



Power Section Catalog



Model No: DD800784.0 8" 7/8 Lobes 4 Stages

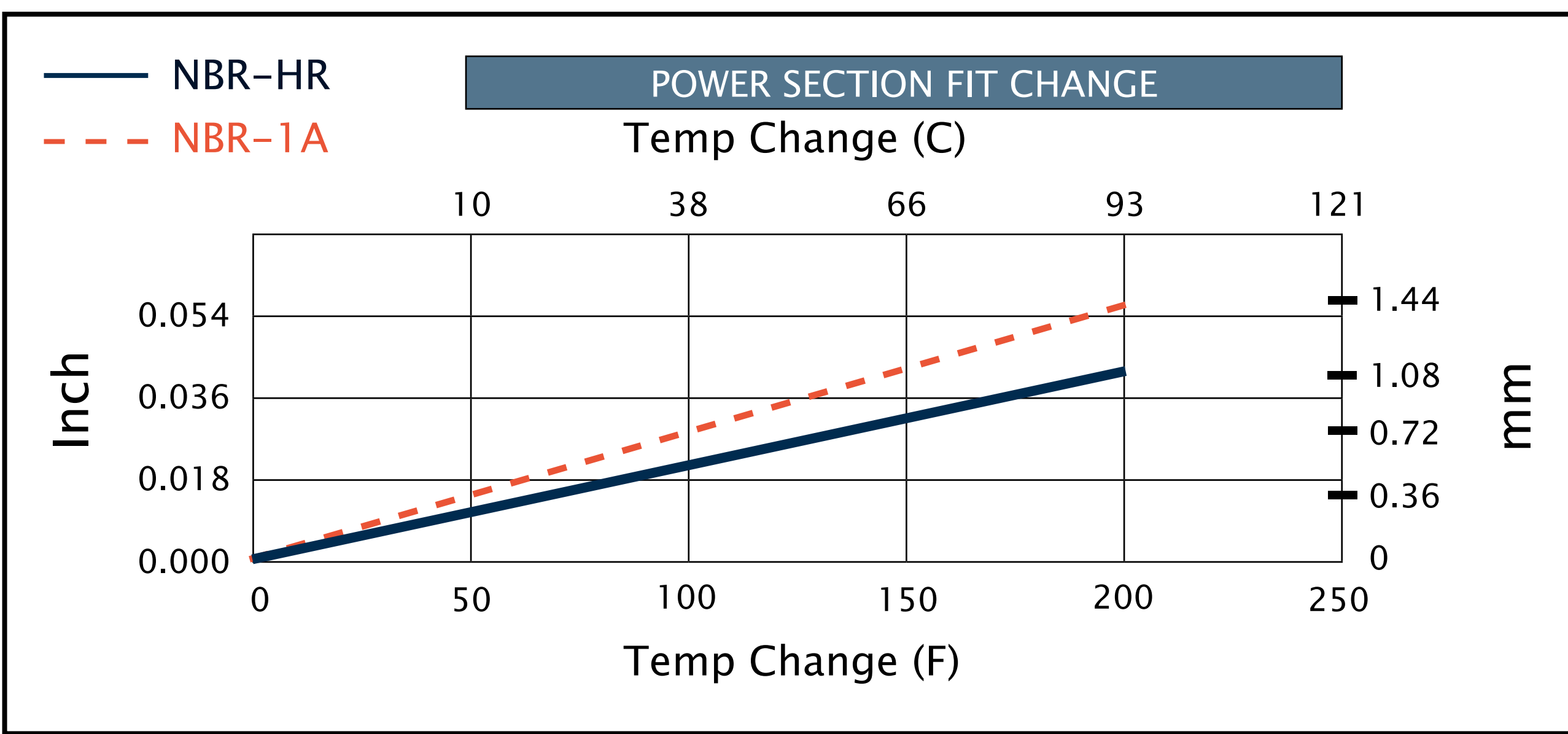
POWER SECTION

Rotor Specifications		
	Inch	mm
Overall Length	196.3	4985
Contour Length	188.3	4782
Eccentricity	0.293	4782
Major Diameter	5.186	131.72
Head Diameter	4.750	120.70
Weight	883 (lbs) 400.5 (kg)	
Material	17 - 4SS	
Thread Form*	3 1/2 API IF	

