

KRYPTOSPHERE Technology: Latest Developments

Terry Palisch

Global Engineering Advisor



Outline

- KRYPTOSPHERE Technology
- 2015 Developments
- KRYPTOSPHERE LD
- Summary

The pinnacle of proppant technology

Highest EUR, Production & IRR

Highest Conductivity

Ultra-high strength
Mono-size and spherical

KRYPTOSPHERE
Ultra-conductive ceramic

High strength
Regular size and shape

Tier 1
High conductivity ceramic

Medium strength
Irregular size and shape

Tier 2
Medium conductivity resin-coated sand

Low strength
Irregular size and shape

Tier 3
Low conductivity sand



KRYPTOSPHERE: Precision-engineered Proppant

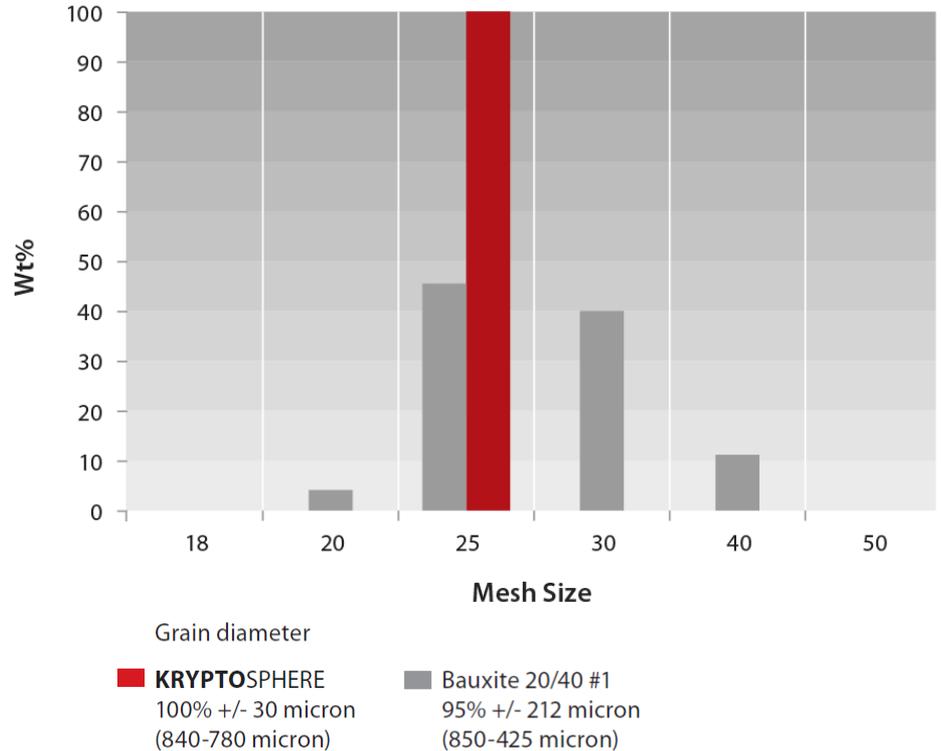
- Size
- Shape
- Strength
- Increased Conductivity
- Increased Durability
- Increased Production
- Increased ROI



Actual proppant grains

Uniform Size

- Single mesh proppant manufactured at any size required for your well conditions



