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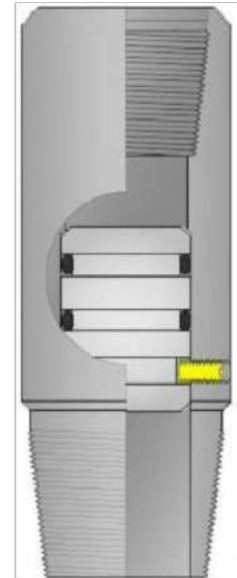
STATE Energy Solutions
www.stateenergysolutions.com





In-line Dissolving Pump-Out Plug (D-POP)

The Dissolving Pump-out Plug is used to form a temporary solid barrier in the tubing string to perform a variety of downhole operations. Once the intended operation is complete, the solid plug is expended from the housing via applied pressure where it dissolves in the wellbore fluids conveniently eliminating potentially troublesome debris in your wellbore. Also available with a Wireline Entry Guide and/or Ball Drop Configuration.



APPLICATION

- Temporary dissolving barrier in the tubing string

BENEFITS

- Low cost
- Wide choice of shear-out pressures
- Provides a tubing plug without a well intervention
- Eliminates interfering debris left in the wellbore

FEATURES

- Adjustable shear value
- Full bore after actuation
- Shouldered housing eliminates stress on shear screws
- Available in standard and premium threads and materials
- Plug coated to protect it from premature dissolution

DESCRIPTION AND OPERATION

The Dissolving Pump-out Plug sub is equipped with double O-rings and a proprietary coating prevent premature degradation. The shear settings are easily adjusted in the field. The housing is attached to the completion assembly and run-in hole. The required setting pressure is applied and held for the time required. The tubing pressure is increased to shear the screws retaining the plug. Once sheared, the solid plug simply falls to the bottom of the well and dissolves in the well fluid, leaving a Full tubing ID.

The Dissolving Pump-out Plug sub accommodates an adjustable shear value.

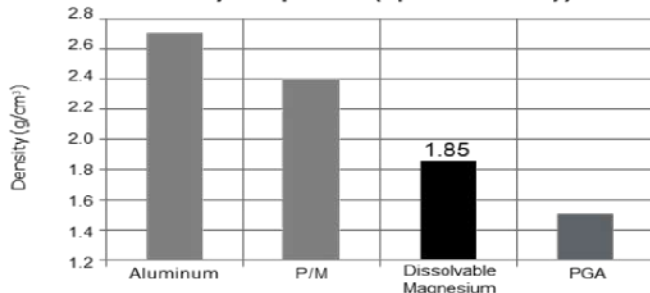
Tubing	Pump-out Plugs			
OD (in. [mm])	Sub Max. OD (in. [mm])	OD of Plug (in. [mm])	ID of Tool After Shear (in. [mm])	Setting Pressure Per Screw (PSI/Screw +/-15%)
2.375 [60.3]	3.068 [77.9]	1.900 [48.26]	1.800 [45.7]	700
2.875 [73.0]	3.668 [93.2]	2.300 [58.42]	2.205 [56.0]	480
3.500 [88.9]	4.500 [114.3]	2.740 [69.85]	2.65 [67.31]	573
4.500 [114.3]	5.563 [141.30]	3.823 [97.10]	3.725 [94.62]	477

Magnesium Alloy Dissolution

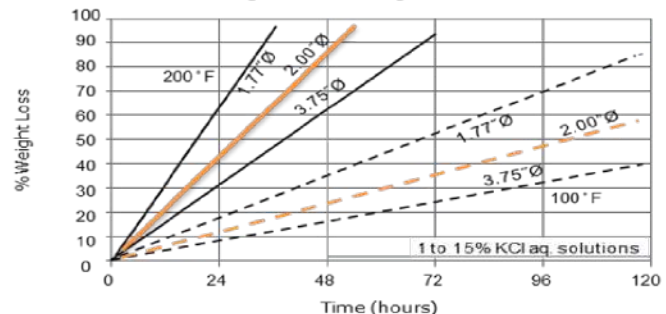
The magnesium alloy has a corrosion rate of 1100 MCD (milligrams/sq cm/day) in 3% KCl solutions at 200F. This high strength magnesium alloy has good ductility. The magnesium alloy needs at least 10,000 ppm chloride ion to corrode actively. To protect the magnesium alloy plug from beginning the dissolution process or corrosion during installation, a specialized coating is applied to the plug.

