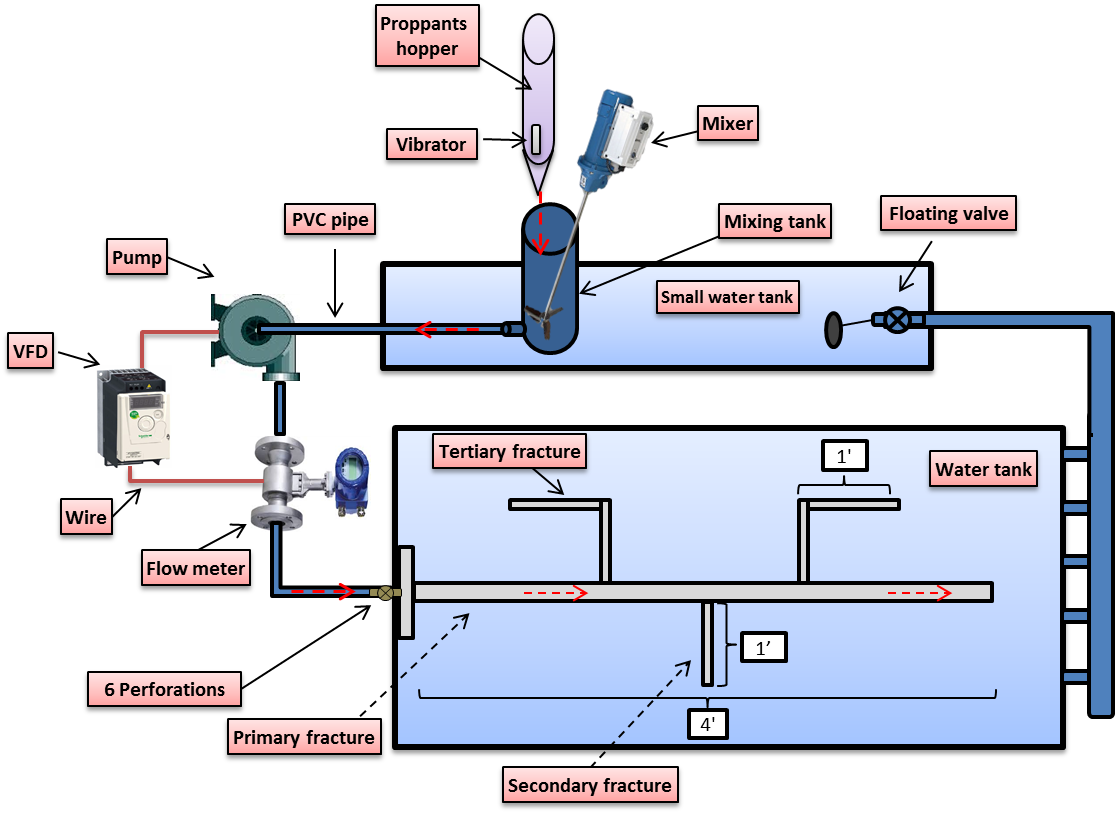
****

**Figure-1: Schematic of the flow slot apparatus components and fracture slot dimensions in feet.**

Dune

**Stage-1**

**Figure-2: sand grains transport mechanism during stage-1 of dune development.**

Dune

**Stage-1**

ϴ1

ϴ3

ϴ2

ϴ1 > ϴ2 > ϴ3

**Figure-3: Larger proppants settle at larger angles and, hence, travels shorter distances during stage-1.**

**Decreasing diameter**

**Figure-4: Anticipated proppants size distribution at the bottom of the fracture slot during stage-1.**

Dune

**Stage-2**

Settling + rolling

**Figure-5: Proppants are transported to stage-2 dune by settling from moving fluid and rolling from preceding dune.**

**Time-0**

**Time-1**

**Time-2**

**Time-3**

**Figure-6: New dune surface developing with steeper slope during stage-2.**

Dune

**Stage-3**

Rolling & suspension with vertical eddies **forming**

**Figure-7: High turbulence flow creating vertical eddies during stage-3.**

Dune

Dune

Dune

**Time = 1**

**Time = 2**

**Time = 3**

**Figure-8: Dune shape transformation during stage-3, red line shows the new curved dune shape.**

**Stage-4**

**Figure-9: transport mechanism during stage-4 showing proppants rolling and saltation.**

**Stage-1**

**Stage-2**

**Stage-3**

**Stage-4**

**Figure-10: 30/70 Brown sand anticipated dune proppants size distribution.**

**Dune height increases with distance (slope of increase declines)**

**Slurry velocity increases with similar trend as dune height (77% increase in velocity)**

**Velocity**

**Dune height**

The increasing slurry velocity reduces the friction effect and proppants settling by providing more drag force to transport proppants.

**257 ft/min**

**145 ft/min**

**20.94 inches**

**21.94 inches**

**Dune**

**Dune**

**Figure-11: The inverse relationship between slurry velocity and friction effect.**