Stator Specifications		
	Inch	mm
Overall Length	203.2	5161
Rubber Cut Back	8.0	203
Tube O.D.	8.00	203.2
Tube I.D.	6.25	158.8
Weight	1253 (lbs) 568 (kg)	
Number of Stages	4.0	
Rubber Type	NBR-1A, NBR-HR	
Tube Material	4142 Seamless Tubing	

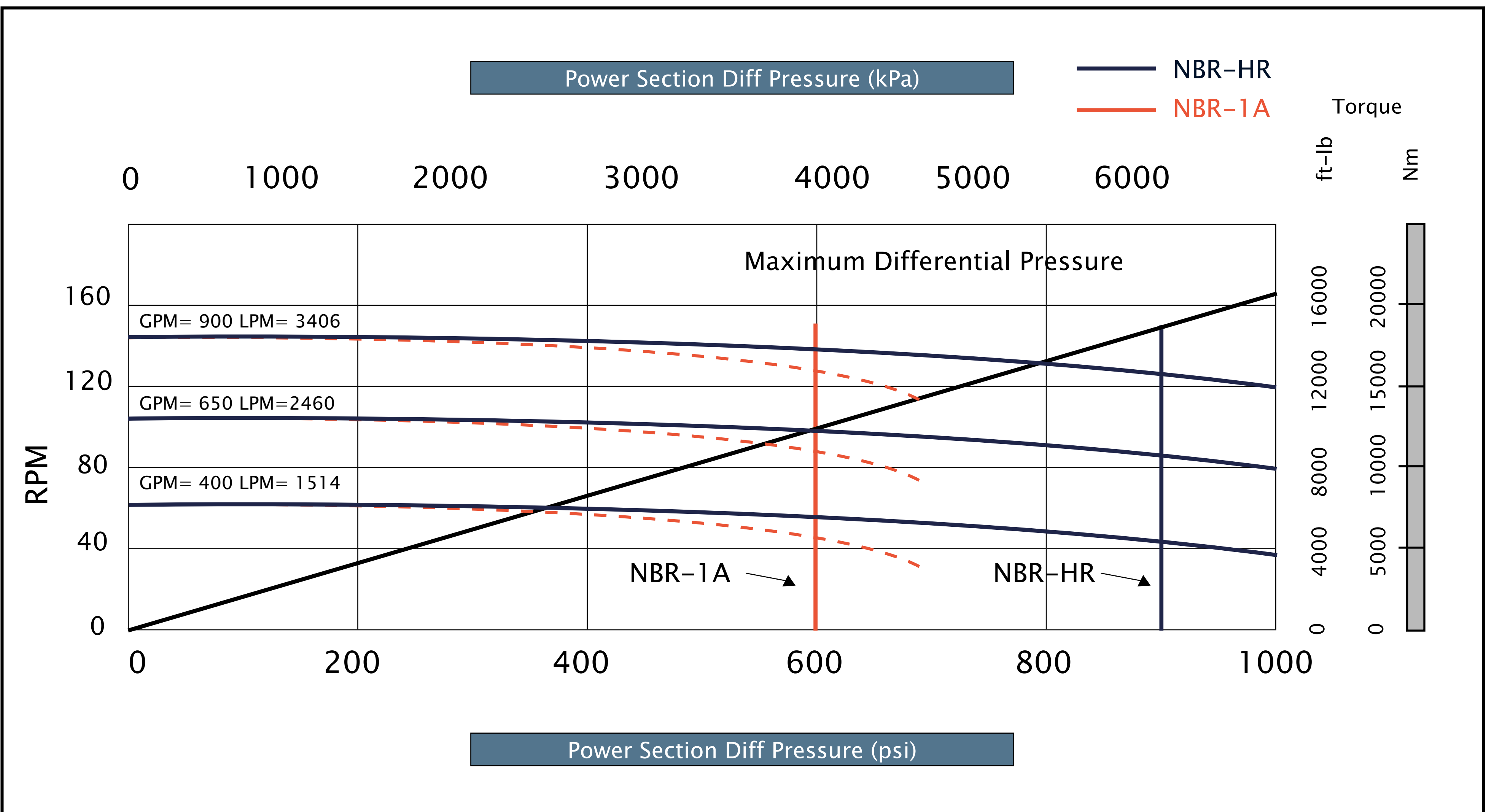
Fit Information		
NBR-1A	Minor Diameter	
Stator Size	Inch	mm
Standard	4.581	116.36
Oversize	4.606	116.99
Double Oversize		
Third Oversize		
Nominal Fit at 75 F (25 C)		
Standard	0.019	0.48
Oversize	-0.006	-0.15
Double Oversize		
Third Oversize		

