



# DRILL-WELL™ D244 Fluid Loss Additive (FLA)

DRILL-WELL™ D244 Fluid Loss Additive (FLA) is a proprietary polymeric product used for high temperature high pressure (HTHP) fluid loss (FL) control in oil-based drilling muds (OBM) including mineral, diesel, and synthetic oils. DRILL-WELL™ D244 FLA is a liquid system composed of 40% active ingredients in a diluent mineral oil that is compatible with OBM fluid systems. The product blends easily through a standard mud hopper or may be added at the return pit to ensure even distribution throughout the system. It is recommended this product be bled slowly into an active system for optimum distribution throughout the mud system. DRILL-WELL™ D244 FLA works in both low and high temperature drilling fluids is highly effective at low concentrations and may be added at a mud plant or rig site. The viscosity of the product is quite similar to some oil based drilling mud emulsifiers and should be blended in over a complete circulation depending upon the concentration being added. In addition DRILL-WELL™ D244 FLA also provides for improved electrical stability (ES).

## Advantages:

- Works at low concentrations of 2-4 ppb of liquid to substantially reduce the HTHP fluid loss values
- Supports Yield Point (YP) and low end rheology especially in synthetic drilling fluids
- Provides increased ES as shown in testing @ 150 °F
- Shows good thermal stability in testing to ±176.7 °C (350 °F) for HTHP fluid loss control
- 40% active product in a liquid carrier eliminates the formation of “fisheyes” and ensures maximum utilization of the polymer
- Works better than most other polymeric fluid loss additives sold in the market today
- Works in oil muds of any density
- Mixes easily at the mud plant at ambient temperatures or on the drilling rig with no high shear or heat cycle required
- Is compatible with most other commonly used drilling mud additives
- Is compatible with Drilling Specialties DRILL-WELL™ D294 Flat Rheology Modifier

TABLE I

13.0 ppb, 70/30 OWR Laboratory Mineral OBM test results	Base Mud	DRILL-WELL™ D244 FLA 4.0 ppb	Base Mud	DRILL-WELL™ D244 FLA 4.0 ppb
Post 16 hour Hot Roll	300 °F	300 °F	350 °F	350 °F
HTHP FL @ 148.9 °C (300 °F), ml	4.1	1.6	10	5.6
Yield Point @ 150 °F, lb <sub>f</sub> /100 ft <sup>2</sup>	17	23	10	17
Electrical Stability, volts	499	674	206	659

TABLE II

18.0 ppg, 84/16 OWR Field Mud Invert Diesel OBM test results	Base Mud	DRILL-WELL™ D244 FLA 3.0 ppb
Post 16 hour Hot Roll	300 °F	300 °F
HTHP FL @ 148.9 °C (300 °F), ml	5.2	0.8
Yield Point @ 150 °F, lb <sub>f</sub> /100 ft <sup>2</sup>	13	39
Electrical Stability, volts	499	674

For rheological data of the 2 charts above see Tables [III; IV and V] below

**Table III**

18.0 ppg, 84/16 oil water ratio (OWR) optimized diesel field mud invert (Components mixed in order as listed)	Units	Fluid #1 Initial	Fluid #1 Dynamic	Fluid #2 Initial	Fluid #2 Dynamic
Volume	bbl eqv	1		1	
Mixer			2-Speed Mixer		2-Speed Mixer
			Mix Time		Mix Time
Fluid #1 (Base Mud)	bbl	1.0	15 min.	0.991	15 min.
DRILL-WELL™ D244 FLA Polymer	ppb	-	-	3.0	5 min.