Superior Shape

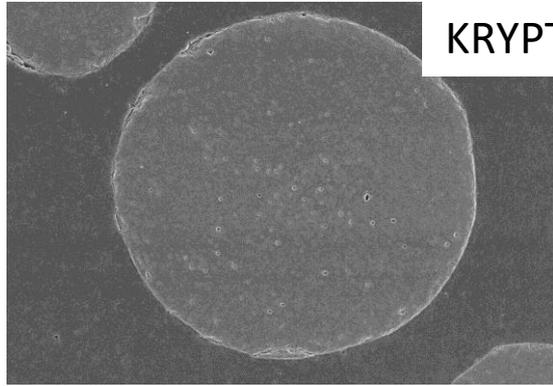


Bauxite 20/40

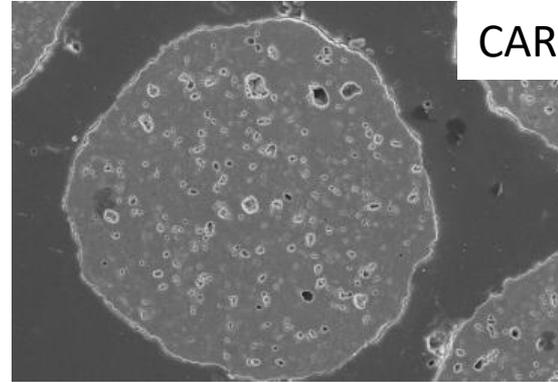


KRYPTOSPHERE HD 25

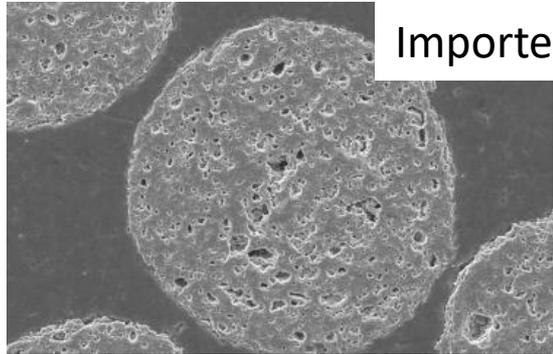
Exceptional Microstructure (Strength)



