

Various Sizes

3"

3 3/4"

4 1/8"

4 3/4"

5"

6 3/4"

8 1/4"

9 5/8"

- Reliable PDM design and wide range of power sections ensure well drilling at any conditions
- Optimum RPM / torque ratio of power sections manufactured using best worldwide technologies
- Adjustable bent housings ensure reliable directional control at severe horizontal drilling conditions
- Sleeve stabilizers available
- Standard bearing section with operation life up to 250 hours
- Reinforced bearing section with operation life up to 350 hours
- Enhanced axial and radial bearings for reliable operation under loads

PDM MUD MOTORS

Various Sizes

3"

3 3/4"

4 1/8"

4 3/4"

5"

6 3/4"

8 1/4"

9 5/8"



IN HOUSE POWER SECTION PRODUCTION

- Various stator elastomers for WBM, OBM, SOBM and HT
- Best worldwide manufacturing technologies
- Power sections design and manufacturing
- Corrosion resistant plating or TC coated
- Chrome plated
- Length of up to 7 m
- Power sections with increased torque
- Optimal ratio of revolutions and torque
- Customized equipment selection for specified drilling conditions



IN HOUSE POWER SECTION PRODUCTION



- Customized equipment selection for specified drilling conditions



HYDRAULIC & HYDRAULIC MECHANICAL DRILLING JARS

various sizes

4 1/4"

4 3/4"

6 3/4"

8"

- Surface adjustable mechanical part to protect against accidental activation while drilling
- Enhanced hydraulic section reliability and operational stability
 - Laser hardened splined connection for secure torque transfer
- Open hydraulic parts are tungsten carbide coated
- Wide temperature range up to +428°F
- Enhanced, robust and reliable design
- Optimized hydraulic for maximum impact
- Impact force adjustment for jarring up and down



DRILLING JARS

HYDRAULIC & HYDRAULIC MECHANICAL DRILLING JARS

various sizes

4 1/4"

4 3/4"

6 3/4"

8"



OSCILLATORS

various sizes

4 1/4"

4 3/4"

6 3/4"



Unique design of rotor-stator and valves coupling allows oscillator creates low frequency vibration to lower friction factor between BHA and borehole

- Helps to drill extended sections

- Reduces risk of differential sticking

- Lower friction of drillstring in borehole

- Stabilizes tool face during sliding with Motors

- Improved weight on bit transfer and smoothness

- Improve ROP

DOWNHOLE SHOCK TOOLS

various sizes

6 3/4"

8"

8 2/3"

Downhole shock tool is designed to absorb axial vibrations that occur while drilling

- In case of rotary drilling the shock tool is placed above the bit, in case of PDM use, the ST is placed in BHA above the PDM

- shock tool design ensures its reliable operations at various axial loads on bit and differential pressures

- Splined connection ensures reliable torque transferring to bit

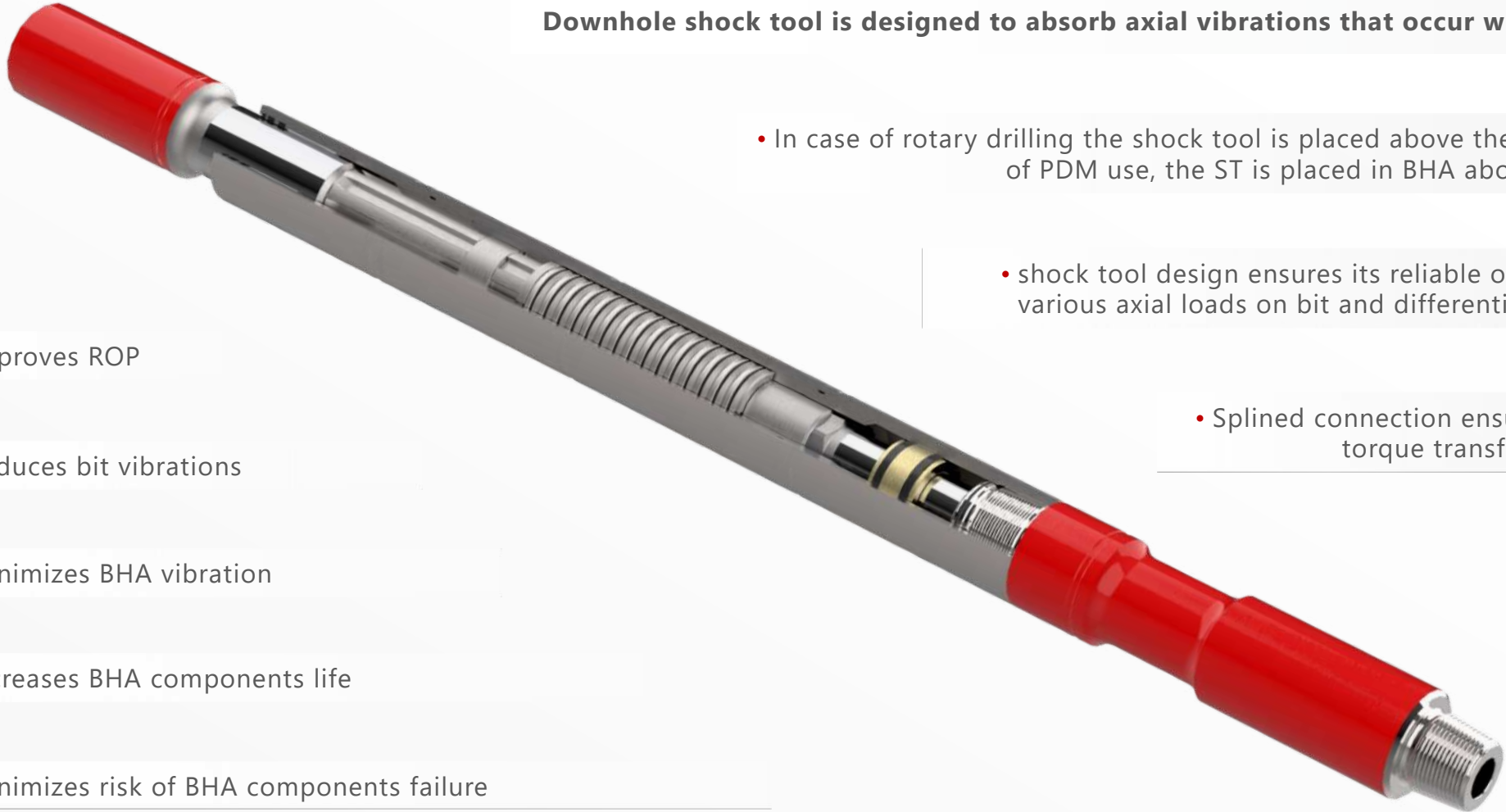
- Improves ROP

- Reduces bit vibrations

- Minimizes BHA vibration

- Increases BHA components life

- Minimizes risk of BHA components failure



CIRCULATION SUBS

various sizes

4 1/4"

4 3/4"

6 3/4"

8"

8 2/3"

Circulation sub is a flow bypass system which can be activated multiple times. A simple tool installed in BHA allows redirecting flow from inside of drillstring to annulus bypassing everything what is below



- Two points stabilization of internal piston to avoid jamming

- Double main seals to increase reliability

- Main components are made of stainless steel

- Spring isolated from direct mud flow to improve reliability

- Usage of rubber ball for activation allows to simplify design and increase reliability

- Can be used to pump all kind of sweeps

- Can be used to pump all kind of LCM

- Can be used to pump acids

DUMP & FLOAT VALVES

FLOAT VALVE



Float valve is a well control device protecting PDM from cuttings invasion during drill-string running. Float valve is installed above PDM. When used in combination with dump valve, float valve is installed below the dump valve.

