

## Popular Materials & Applications – Issue 3

September 2015

Welcome to 'Formech Technical Notes', a quarterly publication in which we delve in to the secrets of the 'Dark Art' of vacuum forming. In this issue we focus on typical applications, materials and recommended UK suppliers. Please contact us if you would like assistance sourcing any of the below materials outside the UK.



### HIPS (High Impact PolyStyrene)

**Typical uses:** display, packaging & light weight internal applications

**Strength:** Moderate

**Specific gravity:** 1.06

**UK Distributor:** [www.stephen-webster.co.uk](http://www.stephen-webster.co.uk)

**Brand names:** not well known by brand names from stockists

**Formability:** Easy

**Colours:** Black, white & stocked in up to ten different colours in UK

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 150 – 175C (302 – 347F)

**Conclusion:** an entry level plastic, easy to form & not expensive



### ABS (Acrylonitrile Butadiene Styrene)

**Typical uses:** enclosures, outdoor applications, marine pods

**Strength:** impact resistant

**Specific gravity:** 1.08

**UK Distributor:** [www.stephen-webster.co.uk](http://www.stephen-webster.co.uk)

**Brand names:** not well known by brand names from stockists

**Formability:** Easy but needs drying

**Colours:** Black, white, grey from stockists in UK

**Hygroscopic (needs drying):** Yes – 90 minutes per mm

**Vac forming temp range:** 150 – 180C (302 – 356F)

**Conclusion:** stronger than HIPS, +/- 35% more expensive



### PETG (Polyethylene terephthalate glycol-modified)



### PET (Polyethylene terephthalate)

**Typical uses:** Clear covers & reverse printed signage

**Strength:** impact resistant

**Specific gravity:** 1.27

**UK Distributor:** [www.stephen-webster.co.uk](http://www.stephen-webster.co.uk)

**Brand names:** Vivak, Spectar

**Formability:** Easy

**Colours:** Generally clear

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 120 – 160C (248 – 320F)

**Conclusion:** Easy to form and stronger than HIPS, +/- 50% more expensive



## PVC (PolyVinylChloride)

**Typical uses:** Outdoor enclosures, marine pods, blister packaging & tray inserts

**Strength:** impact resistant

**Specific gravity:** 1.37

**UK Distributor:** [www.saffronplastics.co.uk](http://www.saffronplastics.co.uk) (for thin reels less than 0.75mm or less)

**Brand names:** Simona, Palram (for thick sheet over 0.75mm)

**Formability:** Fairly easy although if burnt gives off hydrochloric acid

**Colours:** various in thicker sheets

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 140 – 190C ( 284 – 374F)

**Conclusion:** Not as popular in every market – similar price to thin APET



## PP (PolyPropylene)

**Typical uses:** Blister Packaging, tray inserts (RPET or APET)

**Strength:** impact resistant

**Specific gravity:** 1.38

**UK Distributor:** [www.saffronplastics.co.uk](http://www.saffronplastics.co.uk)

**Brand names:** not well known by brand names from stockists

**Formability:** Narrow heating band – will crystallise if over heated

**Colours:** Generally clear

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 120 – 160C (248 – 320F)

**Conclusion:** Good clarity, but will blunt cutters quickly – similar price to thin PVC



## HDPE (High Density PolyEthylene)

**Typical uses:** Outdoor play equipment, pond liners

**Strength:** very impact resistant

**Specific gravity:** 0.96

**UK distributor:** [www.saffronplastics.co.uk](http://www.saffronplastics.co.uk)

**Brand names:** not well known by brand names from stockists

**Formability:** webs easily due to stretching and will seek out any gaps in tooling & lose vacuum

**Colours:** Limited from stock – generally black

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 150 – 180C (302 – 356F)

**Conclusion:** Very good impact resistance, tricky to get good results – similar price to PP



## PC (Polycarbonate)

**Typical uses:** Outdoor furniture and packaging applications

**Strength:** Rugged and chemical resistant  
Specific gravity: 0.91

**UK Distributors:** www.stephen-webster.co.uk

**Brand names:** not well known by brand names from stockists

**Formability:** webs easily due to stretching and will seek out any gaps in tooling & lose vacuum

**Colours:** Limited from stock – generally black, white and natural

**Hygroscopic (needs drying):** No

**Vac forming temp range:** 150 – 180C (302 – 356F)

**Conclusion:** Very good impact resistance, tricky to get good results – similar price to HDPE

**Typical uses:** R/C car bodies, riot shields, machine guards and skylights

**Strength:** Rigid and high impact resistance  
Specific gravity: 1.2

**UK Distributor:** www.amariplastics.co.uk

**Brand names:** Lexan, Makrolon and Palsun

**Formability:** Challenging to get optical clarity

**Colours:** usually clear or tinted from stockists

**Hygroscopic (needs drying):** Yes

**Vac forming temp range:** 170 - 205C (338 - 401F)

**Conclusion:** Very good impact resistance, tricky to get good clear results – +/- 35% more than PETG



## Extruded PMMA Poly(methyl methacrylate)

**Typical uses:** Display & signage

**Strength:** Can be brittle, but weather resistant

**Specific gravity:** 1.19

**UK Distributors:** www.amariplastics.co.uk

**Brand names:** Acryglas XT, Quinn XT

**Formability:** Good

**Colours:** Clear and a range of colours

**Hygroscopic (needs drying):** Yes

**Vac forming temp range:** 150 - 175C (302 - 347F)

**Conclusion:** Brittle – low impact resistance, good weather resistance for outdoors



## Cast PMMA Poly(methyl methacrylate)

**Typical uses:** Display, signage and window applications

**Strength:** Can be brittle, but weather resistant

**Specific gravity:** 1.19

**UK Distributors:** www.amariplastics.co.uk

**Brand names:** Acrycast, Perspex, Plexiglas & Lucite

**Formability:** Poor. Will only form into gentle cavities unless assisted by plug assist

**Colours:** Clear and a large range of colours

**Hygroscopic (needs drying):** Yes

**Vac forming temp range:** 150 - 175C (302 - 347F)

**Conclusion:** Brittle – low impact resistance, good weather resistance for outdoors, very good optical clarity

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Look out for the next quarterly Technical Notes in December where we will be offering handy hints on trimming vacuum formings.

**Martin Smith, Product Manager**

*E&OE*