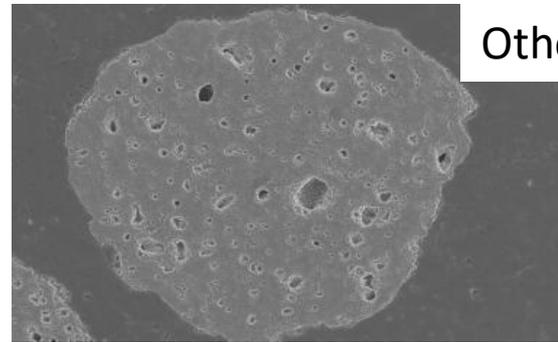
KRYPTOSPHERE



CARBOHSP



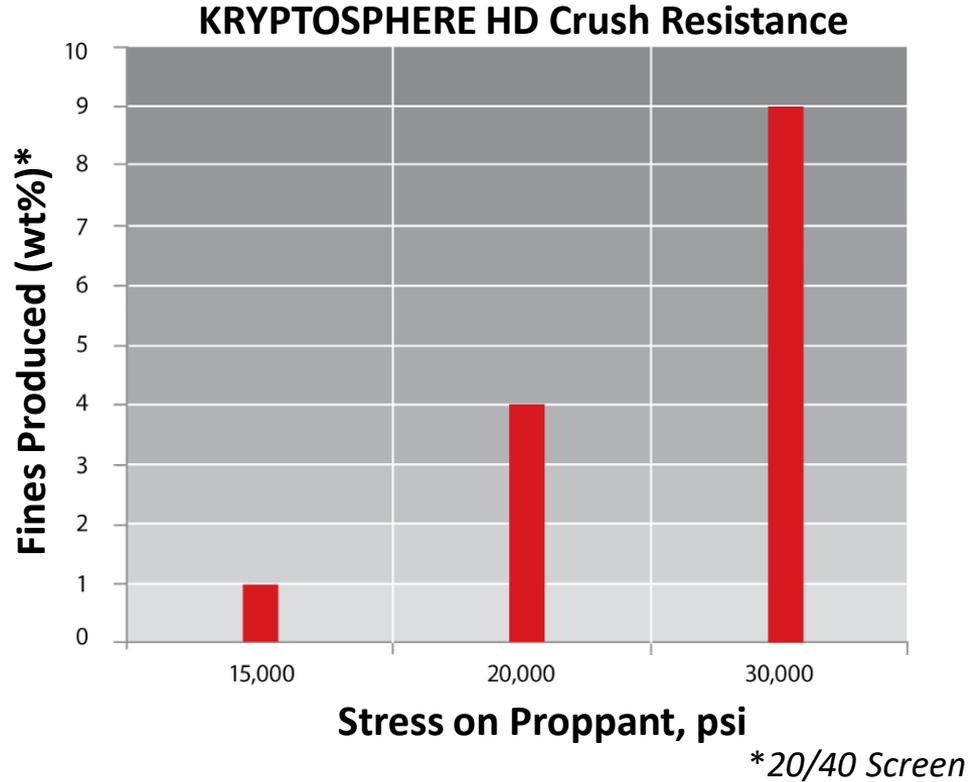
Imported IDC



Other Bauxite

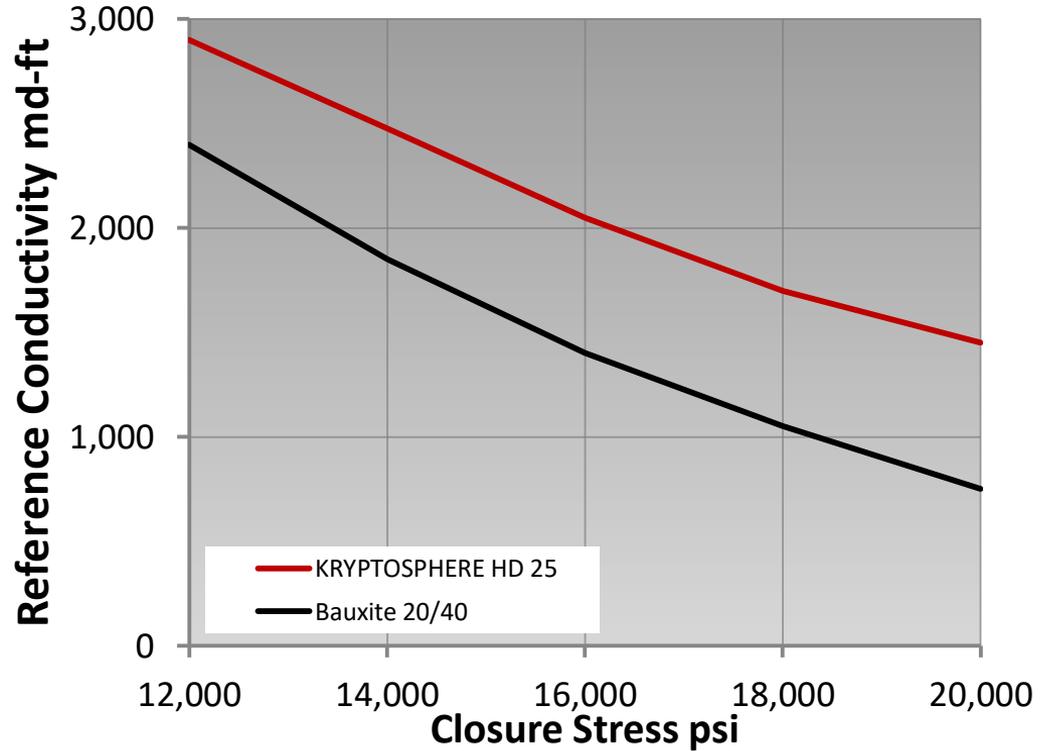
Higher Strength

- KRYPTOSPHERE technology yields proppant with exceptional strength



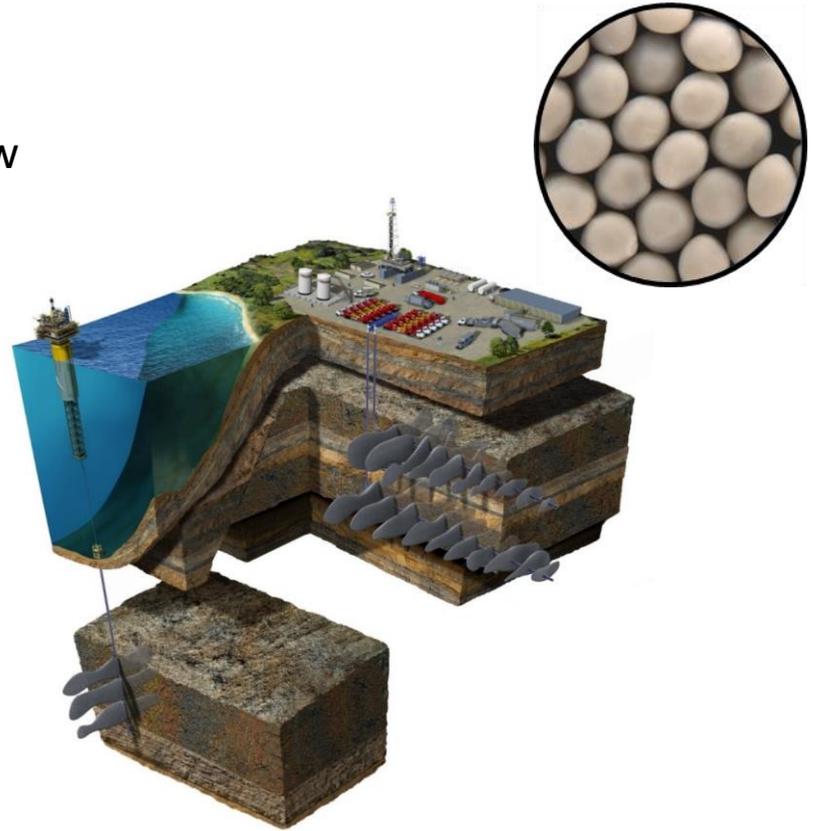
Unmatched Conductivity

- 20-100% more baseline conductivity at high stresses



Additional Benefits of KRYPTOSPHERE Technology

- Lower Beta
 - Lower pressure drop due to non-Darcy flow
- More resistant to stress cycling
 - More durable