* Alternate or custom thread forms are available.



Fit Information		
NBR - HR	Minor Diameter	
Stator Size	Inch	mm
Undersize	4.574	116.18
Standard	4.596	116.74
Oversize	4.613	117.17
Double Oversize	4.623	117.42
Nominal Fit at 75 F (25 C)		
Undersize	0.026	0.66
Standard	0.004	0.10
Oversize	-0.013	-0.33
Double Oversize	-0.023	-0.58

Performance Specifications		Performance Details		
			NBR-1A	NBR-HR
Torque Slope	16.589 ft-lb/psi 3.262 Nm/kPa	Max Diff Press psi (kPa)	600 (4140)	900 (6210)
Flow Range	400 to 900 GPM 1510 to 3410 Litre/min	Max Torque ft-lb (Nm)	9950 (13490)	14930 (20240)
Rotation	0.166 Rev/Gal 0.044 Rev/Litre	Stall Diff Press psi (kPa)	900 (6210)	1350 (9310)
Speed Range	66 to 150 RPM	Stall Torque ft-lb (Nm)	14930 (20240)	22400 (30360)
Off Bottom Press	126 psi 870 kPa	Max Recommended HP (kW)	283 (211)	401 (299)



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Model No: DD475783.8 4.75" 7/8 Lobes 3.8 Stages

