

# CARBOECONOPROP®

Low-cost lightweight ceramic proppant

## FEATURES

- Developed for the largest well population.
- Bulk density and specific gravity similar to frac sand.
- High conductivity, making it more cost-effective than resin-coated sands.
- Chemically inert, will not react with fracturing fluid crosslinkers and breakers.
- Available in two standard sizes – 20/40 and 30/50.

## Physical and Chemical Properties

### Typical Sieve Analysis [weight % retained]

U.S. Mesh [mesh]	Microns	20/40	30/50
-16+20 mesh	-1180+850	5	—
-20+30 mesh	-850+600	60	3
-30+40 mesh	-600+425	35	79
-40+50 mesh	-425+300	—	17
-40+60 mesh	-425+250	—	—
-50 mesh	-300	—	1
<b>Median Particle Diameter [microns]</b>		635	473

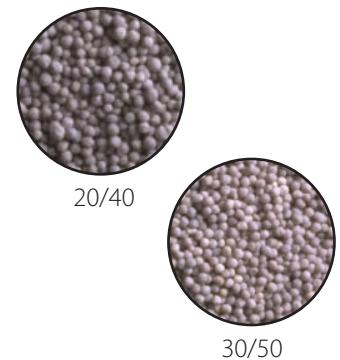
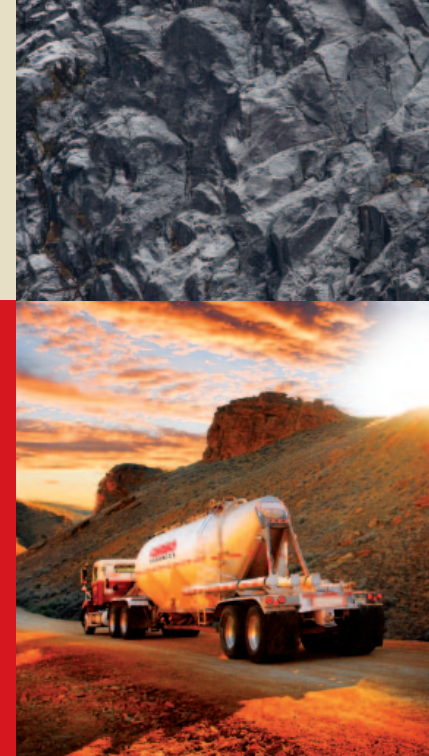
### API Crush Test

% by weight fines generated	@5,000psi	1.0	0.8
	@7,500 psi	5.2	2.8

**Sizing Requirements:** A minimum of 90% of the tested sample should fall between the designated sieve sizes. These specifications meet the recommended practices as detailed in ISO 13503-2.

### Typical Additional Properties

Roundness	0.9	Chemistry [weight %]	
Sphericity	0.9	Al <sub>2</sub> O <sub>3</sub>	48
Bulk Density [lb/ft <sup>3</sup> ]	96	SiO <sub>2</sub>	48
[g/cm <sup>3</sup> ]	1.56	TiO <sub>2</sub>	2
Apparent Specific Gravity	2.70	Fe <sub>2</sub> O <sub>3</sub>	1
Absolute Volume [gal/lb]	0.044	Other	1
Solubility in 12/3 HCl/HF Acid [% weight loss]	1.7		



## Long-Term Conductivity

### Reference Conductivity\*, md-ft @ 250°F

Closure Stress [psi]	2 lb/ft <sup>2</sup> 20/40	2 lb/ft <sup>2</sup> 30/50
2,000	6,300	4,150
4,000	5,500	3,300
6,000	4,100	2,550
8,000	2,500	1,600
10,000	1,300	975

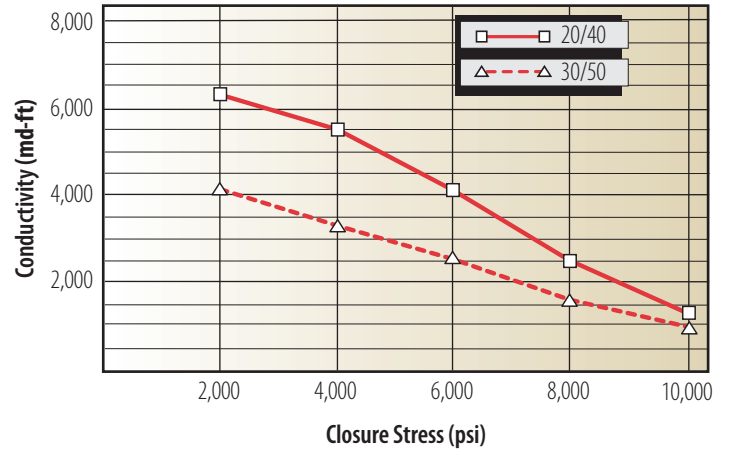
### Reference Permeability, Darcies @ 250°F

Closure Stress [psi]	2 lb/ft <sup>2</sup> 20/40	2 lb/ft <sup>2</sup> 30/50
2,000	340	220
4,000	300	180
6,000	230	140
8,000	150	90
10,000	85	65

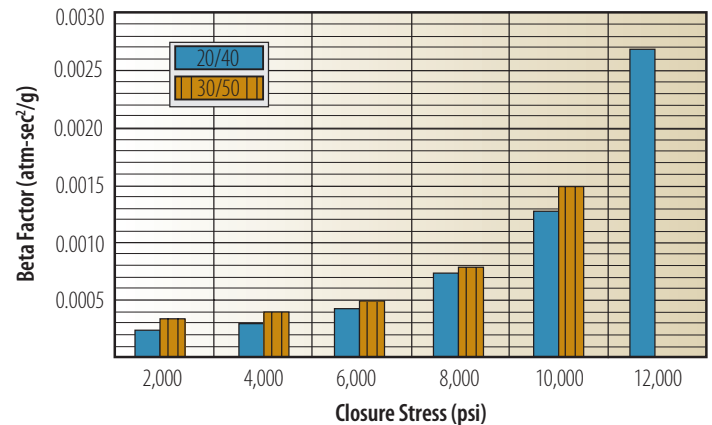
## Beta Factors

Closure Stress [psi]	Beta Factor [atm sec <sup>2</sup> /g]	
	20/40	30/50
2,000	0.00024	0.00035
4,000	0.00029	0.00040
6,000	0.00043	0.00050
8,000	0.00075	0.00080
10,000	0.00129	0.00150
12,000	0.00268	—

2 lb/ft<sup>2</sup>, 250°F, with 2% KCl | Between Ohio sandstone



2 lb/ft<sup>2</sup>, 250°F, with 2% KCl | Between Ohio sandstone, Young's modulus of 5x10<sup>6</sup> psi | No gel damage included



Beta Factor data reported by Stim-Lab Consortium, PredK Feb 2002

\* Reference conductivity and permeability are measured with a single phase fluid under laminar flow conditions in accordance with ISO 13503-5. In an actual fracture, the effective conductivity will be much lower due to non-Darcy and multiphase flow effects. For more information, please refer to SPE Paper #106301.

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