Purpose Designed Perforating Charge Delivers Superior and Consistent Performance in Hydraulic Stimulation Operations in the Williston Basin

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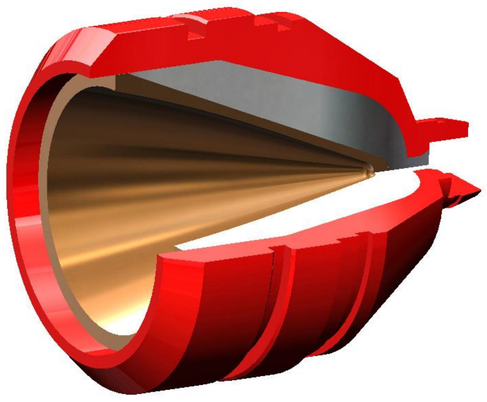
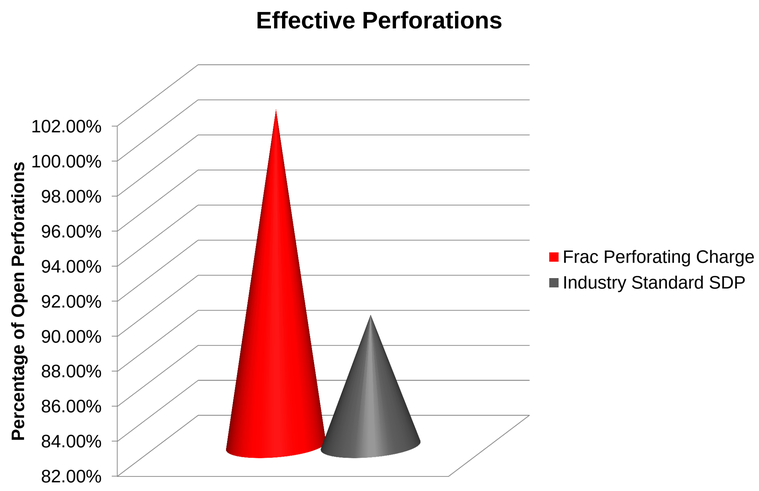
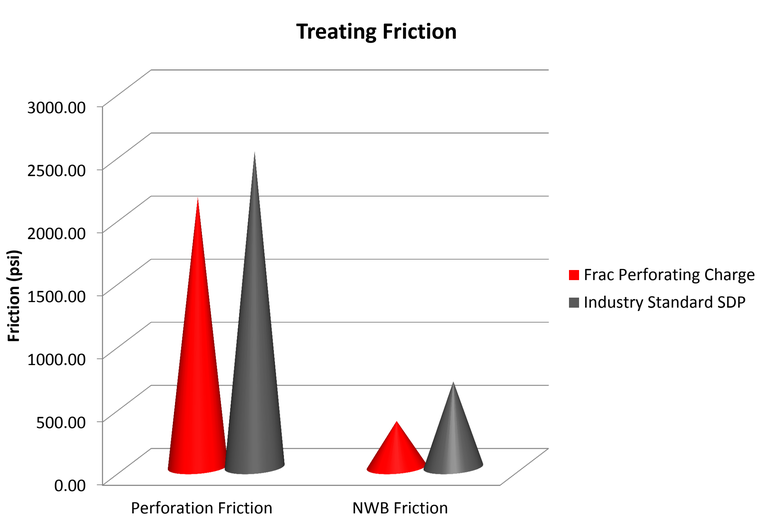
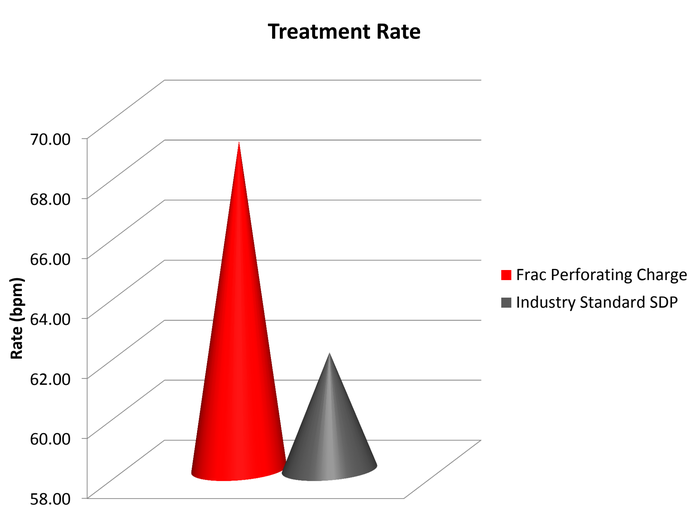




- One of the primary considerations when perforating for hydraulic fracturing applications is the entry hole diameter (EHD) of the perforating charge and its variation with respect to gun position in the wellbore. A family of perforating charges was developed with the objective to maintain consistent entry hole size, regardless of the clearance distance between the charges and the casing.

- Inconsistencies in the number of open perforations and the size of those perforations affect the overall consistency of the stimulation treatment, which in turn affects the amount of fluid and proppant placed in the formation, influencing overall well productivity.





- Treatment performance resulting from inconsistencies in the number of open perforations and the size of those perforations is primarily affected by the friction components of a stimulation that the perforation influences.

- When inconsistencies in EHD are minimized, the number of effective perforations increases and friction components related to the perforations decrease, resulting in an overall superior stimulation treatment.

- In an effort to reduce uncertainties and increase overall stimulation performance, a new family of perforation charges, designed for use in hydraulic fracturing operations, was developed.

- An operator was targeting the Bakken and Three Forks unconventional reservoirs in the Greater Williston basin petroleum system.

- The new charges were tested by the operator in an attempt to increase consistency in their hydraulic stimulation operations. The results of the trial are presented here.

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