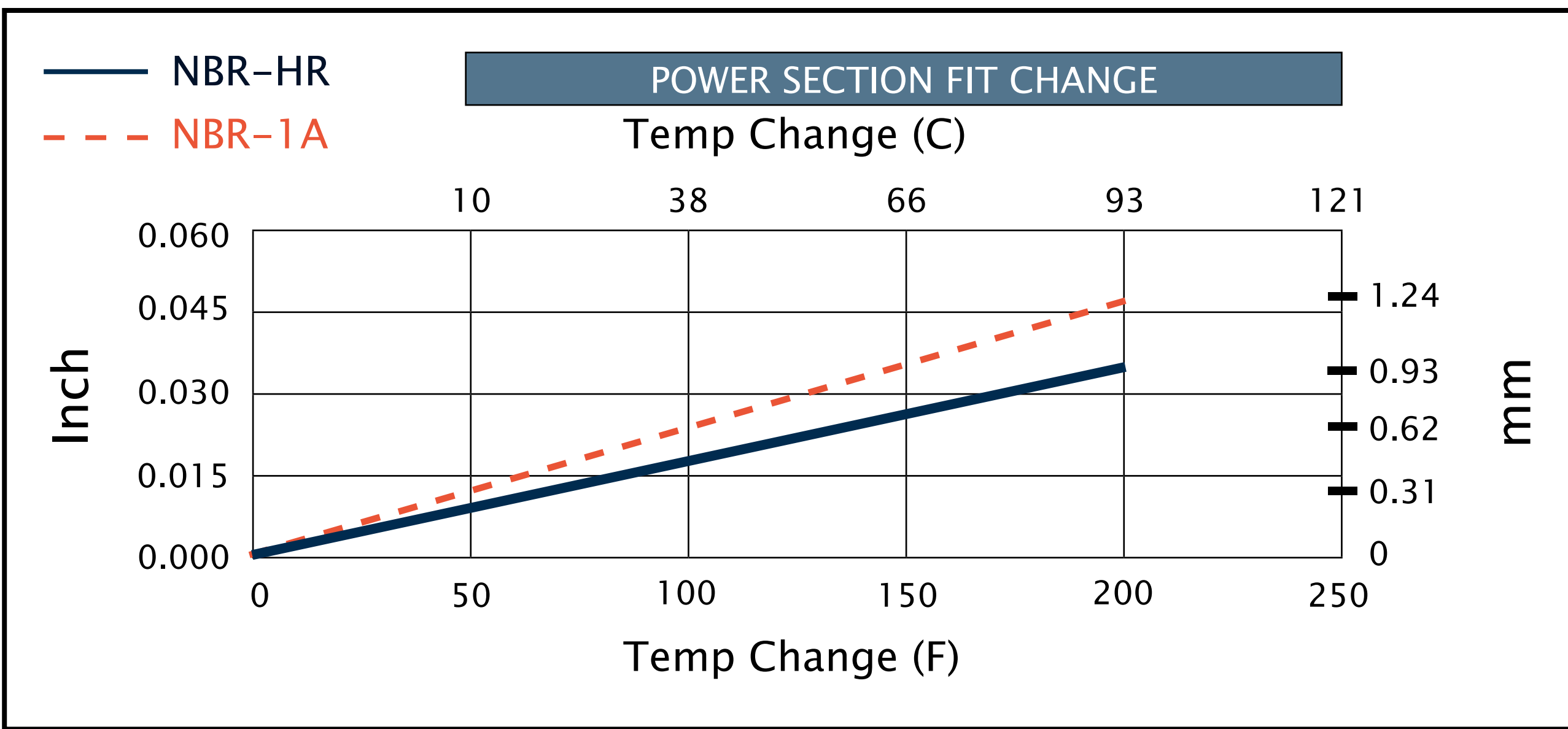
POWER SECTION

Rotor Specifications		
	Inch	mm
Overall Length	178.0	4985
Contour Length	172.3	4782
Eccentricity	0.163	4782
Major Diameter	2.945	131.72
Head Diameter	2.750	120.70
Weight	240 (lbs) 108.9 (kg)	
Material	17 - 4SS	
Thread Form*	2 3/8 Hughes External Flush Mod	

Stator Specifications		
	Inch	mm
Overall Length	187.0	4750
Rubber Cut Back	8.0	203
Tube O.D.	4.75	120.7
Tube I.D.	3.75	95.3
Weight	399 (lbs) 181 (kg)	
Number of Stages	3.8	
Rubber Type	NBR-1A, NBR-HR	
Tube Material	4142 Seamless Tubing	

