

Q-CEL[®]

A Hi-Tech Filler

Unlike any filler you have used before.

microspheres provide a low density filler/extender that:

- * *reduces cost*
- * *reduces weight*
- * *extends resin*
- * *enhances performance properties*

and is unlike any filler you have used before.

microspheres are hi-tech fillers designed to meet the needs of design engineers, formulators, parts manufacturers, and other end users.

microspheres are compatible with most resins including thermoset resins such as polyester, epoxies, and polyurethanes, as well as most thermoplastic resins.

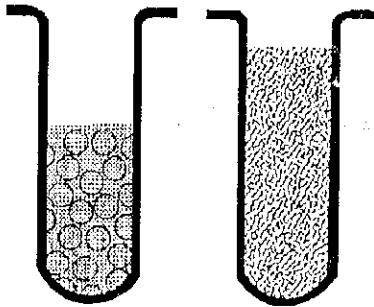
All in all, Q-Cel imparts many beneficial properties to the final product and all of these benefits need to be considered to appreciate the full economic advantages of Q-Cel.



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Some of these unique properties include:

Lower Resin Demand/Lower Costs



Q-Cel is a sphere and therefore has the lowest surface to volume ratio of any shape. Hence, Q-Cel has an extremely low resin demand.

Packing is further enhanced by Q-Cel's broad particle size distribution which permits smaller spheres to fill voids between larger ones. This leads to substantially higher filler loading potential compared to other fillers with no sacrifice in viscosity or flow, and savings on expensive resin.

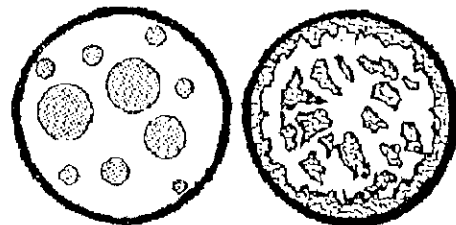
Q-Cel microspheres reduces resin costs because they occupy volume efficiently. Q-Cel can displace more expensive resins better and more than other non-spherical fillers.

Note that the economic value of a filler comes from the volume of resin, that it replaces.

Q-Cel should be evaluated on a volume basis even though it, like most fillers, is sold on a weight basis.

Lower Viscosity/Improved Flow

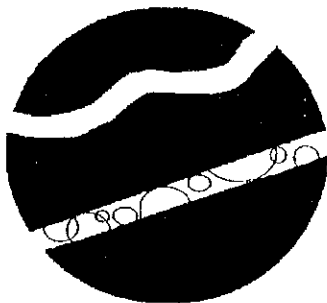
Q-Cel microspheres flow over each other just like ball bearings with relative ease compared to irregular shaped particles.



Q-Cel also has a olephinic surface which further reduces flow resistance and saves energy, time, wear, and tear on equipment.

Q-Cel contributes a desirable level of thixotropic behaviour to filled resin systems. Q-Cel also resists the tendency to float out which is exhibited by other lightweight fillers.

Reduced Shrinkage and Warpage

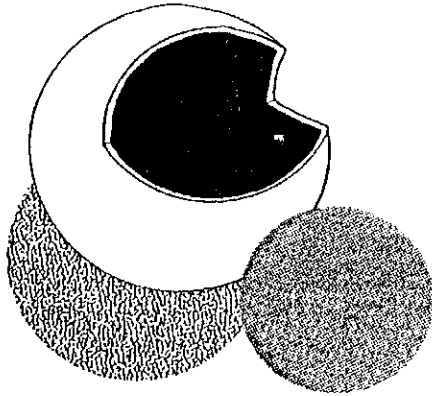


Q-Cel's high loading potential, efficient packing, and uniform distribution of stresses, means that parts containing Q-Cel show a marked reduction in shrinkage and warpage.



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Lower Density



Q-Cel are hollow microspheres which are up to 14 times lower in density than other common mineral fillers. Table 1 shows comparison of density of Q-Cel with some common fillers.

