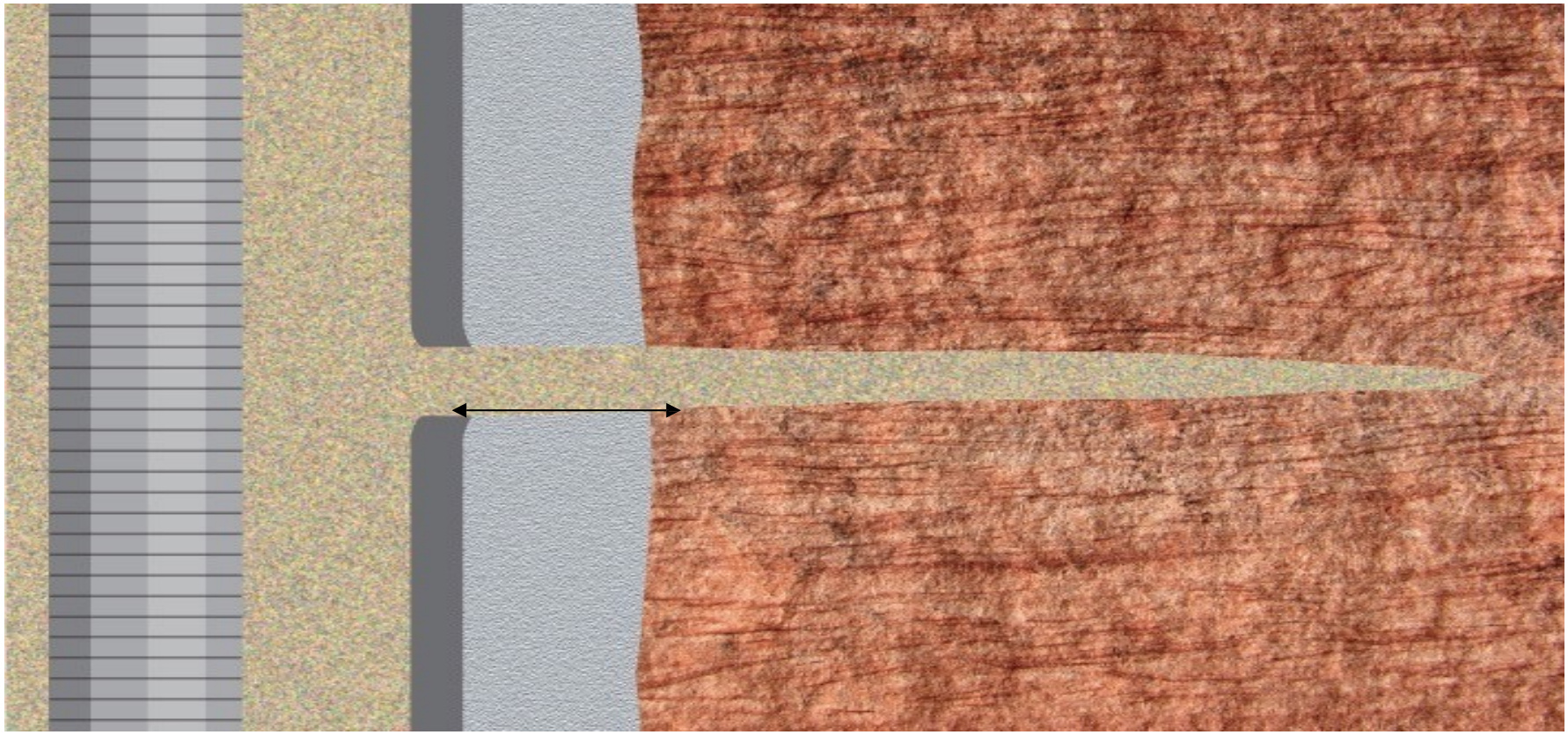
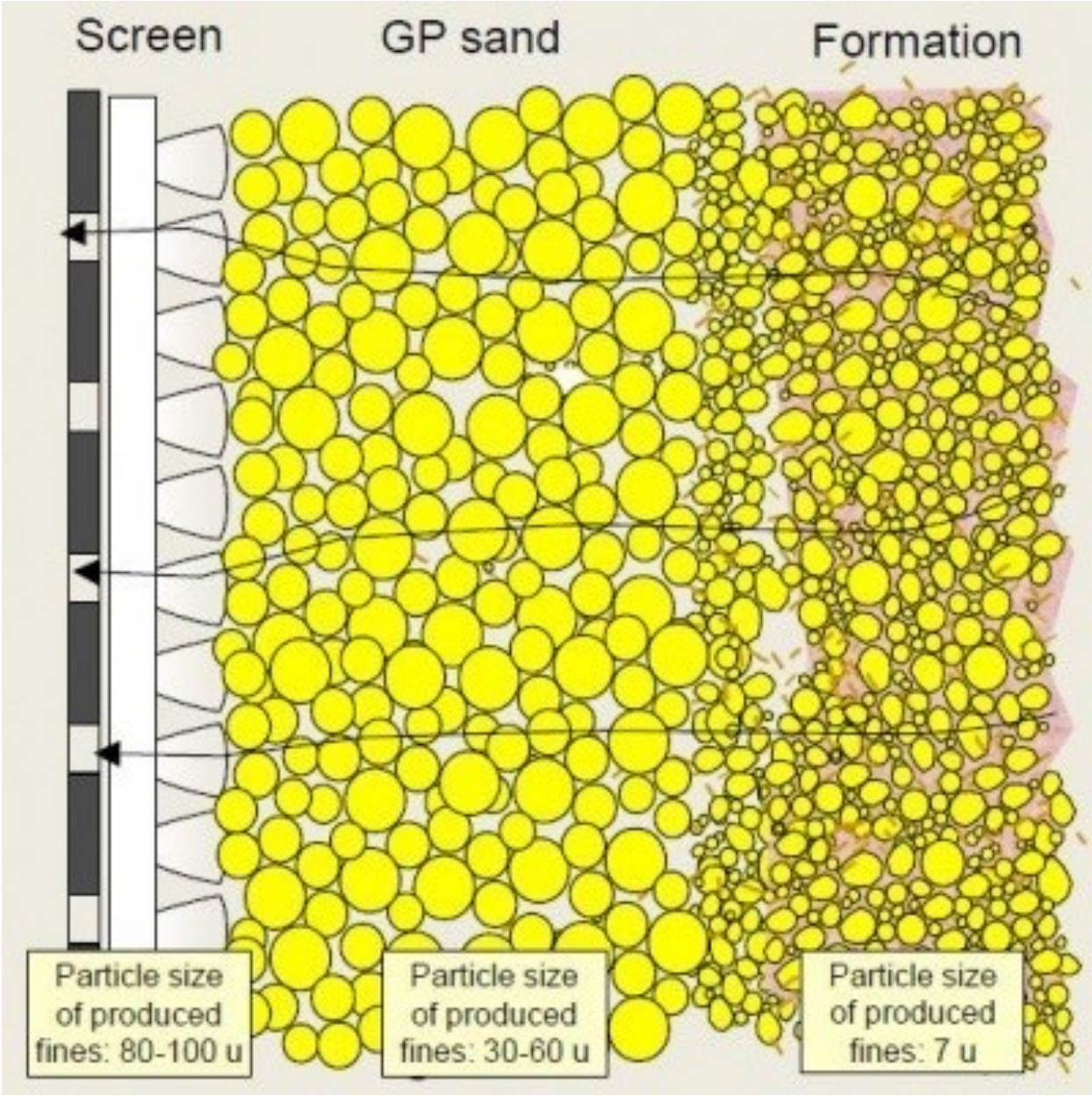
Rig less
***T**hru **T**ubing Sand Control Systems*