- More acid resistant
 - More durable
- Lower erosivity
 - Less equipment wear



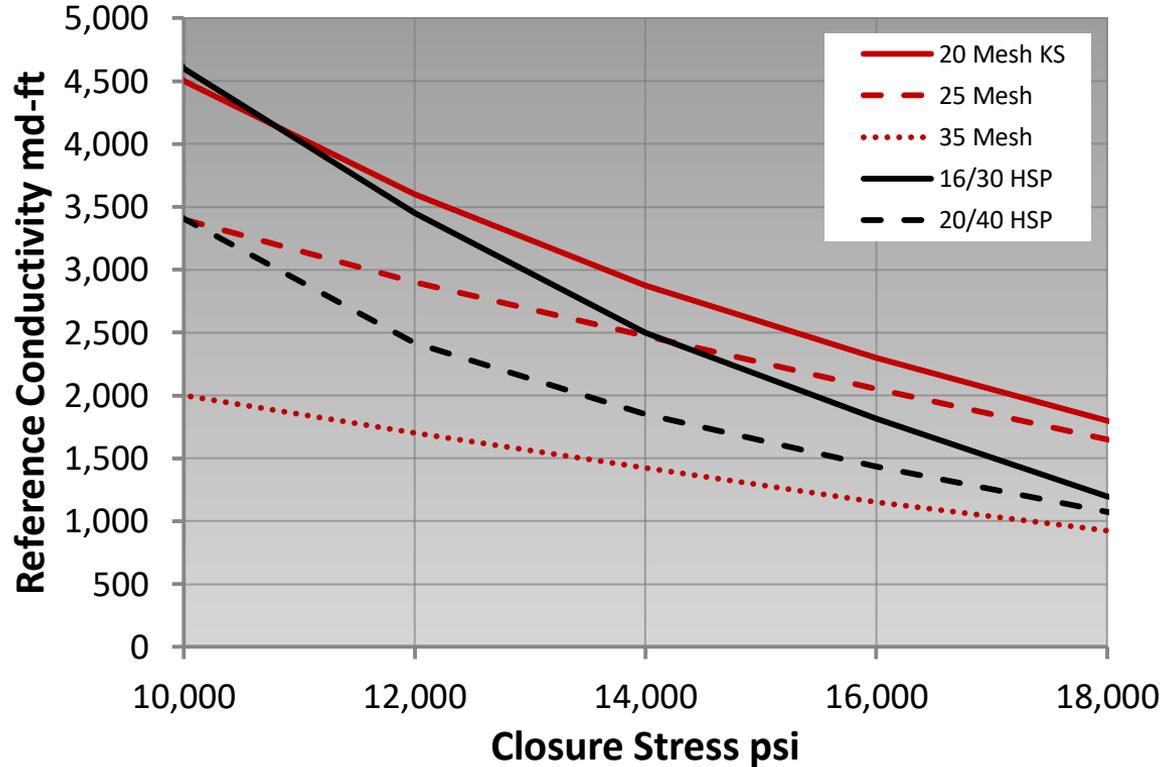
Recent Developments – Improved KRYPTOSPHERE HD

- Comparable density to bauxite
- Higher conductivity at 12k – 16k psi
- Replaces bauxite at all stresses

Property	Original 25 Mesh HD	Improved 25 Mesh HD	Standard 20/40 HSP
ASG (g/cc)	3.8	3.47	3.55
BD (g/cc)	2.34	2.06	2.0
Conductivity (md-ft)			
12k psi	2600	2900	2400
14k psi	2250	2475	1800
16k psi	1950	2050	1450
18k psi	1675	1650	1075
Crush (%)			
15k psi	1%	1%	5%
20k psi	3%	4%	8%

