IADD MUD MOTOR FORUM
January 26 – Oxy Woodlands Allison Tower
Reception at Landry's to follow

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International Association
Of Directional Drilling

Benefits of Abaco OPTIFIT™ Stators

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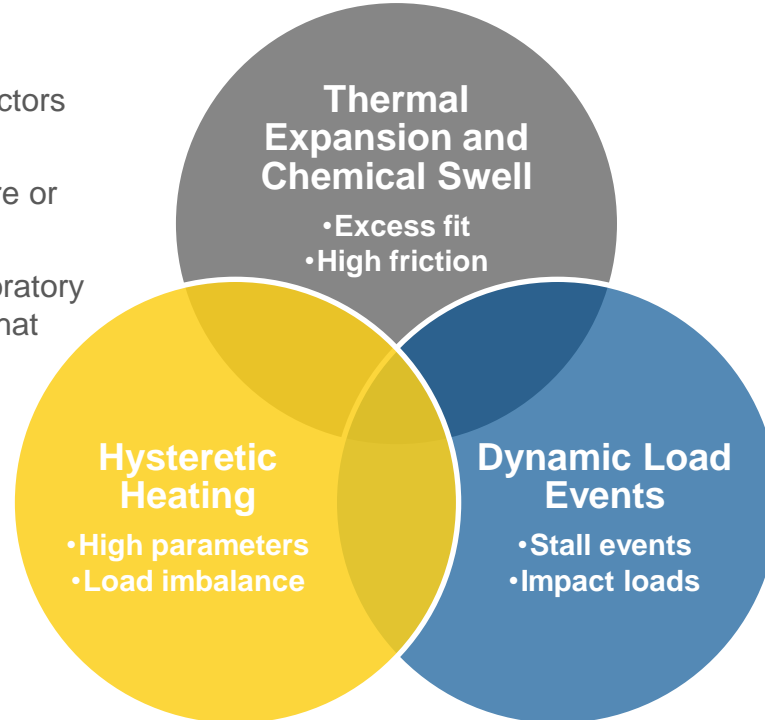
Speaker Information

- Pete Cariveau
- Vice President of Engineering
- Abaco Drilling Technologies

- Toby Dauphinet
- US Sales Manager
- Abaco Drilling Technologies

- IADD Mud Motor Forum
- January 26, 2023

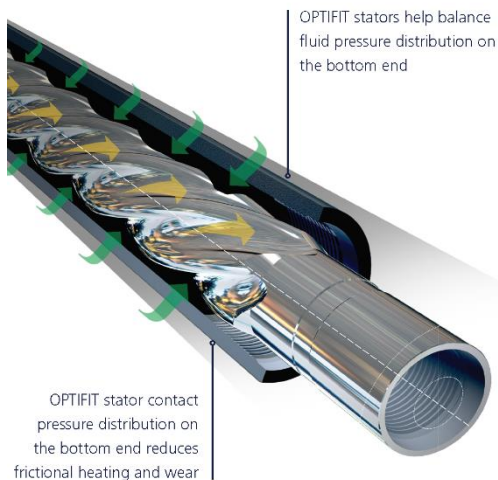iadd International Association Of Directional Drilling

Stator Chunking Root Cause

- Stress, Thermal and Chemical factors determine time to chunking

- Each factor increases temperature or stress in the elastomer

- Abaco developed a series of laboratory tests to identify stator geometry that optimizes stress distribution and reduces friction
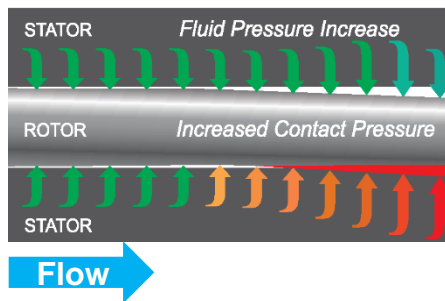
Thermal Expansion and Chemical Swell
- Excess fit
- High friction