***Fluid Properties***

Sample	Units	Fluid #1 Initial	Fluid #1 Dynamic	Fluid #2 Initial	Fluid #2 Dynamic
Fluids Aged		Initial	Dynamic	Initial	Dynamic
Fluids Aged	Hrs.	-	16	-	16
Temp. Aged	° F	-	300	-	300
Density	ppg	18.0	18.0	18.0	18.0
Oil Water Ratio (OWR)	%	84/16	84/16	84/16	84/16
Rheology Measured	° F	150	150	150	150
600	rpm	142	157	166	159
300	rpm	79	85	96	99
200	rpm	57	59	68	73
100	rpm	33	32	39	44
6	rpm	7	5	6	7
3	rpm	5	3	5	5
Gel Strengths (10s/10m/30m)	lb <sub>f</sub> /100 ft <sup>2</sup>	9/20/22	5/19/23	9/34/39	6/21/27
Apparent Viscosity	cPs	71	78.5	83	79.5
Plastic Viscosity (PV)	cPs	63	72	70	60
Yield Point	lb <sub>f</sub> /100 ft <sup>2</sup>	16	13	26	39
Solids	vol. %	36.5	36.5	36.5	36.5
Water	vol. %	10.5	10.5	10.5	10.5
Oil	vol. %	53.0	53.0	53.0	53.0
Electrical Stability	volts	468	487	539	526
HTHP Fluid Loss temperature	° F	-	300	-	300
	ml/30 min	-	2.6	-	0.4
HTHP Fluid Loss value	ml x 2	-	5.2	-	0.8
Filter cake thickness	mm	-	4.06	-	2.67

**Table IV**  
**Mineral Oil Base Drilling Fluid Test Results Base Mud**

Fluid (Components mixed in order as listed)	Units	Fluid #1 Base Mud 1 bbl. eqv.
<b>Fluid Type</b>		Mineral Oil Base Drilling Mud
Escaid® 110 Oil	bbl	0.520
Organophillic Clay	ppb	6.0
Lime	ppb	4.0
Emulsifier	ppb	8.0
Wetting Agent	ppb	2.0
Gilsonite® <sup>1</sup>	ppb	5.0
*Tapwater	bbl	0.219
*CaCl <sub>2</sub> (95%)	ppb	27.4
Barite	ppb	269.4
Rev Dust	ppb	15.0

Fluid mixed 30 min. on Dispersator Mixer then sheared on Silverson Mixer @ 7000 rpm to 57 °C (135 °F)

\*26% wt. CaCl<sub>2</sub> brine mixed prior to introduction into the fluid.

1. Registered trademark of American Gilsonite Company Corporation Oklahoma

**Fluid Properties on the base mud**

Sample	Units			
<b>Fluids Aged</b>		Initial	Hot Roll	Hot Roll
Fluids Aged	Hours	-	16	16
Temp. Aged	° F	-	300	350
Density	ppg	13.0	13.0	13.0
Rheology Measured	° F	150	150	150
Oil/Water Ratio (OWR)		70/30	70/30	70/30
600	rpm	69	61	72
300	rpm	43	39	41
200	rpm	33	28	30
100	rpm	23	18	17
6	rpm	9	6	3
3	rpm	8	5	2
Gel Strengths, (10s/10m/30m)	lb <sub>f</sub> /100 ft <sup>2</sup>	10/16/16	8/12/12	3/8/9
Apparent Viscosity	cPs	34.5	30.5	36
Plastic Viscosity	cPs	26	22	31
Yield Point	lb <sub>f</sub> /100 ft <sup>2</sup>	17	17	10
Electrical Stability @ 65.6 °C (150 °F)	volts	596	499	206
HTHP Fluid Loss	° F	-	300	350
Delta Pressure	psi	-	500	500
	ml/30 min	-	2.05	9.6
HTHP FL value	ml X 2	-	4.1	19.2*
<b>*Poor quality filter cake, severe barite settling observed!</b>				

**Table V**  
**Mineral Oil Base Drilling Fluids Test Results Treated Mud**

Fluid (Components mixed in order as listed)	Units	Fluid #2 Base Mud	Fluid #2 176.7 °C (350 °F) Hot Roll*	Fluid #2 204.4 °C (400 °F) Hot Roll**
Base Mud (Fluid #1)	bbl eqv	1.0	1.0	1.0
DRILL-WELL™ D244 FLA (1/1 wt. % blend with Escaid® 110)	ppb	4.0	4.0	4.0

