

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION

EXHIBIT NO. 16

CASE NO. 7318

Submitted by Phillips

Hearing Date 7-29-81

EZ Drill® Bridge Plug



EZ Drill®
Bridge Plug

Halliburton's drillable bridge plug, the EZ Drill®, offers improved operating performance at higher temperatures and pressures and faster removal from a well by either rotary or cable tool drilling methods.

It runs in faster, because of the smaller OD of the tool, and drilling out time is significantly faster than comparable products. The new EZ Drill bridge plug has main structural parts composed of controlled cast iron, to enhance uniform drillability.

Important design features include:

- High temperature and pressure sealing element. This consists of a relatively soft rubber center packer between harder rubber rings and expandable metal shoes. The metal shoes expand with the rubber packer, to help prevent extrusion of the packers over the wedges at high pressures and temperatures.
- Smaller tool diameter. The design of the packer element permits the use of smaller tool diameters so that only one tool

is required for a given casing size, regardless of its weight (wall thickness). This design also offers greater clearance with casing ID and, therefore, less danger of premature setting while going in the hole.

- Top drilling. When the top portion of the EZ Drill bridge plug is drilled into, the mandrel opening is penetrated before the upper slips are reached, allowing any pressure buildup from below to bleed off sufficiently and be relieved through the mandrel into the casing. This is an integral feature of the tool's design and does not require an adapter.
- Floating mandrel. The mandrel upon which all external parts are mounted is free to move with pressure. Forces due to well pressures, either from above or below the bridge plug, are thus applied directly to the slips and packer element, causing it to set tighter as pressures increase.
- Junk pusher. The lower end of the EZ Drill bridge plug is made to help prevent cuttings and other debris from fouling the tool slips, to prevent premature setting while going in the hole.
- Quick removal. Each part of the EZ Drill bridge plug is designed for quick removal from the well with either rotary or cable tools, i.e.:
 - A. Material used for each component is selected for the maximum drillability permitted by its strength requirements.
 - B. Wedges, metal shoes and packer element are locked together to help prevent their spinning while being drilled.
 - C. Slips are grooved so that they will be broken up in small pieces, which can be circulated away from the bit. The holding ability of the slips is not impaired.

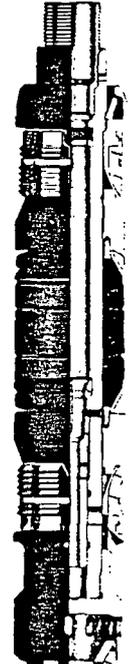
EZ Drill bridge plugs are designed primarily to be set on electrical wire line—or tubular goods with necessary modifications.



EZ Drill® Squeeze Packers



EZ Drill®
Squeeze Packer
with spring loaded
back-pressure valve



EZ Drill SV®
Squeeze Packer
with pressure balanced
sliding valve

Halliburton Services field proven EZ Drill® Squeeze Packers permit faster removal from the well by either rotary or cable tool methods without reduction in operating performance at even elevated temperatures and pressures.

In addition, OD of the tool is less and ID of the tool is greater than comparable products now in use, permitting faster running-in and quicker displacement of fluids at less pressure. Drilling out time is significantly quicker than comparable products.

The EZ Drill squeeze packer contains a spring loaded back pressure valve. The main structural parts of this tool are made of controlled cast iron.

EZ Drill® Packer

(Cont'd)

The EZ Drill SV squeeze packer contains a pressure-balanced sliding valve for control of fluid movement in the well. As with the other type, the main structural parts of this tool are made of controlled cast iron.

DESIGN FEATURES COMMON TO BOTH TYPES INCLUDE:

- High temperature and pressure sealing element. Consists of a relatively soft rubber center packer between harder rubber rings and expandable metal shoes. The metal shoes expand with the rubber packer, help prevent extrusion of the packers over the wedges at high pressures and temperatures.
- Smaller tool diameter. The design of the packer element permits the use of smaller tool diameters, thus less danger of premature setting while going in hole.
- Floating Mandrel. The mandrel upon which all the external parts are mounted is free to move with pressure. Forces due to well pressures, either from above or below the packer, are thus applied directly to the slips and packer element, causing it to set tighter as pressures are increased.
- Junk Pusher. The lower end of EZ Drill® packers is made to help prevent cuttings and other debris from fouling the tool slips, causing premature setting while going in the hole. The "Junk Pusher" is ribbed to provide good anchor in cement to resist the tool's rotation as it is being drilled out.
- Designed for quick removal. Each part of EZ Drill packers is designed for quick removal from the well with either rotary or cable tools, i.e.:

A. The material used for each

component is selected for maximum drillability permitted by its strength requirements.

- B. The wedges, metal shoes and packer element are locked together to prevent their spinning while being drilled.
- C. The slips are grooved so that they will be broken up in small pieces, which can be circulated away from the bit. The holding ability of the slips is not impaired.

Fluid movement through EZ Drill SV® squeeze packers is controlled with a pressure-balanced "Sliding Valve" which replaces the spring-loaded back-pressure valve.

Operated by reciprocation of the tubing, the valve may be opened or closed, as desired, before and after squeeze cementing. Fluid movement through the valve will not affect its position. When the valve is in the up position, the packer is sealed against fluid or gas movement in either direction. When the valve is in the down position, fluid may be pumped through the packer or pressure may be relieved from below it. When the valve is open an unrestricted fluid passage is provided through side ports in the tool. With interlocking valve fingers not exposed to cement slurry, the sliding valve is not likely to be cemented in place.

EZ Drill® and EZ Drill SV® squeeze packers may be set on tubing (drill pipe), electrical wire line, or sand line. They may be converted for use as bridge plugs (no fluid movement in either direction through the tool) before running in the hole.

EZ DRILL® AND EZ DRILL SV® SQUEEZE PACKERS AND EZ DRILL BRIDGE PLUGS

EZ Squeeze Packer Catalog No.	EZ-SV Squeeze Packer Catalog No.	EZ Drill Bridge Plug Catalog No.	RECOMMENDED Csg./Tbg. RANGE		Max. OD of Tool (Inches)	ID Lightest St. Csg./Tbg. To be Set in (Inches)
			Size OD (Inches)	Weight Range (Lbs./Ft.)		
802.303			2½	6.50	2.187	2.441
802.305			3½	5.75—10.20 Non. Up. Tbg. 9.30 EUE Tbg. 7.70	2.69	3.188
802.307			4	11.85-14.0 D.Pipe 11.6 Casing 11.00 EUE Tbg. 9.5 Non. Up. Tbg. 9.25	3.125	3.548
802.309	802.339	803.639	4½	9.5 —13.5	3.66	4.090
	802.338		4½	13.5 —15.1	3.58	3.920
802.311	802.341	803.641	5	11.5 —18	3.97	4.560
802.313	802.343	803.643	5½	13 —23	4.37	5.044
802.319	802.349	803.649	6¾ 7	17 —28 20 —38	5.50 5.50	6.456 6.456
	802.351	803.651	7 7¾	17 —20 20 —39	6.12 6.12	7.125 7.125
	802.353		8¾	24 —49	7.00	8.097
	802.354		9¾	29.3 —53.5	7.75	9.063
	802.357		10¾	32.75—65.7	9.00	10.192
	802.355		11¾	42 —65	9.87	11.084
	802.358		13¾	48 —72	11.68	12.715