Hysteretic Heating
- High parameters
- Load imbalance

Dynamic Load Events
- Stall events
- Impact loads

OPTIFIT™ Stator Feature Benefits

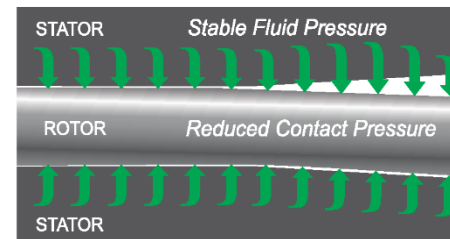**OPTIFIT™ stators increase reliability by addressing stresses and pressure on the power section lower end**
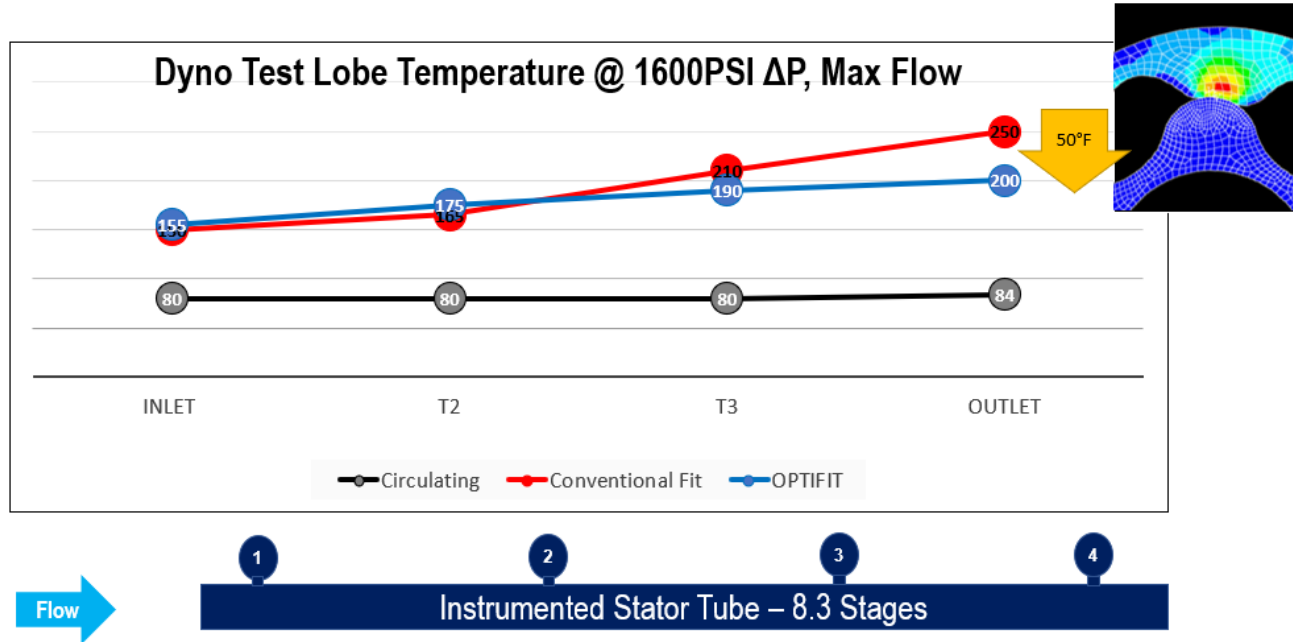
Benefits:
- Reduced frictional heating
- Greater reliability at high power
- Extended operating range
- Reduced field failure rates
- Works with existing rotor fleet

OPTIFIT stators help balance fluid pressure distribution on the bottom end

OPTIFIT stator contact pressure distribution on the bottom end reduces frictional heating and wear

Standard Bottom End Contact Pressure

STATOR   *Fluid Pressure Increase*

ROTOR   *Increased Contact Pressure*

STATOR

Flow

Optimized Bottom End Contact Pressure

STATOR   *Stable Fluid Pressure*

ROTOR   *Reduced Contact Pressure*

STATOR

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Thermal Testing Dyno Results

Dyno Test Lobe Temperature @ 1600PSI ΔP, Max Flow

- Circulating
- Conventional Fit
- OPTIFIT

Instrumented Stator Tube – 8.3 Stages
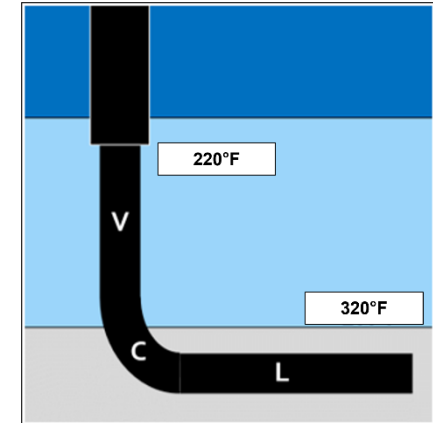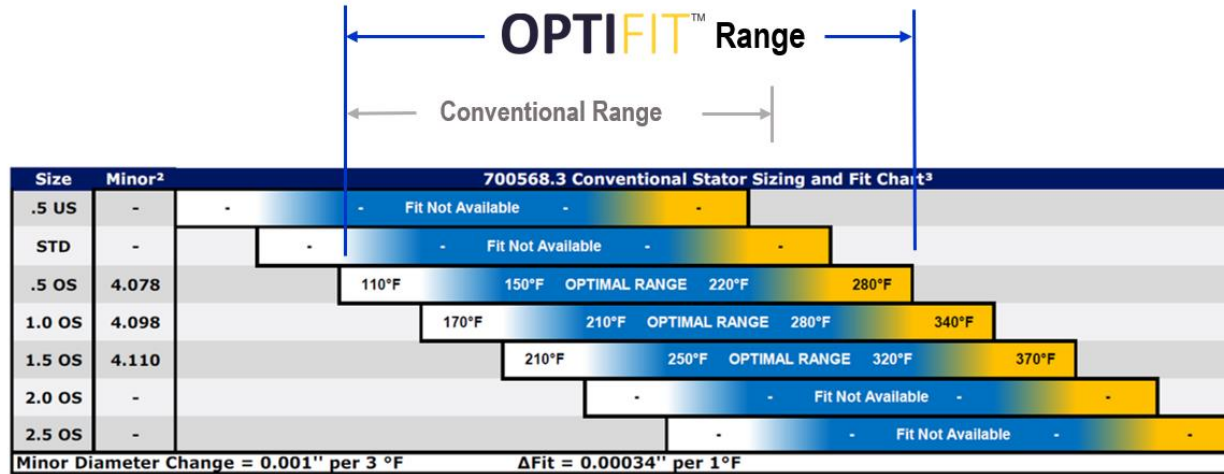
Flow