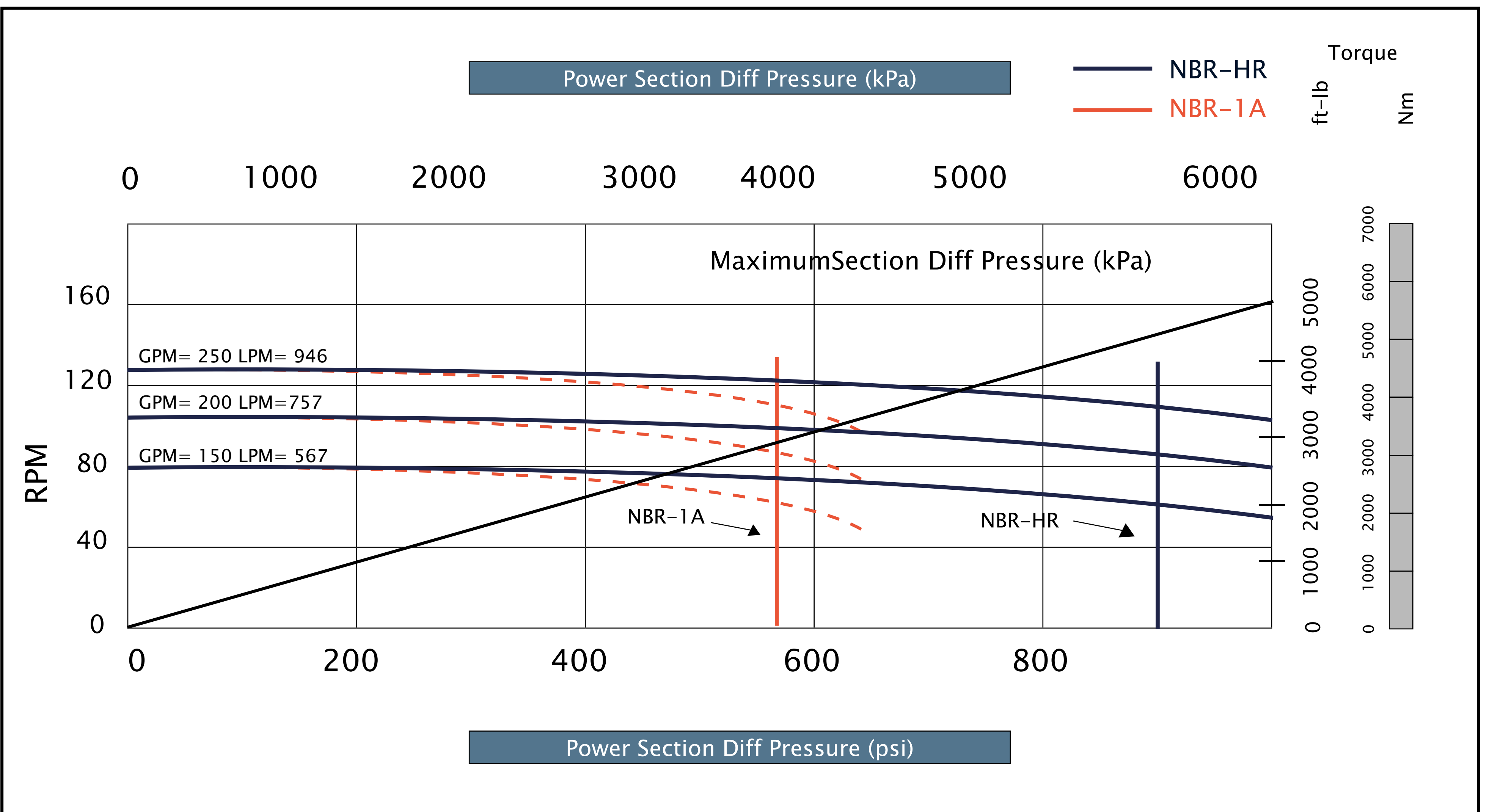
Fit Information		
NBR-1A	Minor Diameter	
Stator Size	Inch	mm
Standard	2.606	66.19
Oversize	2.622	66.60
Double Oversize	2.638	67.01
Third Oversize	2.663	67.64
Nominal Fit at 75 F (25 C)		
Standard	0.013	0.33
Oversize	-0.003	-0.08
Double Oversize	-0.019	-0.48
Third Oversize	-0.044	-1.12

* Alternate or custom thread forms are available.



Fit Information		
NBR - HR	Minor Diameter	
Stator Size	Inch	mm
Undersize		
Standard	2.610	66.29
Oversize	2.624	66.65
Double Oversize	2.651	67.34
Nominal Fit at 75 F (25 C)		
Undersize		
Standard	0.009	0.23
Oversize	-0.005	-0.13
Double Oversize	-0.032	-0.81

Performance Specifications		Performance Details		
			NBR-1A	NBR-HR
Torque Slope	5.200 ft-lb/psi 1.023 Nm/kPa	Max Diff Press psi (kPa)	570 (3930)	860 (5900)
Flow Range	150 to 250 GPM 570 to 950 Litre/min	Max Torque ft-lb (Nm)	2960 (4020)	4450 (6030)
Rotation	0.521 Rev/Gal 0.138 Rev/Litre	Stall Diff Press psi (kPa)	860 (5900)	1280 (8840)
Speed Range	78 to 140 RPM	Stall Torque ft-lb (Nm)	4450 (6030)	6670 (9050)
Off Bottom Press	64 psi 440 kPa	Max Recommended HP (kW)	74 (55)	104 (78)



