

# CARBOBEAD HTM

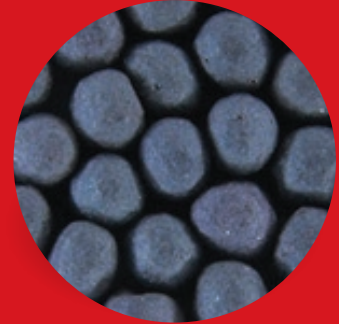
High-performance ceramic heat transfer media to enhance efficiencies in renewable energy systems

## Features and benefits

- High thermal absorptance
- Superior durability
- High operating temperature >700°C
- Low metal erosion
- Chemically inert and non-hazardous
- Low emissivity
- Proudly made in the USA

## Applications

- Concentrated Solar Power (CSP) particles
- Heat storage media
- Waste heat recovery media
- Heat transfer media



## Media engineered to absorb, store and deliver heat

The CARBOBEAD® HTM family of high-performance ceramic media technologies is engineered to provide a unique combination of consistent thermal, physical and chemical properties. These characteristics provide economic and performance advantages in a wide variety of heat transfer and storage applications as compared to sand and other competing synthetic media types.

## Physical properties

### Density and thermal properties

Typical properties	LD	MAX LD	ID	HD	MAX HD
Roundness	0.9	0.9	0.9	0.9	0.9
Sphericity	0.9	0.9	0.9	0.9	0.9
Bulk density (lb/ft <sup>3</sup> )	97	103	119	131	134
(g/cm <sup>3</sup> )	1.55	1.65	1.9	2.1	2.15
Absolute density (g/cm <sup>3</sup> )	2.7	2.8	3.3	3.6	3.6
Vicker's hardness	816	1065	1120	1248	1431
Solar absorptance	0.75		0.90	0.93	
Thermal emittance	0.70		0.76	0.86	

Thermal conductivity (W/m°C)	LD	ID	HD
Ambient	0.27	0.28	0.32
400°C	0.44	0.43	0.50
800°C	0.61	0.57	0.77
1200°C	0.78	0.70	0.97

Heat capacity cal/g°C	LD	ID	HD
Ambient	0.16	0.15	0.15
400°C	0.18	0.18	0.18
800°C	0.20	0.21	0.20
1200°C	0.25	0.30	0.28

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## Physical properties, *continued*

Typical sieve analysis  
(weight % retained)

Mean particle diameter in Microns	LD					ID							
	1400	1000	750	500	350	1350	950	700	450	300	275	225	200
Sieve size (mesh)	Microns												
-8+12	-2360+1700	4				2							
-12+16	-1700+1180	91	5			82	3						
-16+20	-1180+850	5	93	7		16	74	4					
-20+30	-850+600		2	90	4		23	75	3				
-30+40	-600+425			3	90	5		21	68	3			
-40+50	-425+300				6	72			28	70	37	22	
-50+70	-300+212					22			1	26	45	38	35
-70+100	-212+150					1				1	16	32	43
-100+140	-150+106										2	8	21
-140+200	-106+75												1

Mean particle diameter in Microns	MAX LD			HD				MAX HD			
	950	800	600	1300	950	700	500	350	950	800	600
Sieve size (mesh)	Microns										
-8+12	-2360+1700			1							
-12+16	-1700+1180			70	3						
-16+20	-1180+850	100		29	85	4			100		
-20+30	-850+600		100		12	85	5			100	
-30+40	-600+425			100		11	87				100
-40+50	-425+300						8	73			
-50+70	-300+212							26			
-70+100	-212+150							1			
-100+140	-150+106										
-140+200	-106+75										

### Chemical composition

(weight %)	LD	ID	HD
Al <sub>2</sub> O <sub>3</sub>	40-50	70-80	75-85
SiO <sub>2</sub>	40-50	10-20	7-12
Fe <sub>2</sub> O <sub>3</sub>	<2	5-10	7-12
TiO <sub>2</sub>	1-5	1-5	1-5

Talk to CARBO to find out how we can help increase efficiency in your energy storage systems.

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**CARBO**

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