Magnesium Alloy

Materials density comparison (Specific Gravity)



Dissolvable Magnesium weight loss





Dissolving Pump-Out Plug with Wireline Entry Guide (WD-POP)

The Dissolving Pump-out Plug is used to Form a temporary solid barrier in the tubing string to perform a variety of downhole operations. Once the intended operation is complete, the solid plug is expended from the housing via applied pressure where it dissolves in the wellbore fluids conveniently eliminating potentially troublesome debris in your wellbore. Also available with a **Box by Pin In-Line Configuration** and/or **Ball Drop**.



APPLICATION

- Temporary dissolving barrier in the tubing string

BENEFITS

- Low cost
- Wide choice of shear-out pressures
- Provides a tubing plug without a well intervention
- Eliminates interfering debris left in the wellbore

FEATURES

- Adjustable shear value
- Full bore after actuation
- Shouldered housing eliminates stress on sheer screws
- Available in standard and premium threads and materials
- Plug coated to protect it from premature dissolution

DESCRIPTION AND OPERATION

The Dissolving Pump-out Plug sub is equipped with double O-rings and a proprietary coating prevent premature degradation. The shear settings are easily adjusted in the field. The housing is attached to the completion assembly and run-in hole. The required setting pressure is applied and held for the time required. The tubing pressure is increased to shear the screws retaining the plug. Once sheared, the solid plug simply falls to the bottom of the well and dissolves in the well fluid, leaving a Full tubing ID.

The Dissolving Pump-out Plug sub accommodates an adjustable shear value.

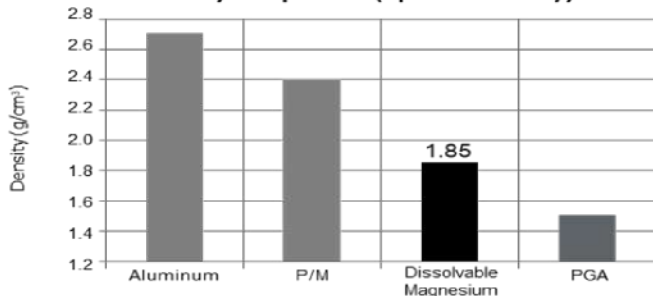
Tubing	Pump-out Plugs			
OD (in. [mm])	Sub Max. OD (in. [mm])	OD of Plug (in. [mm])	ID of Tool After Shear (in. [mm])	Setting Pressure Per Screw (PSI/Screw +/-15%)
2.375 [60.3]	3.068 [77.9]	1.900 [48.26]	1.800 [45.7]	700
2.875 [73.0]	3.668 [93.2]	2.300 [58.42]	2.205 [56.0]	480
3.500 [88.9]	4.500 [114.3]	2.740 [69.85]	2.65 [67.31]	573
4.500 [114.3]	5.563 [141.30]	3.823 [97.10]	3.725 [94.62]	477

Magnesium Alloy Dissolution

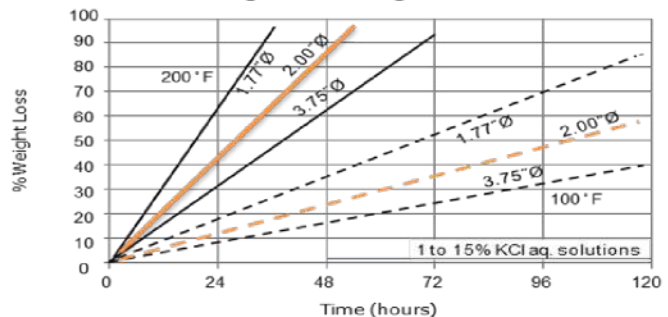
The magnesium alloy has a corrosion rate of 1100 MCD (milligrams/sq cm/day) in 3% KCl solutions at 200F. This high strength magnesium alloy has good ductility. The magnesium alloy needs at least 10,000 ppm chloride ion to corrode actively. To protect the magnesium alloy plug from beginning the dissolution process or corrosion during installation, a specialized coating is applied to the plug.

Magnesium Alloy

Materials density comparison (Specific Gravity)



Dissolvable Magnesium weight loss



Large Bore Dissolving Pump-out Plug (LBD-POP)

The Large Bore Dissolving Pump-out Plug is used to form a temporary barrier in the tubing string to perform a variety of downhole operations and is perfect for Disposal Well Completion applications. The Large Bore Dissolvable Pump-Out Plug restricts fluid and pressure from below until expended with tubing pressure once the intended operation is complete. The fully dissolvable plug is expended from the housing via applied pressure where it dissolves in the wellbore fluids, conveniently eliminating potentially troublesome debris in your wellbore. **Also available in Ball Drop Configuration.**

APPLICATION

- Temporary dissolving barrier in the tubing string

BENEFITS

- Low cost
- Wide choice of shear-out pressures
- Provides a tubing plug without well intervention