Additives initially mixed in fluid for 15 min. on Hamilton Beach (HB) Mixer. Post aged fluids mixed 5 min. on HB mixer

**Fluid Properties of the base mud treated with DRILL-WELL™ D244 polymeric fluid loss additive**

Sample	Units			
<b>Fluids Aged</b>		Hot Roll	Hot Roll	Hot Roll
<b>Fluids Aged</b>	Hrs.	16	16	16
<b>Temp. Aged</b>	° F	300	350	400
<b>Density</b>	ppg	13.0	13.0	13.0
<b>Rheology Measured</b>	° F	150	150	150
<b>Oil/Water Ratio</b>		70/30	70/30	70/30
<b>600</b>	rpm	79	81	54
<b>300</b>	rpm	51	49	28
<b>200</b>	rpm	40	38	21
<b>100</b>	rpm	28	25	12
<b>6</b>	rpm	13	7	3
<b>3</b>	rpm	12	6	2
<b>Gel Strengths, (10s/10m/30m)</b>	lb <sub>f</sub> /100 ft <sup>2</sup>	19/39/41	10/29/33	2/3/3
<b>Apparent Viscosity</b>	cPs	39.5	40.5	27
<b>Plastic Viscosity</b>	cPs	28	32	26
<b>Yield Point</b>	lb <sub>f</sub> /100 ft <sup>2</sup>	23	17	2
<b>Electrical Stability</b>	volts	674	659	190
<b>HTHP Fluid Loss</b>	° F	300	350	400
<b>Delta Pressure</b>	psi	500	500	500
	ml/30 min	0.8	2.8	-
<b>HTHP Fluid Loss Value</b>	ml X 2	1.6	5.6	No Control

**\* DRILL-WELL™ D244 FLA: 176.7 °C (350 °F) Results ~ Summary**

- The addition of 4 ppb DRILL-WELL™ D244 FLA stabilized the base fluid when the fluid was hot rolled for 16 hours at 176.7 °C (350 °F)
- The addition of 4 ppb of DRILL-WELL™ D244 FLA lowered the fluid's HTHP fluid loss value at 176.7 °C (350 °F) by 71% after the fluid was hot rolled for 16 hours at 176.7 °C (350 °F). Base fluids HTHP fluid loss value at 176.7 °C (350 °F) = 19.2 ml. Base fluid plus 4 ppb DRILL-WELL™ D244 244 FLA HTHP value at 176.7 °C (350 °F) = 5.6 ml.
- The 4 ppb DRILL-WELL™ D244 FLA addition increased the fluid's rheology @ 65.6 °C (150 °F) after hot rolling at 176.7 °C (350 °F) for 16 hrs.  
Base fluid: Yield Point = 10 lb<sub>f</sub>/100 ft<sup>2</sup>, 6 rpm = 3, 3 rpm = 2, Gel Strengths = 3/8/9 lb<sub>f</sub>/100 ft<sup>2</sup>  
Base + 4 ppb DRILL-WELL™ D244 FLA: Yield Point = 17 lb<sub>f</sub>/100 ft<sup>2</sup>, 6 rpm = 7, 3 rpm = 6, Gel Strengths = 10/29/33 lb<sub>f</sub>/100 ft<sup>2</sup>
- The 4 ppb DRILL-WELL™ D244 FLA addition increased the fluid's emulsion stability @ 65.6 °C (150 °F) after hot rolling at 176.7 °C (350 °F) for 16 hours. (Base fluid Emulsion Stability = 206 volts, Base + 4 ppb DRILL-WELL™ D244 FLA = 659 volts)

**\*\* DRILL-WELL™ D244 FLA: 204.4 °C (400 °F) Results ~ Summary**

- The addition of 4 ppb DRILL-WELL™ D244 FLA to the base fluid did not stabilize the fluid when the fluid was hot rolled for 16 hours at 400 °F. A reformulation of the fluid for higher temperatures is needed to better see how DRILL-WELL™ D244 FLA preforms at these temperatures.

