

Increasing lateral lengths, stage counts and proppant intensity levels have all contributed to a significant increase in frac sand consumption. As a result, producers are looking for economic solutions to resolve their supply issues, simplify logistics and maintain economics for their frac programs. With emerging plays further away from traditional transloads and rail sites, operators have turned to local solutions to address their frac sand needs.

Frac sand quality is defined by physical characteristics such as compressibility, permeability, and turbidity. ChemTerra's UPsil™ sand upgrading technology is an economical, easy-to-apply sand coating that enhances the sand's physical characteristics without affecting its mesh size or visibly modifying the sand surface.

Advantages:

- ◆ Improved physical characteristics when silica sand used in hydraulic fracturing (ISO tested) is chemically treated
- ◆ Fines generation is reduced during transfers and frac closure stress, creating increased conductivity and permeability
- ◆ Increased crush resistance due to modified sand pack sorting
- ◆ Same proppant grain size/sieve distribution as untreated sand
- ◆ Compatible with all fracturing fluid chemistry
- ◆ Reduced dust generation during surface transfers
- ◆ Easy-to-apply at mine site, transload, or wellsite locations

Application:

Application methods have been developed to allow for fast, effective application. Whether at the mine/transload using our patented sand coater equipment or directly on frac location using our spray bar at the blender tub. Both apparatuses allow for optimum coating to provide peak performance of Upsil, while maintaining fast effective operations which will not slow down the project.

Performance:

Compressive strength, permeability and turbidity testing demonstrates that treating frac sand with UPsil significantly improves its performance. In particular, UPsil can **increase compressive strength by up to 60%** and **reduce fines generation by approximately 40%**. In addition, sand turbidity is virtually eliminated, resulting in a cleaner proppant that maximizes conductivity and helps sustain long-term production.

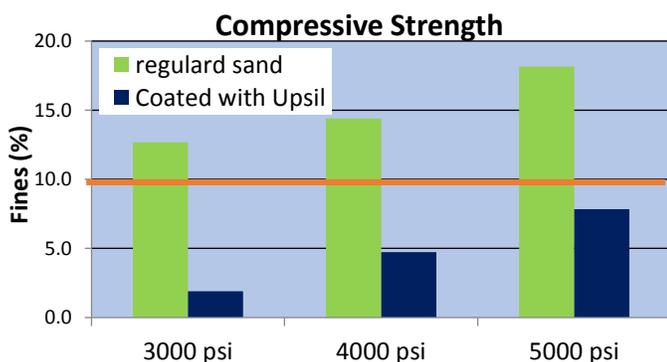


Figure 2 Compressive Strength comparison between coated and Regular West Texas 40/70

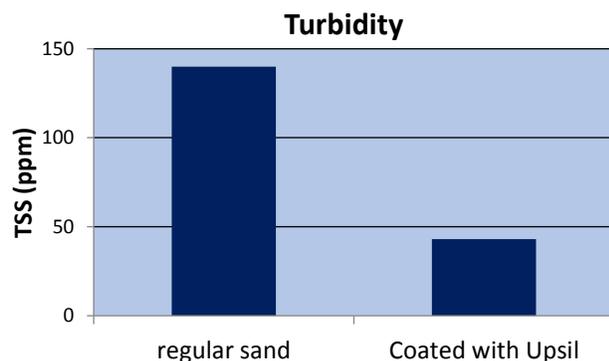


Figure 1 Comparison of total suspended solids in regular Vs. Coated West Texas 40/70

