

# CARBOLITE

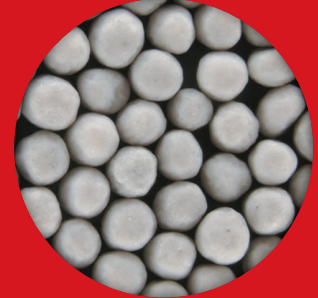
High-performance, low-density ceramic proppant

## Features

- Bulk density and specific gravity similar to sand
- Available in five closely sieved standard sizes—12/18, 16/20, 20/40, 30/50 and 40/70

## Benefits

- The ideal high-performance proppant in oil and gas wells
- High flow capacity for enhanced production rates
- Provides highest fracture conductivity in moderate-depth wells



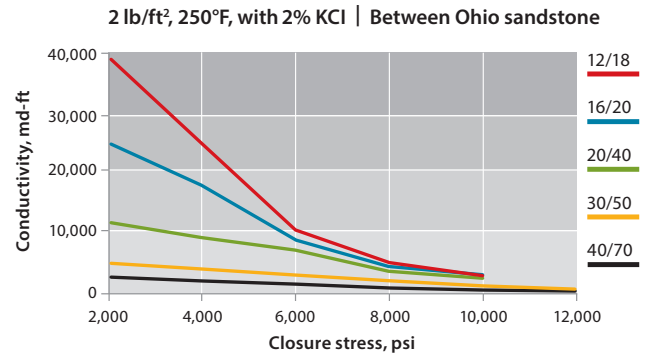
## Highest fracture conductivity for greater productivity in moderate-depth wells

CARBOLITE® high-performance, low-density ceramic proppant technology has a bulk density and specific gravity similar to sand, yet delivers higher conductivity and flow capacity to enhance production and your estimated ultimate recovery (EUR). CARBOLITE is particularly effective for enhanced production rates in moderate-depth oil wells.

## Long-term conductivity

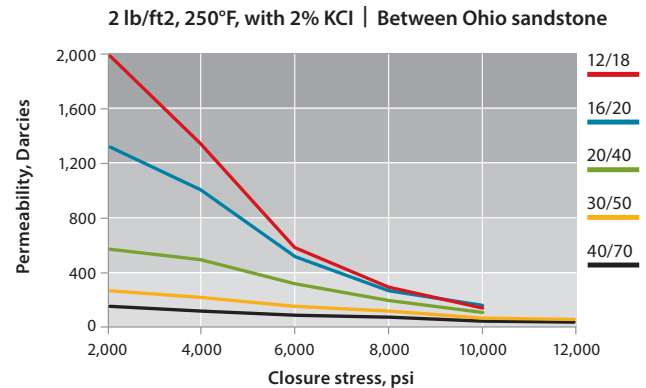
Reference conductivity, md-ft @ 250°F (121°C)

Closure stress [psi]	2 lb/ft <sup>2</sup> 12/18	2 lb/ft <sup>2</sup> 16/20	2 lb/ft <sup>2</sup> 20/40	2 lb/ft <sup>2</sup> 30/50	2 lb/ft <sup>2</sup> 40/70
2,000	38,795	24,630	10,700	4,640	2,200
4,000	24,560	17,780	8,900	3,740	1,660
6,000	9,940	9,035	6,000	2,870	1,270
8,000	4,840	4,625	3,700	1,900	870
10,000	2,235	2,400	2,000	1,270	555
12,000				650	340



Reference permeability, Darcies @ 250°F (121°C)

Closure stress [psi]	2 lb/ft <sup>2</sup> 12/18	2 lb/ft <sup>2</sup> 16/20	2 lb/ft <sup>2</sup> 20/40	2 lb/ft <sup>2</sup> 30/50	2 lb/ft <sup>2</sup> 40/70
2,000	2,000	1,290	570	250	135
4,000	1,325	955	480	200	100
6,000	570	510	340	160	80
8,000	295	275	210	110	60
10,000	140	150	120	75	35
12,000				40	25



Reference conductivity and permeability are measured with a single phase fluid under laminar flow conditions in accordance with API RP 19D. 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 - "Determining Realistic Fracture Conductivity and Understanding its Impact on Well Performance -Theory and Field Examples."



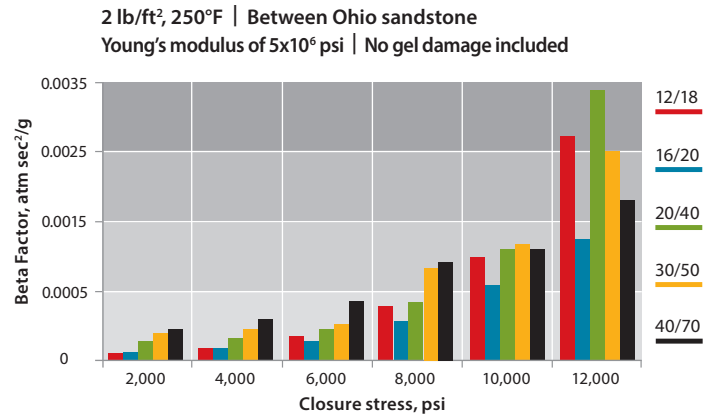
Production. Enhanced.

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High-performance, low-density ceramic proppant

## Beta factors

Closure stress [psi]	Beta factor [atm sec <sup>2</sup> /g]				
	12/18	16/20	20/40	30/50	40/70
2,000	0.00007	0.00009	0.00020	0.00030	0.00034
4,000	0.00011	0.00011	0.00024	0.00035	0.00046
6,000	0.00027	0.00022	0.00035	0.00040	0.00070
8,000	0.00058	0.00045	0.00066	0.00080	0.00092
10,000	0.00120	0.00086	0.00131	0.00140	0.00131
12,000				0.00250	0.00190



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

## Physical and chemical properties

### Typical sieve analysis [weight % retained]

U.S. Mesh [mesh]	Microns	12/18	16/20	20/40	30/50	40/70
+12 mesh	+1700	4				
-12+16 mesh	-1700+1180	91	5			
-16+20 mesh	-1180+850	5	93	7		
-20+30 mesh	-850+600		2	90	4	
-30+40 mesh	-600+425			3	90	1
-40+60 mesh	-425+250				6	97
-60+70 mesh	-250+212					2
<b>Median particle diameter [microns]</b>		1374	1001	730	522	334
<b>API/ISO crush test</b> % by weight fines generated	@7,500 psi	17.9	14.0	5.2	2.5	2.0
	@10,000 psi		19.3	8.3	5.8	4.4

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 API RP 19C.

### Typical additional properties

Roundness	0.9	Apparent specific gravity	2.71
Sphericity	0.9	Absolute volume [gal/lb]	0.044
Bulk density [lb/ft <sup>3</sup> ] [g/cm <sup>3</sup> ]	97 1.57	Solubility in 12/3 HCl/HF acid [% weight loss]	1.7

All data represents typical values.

Talk to CARBO to find out how we can help you enhance your production.

[carboceramics.com](http://carboceramics.com)

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