

## SET<sup>®</sup> Openhole Liner System

In openhole environments, SET<sup>®</sup> Systems provide a variety of solutions including mitigating risk, adding casing strings, and isolating trouble formations while retaining maximum internal diameter.

Openhole Systems anchor to the bottom of an existing casing string and extend into the unfinished wellbore. The expandable liner is then hydraulically expanded using cold-working process, casing-off the openhole while maintaining maximum hole size. Anchoring is achieved by expanding anchor hanger joints (expandable liner joints with bonded elastomeric bands) inside the base casing. Additional joints can also be run in different sections of the liner to achieve further zonal isolation.

### Field Applications

The first applications of SET Openhole Systems were mostly to mitigate trouble zones such as borehole instabilities and pore-pressure/frac gradient issues in an open wellbore. Today, however, the technology is used in multiple scenarios as part of well architecture. One common use is to strategically place the SET System in the well design in order to slim down the entire wellbore. This can increase the rate of penetration (ROP), maximize recovery, and increase efficiency while reducing overall environmental impact. Other applications include extending reach, preemptively mitigating risk in exploratory drilling, and maximizing recovery in sidetracking operations.



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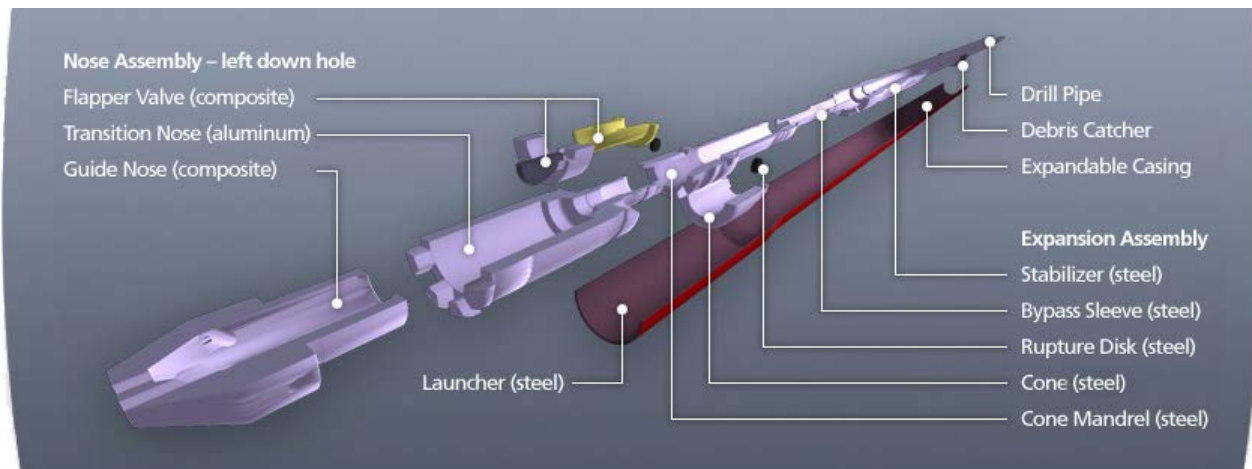
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## Technical Specification and Details

The elastomeric bands on the anchoring joints can be supplied in a variety of compounds to compliment different downhole temperatures, fluids, and internal diameters.

**Maximum Temperature Rating:** 400°F (204°C)

**Drill out Time:** Drill out time can range from <1 hour to 6 hours based on the type of bit utilized, rotation speeds, and weight on bit. The material to be drilled out is made of aluminum and composite material (see illustration below).



**Pressure Ratings:** Collapse and burst pressures are size dependent. Information on each system size is on the SET@ Chart.

**Cementing:** Cement volumes are calculated on whole volume with longer setting times to accommodate the expansion process. The amount of lead and tail cement is calculated then pumped so that the top of the cement is at ~50 percent of the liner length before expansion. As expansion occurs the cement fills the remaining annulus.

**Liner Length:** Liner length is weight dependent and is calculated at the time of design. The longest Openhole System installed to date was a 7-5/8 x 9-5/8 in. system of 6,935 ft. (2,114 m).

## Proven Results

**Challenge:** Reduce field development costs by utilizing SET expandable technology to slim the well profile and reduce overall well costs in a field-wide program.

**Solution:** Incorporate a 6 x 7-5/8 in. Openhole SET@ System into the base well design.

**Value:** Increased rate of penetration by 37% and saved over \$1M per well.

Enventure does not guarantee the accuracy of any well design based upon this tool or any interpretation that this tool may allow or based upon any recommendations that may be given by Enventure's personnel or in any other form. Any user of this tool or the data or designs created by it or by Enventure's personnel agrees that Enventure is not responsible, except where due to Enventure's gross negligence or willful misconduct, for any loss, damages, or expenses resulting from such use.

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