**Table VI**  
**HTHP Fluid Loss: DRILL-WELL™ D244 FLA Polymer Dosage Study in Diesel OBM**

<b>Oil Based Mud: Comparison of DRILL-WELL™ D244 FLA dosage on HTHP fluid loss in diesel fuel. OBM formulation is described in reference *1 below. DRILL-WELL™ D244 FLA is a 40% active product &amp; numbers reflect the liquid product!</b>						
	<b>Control</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
<b>Diesel OBM Control</b>	428g	428g	428g	428g	428g	428g
+						
<b>DRILL-WELL™ D244 FLA</b>	-----	1 lbb	-----	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	2.0 lbb	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	3.0 lbb	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	-----	5.0 lbb	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	-----	-----	6.0 lbb
	20.0 ml	22.0 ml	21.0 ml	19.8 ml	4.6 ml	4.4 ml
	HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2					

\*1 Diesel OBM preparation via recipe: #2 Diesel 2120g, Lime 75g, VG-69\* organophillic clay 87.5g, Invermul® surfactant 75g, Ezmul® emulsifier 75g, 30% CaCl<sub>2</sub> brine 815g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 208g Diesel OBM, 212g barite, 8g API clay and various amounts of 40% active DRILL-WELL™ D244 FLA polymer were mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 300 °F for 16 hours. VG-69\* is a product of M-I SWACO; Invermul® and Ezmul® are products of Baroid Drilling Fluids/Halliburton.

**Table VII**  
**HTHP Fluid Loss: DRILL-WELL™ D244 244 FLA Dosage Study in Escaid® 110 OBM**

<b>Oil Based Mud: Comparison of DRILL-WELL™ D244 FLA dosage on HTHP fluid loss in Escaid® 110. [OBM formulation is described in reference*1 below.] DRILL-WELL™ D244 FLA is a 40% active product &amp; numbers reflect the liquid product!</b>						
	<b>Control</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
<b>Escaid® OBM Control</b>	428g	428g	428g	428g	428g	428g
+						
<b>DRILL-WELL™ D244 FLA</b>	-----	1.0 lbb	-----	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	2.0 lbb	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	3.0 lbb	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	-----	5.0 lbb	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	-----	-----	6.0 lbb
	20.5 ml	15.5 ml	15.2 ml	6.5 ml	5.4 ml	4.2 ml
	HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2					

\*1 Escaid® 110 OBM preparation via recipe: Escaid® 110 2120g, Lime 75g, VG-69\* organophillic clay 87.5g, Invermul® surfactant 75g, Ezmul® emulsifier 75g, 30% CaCl<sub>2</sub> brine 815g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 208g Escaid® 110 OBM, 212g barite, 8g API clay and various amounts of 40% active DRILL-WELL™ D244 FLA polymer were mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 300 °F for 16 hours. Escaid® 110 oil is a product of Exxon Chemical. VG-69\* is a product of M-I SWACO; Invermul® and Ezmul® are products of Baroid Drilling Fluids/Halliburton.