- Temperature gradient is less severe
- Decrease maximum temperature by 50°F – Greatly improves elastomer life!

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Temperature Window for Stator Increases

Size	Minor[2]	700568.3 Conventional Stator Sizing and Fit Chart[3]				
.5 US	-	-	Fit Not Available	-		-
STD	-	-	Fit Not Available	-		
.5 OS	4.078	110°F	150°F	OPTIMAL RANGE 220°F	280°F	
1.0 OS	4.098	170°F	210°F	OPTIMAL RANGE 280°F	340°F	
1.5 OS	4.110	210°F	250°F	OPTIMAL RANGE 320°F	370°F	
2.0 OS	-		-	Fit Not Available		-
2.5 OS	-		-	Fit Not Available		-

Minor Diameter Change = 0.001'' per 3 °F   ΔFit = 0.00034'' per 1°F

- Extended temperature operation window improved reliability
- Vertical-Curve-Lateral drilling reliability can be improved significantly

Applications

- Run in every major basin

- Significant improvement in shop teardown condition

- Significant improvement in reliability when lower end chunking is primary failure mode

Bakken
- 500-550 0.7 RPG
- Medium Speed
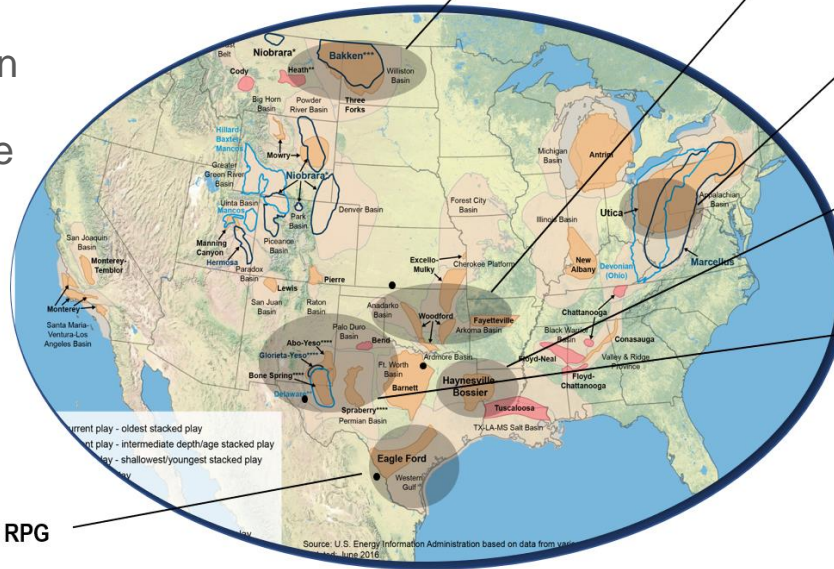
MID-CON
- 675-700 0.16 to 0.30 RPG

Marcellus
- 675/700 Series
- 0.30 RPG

HAYNESVILLE
- 51545 1.0 RPG
- 50067 0.7 RPG

PERMIAN
- 500-575 0.48-0.7 RPG
- 700/725 0.25-0.30RPG
- 800 78 5.9
- 800 78 7.0

EAGLE FORD
- 700/725 0.30-0.38 RPG

Source: U.S. Energy Information Administration based on data from various sources, June 2016

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Conclusion

- Abaco has been successfully deploying the OPTIFIT stator technology for over two years.

- Significant reliability gains have been achieved in high power models that push the limits of elastomer heating.

- Over 30 models are currently available for reline or new stators.

Thank You