DUMP VALVE



Dump valve is used for drill string filling and dumping during trips. Is installed above PDM. When used in combination with float valve, dump valve is installed above the float valve.



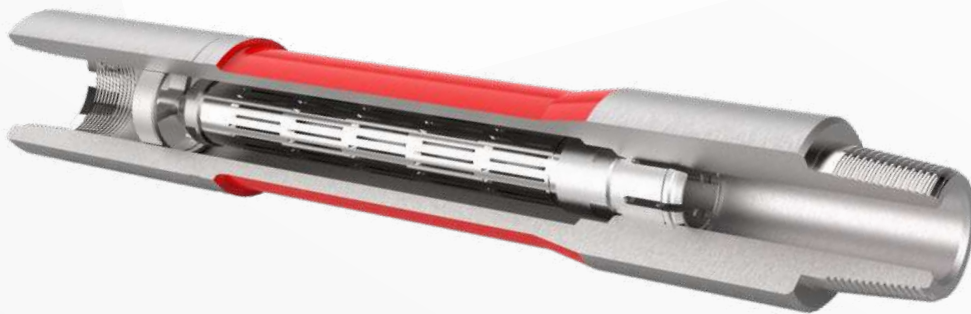
FLEX VALVE - FILTER

Flex valve - filter recommended to use while drilling with higher dogleg severity. Flex housing helps to decrease stress level in the BHA. Two-in-one design tool keeps the BHA length the same.



MOTOR FILTER

The main purpose of downhole motor filter is to protect motor, MWD and other BHA components from foreign particles damage. Filter is installed directly above the motor or MWD system.



MVR1-240T (9 5/8") advantages



- Bit installing and replacing operations do not impact the lower fishing device

- Improved drilling controllability of curved sections

- Increased maximum torque: for 29%

- Motor equipped with high-torque power sections guarantees reliable operation

Bearing section type	Max estimated torque, ft-lbs	Length to bend , ft
Standard MVR-240T	21861	8.76
Heavy-duty MVR1-240T	30756	7.21



SPEC SHEET MVR1-240T (9 5/8" 3/4 5.8 stages)



PARAMETERS	IMPERIAL	METRIC
Overall length (A)	29.3 ft	8.93 m
Length to Stabilizer (B)	35.43 in	750 mm
Length to bend (C)	86.54 in	2198 mm
Max. Slick OD (D)	9.65 in	245 mm
Length of stator (E)	216.54 in	5500 mm
Weight	4523 lbs	2052 kg
Bit Sizes (with proper stabilization)	11-1/4-26 in	285.8-660.4 mm
Top Connection	6-5/8 FH (3-171) box	
Bit Connection	6-5/8 Reg (3-152) box	
ABS Angle Range	0° - 3°	
WOB and Backreaming Weight	86 klbs	40000 kgs
Rerun Pull and Set-down Weight*	345 klbs	160000 kgs
Ultimate Pull to Failure*	810 klbs	375000 kgs
Max allowable torque, lbf*ft	44.1 klbs*ft	6100 kgs*m
Flow Rate	475-1190 gpm	30-75 l/s
Speed	105-265 rpm	
Speed to Flow Ratio	0.23 rev/gal	0.06 rev/l
No Load Pressure Drop	580 psi	40 kgs/sm ²

Predicted Build Rates – Degrees/100ft

BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
Deg	12-1/4 in	15-1/2 in	17-1/2 in	12-1/4 in	15-1/2 in	17-1/2 in
0.62°	-	-	-	4.00	6.25	7.46
0.93°	1.56	-	-	6.02	7.99	9.20
1.22°	3.54	-	-	7.64	9.61	10.82
1.50°	5.45	-	-	9.21	11.18	12.39
1.77°	7.29	-	-	10.73	12.70	13.90
2.00°	8.86	1.52	-	12.02	13.98	15.19
2.23°	10.43	3.09	-	13.31	15.27	16.48
2.43°	11.79	4.45	-	14.43	16.39	17.60
2.60°	12.95	5.61	1.10	15.38	17.34	18.55
2.73°	13.84	6.50	1.99	16.11	18.07	19.28
2.85°	14.66	7.32	2.80	16.78	18.74	19.95
3.00°	15.68	8.34	3.83	17.62	19.58	20.79

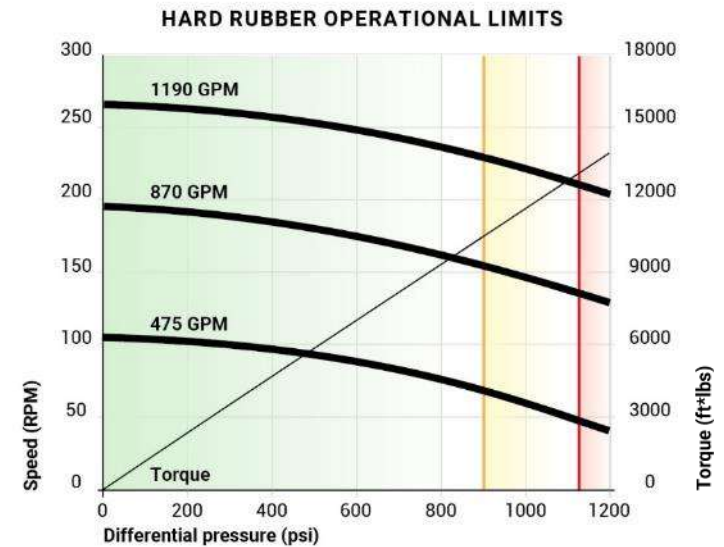
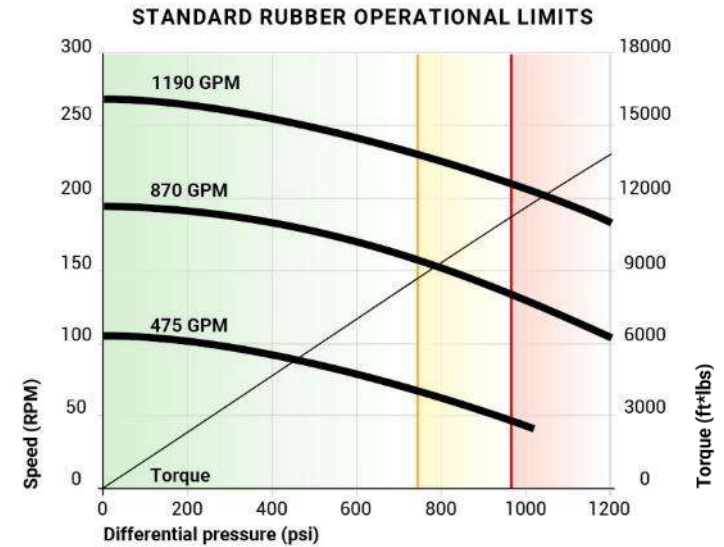
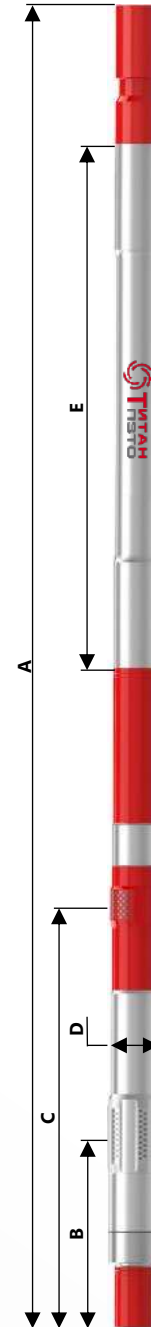
Stabilizers are considered to be 1/8" undergauge.