**Table VIII**

**HTHP Fluid Loss: DRILL-WELL™ D244 FLA Dosage Study in Isomerized Olefin 15/18 OBM**

<b>Oil Based Mud: Comparison of DRILL-WELL™ D244 FLA dosage on HTHP fluid loss in IO 15/18 OBM. [OBM formulation is described in reference *1 below.] DRILL-WELL™ D244 FLA is a 40% active product and numbers reflect the liquid product!</b>						
	Control	(1)	(2)	(3)	(4)	(5)
IO 15/18 OBM Control	444g	444g	444g	444g	444g	444g
+						
DRILL-WELL™ D244 FLA	-----	1.0 lbb	-----	-----	-----	-----
DRILL-WELL™ D244 FLA	-----	-----	2.0 lbb	-----	-----	-----
DRILL-WELL™ D244 FLA	-----	-----	-----	3.0 lbb	-----	-----
DRILL-WELL™ D244 FLA	-----	-----	-----	-----	4.0 lbb	-----
DRILL-WELL™ D244 FLA	-----	-----	-----	-----	-----	6.0 lbb
	16.6 ml	14.0 ml	9.6 ml	5.8 ml	4.2 ml	4.6 ml
HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2						

\*1 IO 15/18 OBM preparation via recipe: IO 15/18 1548g, Lime 60g, VG-69\* organophillic clay 60g, Suremul® surfactant 80g, Suremod® surfactant 20g, 30% CaCl<sub>2</sub> brine 944g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 215g IO 1518 OBM, 220g barite, 9g API clay and various amounts of 40% active DRILL-WELL™ D244 FLA polymer were mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 148.9 °C (300 °F) for 16 hours. VG-69\*; Suremul\* and Suremod\* are products of M-I SWACO.

**Table IX**

**HTHP Fluid Loss: DRILL-WELL™ D244 FLA VS Pliolite® Dosage Study in Diesel OBM**

<b>Oil Based Mud: Comparison of DRILL-WELL™ D244 FLA dosage on HTHP fluid loss in diesel fuel. [OBM formulation is described in reference *1 below.] DRILL-WELL™ D244 FLA is a 40% active liquid product; Pliolite® is 100% active dry</b>							
	Control	(1)	(2)	(3)	(4)	(5)	(6)
Diesel OBM Control	428g	428g	428g	428g	428g	428g	428g
+							
Pliolite®	-----	1 lbb	-----	-----	-----	-----	-----
DRILL-WELL™ D244 FLA	-----	-----	2.0 lbb	-----	-----	-----	-----
Pliolite®	-----	-----	-----	2.0 lbb	-----	-----	-----
DRILL-WELL™ D244 FLA	-----	-----	-----	-----	5.0 lbb	-----	-----
Pliolite®	-----	-----	-----	-----	-----	3.0 lbb	-----
DRILL-WELL™ D244 FLA							6.0 lbb
	20.0 ml	12.8 ml	21.0 ml	5.7 ml	4.6 ml	4.9 ml	4.4 ml
HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2							

\*1 Diesel OBM preparation via recipe: #2 Diesel 2120g, Lime 75g, VG-69\* organophillic clay 87.5g, Invermul® surfactant 75g, Ezmul® emulsifier 75g, 30% CaCl<sub>2</sub> brine 815g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 208g Diesel OBM, 212g barite, 8g API clay and various amounts of 40% active DRILL-WELL™ D244 FLA polymer were mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 148.9 °C (300 °F) for 16 hours. Pliolite® polymer was added as a dry 100% active material. Pliolite® is a product of Eliokem. VG-69\* is a product of M-I SWACO; Invermul® and Ezmul® are products of Baroid Drilling Fluids/Halliburton.

**Table X****HTHP Fluid Loss: DRILL-WELL™ D244 FLA VS Pliolite® Polymer Dosage Study in Escaid® 110 OBM**

<b>Oil Based Mud: Comparison of D 244 FLA dosage on HTHP fluid loss in Escaid® 110. [OBM formulation is described in reference *1 below.] <i>D 244 FLA is a 40% active liquid product; Pliolite® is 100% active dry</i></b>							
	Control	(1)	(2)	(3)	(4)	(5)	(6)
<b>Escaid® OBM Control</b>	428g	428g	428g	428g	428g	428g	428g
<b>+</b>							
<b>Pliolite®</b>	-----	1 lbb	-----	-----	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	2.0 lbb	-----	-----	-----	-----
<b>Pliolite® polymer</b>	-----	-----	-----	2.0 lbb	-----	-----	-----
<b>DRILL-WELL™ D244</b>	-----	-----	-----	-----	5.0 lbb	-----	-----
<b>Pliolite®</b>	-----	-----	-----	-----	-----	3.0 lbb	-----
<b>DRILL-WELL™ D244 FLA</b>							6.0 lbb
	20.0 ml	14.7 ml	15.2 ml	11.0 ml	5.4 ml	6.9 ml	4.2ml
	HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2						