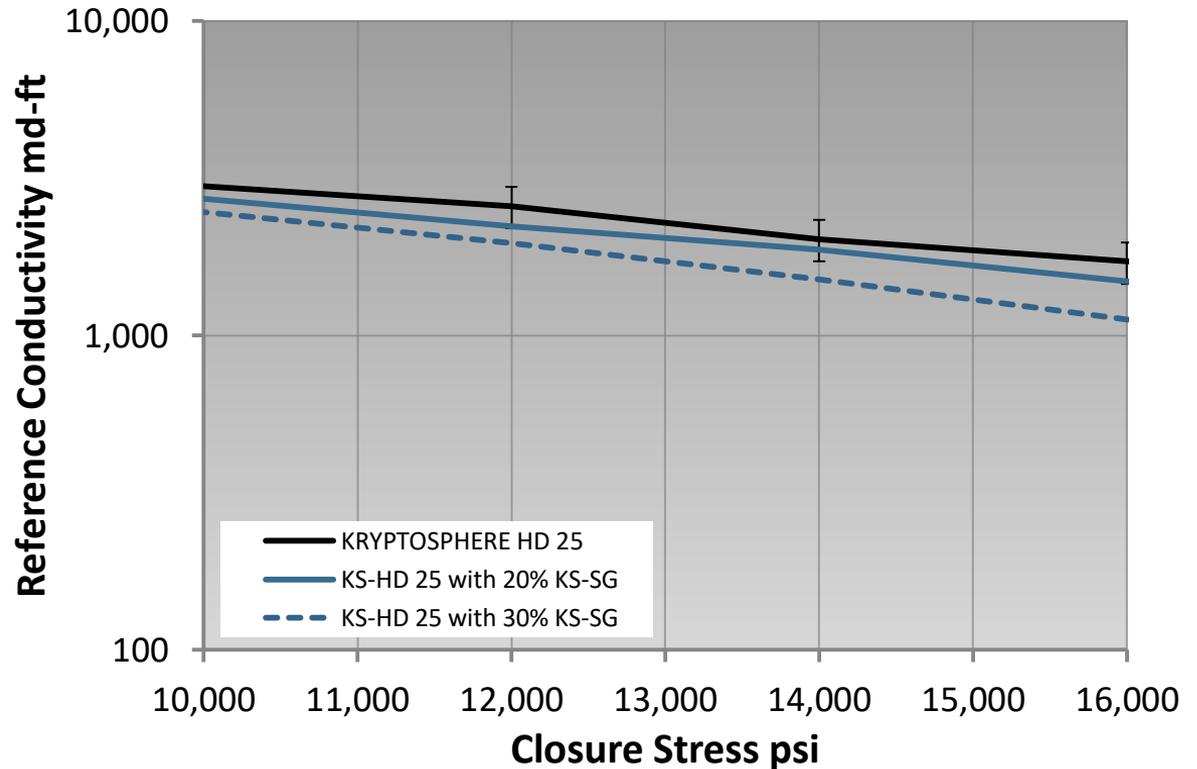
Recent Developments – Additional Sizes

- 20, 25 & 35 Mesh KRYPTOSPHERE HD
- Outperforms comparably sized bauxite proppant