FEATURES

- Adjustable shear value
- Full bore after actuation
- Available in standard and premium threads and materials
- Plug coated to protect it from premature dissolution

DESCRIPTION AND OPERATION

The Large Bore Dissolving Pump-out Plug sub comes with a dissolvable pump-out plug which prevents the tubing from filling with fluid in addition to providing a pressure barrier as the equipment runs in-hole. The shear settings are easily adjusted in the field. Once the equipment's required setting pressure is applied and held for the time required for the specific application, the tubing pressure is then increased to shear the screws retaining the plug. Once expended, the plug simply falls to the bottom of the well and dissolves in the well fluid, leaving the pump-out plug housing with a fully open tubing ID.

The Large Bore Dissolving Pump-out Plug sub accommodates an adjustable shear value.



Tubing	Pump-out Plugs			
	Sub Max. OD (in. [mm])	OD of Plug (in. [mm])	ID of Tool After Shear (in. [mm])	Setting Pressure Per Screw (PSI/Screw+15%)
3.500 [88.9]	4.500 [114.3]	3.400 [31.75]	3.460 [87.884]	375
4.500 [114.3]	5.563 [141.30]	3.940 [31.75]	4.000 [101.60]	451

BULLSEYE Pump-out Plug

The **PATENT PENDING SES BULLSEYE Dissolving Pump-out Plug** utilizes a **TWO-PART** system to form a temporary barrier in the tubing string in order to perform a variety of downhole operations including but not limited to hydraulic packer and ESP/PCP installations. Once the intended operation is complete, the inner plug is expended into the wellbore Fluids where it dissolves. The outer shroud remains in the housing and dissolves in place leaving a Full I.D.

APPLICATION

- Ideal For applications with a smaller restriction below the housing
- Two-part temporary dissolving barrier in the tubing string

BENEFITS

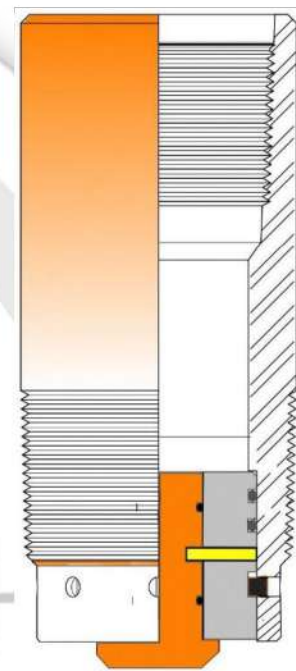
- Low cost
- Wide choice of shear-out pressures
- Provides a tubing plug without a well intervention
- Eliminates interfering debris left in wellbore

FEATURES

- Adjustable shear value
- Shouldered parts eliminate stress on shear screws
- Available in standard and premium threads and materials
- Plugs coated to reduce premature dissolution

DESCRIPTION AND OPERATION

The Bullseye Dissolving Pump-out Plug sub is equipped with double O-rings and a proprietary coating to reduce premature degradation. It utilizes a plug consisting of two dissolvable pieces: an expendable, dissolvable pump-out plug inside of an outer shroud secured in place with stainless steel set screws and is intended to dissolve in place. The shear settings are easily adjusted in the field. During installation, the sub is attached to the completion assembly and run-in hole. The equipment's required setting pressure is applied and held for the time required. The tubing pressure is increased to shear the pins retaining the inner plug. Once sheared, the plug simply falls to the bottom of the well and dissolves in the well Fluid. Then the outer shroud is left in place to dissolve.



Tubing	Housing and Plug Data				
	Sub MAX OD (in. [mm])	MAX OD of Inner Plug (in. [mm])	MIN ID of Tool After Shear (in. [mm])	Total Number of Shear Screws	Shear Pressure (PSI/Screw +/-15%)
2.375 [60.3]	3.063 [77.8]	1.900 [48.26]	1.800[45.72]	6	737
2.875 [73.0]	3.668 [93.2]	2.300 [58.42]	2.200 [55.88]	8	679
3.500 [88.9]	4.313 [109.55]	2.740 [69.6]	2.750 [69.85]	10	637
4.500 [114.3]	5.500 [139.7]				

Dizzolv Solid Dissolvable Balls

The Dizzolv Solid Dissolvable Ball is designed to reduce the amount of time large diameter balls take to dissolve after completion of a wide variety of downhole operations.

The Dizzolv Solid Ball delivers solid performance and corrodes away quickly without using high corrosion rate materials.