STANDARD OR HIGH TEMPERATURE ELASTOMER		
Maximum differential mode parameters		
Differential Pressure	725 psi	51 kgs/sm ²
Speed	42-205 rpm	42-205 rpm
Torque	8564 ft-lbs	1184 kgs*m
Power Output	75-339 hp	55-249 kW
Maximum Operational		
Differential Pressure	868 psi	61 kgs/sm ²
Speed	181 rpm	180 rpm
Torque	10329 ft-lbs	1428 kgs*m
Power Output	359 hp	264 kW
HARD RUBBER ELASTOMER		
Maximum differential mode parameters		
Differential Pressure	839 psi	59 kgs/sm ²
Speed	45-205 rpm	45-205 rpm
Torque	10199 ft-lbs	1410 kgs*m
Power Output	88-404 hp	65-297 kW
Maximum Operational		
Differential Pressure	1010 psi	71 kgs/sm ²
Speed	181 rpm	180 rpm
Torque	12188 ft-lbs	1685 kgs*m
Power Output	423 hp	311 kW

Maximum Adjustable Bend Setting For Rotary Drilling

BEND SETTING	SLICK HOLE SIZE 11-1/4 in – 26 in		STABILIZER HOLE SIZE 11-1/4 in – 26 in	
Deg	Tangent RPM	Curved RPM	Tangent RPM	Curved RPM
0.62°	100	80	100	80
0.93°	80	50	80	50
1.22°	80	50	60	40
1.50°	80	50	-	-
1.77°	-	-	-	-
2.00°	-	-	-	-
2.23°	-	-	-	-
2.43°	-	-	-	-
2.60°	-	-	-	-
2.73°	-	-	-	-
2.85°	-	-	-	-
3.00°	-	-	-	-

«-» - rotation is prohibited



- Recommended operating range
- Short-term operating range
- Prohibit to operate

SPEC SHEET MVR1-240T (9 5/8" 7/8 6.5 stages)



PARAMETERS	IMPERIAL	METRIC
Overall length (A)	30.9 ft	9.43 m
Length to Stabilizer (B)	35.43 in	900 mm
Length to bend (C)	86.54 in	2198 mm
Max. Slick OD (D)	9.65 in	245 mm
Length of stator (E)	236.22 in	6000 mm
Weight	5154 lbs	2338 kg
Bit Sizes (with proper stabilization)	11-1/4-26 in	285.8-660.4 mm
Top Connection	6-5/8 FH (3-171) box	
Bit Connection	6-5/8 Reg (3-152) box	
ABS Angle Range	0° - 3°	0° - 3°
WOB and Backreaming Weight	86 klbs	40000 kgs
Rerun Pull and Set-down Weight*	345 klbs	160000 kgs
Ultimate Pull to Failure*	810 klbs	375000 kgs
Max allowable torque, lbf*ft	44.1 klbs*ft	6100 kgs*m
Flow Rate	475-1190 gpm	30-75 l/s
Speed	75-188 rpm	75-188 rpm
Speed to Flow Ratio	0.158 rev/gal	0.042 rev/l
No Load Pressure Drop	580 psi	40 kgs/sm ²

Predicted Build Rates – Degrees/100ft

BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
Deg	12-1/4 in	15-1/2 in	17-1/2 in	12-1/4 in	15-1/2 in	17-1/2 in
0.62°	-	-	-	4.00	5.76	5.99
0.93°	1.46	-	-	5.67	7.42	7.65
1.22°	3.50	-	-	7.23	8.98	9.21
1.50°	5.17	-	-	8.73	10.49	10.72
1.77°	6.93	-	-	10.18	11.94	12.17
2.00°	8.43	1.42	-	11.42	13.17	13.41
2.23°	9.93	2.92	-	12.66	14.41	14.64
2.43°	11.23	4.22	-	13.73	15.48	15.71
2.60°	12.33	5.33	1.03	14.64	16.40	16.62
2.73°	13.18	6.18	1.87	15.34	17.09	17.32
2.85°	13.96	6.96	2.65	15.99	17.74	17.96
3.00°	14.94	7.93	3.63	16.79	18.54	18.77

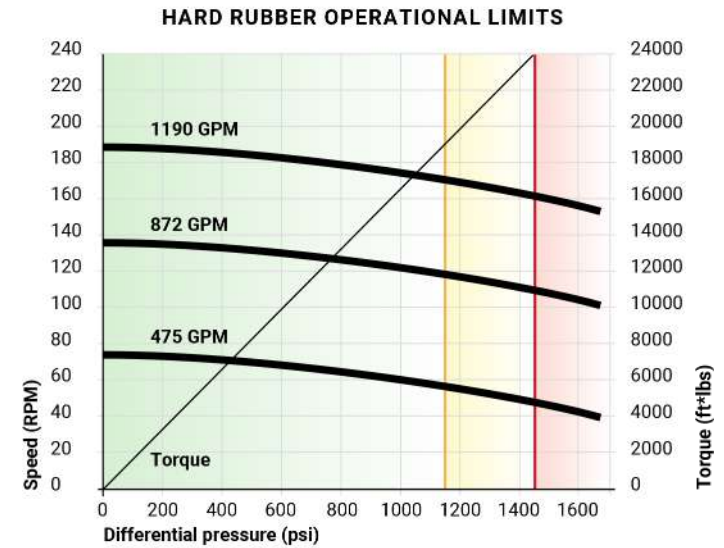
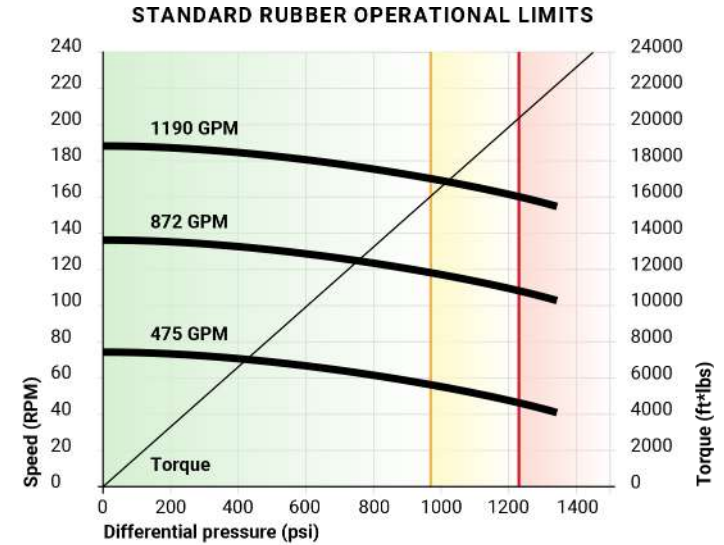
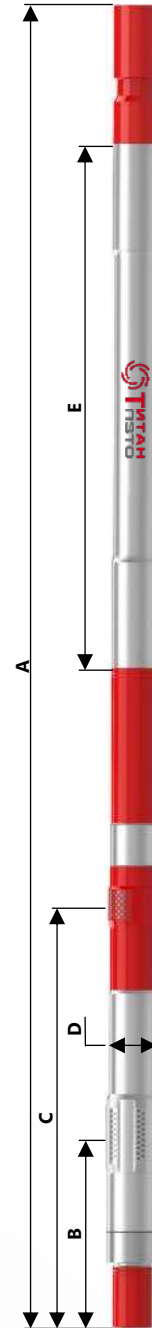
Stabilizers are considered to be 1/8" undergauge.

