

### QPAC®25 & QPAC®40

#### Product Overview:

Poly(alkylene carbonates) are synthesized through the polymerization of carbon dioxide and epoxides. The products of their combustion are carbon dioxide and water vapor, which are non-toxic, non-flammable, and environmentally safe. They burn cleanly in any environment, oxidizing or inert. They are colorless, amorphous organic polymers with low glass transition temperatures.



#### QPAC is being evaluated in various energetic/pyrotechnic applications including safety devices for airbag inflators. Here's why:

- Decomposition is complete through three phases: solid, liquid, and vapor.
- QPAC decomposes completely between 220°C - 250°C, which can be as much as 150°C below the decomposition temperatures of other binders.
- Upon decomposition, QPAC leaves very low ash residue with the complete burn-out of carbon.
- QPAC is soluble in many common solvents, but is not water soluble.
- Decomposition is uniform and controlled, and flame temperatures are noticeably reduced during combustion.
- QPAC is available in many forms including powder, granulate, pellet, solution and water-based emulsion.

#### Properties:

##### QPAC® 25 - PEC - poly(ethylene carbonate)

Density	1.42	Molar Mass	88.1
Chemical formula	C <sub>3</sub> H <sub>4</sub> O <sub>3</sub>	Heat of Combustion	3,753 cal/gm
Tg	25°C	Heat of Formation	-88.276 kcal/mol
Tensile strength	500 - 1,500 psi	Melting Point	498K
Solubility	Methylene chloride, Chloroform, and 1,2 Dichloroethane		

##### QPAC® 40 - PPC - poly(propylene carbonate)

Density	1.26	Molar Mass	102.1
Chemical formula	C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>	Heat of Combustion	4,266 cal/gm
Tg	40°C	Heat of Formation	-145.647 kcal/mol
Tensile strength	5,000 - 6,000 psi	Melting Point	548K
Solubility	Methylene chloride, MEK, Acetone, & Propylene carbonate		

#### Other QPAC Binder Applications:

- High Energy Capacitor Processing
- Brazing Solutions and Pastes
- Ceramic Fiber Processing
- Thick Film Inks
- Diamond Cutting Tool Manufacturing
- Die Attach Adhesives

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