\*1 Escaid® 110 OBM preparation via recipe: Escaid® 110 2120g, Lime 75g, VG-69\* organophillic clay 87.5g, Invermul® surfactant 75g, Ezmul® emulsifier 75g, 30% CaCl<sub>2</sub> brine 815g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 208g Escaid® 110 OBM, 212g barite, 8g API clay and various amounts of 40% active DRILL-WELL™ D244 FLA polymer was mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 148.9 °C (300 °F) for 16 hours. Pliolite® polymer was added as a dry 100% active dry material. Pliolite® is a product of Eliokem. Escaid® 110 oil is a product of Exxon Chemical. VG-69\* is a product of M-I SWACO; Invermul® and Ezmul® are products of Baroid Drilling Fluids/Halliburton.

**Table XI****HTHP Fluid Loss: DRILL-WELL™ D244 FLA VS Pliolite® Polymer Dosage Study in Isomerized Olefin 15/18 OBM**

<b>Oil Based Mud: Comparison of DRILL-WELL™ D244 FLA dosage on HTHP fluid loss in IO 15/18 OBM. [OBM formulation is described in reference *1 below.] <i>DRILL-WELL™ D244 FLA is a 40% active liquid product; Pliolite® is 100% active dry</i></b>							
	Control	(1)	(2)	(3)	(4)	(5)	(6)
<b>IO 15/18 OBM Control</b>	428g	428g	428g	428g	428g	428g	428g
<b>+</b>							
<b>Pliolite®</b>	-----	1 lbb	-----	-----	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	2.0 lbb	-----	-----	-----	-----
<b>Pliolite®</b>	-----	-----	-----	2.0 lbb	-----	-----	-----
<b>DRILL-WELL™ D244 FLA</b>	-----	-----	-----	-----	4.0 lbb	-----	-----
<b>Pliolite®</b>	-----	-----	-----	-----	-----	3.0 lbb	-----
<b>DRILL-WELL™ D244 FLA</b>							6.0 lbb
	20.0 ml	9.2 ml	9.6 ml	5.0 ml	4.2 ml	4.8 ml	4.6 ml
	HTHP FL @ 148.9 °C (300 °F) hot-rolled @ 148.9 °C (300 °F) ml x 2						

\*1 IO 15/18 OBM preparation via recipe: IO 15/18 1548g, Lime 60g, VG-69\* organophillic clay 60g, Suremul® surfactant 80g, Suremod® surfactant 20g, 30% CaCl<sub>2</sub> brine 944g (mixed approximately 30 minutes on the Silverson or until 135 °F was obtained). Samples containing 215g IO 1518 OBM, 220g barite, 9g API clay and various amounts of 40% active D 244 FLA polymer were mixed approximately 30 minutes via multi-mixer and subsequently hot-rolled at 148.9 °C (300 °F) for 16 hours. Pliolite® polymer was added as a dry 100% active dry material. Pliolite® is a product of Eliokem. VG-69\*, Suremul\* and Suremod\* are products of M-I SWACO.

**Standard packaging:**

- 275 gallon non-returnable totes
- Product may be special ordered in 5 gallon pails (32 pails to the pallet) or
- 55 gallon drums 4 drums per pallet

For more information on Drilling Specialties Company products visit our web site at [www.drillingspecialties.com](http://www.drillingspecialties.com)

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