STANDARD OR HIGH TEMPERATURE ELASTOMER		
Maximum differential mode parameters		
Differential Pressure	953 psi	67 kgs/sm ²
Speed	55-170 rpm	55-170 rpm
Torque	15942 ft-lbs	2204 kgs*m
Power Output	169-522 hp	124-384 kW
Maximum Operational		
Differential Pressure	1664 psi	117 kgs/sm ²
Speed	135 rpm	135 rpm
Torque	27110 ft-lbs	3748 kgs*m
Power Output	706 hp	519 kW
HARD RUBBER ELASTOMER		
Maximum differential mode parameters		
Differential Pressure	1095 psi	77 kgs/sm ²
Speed	55-170 rpm	55-170 rpm
Torque	18228 ft-lbs	2520 kgs*m
Power Output	193-598 hp	142-440 kW
Maximum Operational		
Differential Pressure	1892 psi	133 kgs/sm ²
Speed	136 rpm	135 rpm
Torque	30597 ft-lbs	4230 kgs*m
Power Output	797 hp	586 kW

Maximum Adjustable Bend Setting For Rotary Drilling

BEND SETTING	SLICK HOLE SIZE 11-1/4 in – 26 in		STABILIZER HOLE SIZE 11-1/4 in – 26 in	
Deg	Tangent	Curved	Tangent	Curved
Deg	RPM	RPM	RPM	RPM
0.62°	100	80	100	80
0.93°	80	50	80	50
1.22°	80	50	60	40
1.50°	80	50	-	-
1.77°	-	-	-	-
2.00°	-	-	-	-
2.23°	-	-	-	-
2.43°	-	-	-	-
2.60°	-	-	-	-
2.73°	-	-	-	-
2.85°	-	-	-	-
3.00°	-	-	-	-

«-» - rotation is prohibited



- Recommended operating range
- Short-term operating range
- Prohibit to operate

SPEC SHEET MVR-176TU (6 3/4" 7/8 5.4 stages)



PARAMETER	IMPERIAL	METRIC
Overall length (A)	29.83 ft	9.09 m
Length to Stabilizer (B)	27.16 in	690 mm
Length to bend (C)	63.78 in	1620 mm
Max. Slick OD (D)	7.67 in	195 mm
Length of stator (E)	236.22 in	6000 mm
Weight	2840 lbs	1288 kg
Bit Size Range (with proper stabilization)	8-3/8 in-9-7/8 in	212.7-250.8 mm
Top Connection (Optional)	5-1/2 in FH Box (NC50)	
Bit Connection	4-1/2 in API Reg. Box	
ABS Angle Range	0° - 2°	0° - 2°
Rotor Nozzle	No	No
Max. Flow Rate w/Nozzle	-	-
WOB and Backreaming Weight	66 klbs	30000 kgf
Rerun Pull and Set-down Weight*	156 klbs	71000 kgf
Ultimate Pull to Failure*	353 klbs	160000 kgf

* While motor is not operating

Predicted Build Rates – Degrees/100ft

BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
	8-1/2 in	8-3/4 in	9-7/8 in	8-1/2 in	8-3/4 in	9-7/8 in
Deg						
0.62°	1.88	1.13	-	3.65	3.80	4.45
0.82°	3.22	2.47	-	4.84	4.99	5.64
1.00°	4.43	3.67	0.29	5.92	6.06	6.71
1.18°	5.63	4.88	1.49	6.99	7.13	7.79
1.33°	6.64	5.89	2.50	7.88	8.03	8.68
1.48°	7.64	6.89	3.50	8.78	8.92	9.57
1.62°	8.58	7.83	4.44	9.61	9.75	10.41
1.73°	9.32	8.57	5.18	10.26	10.41	11.06
1.83°	9.99	9.24	5.85	10.86	11.00	11.66
1.90°	10.46	9.71	6.32	11.28	11.42	12.07
2.00°	11.13	10.38	6.99	11.87	12.02	12.67

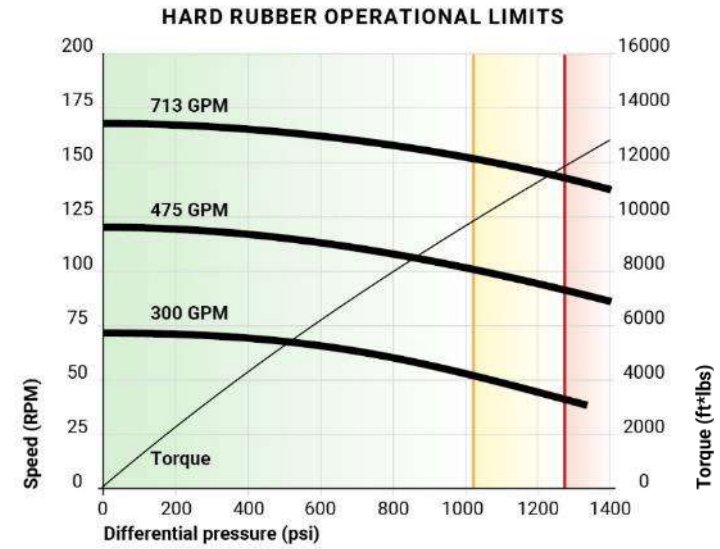
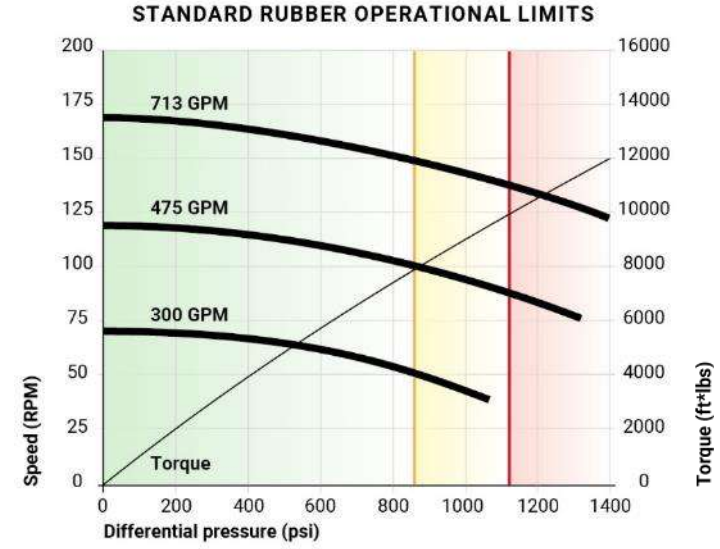
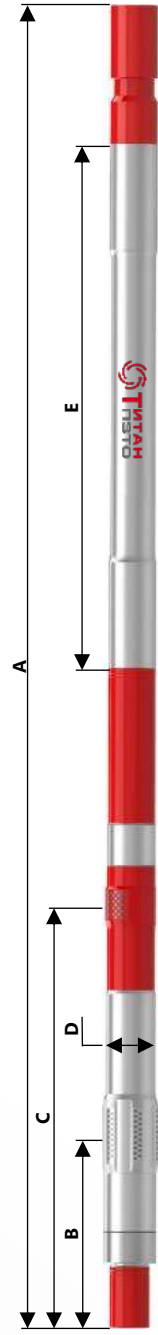
Stabilizers are considered to be 1/8" undergauge.