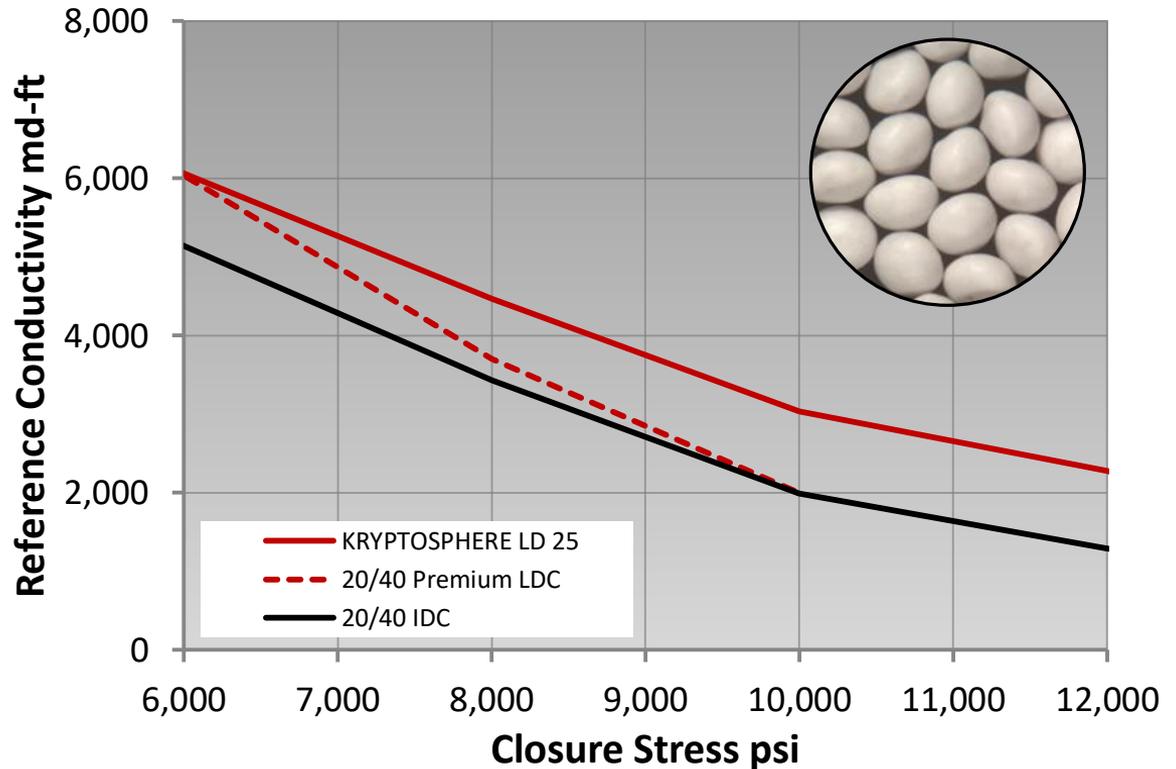
Recent Developments – Incorporated into SCALEGUARD

- Scale inhibition for several years in GOM application
- No impact to conductivity
- Blended prior to loading on stimulation boat
- Projected to inhibit several million barrels of water



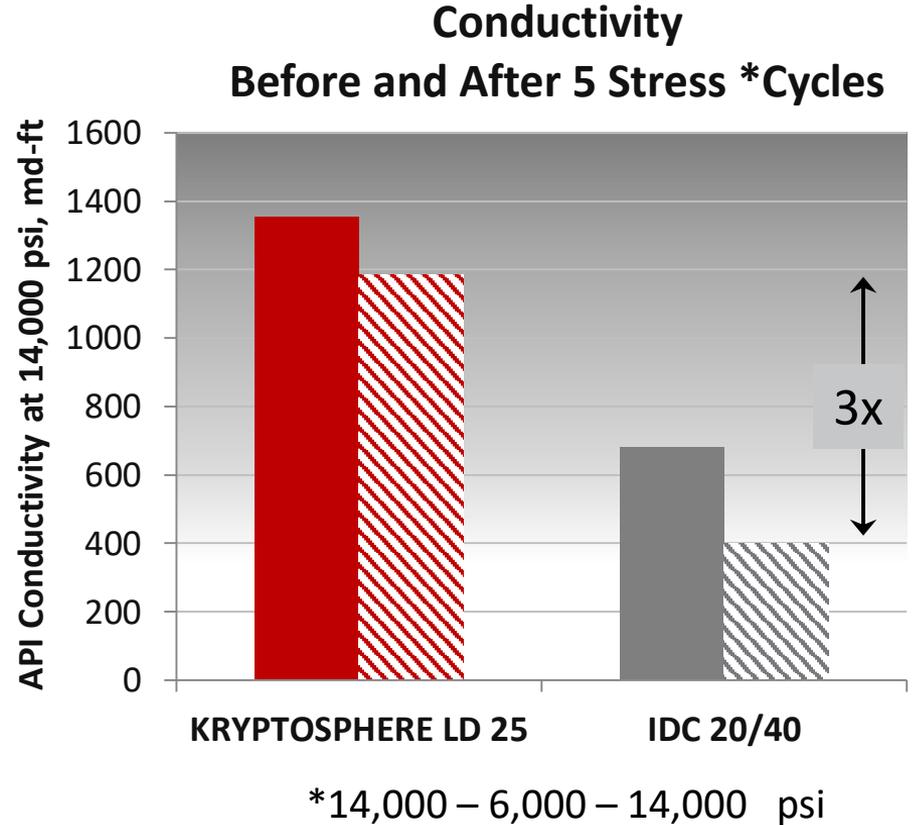
Recent Developments – KRYPTOSPHERE LD

- Low Density (2.75 ASG)
- 18, 25 & 35 Mesh
- Replaces standard LD and ID ceramic proppant, and in some cases HDC



