In some cases, where it is feasible, simply increasing the pitch of the roof will reflect a greater proportion of sunlight shining on it and also allows greater dissipation of the heat generated within a room.

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Q. How much sound insulation does polycarbonate sheet provide?

A. As a guide the reduction in noise for different thicknesses of polycarbonate (measured according to DIN 52210-75 Rw) is:

Solid polycarbonate

Solid polycarbonate as secondary glazing (with 6mm

(single glazing)	glass + 85mm air gap)
4mm : 24dB	39dB
5mm : 25dB	40dB
6mm : 26dB	42dB
8mm : 28dB	44dB
10mm : 30dB	-
12mm : 31dB	-

Multiwall polycarbonate sheet	
4mm-8mm	18dB
10mm-16mm	20dB-21dB
20mm-35mm	22dB
40mm	23dB

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Q. Does condensation affect the performance of polycarbonate sheet?

A. In common with many glazing materials polycarbonate sheets can develop condensation as a result of environmental factors. It does not affect the performance of solid or multiwall polycarbonate sheets, the effects are purely visual and normally temporary. At all stages of the handling, transporting and installation of multiwall sheets care should be taken to minimize the amount of moisture entering the sheet flutes. Polycarbonate however is hygroscopic, with a 24h water absorption figure of around 0.36% (DIN 53495). To a small degree it is also permeable to water vapour (15g/m³ - DIN 53122). Therefore it is possible that condensation can form within a sheet's structure in spite of all the precautions taken especially where extremes of temperature and humidity occur. Because it is a natural phenomenon condensation is not acknowledged as a fault of the material and is therefore excluded from product performance warranties.

Should condensation form within multiwall polycarbonate sheet it will be exaggerated in the cold wet months, and will diminish during the dry summer months. To aid the dispersal of condensation on warm dry days remove closures or end profiles and unseal the panel edges where possible, allowing air to circulate through the flutes. If this cannot be done in-situ then removing the affected panels will be necessary. To accelerate the 'drying out' of a sheet's internal structure, force air through the flutes with a dry compressed air line or similar, before resealing each panel.

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Q. Can polycarbonate be recycled?

A. Post production scrap material can be reprocessed and used in the production of re-granulated sheet material - the same applies to off-cuts produced by cutting and trimming to size on site, or clean used sheets. All of these plus used/aged sheet can also be recycled into lower grade mixed plastic products.

Polycarbonate disposed of in approved landfill sites will slowly degrade without producing by-products that contribute to soil or water contamination and is inert in terms of its environmental impact.

Rockwell has a policy of wherever possible re-using all packaging materials, pallets etc associated with the production and distribution of its polycarbonate sheet. Further details concerning Rockwell's commitment to recycling and energy conservation are available within the [Rockwell Environmental Policy.PDF](#)

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Disclaimer: Information and advice above is based on manufactures guidelines and/or independent test data as well as from general experience and is given in good faith. However, no liability, warranty or guarantee is given or is to be implied with respect to validity and final product performance. Every effort has been made to ensure that the information provided is accurate and up to date, however it does not constitute legal or other professional advice. All users should satisfy themselves that products are suitable for their individual application. Rockwell cannot be held responsible for the contents of any pages referenced by an external link.

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