STANDARD OR HIGH TEMPERATURE ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	711 psi	50 kgs/sm ²
Speed	55-155 rpm	
Torque	7233 ft-lbs	1000 kgs*m
Power Output	76-216 hp	56-159 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1422 psi	100 kgs/sm ²
Speed	120 rpm	
Torque	12577 ft-lbs	1736 kgs*m
Power Output	291 hp	214 kW
HARD RUBBER ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	825 psi	58 kgs/sm ²
Speed	55-155 rpm	
Torque	8318 ft-lbs	1150 kgs*m
Power Output	88-249 hp	65-183 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1650 psi	116 kgs/sm ²
Speed	120 rpm	
Torque	13960 ft-lbs	1930 kgs*m
Power Output	324 hp	238 kW

Maximum Adjustable Bend Setting For Rotary Drilling

BEND SETTING	SLICK HOLE SIZE 8-3/8 in – 9-7/8 in		STABILIZER HOLE SIZE 8-3/8 in – 9-7/8 in	
	Tangent	Curved	Tangent	Curved
Deg				
0.62°	RPM	RPM	RPM	RPM
0.62°	120	90	100	50
0.82°	120	70	100	50
1.00°	120	70	100	50
1.18°	120	70	100	50
1.33°	120	70	100	50
1.48°	120	70	90	50
1.62°	100	50	80	50
1.73°	90	50	80	50
1.83°	80	50	-	-
1.90°	40	-	-	-
2.00°	-	-	-	-

«-» - rotation is prohibited



- Recommended operating range
- Short-term operating range
- Prohibit to operate

SPEC SHEET MVR-176TU (6 3/4" 7/8 6.1 stages)



PARAMETER	IMPERIAL	METRIC
Overall length (A)	29.83 ft	9.09 m
Length to Stabilizer (B)	27.16 in	690 mm
Length to bend (C)	63.78 in	1620 mm
Max. Slick OD (D)	7.67 in	195 mm
Length of stator (E)	236.22 in	6000 mm
Weight	2890 lbs	1311 kg
Bit Size Range (with proper stabilization)	8-3/8 in-9-7/8 in	212.7-250.8 mm
Top Connection (Optional)	5-1/2 in FH Box (NC50)	
Bit Connection	4-1/2 in API Reg. Box	
ABS Angle Range	0° - 2°	0° - 2°
Rotor Nozzle	No	No
Max. Flow Rate w/Nozzle	-	-
WOB and Backreaming Weight	66 klbs	30000 kgf
Rerun Pull and Set-down Weight*	156 klbs	71000 kgf
Ultimate Pull to Failure*	353 klbs	160000 kgf

* While motor is not operating

Predicted Build Rates – Degrees/100ft

BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
	8-1/2 in	8-3/4 in	9-7/8 in	8-1/2 in	8-3/4 in	9-7/8 in
Deg						
0.62°	1.88	1.13	-	3.65	3.80	4.45
0.82°	3.22	2.47	-	4.84	4.99	5.64
1.00°	4.43	3.67	0.29	5.92	6.06	6.71
1.18°	5.63	4.88	1.49	6.99	7.13	7.79
1.33°	6.64	5.89	2.50	7.88	8.03	8.68
1.48°	7.64	6.89	3.50	8.78	8.92	9.57
1.62°	8.58	7.83	4.44	9.61	9.75	10.41
1.73°	9.32	8.57	5.18	10.26	10.41	11.06
1.83°	9.99	9.24	5.85	10.86	11.00	11.66
1.90°	10.46	9.71	6.32	11.28	11.42	12.07
2.00°	11.13	10.38	6.99	11.87	12.02	12.67

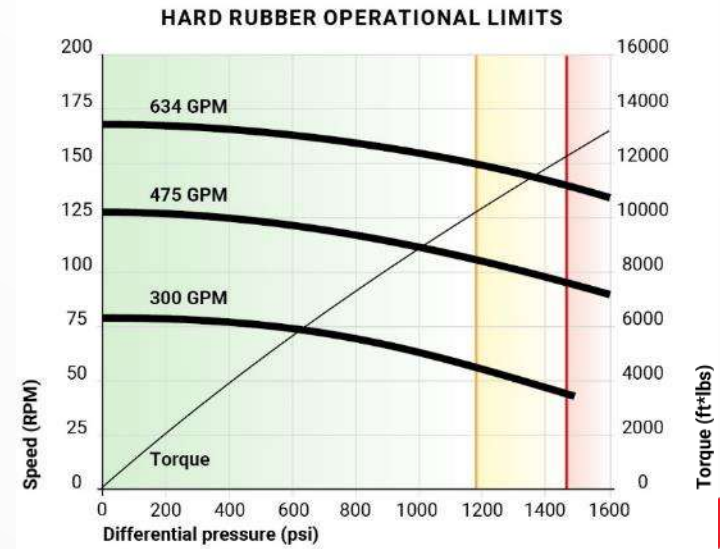
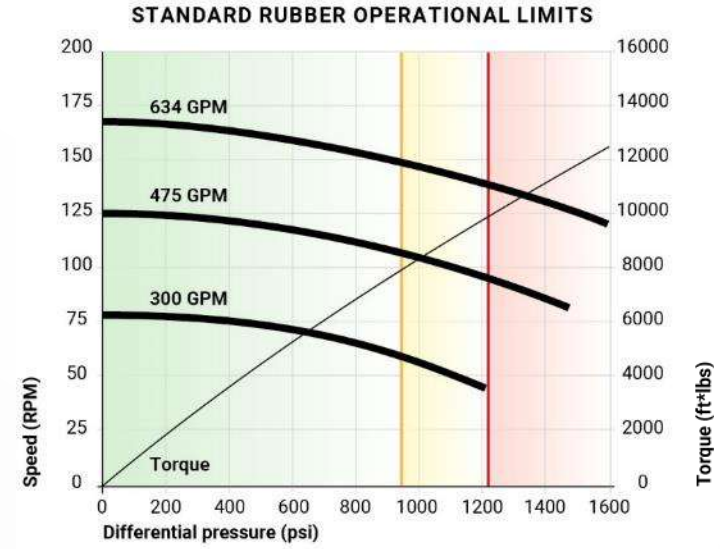
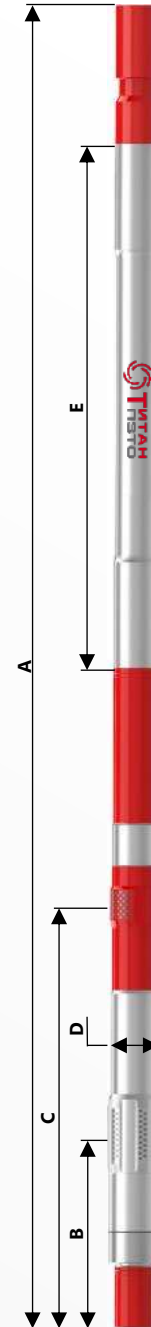
Stabilizers are considered to be 1/8" undergauge.