Table 1
Density of Typical Fillers and Resins Compared to Q-Cel 520

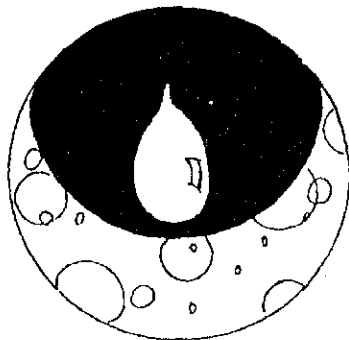
<u>Filler</u>	<u>Density</u>
	gm/cm ³
Q-Cel Microspheres	0.19-0.7
Q-Cel 520	0.2
Calcium Carbonate	2.7
Talc	2.9
Wood Flour	1.2
Fibreglass	2.5
Aluminium Trihydrate	2.4
Polyester Resin	1.1-1.4
Epoxy Resin	1.1-1.2

An addition of just 4% Q-Cel 520 to a casting composite will reduce the density by more than 20%. Hence, this can mean substantial weight reductions in highly filled systems and an increase in parts per kilogram of compound.



Note that the effective density of Q-Cel can be lower than other so called light fillers because other fillers may have a higher surface area which can absorb more resin.

Dispersibility



Q-Cel's oleophilic surface means that Q-Cel wets out faster and easier than other mineral fillers in organic polymers.

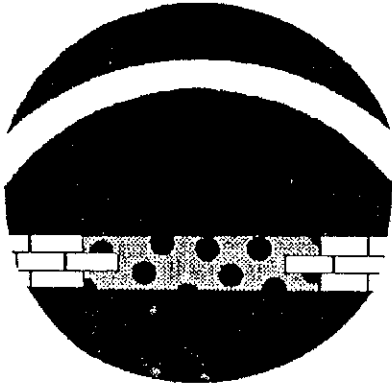


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Fine Particle Size

Q-Cel is available in a variety of particle size ranges to meet your specific application and equipment requirements, including very fine grades suitable for spray applications, resin transfer moulding, and many new applications.

Improved Stiffness

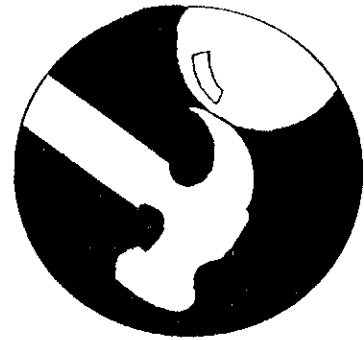


Syntactic foam cores used in polyester laminate construction have a high percent fill of Q-Cel, which significantly reduces the overall weight of the product and increases the stiffness, and the capability of application to any shape at various thicknesses.

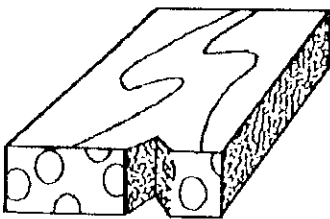
Compared to other methods of producing syntactic foam, Q-Cel gives more stiffness at a lower cost per unit volume.

Increased Impact Resistance

Q-Cel's spherical shape can disperse the energy from an impact better than non spherical fillers in a composite matrix, thus reducing cracking.



Improved Finishing and Working Characteristics



Compositions made with Q-Cel can be more easily filed, sanded, nailed, drilled, and sawn than other fillers. In addition, the sand paper clogs less and the filings drop to the floor causing less dusting.

The improved impact properties obtained with Q-Cel mean that the product resists cracking when nailed.

Q-Cel has also been found to enhance the application and holding power of staples, nails, and screws in furniture parts. The tiny Q-Cel compartments will collapse and crush together with the entry of the screw or staple, literally making room for the fastener as it penetrates the plastic material. In casting resins extended with solid fillers, the elasticity of the resin tends to force staples or screws out of the part, making it susceptible to cracking.



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Improved Resistance to Thermal Shock

Cultured marble sinks can crack if subjected to rapid changes in water temperature. The addition of Q-Cel, even at a small percentage can effectively eliminate cracking due to thermal cycling.

Insulation Properties

Q-Cel hollow microspheres consist of 70-92% encapsulated air and hence have natural insulation properties which have been used in such thermal applications as pipe insulation.

Q-Cel

A Filler for many applications

That have not even been thought of yet

Q-Cel hollow microspheres combine low density with a high level of durability, which makes them an ideal resin extender for a wide range of industries including automotive, marine and construction.

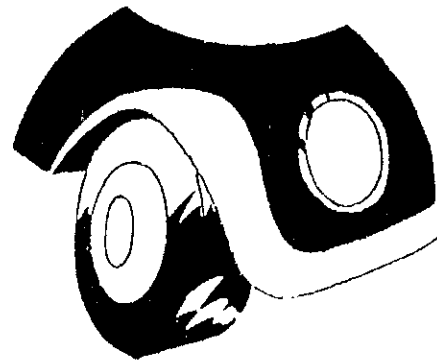
Transportation

Weight reduction of 10-20% for FRP Trailer Liner panels or the canopies of vans, can be obtained with Q-Cel hollow microspheres. In addition, desired mechanical properties are realised. The weight savings allow for potential increases in the amount of pay load that the lighter trailer can carry.