The Goal: Pack Perforations with Gravel Pack Proppant

*Note: The Linear Flow Regime of the packed perforation tunnel (from the casing ID to the cement sheath OD) can be the greatest node in gravel pack completions, hence perforation area (hole size vs. shot density) and efficient packing with highly permeable proppant is key to inflow performance goals.



Thru-Tubing Gravel Pack



Premium Screen

Basepipe OD	Basepipe ID	Coupling OD	Outer Shroud OD	Sintered Cloth Opening Size	Tensile Strength	Collapse Strength	Burst Strength
in	in	in	in	microns	lbs	psi	psi
1.315	1.049	1.660	1.700	125	40,000	14,550	1,500
1.660	1.380	2.054	2.050	125	54,000	12,300	1,350
1.900	1.610	2.200	2.300	125	64,000	11,280	1,200
2.063	1.751	2.500	2.450	125	75,000	11,180	1,100

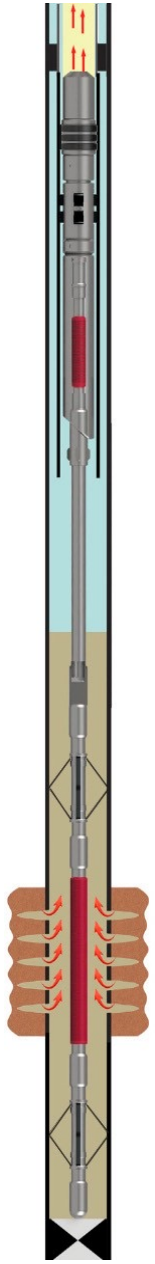
Wireline Gravel-Pack Systems Preferred Methods

- Pump & Place: vent screen with packer isolation
- Pump & Place: vent screen with cement or resin cap isolation
- Surge-Pressure Squeeze Pack

Note: Both “vent screen with packer isolation” and “vent screen with cement or resin cap isolation” systems can be accomplished without pumping services however some compromise on perforation pack efficiency could result.

Wireline Deployed Gravel Pack Systems
Vent Screen with Packer Isolation

- Mechanical packer seals annulus to prevent pack flow back
- Vent screen top lands in production tubing
- Gravel pack proppant is conveyed using a gravel carrier conveyed on wireline (slick or electric)
- Simultaneous injection pressure facilitates perforation-filling and annulus pack integrity
- Carrier runs can be minimized by initially pumping gravel slurry down production tubing from surface
- The following sequence begins after plug back and perforating operations are completed using wireline
- Ideal for mono-bore and conventional configured wells
- Multiple zones with selective-flow options available in common mono-bore sizes



Vent Screen with Packer Isolation: Sequence

Deploy vent screen assembly using slickline or e-line

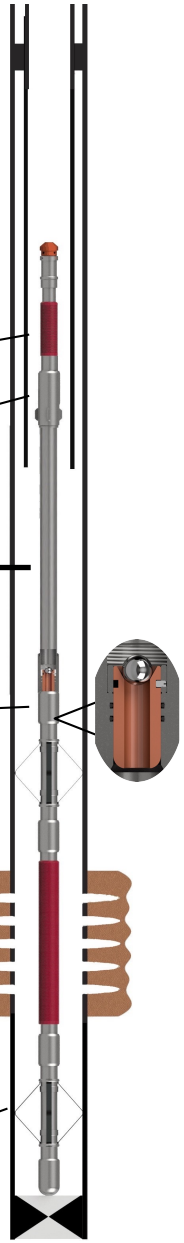
Removable plug

Vent screen w/ sealing receptacle

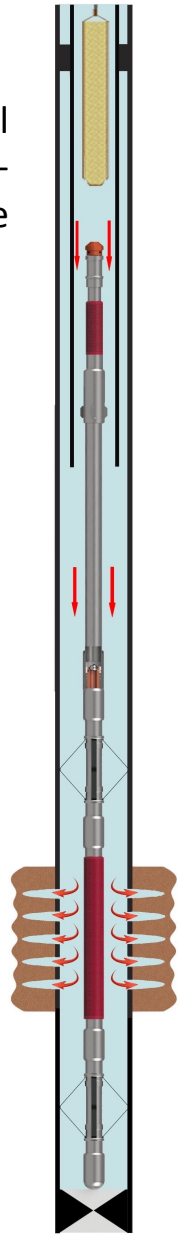
Blank pipe

SHCV

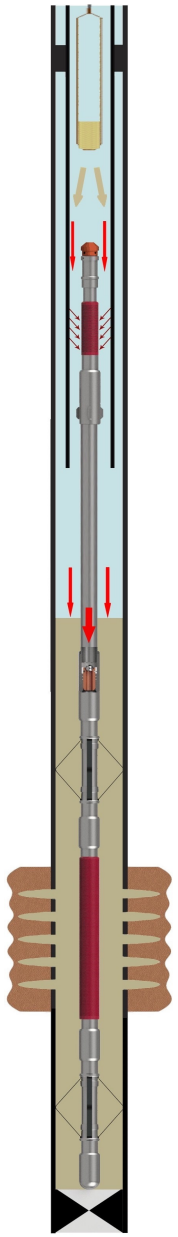
Bow-spring centralizers spaced out across screen assembly



