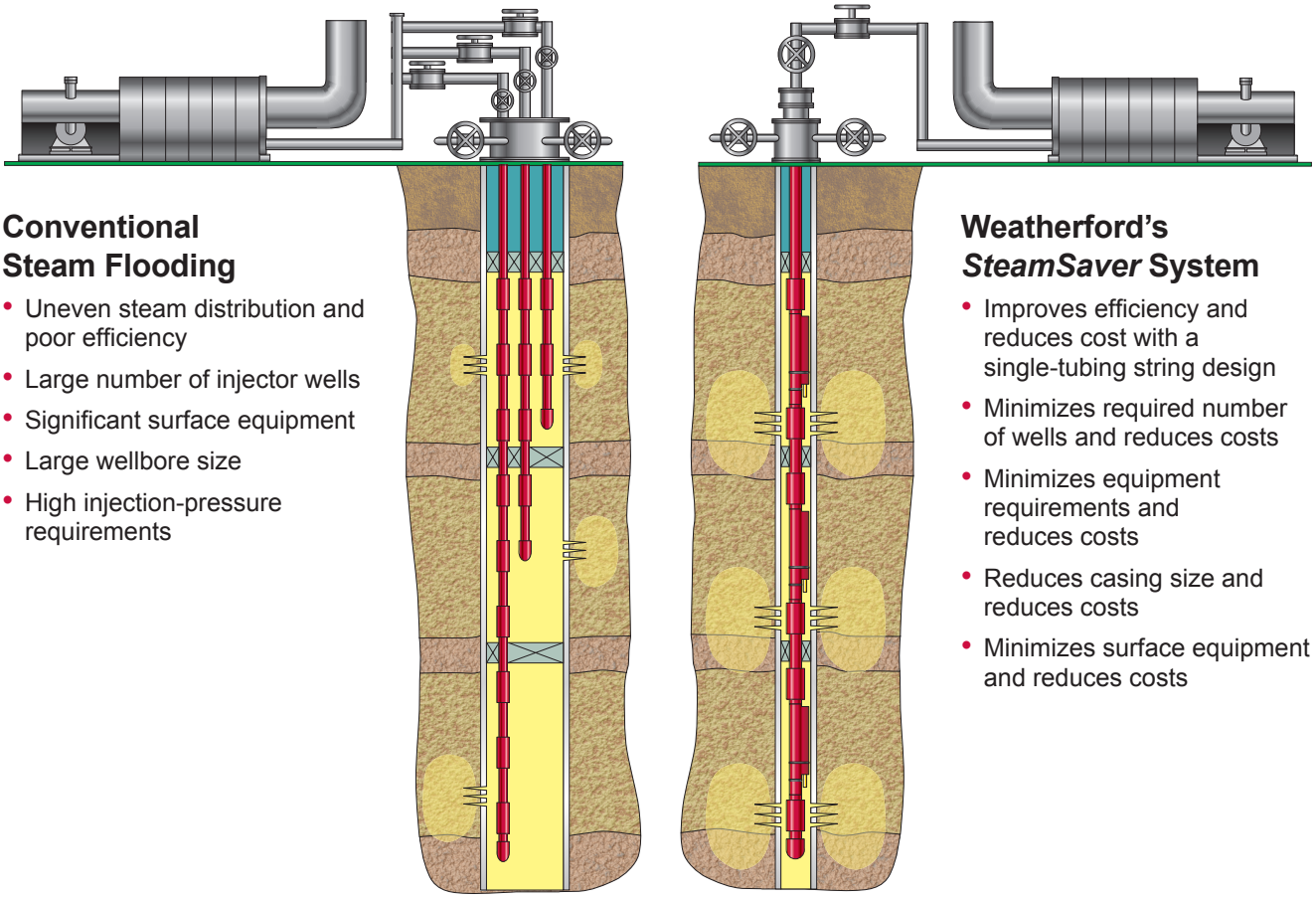
Steam-Injection Equipment

SteamSaver™ Injection System

Simplify well completions. Minimize operational costs. Weatherford's patented *SteamSaver* injection system controls steam rate and enhances steam quality by reducing the number of injection wells and the size of the wellbore. This Weatherford innovation can also potentially reduce the equipment requirement and the surface injection-pressure requirement.