Autobody Fillers

Q-Cel added to polyester autobody repair fillers imparts:

- *Lower formulation costs
- *Longer putty working time
- *Lower density thus reducing sag
- *Easier to file reducing time, and wear and tear on tools
- *Significantly reduced dusting levels
- *Lower shrinkage
- *A flawless smooth surface that can be primed after one hour.



Now, with the introduction of Q-Cel 520 FPS (fine particle size), these same benefits can now be applied to spray up putties, with minimal float out.



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Sheet and Bulk Moulding Compounds/Fibreglass Reinforced Plastic

Q-Cel can be used in FRP products as an effective means of adding volume while at the same time significantly reducing weight without sacrificing desired end use properties.

Similarly, **Q-Cel** has been successfully incorporated into SMC or BMC formulations for reducing the weight of moulded parts for automobiles.

Plastisols

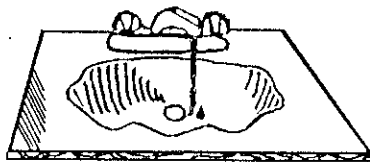
PVC plastisols are used as automobile underbody deadeners, sealers in car air filters and durable carpet backing.

The inclusion of **Q-Cel** as a replacement filler in the plastisol will:

- *Reduce the cost of the formulation
- *Reduce the density of the formulation
- *Resist sag on vertical surfaces
- *Prevent crease whitening
- *Improve flexibility and durability
- *Lead to higher filler loadings without undesirable increases in viscosity



Cultured Marble



Cultured marble consists of vanities, bathtubs and enclosures, shower pans and surrounds, sinks and countertops, decorative interior and exterior panels, shelves, and furniture tops.

A typical cultured marble mix consists of polyester resin and calcium carbonate, plus pigments added for background colours and marble grain.

When **Q-Cel** is added the following benefits are noted:

- *A reduction in density by up to 35%
- *A reduction in shrinkage
- *A reduction in stresses and therefore cracking
- *Easier to work during production and installation
- *Thixotropic properties enhance the veining effect
- *Reduction in cracking due to thermal shock



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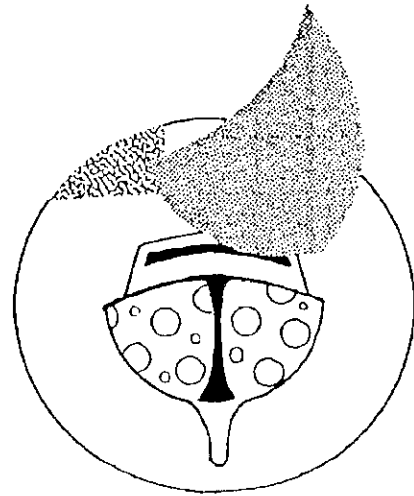
Syntactic Foams/Marine

Syntactic Foams are used extensively in Marine applications such as faring compounds.

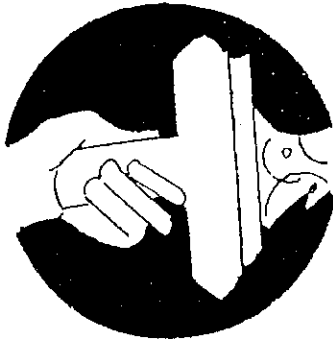
Q-Cel can be used in syntactic foam cores for polyester laminate construction. These can be produced by spray-up techniques or by hand lay-up.

Q-Cel in syntactic foam imparts:

- *Reduced weight
- *Increased stiffness
- *Lower cost per unit volume
- *High compressive strength compared to other foams
- *Insulation properties similiar to cellular urethane or polystyrene



Construction



Q-Cel microspheres decrease application and drying time while enhancing performance in many wall repair compounds, caulks, sealants, and tape joint compounds.

Casting

Cast plastics can capture the minute surface details and duplicate the colour tones of hand-carved woods.

Using Q-Cel as a filler in casting imparts the following properties:

- *Reduction in density by up to 35%
- *Reduction in resin demand by up to 20%
- *Holds nails, staples, and screws better
- *Easier to work
- *Easier to pour
- *A warm feel similiar to wood

For more information, please contact:



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