Deploy gravel carrier using slick or e-line



Begin fluid injection down production tubing using surface pumps

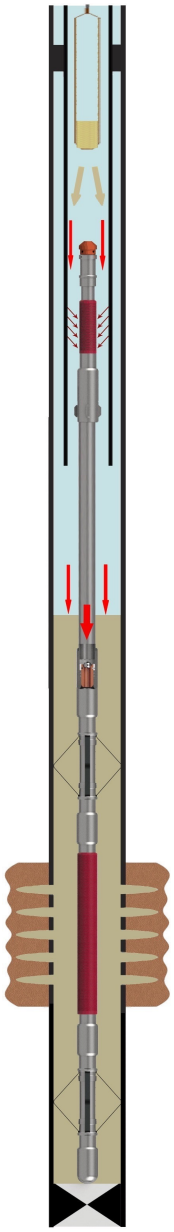


Vent Screen with Packer Isolation: Sequence Cont'd

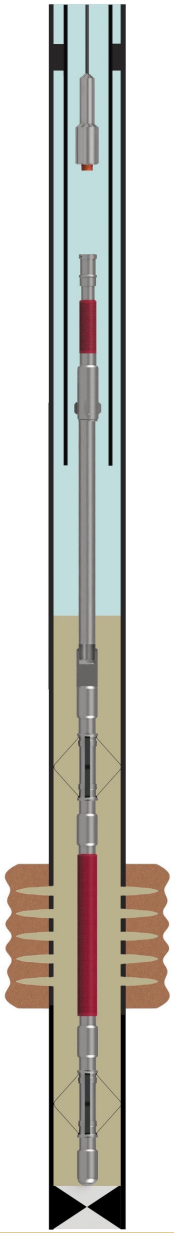
Open proppant carrier while pumped fluid flow from surface carries proppant into perforations and screen annulus.

Repeat process until screen is covered and sufficient proppant is deposited in the blank pipe casing annulus

Fluid injection forces gravel into perforations.

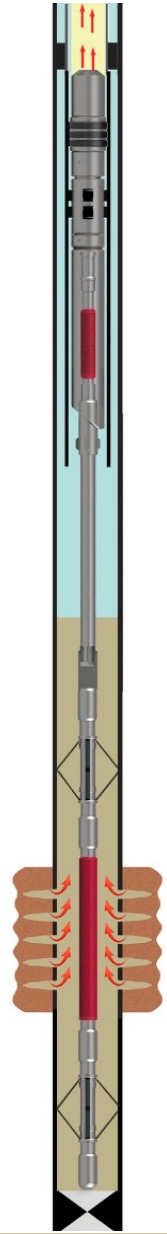


Pull vent plug using slickline allowing access to lower screens and straight through flow



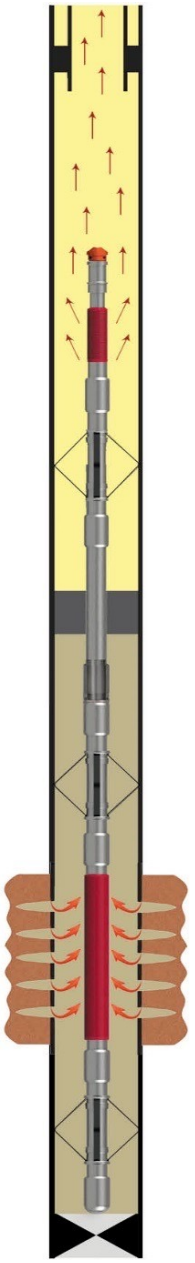
Set packer and produce well

Overshot and packer latch and seal to top of assembly thus isolating and preventing proppant flow back