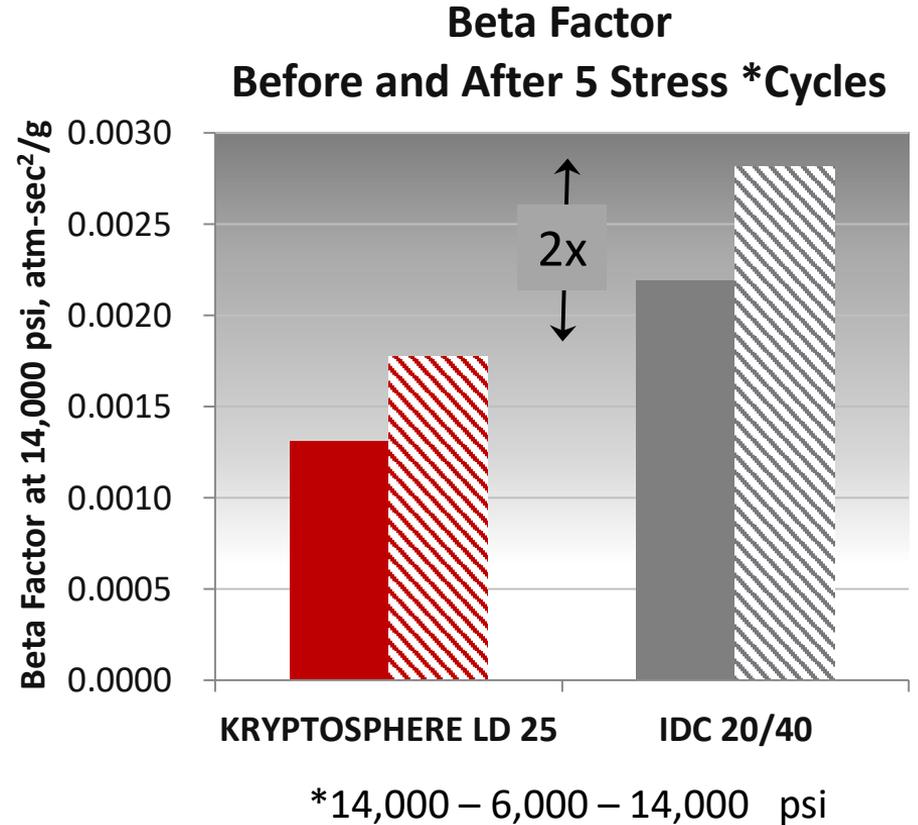
More Resistant to Cycling = More Durable

- 3x more conductive at 14,000 psi after cycling compared to intermediate density ceramic proppant



Lower Beta Factor = Lower Pressure Drop

- 50% lower beta factor at 14,000 psi after cycling compared to intermediate density ceramic proppant



Field Proven

- KRYPTOSPHERE HD
 - GOM
- KRYPTOSPHERE LD
 - Significant interest in several basins