STANDARD OR HIGH TEMPERATURE ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	924.52 psi	65 kgs/sm ²
Speed	55-160 rpm	
Torque	8268 ft-lbs	1143 kgs*m
Power Output	87-256 hp	64-188 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1593.01 psi	112 kgs/sm ²
Speed	125 rpm	
Torque	12774 ft-lbs	1766 kgs*m
Power Output	307 hp	226 Kw
HARD RUBBER ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	1066.75 psi	75 kgs/sm ²
Speed	55-150 rpm	
Torque	9295 ft-lbs	1285 kgs*m
Power Output	87-270 hp	73-198 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1735.25 psi	122 kgs/sm ²
Speed	125 rpm	
Torque	13816 ft-lbs	1910 kgs*m
Power Output	333 hp	245 kW

Maximum Adjustable Bend Setting For Rotary Drilling

BEND SETTING	SLICK HOLE SIZE 8-3/8 in – 9-7/8 in		STABILIZER HOLE SIZE 8-3/8 in – 9-7/8 in	
	Tangent	Curved	Tangent	Curved
Deg				
0.62°				
	RPM	RPM	RPM	RPM
0.62°	120	90	100	50
0.82°	120	70	100	50
1.00°	120	70	100	50
1.18°	120	70	100	50
1.33°	120	70	100	50
1.48°	120	70	90	50
1.62°	100	50	80	50
1.73°	90	50	80	50
1.83°	80	50	-	-
1.90°	40	-	-	-
2.00°	-	-	-	-

«-» - rotation is prohibited



■ Recommended operating range
■ Short-term operating range
■ Prohibit to operate

SPEC SHEET MVR-121TU (4 3/4" 7/8 4.3 stages)



PARAMETERS	IMPERIAL	METRIC
Overall length (A)	24.03 ft	7.32 m
Length to Stabilizer (B)	25.19 in	640 mm
Length to bend (C)	52.75 in	1340 mm
Max. Slick OD (D)	5.00 in	127 mm
Length of stator (E)	196.85 in	5000 mm
Weight	1023 lbs	464 kg
Bit Sizes (with proper stabilization)	5-5/8 - 7 in	142.9-177.8 mm
Top Connection	NC38 Box	
Bit Connection	3-1/2 Reg Box	
ABS Angle Range	0° - 2°30'	0° - 2°30'
WOB and Backreaming Weight	30 klbs	14000 kgs
Rerun Pull and Set-down Weight*	97 klbs	44000 kgs
Ultimate Pull to Failure*	220 klbs	100000 kgs
Max allowable torque, lbf*ft	7950 lbs*ft	1100 kgs*m
Flow Rate	160-320 gpm	10-20 l/s
Speed	90-180 rpm	90-180 rpm
Speed to Flow Ratio	0.57 rev/gal	0.15 rev/l
No Load Pressure Drop	650 psi	45 kgs/sm ²

STANDARD OR HIGH TEMPERATURE ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	654 psi	46 kgs/sm ²
Speed	65-160 rpm	65-160 rpm
Torque	2893 ft-lbs	400 kgs*m
Power Output	37-90 hp	27-66 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1024 psi	72 kgs/sm ²
Speed	140 rpm	140 rpm
Torque	3790 ft-lbs	524 kgs*m
Power Output	102 hp	75 Kw
HARD RUBBER ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	754 psi	53 kgs/sm ²
Speed	65-160 rpm	65-160 rpm
Torque	3219 ft-lbs	445 kgs*m
Power Output	41-99 hp	30-73 kW
MAXIMUM OPERATIONAL		
Differential Pressure	1138 psi	80 kgs/sm ²
Speed	137 rpm	137 rpm
Torque	4145 ft-lbs	573 kgs*m
Power Output	110 hp	81 kW

Predicted Build Rates – Degrees/100ft

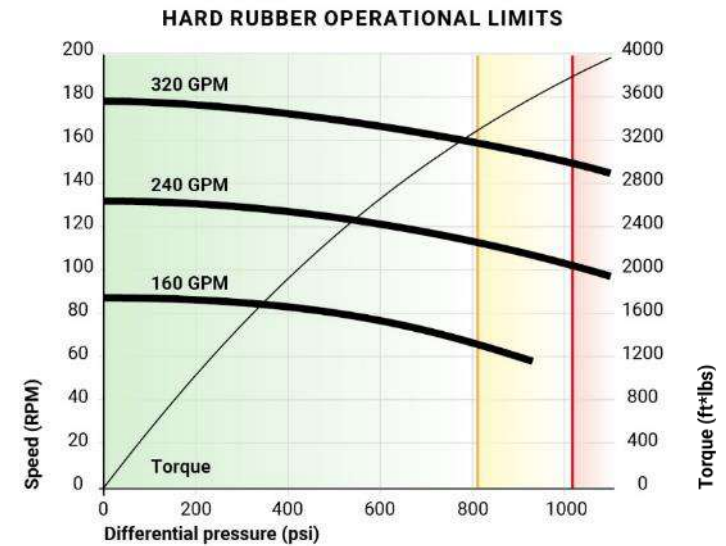
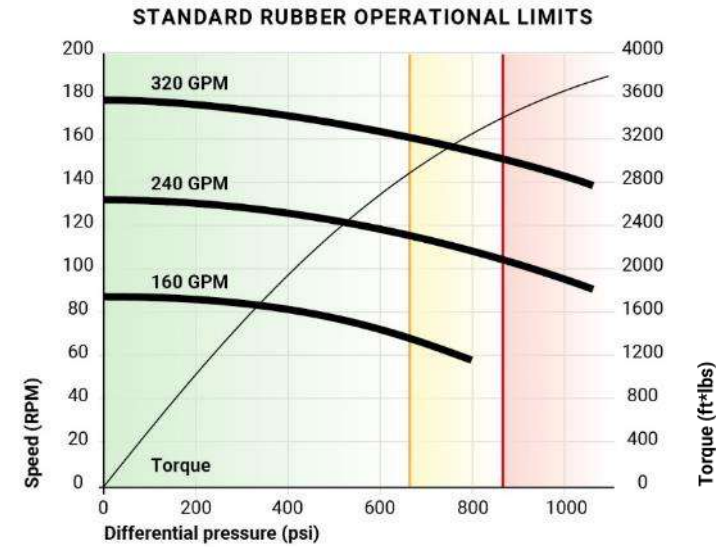
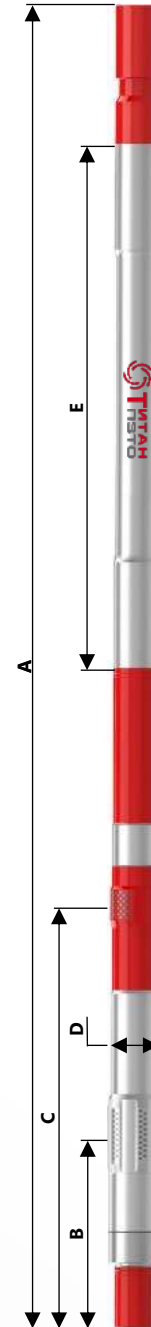
BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
Deg	6 in	6-1/4 in	6-3/4 in	6 in	6-1/4 in	6-3/4 in
0.52°	3.10	1.97	-	3.70	3.92	4.38
0.77°	5.18	4.05	1.79	5.56	5.79	6.24
1.02°	7.26	6.13	3.87	7.42	7.65	8.10
1.25°	9.17	8.04	5.78	9.13	9.36	9.81
1.47°	11.00	9.87	7.61	10.77	11.00	11.45
1.67°	12.66	11.54	9.28	12.26	12.49	12.94
1.85°	14.16	13.03	10.77	13.60	13.83	14.28
2.02°	15.58	14.45	12.19	14.87	15.09	15.54
2.17°	16.82	15.69	13.44	15.98	16.21	16.66
2.28°	17.74	16.61	14.35	16.90	17.03	17.48
2.38°	18.57	17.44	15.18	17.54	17.77	18.22
2.50°	19.57	18.44	16.18	18.44	18.66	19.11

Stabilizers are considered to be 1/8" undergauge.