Product range

- 0.750" to 5.500" OD machined balls
 - Lifetime 3 – 5 days*
 - Equivalent specific gravity of 1.83
- * Tested in 3% KCl, 200°F, atmospheric pressure

Specifications

- Raw materials tested to int'l specifications
- Corrosion rate according to agreed testing protocol
- Manufactured to aerospace quality standards

Mechanical properties

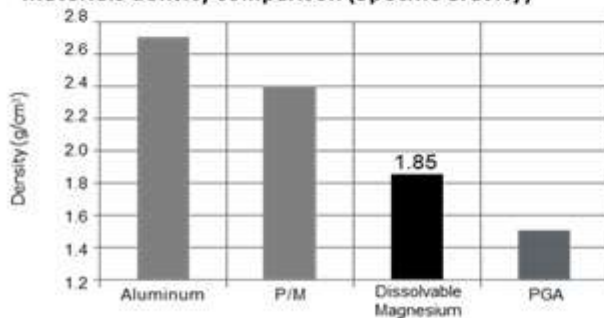
Typical Tensile Properties	Diameter	
	≤4"	>4"
Tensile yield strength (ksi/MPa)	31/210	29/200
Ultimate tensile strength (ksi/MPa)	46/315	45/310
Elongation (%)	19	19
Compressive yield strength (ksi/MPa)	32.5/224	

Raw material corrosion properties (typical):

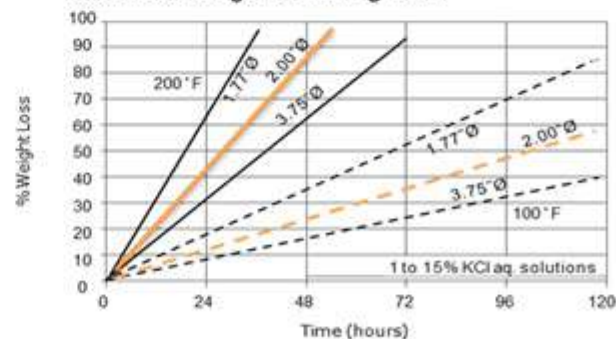
200 °F: 900 - 1300 mg/cm²/day (MCD)
 100 °F: 200 - 400 mg/cm²/day (MCD)

Magnesium Alloy

Materials density comparison (Specific Gravity)



Dissolvable Magnesium weight loss



Aluminum Pump-Out Plug (A-POP)

The Aluminum Pump-out Plug (A-POP) is used to form a temporary barrier in the tubing string to perform a variety of downhole operations. The A-POP restricts fluid and pressure from below until expended with tubing pressure once the intended operation is complete.

Also available in Ball Drop Configuration

APPLICATION

- Temporary barrier in the tubing string

BENEFITS

- Low cost
- Wide choice of shear-out pressures
- Provides a tubing plug without well intervention

FEATURES

- Adjustable shear value
- Full bore after actuation
- Available in standard and premium threads and materials

DESCRIPTION AND OPERATION

The Aluminum Pump-out Plug (A-POP) prevents the tubing from filling with fluid in addition to providing a pressure barrier as the equipment runs in-hole. The shear settings are easily adjusted in the field. Once the equipment's required setting pressure is applied and held for the time required for the specific application, the tubing pressure is then increased to shear the screws retaining the plug. Once expended, the plug simply falls to the bottom of the well, leaving the pump out plug housing with a fully open tubing ID.



Box x Wireline Entry Guide Pump-out Plugs				
Tubing OD (in. [mm])	Sub Max. OD (in. [mm])	OD of Plug (in. [mm])	ID of Tool After Shear (in. [mm])	Setting Pressure Per Screw (PSI/Screw+/15%)
2.385	3.063 [77.8]	1.90 [48.26]	1.80 [45.72]	706
2.875 [114.3]	3.650 [92.71]	2.30 [58.42]	2.25 [57.15]	482
3.500 [88.9]	4.500 [114.3]	3.63 [92.02]	3.60 [91.44]	329

Box x Pin Pump-out Plugs				
Tubing OD (in. [mm])	Sub Max. OD (in. [mm])	OD of Plug (in. [mm])	ID of Tool After Shear (in. [mm])	Setting Pressure Per Screw (PSI/Screw+/15%)
2.385	3.063 [77.8]	1.90 [48.26]	1.80 [45.72]	706
2.875 [114.3]	3.650 [92.71]	2.30 [58.42]	2.25 [57.15]	482
3.500 [88.9]	4.500 [114.3]	2.74 [69.60]	2.75 [69.85]	577



THE mission of STATE Energy Solutions is to always keep a Kingdom perspective as we design and manufacture high-quality, technically innovative products with imagination and originality that are the most cutting-edge, reliable, and cost-effective products for our customers in the Oil & Gas Industry.



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