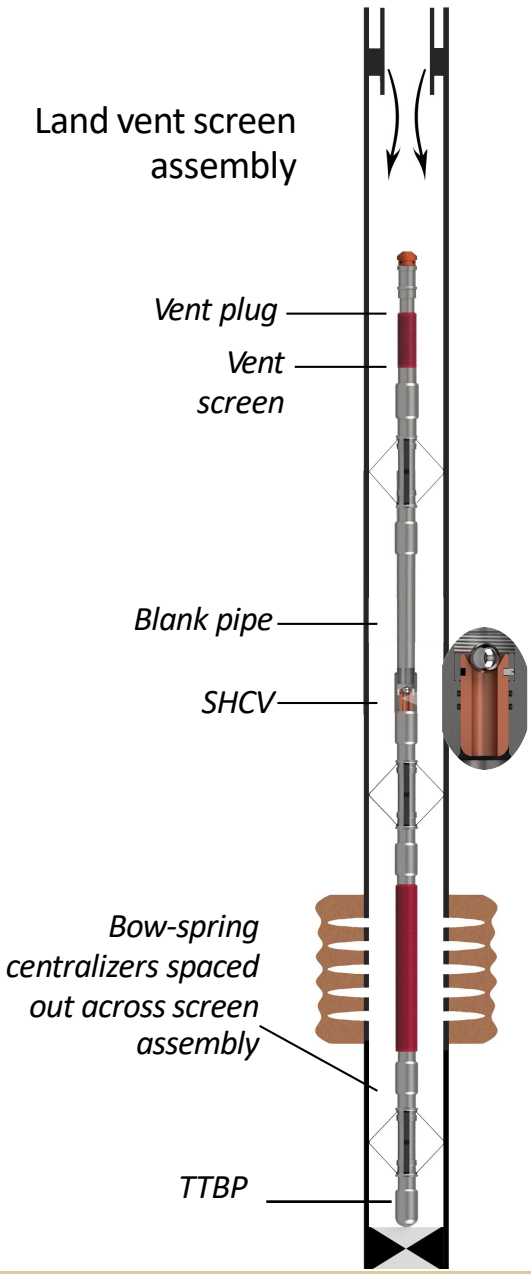


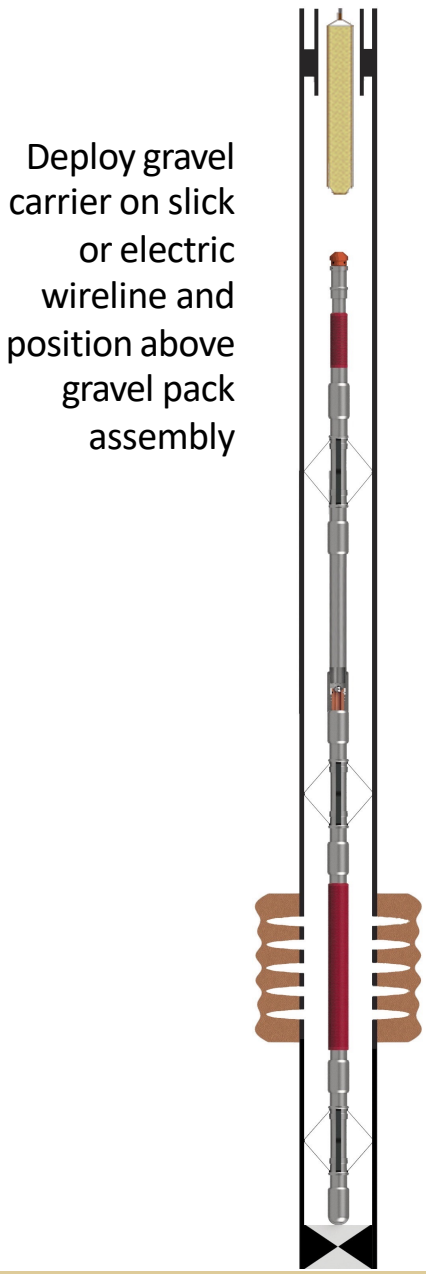
Wireline Deployed Gravel Pack Systems
Vent Screen with Cement Cap Isolation