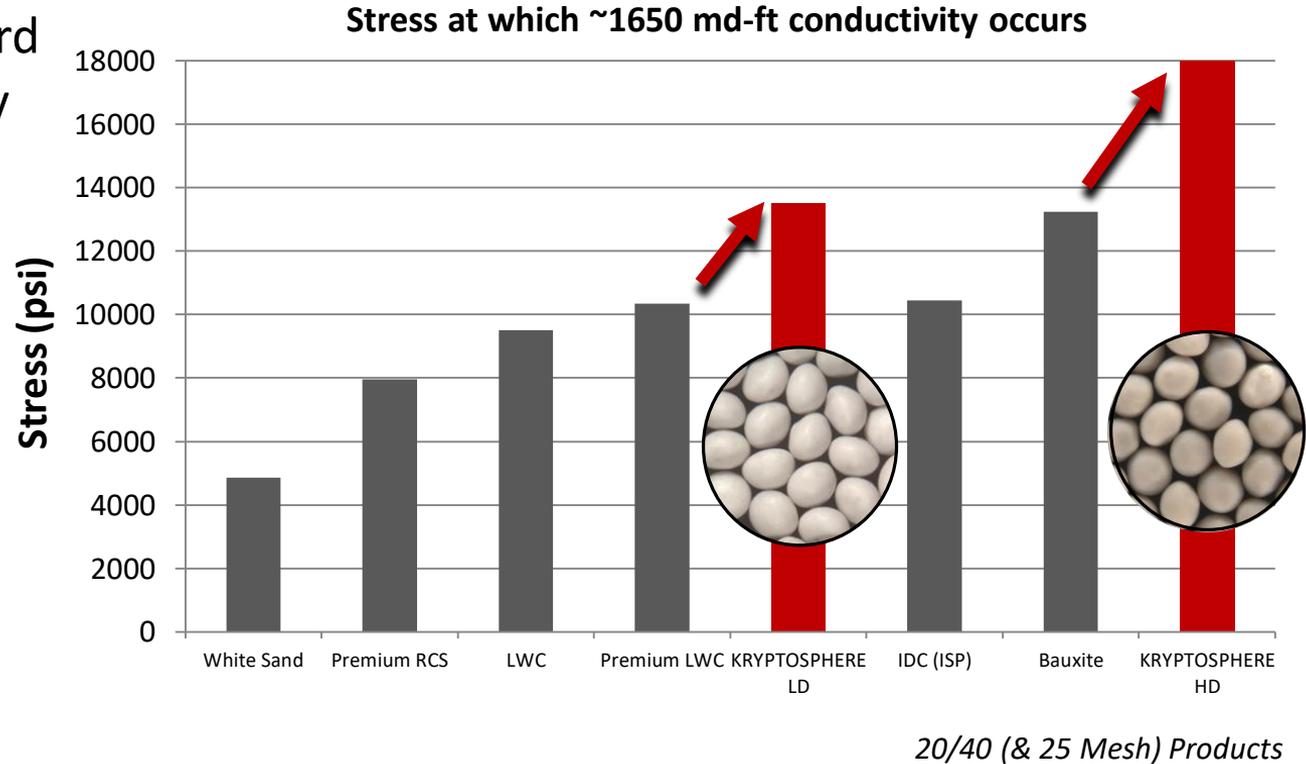
Summary

- KRYPTOSPHERE is the next generation in proppant technology
- Superior shape, uniform size and exceptional microstructure
- HD for high stress applications and LD for low and moderate stress regions
- Lower beta, lower erosivity, more acid resistant and more durable and standard LDC and IDC proppant
- Field proven technology
- Leads to increase production, recovery and maximizes return on investment

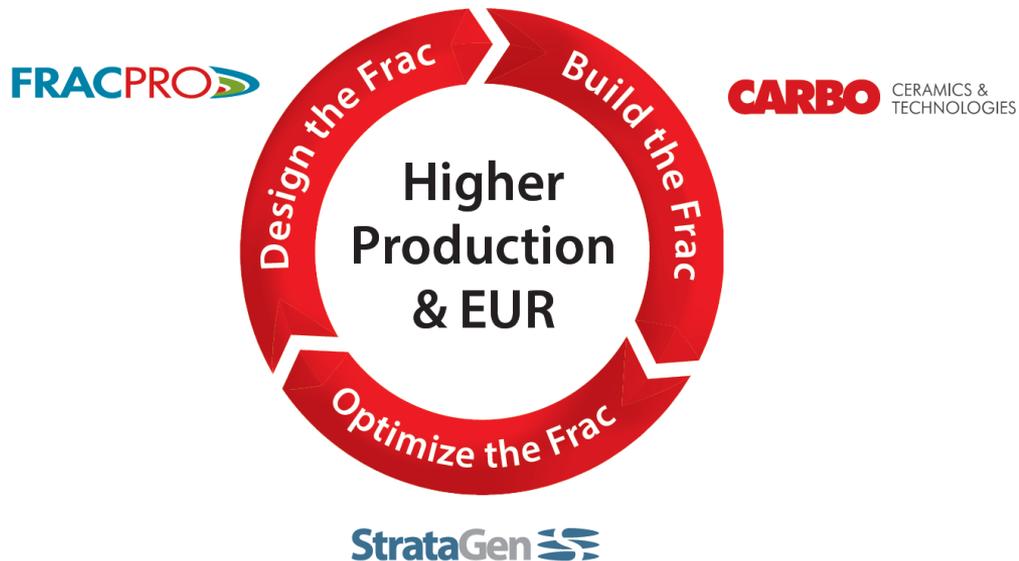


Step Change in Performance – The Next Generation in Proppant

- Outperforms standard proppant technology



Thank You!



Questions?