

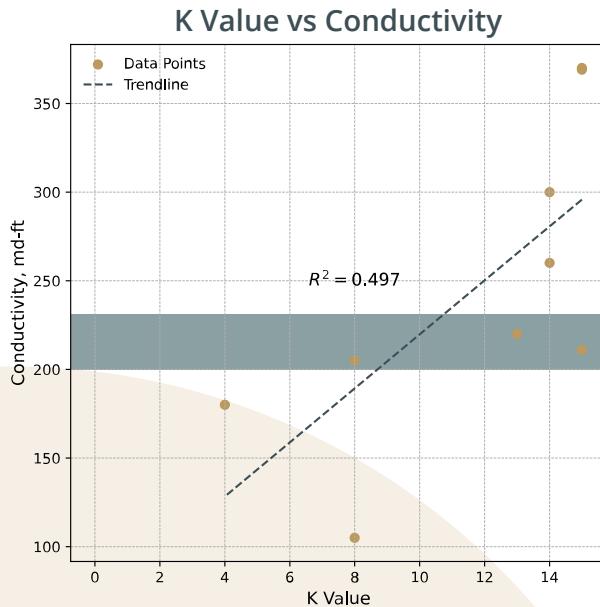


**COMPLETE[™]
CRUSH**

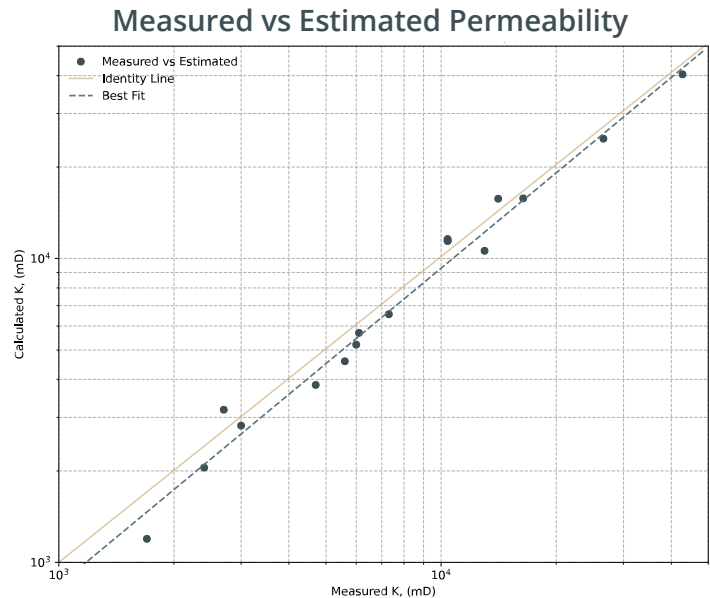
Permeability Based Proppant Crush Test

The only crush test to confidently guide proppant selection

Selecting the right proppant is critical for optimizing hydraulic fracturing operations. Traditional API crush tests provide valuable quality control data but fall short in predicting proppant pack permeability and conductivity. Complete Crush™ provides a new, proprietary approach to proppant crush testing that leverages a modified Kozeny-Carman equation to estimate permeability directly from crush testing, offering engineers a more practical and predictive tool for proppant selection.



K-Value has shown weak correlation with actual permeability and conductivity measurements



Considering parameters like porosity, grain size, and sphericity predict permeability with a high degree of accuracy

The Proper Application of Crush Tests

K-Value

Utilizes API-STD 19C for routine QA/QC purposes.

COMPLETE CRUSH™

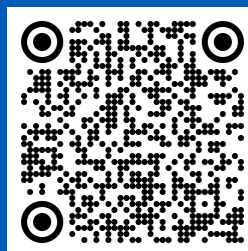
Incorporates geometric properties of the sand pack for more reliable proppant selection.

Max psi stress level	✓	Max psi stress level	✗
Shape	✗	Shape	✓
Sphericity	✗	Sphericity	✓
Porosity	✗	Porosity	✓
Permeability	✗	Permeability	✓
Conductivity	✗	Conductivity	✓

This innovative approach transforms standard crush testing into a powerful tool for permeability estimation, bridging the gap between lab tests and real-world proppant performance. By integrating the revised Kozeny-Carman equation, engineers gain a more reliable, cost-effective method for selecting proppants suited to their operational needs.



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Complete Crush™