Maximum Adjustable Bend Setting For Rotary Drilling

BEND SETTING	SLICK HOLE SIZE 5-3/4 in – 7 in		STABILIZER HOLE SIZE 5-3/4 in – 7 in	
	Tangent RPM	Curved RPM	Tangent RPM	Curved RPM
0.52°	100	100	90	50
0.77°	100	90	90	50
1.02°	90	50	90	40
1.25°	90	40	90	40
1.47°	80	40	80	40
1.67°	80	40	60	-
1.85°	60	40	-	-
2.02°	-	-	-	-
2.17°	-	-	-	-
2.28°	-	-	-	-
2.38°	-	-	-	-
2.50°	-	-	-	-

«-» - rotation is prohibited



- Recommended operating range
- Short-term operating range
- Prohibit to operate

SPEC SHEET MVR-121TU (4 3/4" 7/8 4.5 stages)



PARAMETERS	IMPERIAL	METRIC
Overall length (A)	22.21 ft	6.77 m
Length to Stabilizer (B)	25.19 in	640 mm
Length to bend (C)	52.75 in	1340 mm
Max. Slick OD (D)	5.00 in	127 mm
Length of stator (E)	174.8 in	4440 mm
Weight	981 lbs	445 kg
Bit Sizes (with proper stabilization)	5 5/8 in – 7 in	142.9 - 177.8 mm
Top Connection	NC38 Box	
Bit Connection	3-1/2 Reg Box	
ABS Angle Range	0° - 2°30'	0° - 2°30'
WOB and Backreaming Weight	30 klbs	14000 kgs
Rerun Pull and Set-down Weight*	97 klbs	44000 kgs
Ultimate Pull to Failure*	220 klbs	100000 kgs
Max allowable torque, lbf*ft	7950 lbf*ft	1100 kgs*m
Flow Rate	160-320 gpm	10-20 l/s
Speed	105-210 rpm	105-210 rpm
Speed to Flow Ratio	0.66 rev/gal	0.17 re/l
No Load Pressure Drop	650 psi	45 kgs/sm ²

STANDARD OR HIGH TEMPERATURE ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	697 psi	49 kgs/sm ²
Speed	85-185 rpm	85-185 rpm
Torque	2604 ft-lbs	360 kgs*m
Power Output	42-92 hp	31-68 kW

MAXIMUM OPERATIONAL		
Differential Pressure	953 psi	67 kgs/sm ²
Speed	170 rpm	170 rpm
Torque	3110 ft-lbs	430 kgs*m
Power Output	102 hp	75 kW

HARD RUBBER ELASTOMER		
MAXIMUM DIFFERENTIAL MODE PARAMETERS		
Differential Pressure	797 psi	56 kgs/sm ²
Speed	85-185 rpm	85-185 rpm
Torque	2821 ft-lbs	390 kgs*m
Power Output	46-101 hp	34-74 Kw

MAXIMUM OPERATIONAL		
Differential Pressure	1095 psi	77 kgs/sm ²
Speed	170 rpm	170 rpm
Torque	3436 ft-lbs	475 kgs*m
Power Output	113 hp	83 kW

Predicted Build Rates – Degrees/100ft

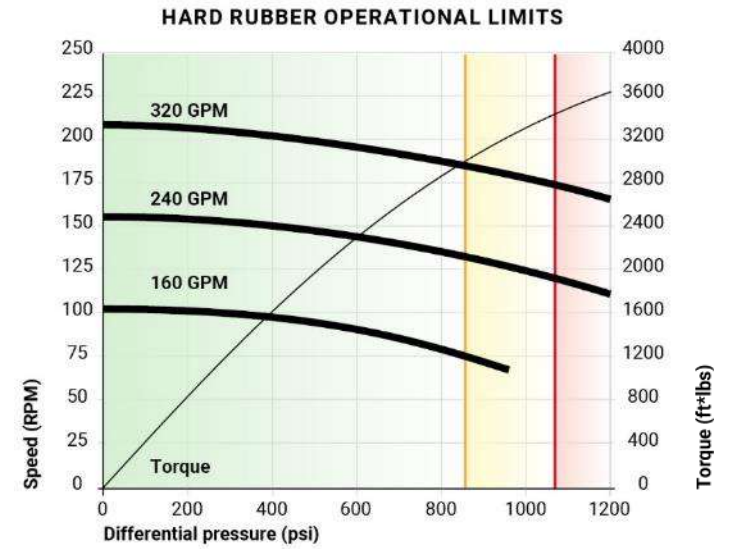
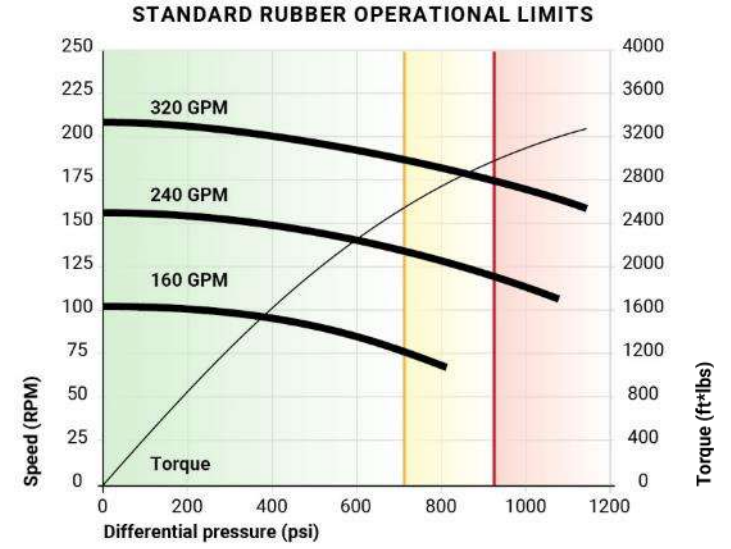
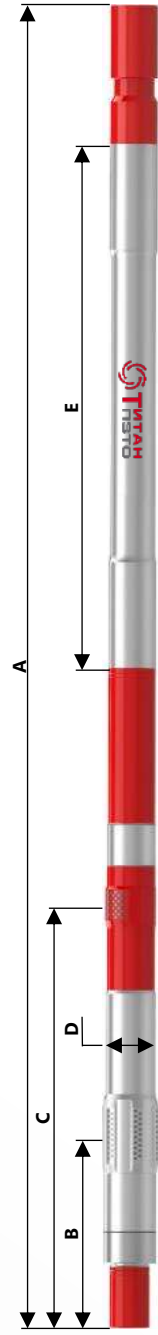
BEND SETTING	SLICK HOLE SIZE			STABILIZER HOLE SIZE		
	6 in	6-1/4 in	6-3/4 in	6 in	6-1/4 in	6-3/4 in
Deg						
0.52°	2.96	1.74	-	4.06	4.33	4.86
0.77°	5.21	3.99	1.54	6.05	6.32	6.86
1.02°	7.47	6.24	3.80	8.05	8.31	8.85
1.25°	9.54	8.31	5.87	9.88	10.15	10.68
1.47°	11.52	10.30	7.85	11.64	11.90	12.44
1.67°	13.32	12.10	9.65	13.23	13.50	14.03
1.85°	14.94	13.72	11.27	14.67	14.93	15.47
2.02°	16.47	15.25	12.81	16.02	16.29	16.82
2.17°	17.82	16.60	14.16	17.22	17.48	18.02
2.28°	18.81	17.59	15.15	18.09	18.36	18.89
2.38°	19.72	18.49	16.05	18.89	19.16	19.69
2.50°	20.80	19.57	17.13	19.85	20.11	20.65

Stabilizers are considered to be 1/8" undergauge.