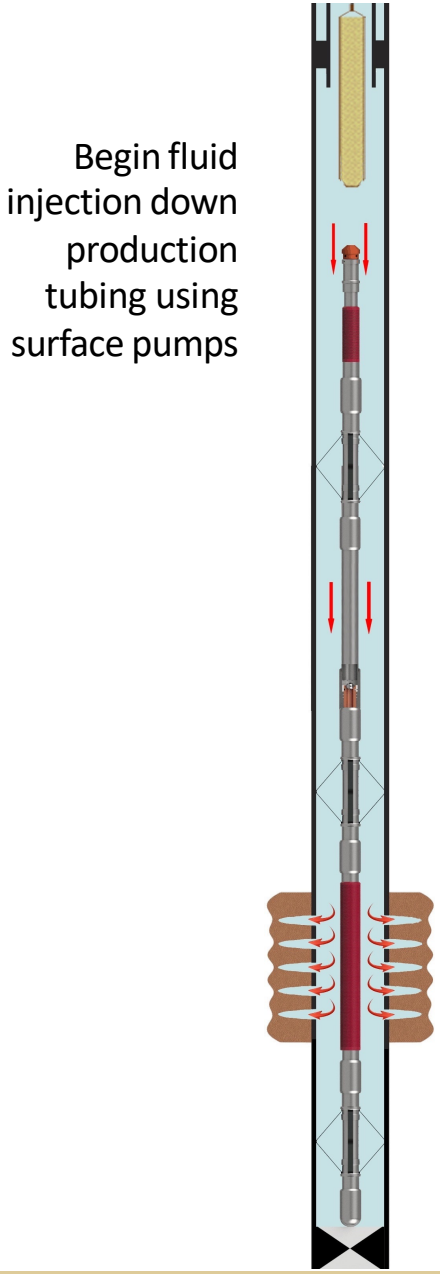
- Well is plugged back using a wireline conveyed thru tubing bridge plug (**TTBP**) set just below perforated interval
- Vent screen gravel pack assembly lands on **TTBP** in casing below production tubing (conveyed on slick or electric wireline)
- Specialized bow spring centralizers assembly off low side of bore hole
- Gravel is transported using slickline conveyed gravel carrier
- Carrier runs can be minimized by pumping partial quantity of gravel slurry
- Permits high-rate displacement of gravel
- Annulus is secured by a cement or resin cap to prevent pack fluidization and proppant flow back
- Short overall assembly length facilitates future wireline plug back completions



Vent Screen with Cement Cap: Sequence





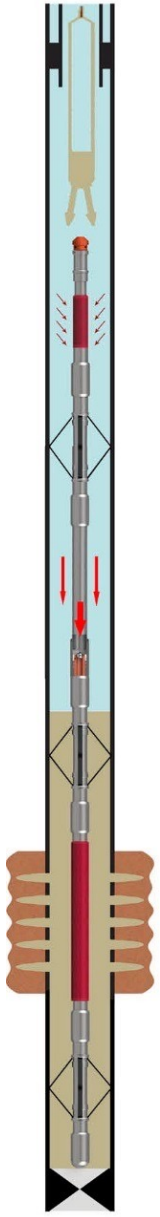


Vent Screen with Cement Cap: Sequence Cont'd

Open proppant carrier while pumped fluid flow from surface carries proppant into perforations and screen annulus.

Repeat process until screen is covered and sufficient proppant is deposited in the blank pipe casing annulus

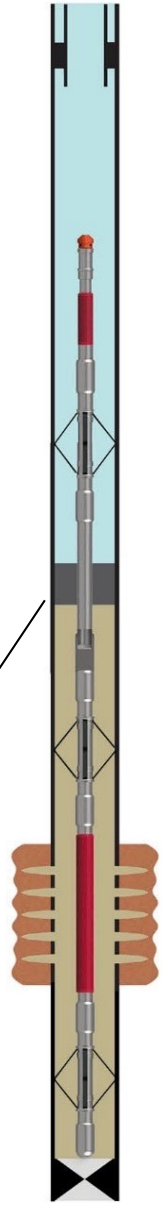
Injection pressure forces gravel into perforations