The *SteamSaver* injection system addresses several issues left unresolved with use of traditional steam-flood solutions.



Conventional Steam Flooding

- Uneven steam distribution and poor efficiency
- Large number of injector wells
- Significant surface equipment
- Large wellbore size
- High injection-pressure requirements

Weatherford's *SteamSaver* System

- Improves efficiency and reduces cost with a single-tubing string design
- Minimizes required number of wells and reduces costs
- Minimizes equipment requirements and reduces costs
- Reduces casing size and reduces costs
- Minimizes surface equipment and reduces costs

Features, Advantages and Benefits

- Constant injection volume into multiple zones improves allocation of steam for greater system efficiency and improved recovery.
- System design reduces the quantity of injector wellbores, minimizing completion equipment costs.
- System design reduces hole-size requirements, which allows smaller casing size and minimizes costs.
- In steam-assisted gravity drainage (SAGD) or cyclic steam-injection applications, heat is distributed evenly along horizontal well sections, potentially improving recovery.
- System's potential to minimize required injection pressure at surface can reduce steam-generation costs.

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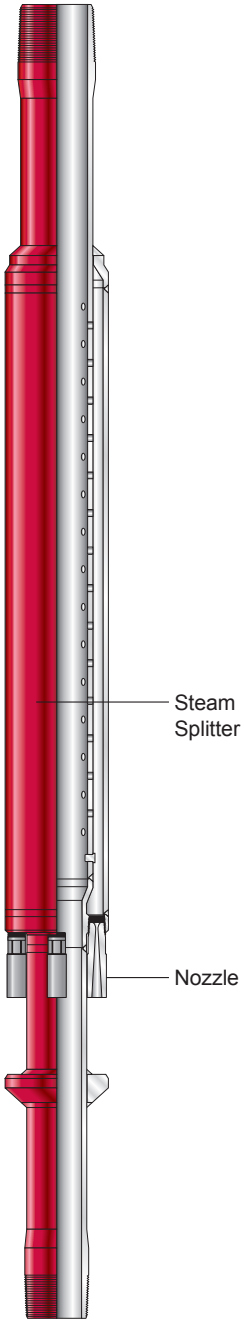
System Components

Steam injection mandrels

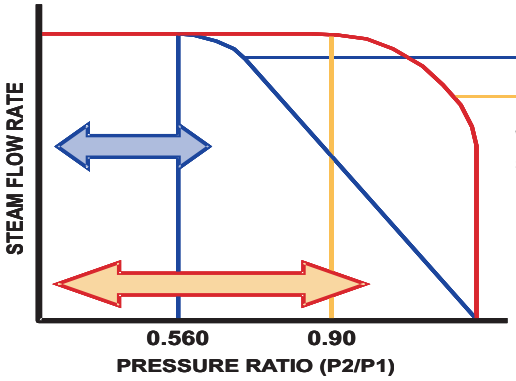
Consist of mandrel, pressure-recovery nozzle, and steam-splitter sleeve.



Surface monitoring equipment

Records injection pressure, injection rate and steam quality.

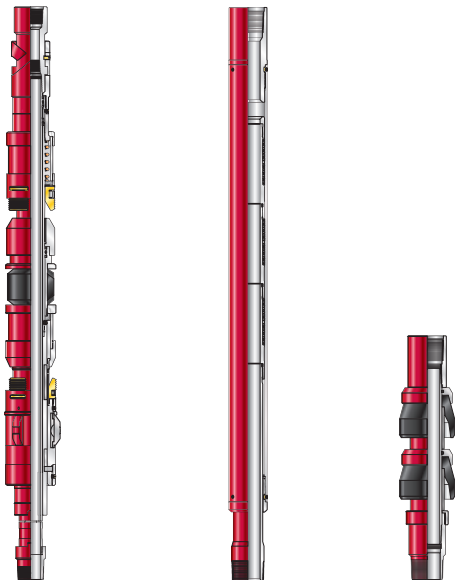
SteamSaver Injection System Performance



Weatherford's *SteamSaver* system achieves a constant rate with less differential.

Isolation packers

Thermal packers with integral expansion joint or thermal-cup packers with separate expansion joints; located between injection zones.



Thermal Packer | Expansion Joint | Cup Packer