

Encapsulated chemical injection system

Improve operational recovery

Applications

- Deployments where capillary lines are set beyond tubing depth
- Geothermal operations
- Systems with the risk of scale build-up around exposed capillary lines

Features and Benefits

- Increases well length exposed to chemical treatment
- Lowers risk of capillary string being lost in well when pulling completion
- Increases capillary overpull by a factor of five
- Permits use of more economical capillary material
- Performs in environments with well temperatures up to 500°F (260°C)
- Deploys via small footprint and lightweight Micro CT equipment
- Maintains greater rigidity than capillary string on deployment

Conventional capillary tubing permits economical in-well delivery of production chemicals. Typically, the capillary tube is strapped externally to the production tubing with chemical delivery close to the tailpipe. On retrieval, a uniform load is passed to the capillary line from the production tubing. In geothermal operations, the production tubing is short and the capillary must be deployed to much greater depths. The deployed capillary is exposed to wellbore conditions of scale buildup. If excess scale is present during a workover, this could result in a parted capillary string. Subsequent fishing operations would be costly and time consuming as multiple fishing runs would be required.

To alleviate this risk, Baker Hughes developed the **encapsulated chemical injection system**, a modified system incorporating an encapsulated capillary tube and a braided cable. The two components are encased together within a polyolefin material measuring 1.1 x 0.5 in. (28 x 14 mm). The encapsulation material is available in several grades with a maximum operating temperature of 550°F (260°C).

Because the capillary tube itself is encapsulated, a lower grade of material can be selected, enhancing system economics. Options exist to run either 0.375 in. or 0.25 in. and cable sizes of 8 or 11 mm.

Because the system is larger than typical capillary systems, modifications were made to the injector heads of the Baker Hughes **Micro CT™ service**, typically used for 0.625- to 1-in. (1.5- to 25-mm) tubing. Additionally, unique termination systems were created including crossover sections on the production tubing that transfer the line from concentric to eccentric/strapped.

Initial deployment of the encapsulated system is via a small injector head, but after the required free-hanging length is released, the system is routed to the outside of the production tubing. The encapsulated capillary is then banded to the production tubing. Deployment is streamlined when the encapsulated capillary is removed—without cutting—from the side of the injector head, which is then removed from the rig floor.

Development of the system increases overpull by a factor of five, enhancing customer confidence in deploying capillary lines where there is a risk of scale buildup.

Another option features the braided cable housing fiber-optic cables to obtain distributed temperature sensing (DTS) or distributed acoustic sensing (DAS) data.

For more information, contact your Baker Hughes representative.