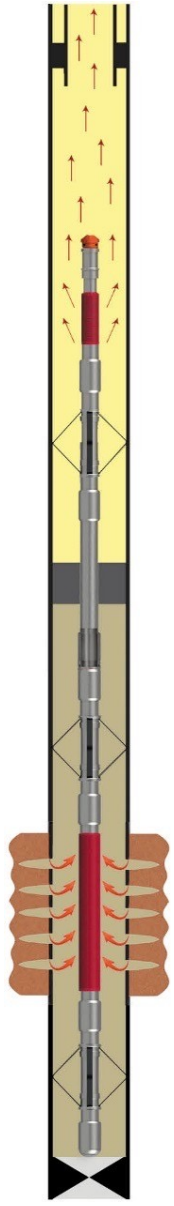
Install cement or resin cap to isolate gravel pack from production

Vent screen top assembly facilitates placement of cement or resin packer using a specialized wireline dump bailer systems or TTS CVDS coil spotting system

Cement cap

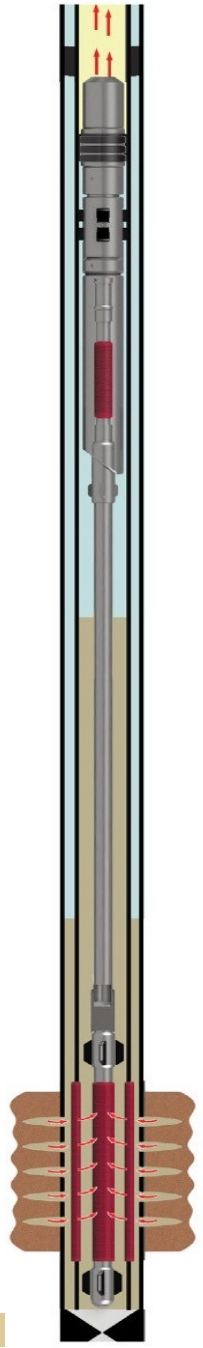


Produce well



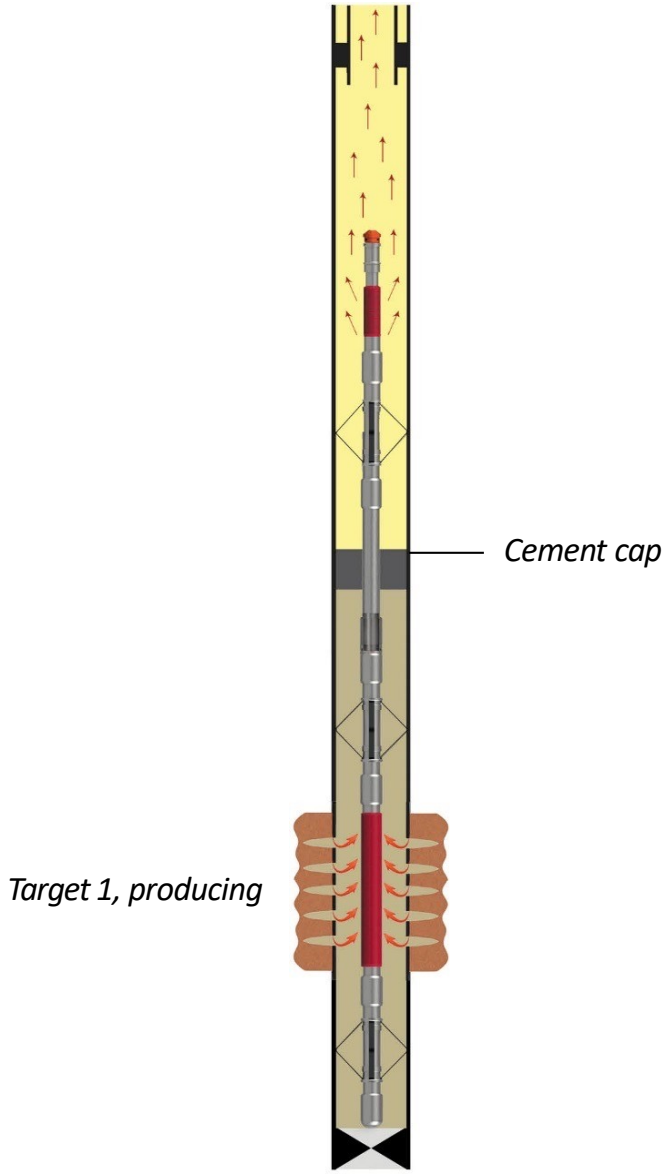
Repair Failed Cased Hole Gravel Pack

- Single trip Circulating or Squeeze Pack on coiled tubing or vent screen deployed on coil tubing or wireline
- Ability to stack system in place
- Proppant placement pumping from surface, through coil tubing or wireline deployed
- Isolation with Paragon Retrievable Packer, High Expansion Permanent Packer or Inflatable Packer
- Process places gravel pack proppant back to perforation tunnels



Conventional Completion: Multiple Plugbacks

Thru-tubing vent-screen gravel packs



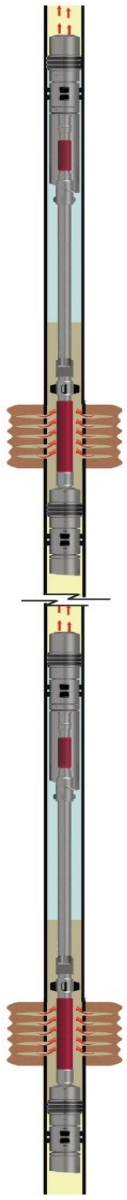
Monobore Multiple Zone Completion

Example: 3 1/2-in, 9.3# tubing

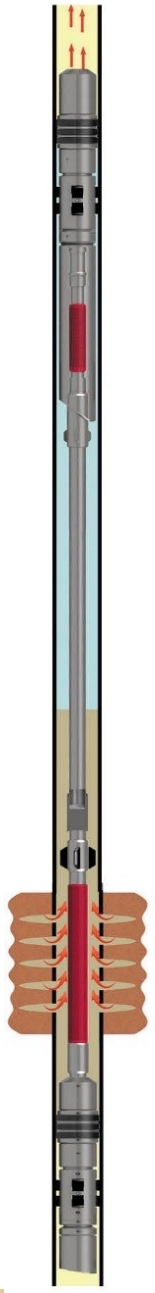
Target 2, flowing

Thru-tubing straddle packer/screen assembly

Target 1, flowing