Maximum Adjustable Bend Setting For Rotary Drilling

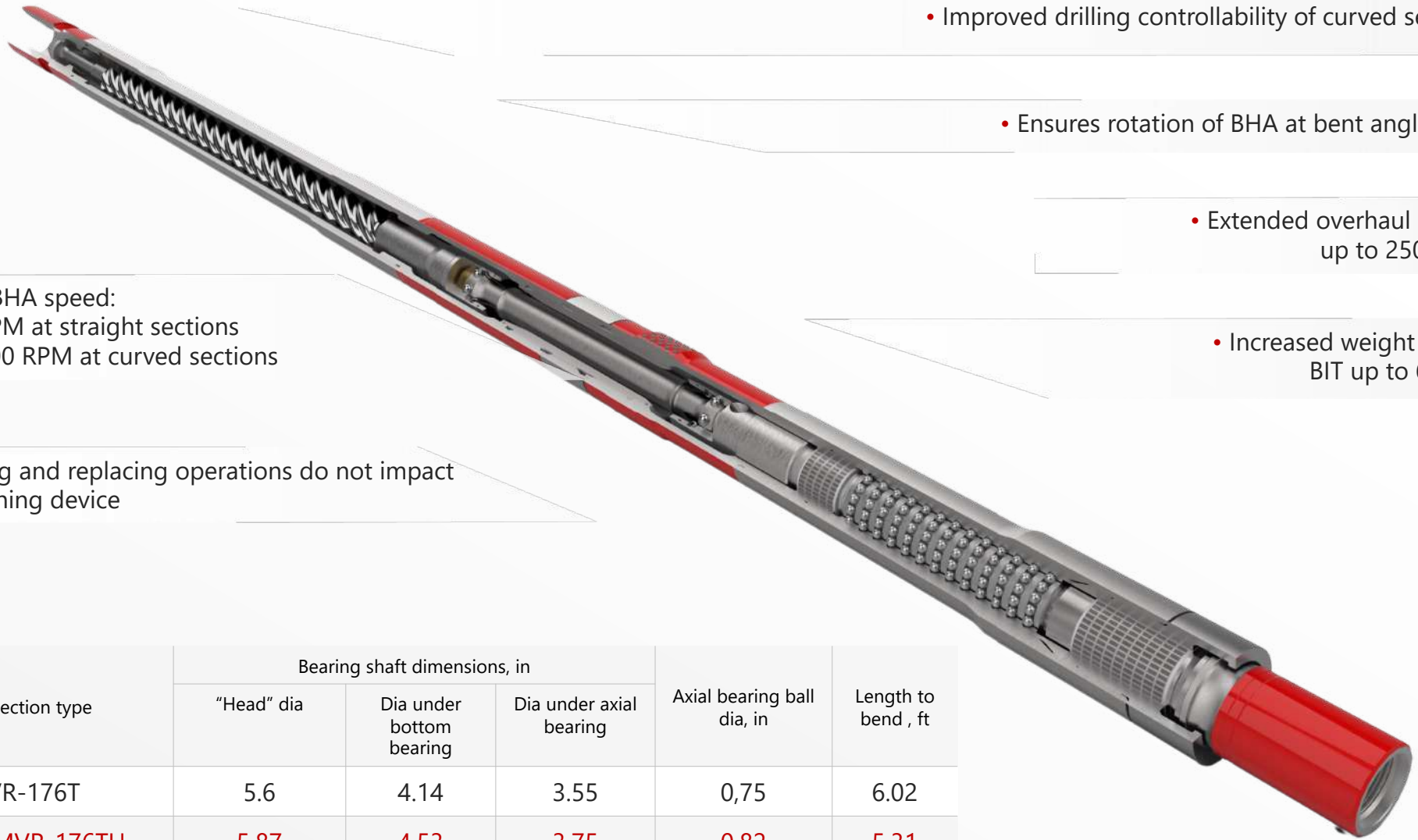
BEND SETTING	SLICK HOLE SIZE 5-3/4 in – 7 in		STABILIZER HOLE SIZE 5-3/4 in – 7 in	
	Tangent	Curved	Tangent	Curved
Deg				
0.52°	RPM	RPM	RPM	RPM
0.52°	100	100	90	50
0.77°	100	90	90	50
1.02°	90	50	90	40
1.25°	90	40	90	40
1.47°	80	40	80	40
1.67°	80	40	60	-
1.85°	60	40	-	-
2.02°	-	-	-	-
2.17°	-	-	-	-
2.28°	-	-	-	-
2.38°	-	-	-	-
2.50°	-	-	-	-

«-» - rotation is prohibited



- Recommended operating range
- Short-term operating range
- Prohibit to operate

MVR-176TU (6 3/4") advantages



- Improved drilling controllability of curved sections
- Ensures rotation of BHA at bent angle 1,54°
- Extended overhaul period: up to 250 hours
- Increased BHA speed: up to 120 RPM at straight sections and up to 100 RPM at curved sections
- Bit installing and replacing operations do not impact the lower fishing device
- Increased weight on the BIT up to 66 klbs

Bearing section type	Bearing shaft dimensions, in			Axial bearing ball dia, in	Length to bend , ft
	"Head" dia	Dia under bottom bearing	Dia under axial bearing		
Standard MVR-176T	5.6	4.14	3.55	0,75	6.02
Heavy-duty MVR-176TU	5.87	4.53	3.75	0,82	5.31



MVR-121TU (4 3/4") advantages



- Extended overhaul period: up to 200 hours

- Increased maximum torque: for 28%

- Bit installing and replacing operations do not impact the lower fishing device

- Improved drilling controllability of curved sections

- Ensures rotation of BHA at bent angle 2°

- Increased weight on the BIT up to 30 klbs

Bearing section type	Max estimated torque, ft-lbs	Length to bend , ft	Dynamic bearing capacity, kN	Max WoB, klbs
Standard MVR-121T	5 402	4.53	210	26
Heavy-duty MVR-121TU	6 933	4.40	270	30



LINER HANGER WITH PACKER

Liner hanger with packer is the component of upper completion used for the high pressure applications. Proprietary running tool is required to run hanger on tubing string. The hanger will anchor an isolate liners in high pressure applications. Allows for fracturing with the proprietary stinger.



LINER HANGER STINGER

Stinger assembly for liner hanger with packer consist of short stinger, compression unit and hydraulic anchor. The tool is used for seal tight connection of tubing string with the liner to protect intermediate casing string from high pressure operations during fracture.



FRAC SLEEVE

Multi-activation hydraulic fracturing sleeve – being a liner part – activates by displacement of internal drillable sliding sleeve



- Sliding sleeve movement enables frac sleeve opening/ closing.
- Equipped with anti accidental opening/closing device.
- Seat-milling ensures ports closing and opening using working string seat milling it is possible to close and open ports using working string

OPEN HOLE PACKER



Packer serves as an isolating tool of intervals for the multi-stage frac operations.
Packer could be used in cased and open holes and has been successfully used in horizontal wells applications.

This type of packer eliminates post activation delay as well as unplanned setting with accidental slack offs and overpulls.



LINER HANGER RUNNING TOOL

Running tool is used to run, anchor and activate packer element as well as anchor of the liner hanger. Equipment allows multiple installations as required.



LINER HANGER CEMENTING SLEEVE

Cementing sleeve is used in combination with liner hanger to activate and catch cementing darts or activation balls



COLUMN SHOE WITH RETURN VALVE