Larger view



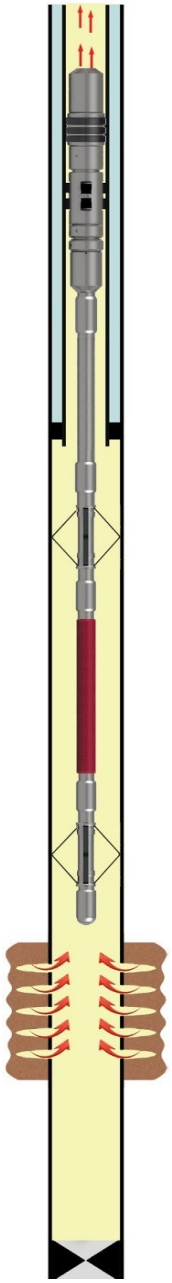
TTS Thru-Tubing Stand Alone Screen Hang-Off

Features/Benefits

- Available for tubing sizes from 2-3/8 to 5-1/2". Most popular sizes are routinely stocked for customer convenience.
- Can be retrieved with coil tubing or slickline in one trip with standard wireline or coil tubing fishing tools. Allows for replacement and repair of failed components.
- Can be deployed in live wells using TTS's multiple-barrier deployment techniques.
  - Retrievable bridge plug deployment (coiled tubing)
  - J-anchor deployment/Stackable **Patent Pending* (slickline/e-line)
  - Proprietary Surface deployment (slick/e-line/specialized BOP systems)
  - Stackable systems for mono-bore wells (slickline/e-line)

Applications

- For use in low to moderate sand producing wells
- Installed as primary sand control in open hole completions
- Installed as primary sand control in horizontal completions



Thank You

Contact us:

PT. DFI Indonesia - Jakarta
Anton Supriyono
Mobile +62 811 158238
anton.supriyono@dfi-fluidics.co.id

Thru Tubing System Asia (TTSA)
Martin Tilbrook
martin.tilbrook@tts-asia.com