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Model No: DD475782.6 ESX 4.75" 7/8 Lobes 2.6 Stages

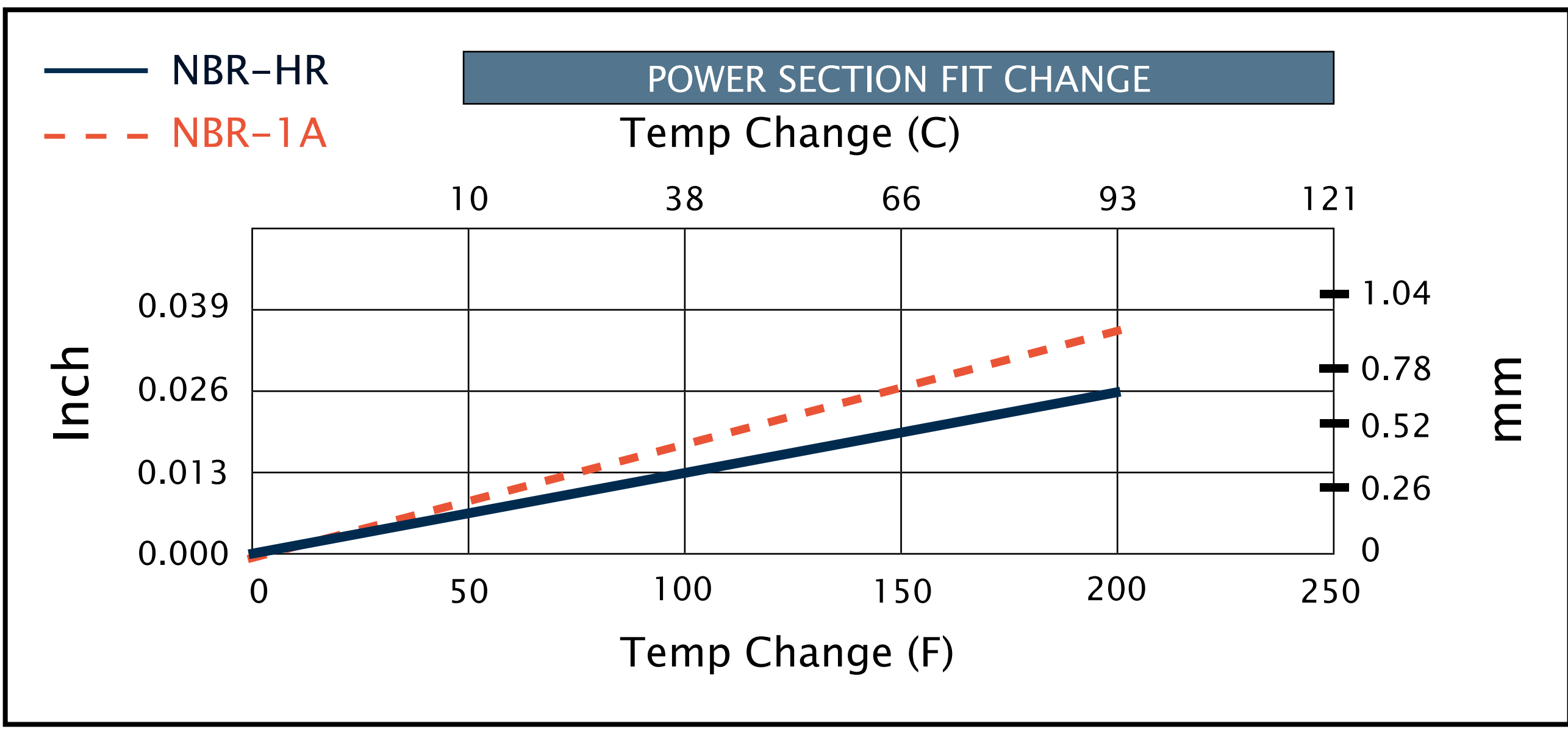
POWER SECTION

Rotor Specifications		
	Inch	mm
Overall Length	220.0	5588
Contour Length	214.3	5442
Eccentricity	0.174	4.41
Major Diameter	3.095	78.61
Head Diameter	2.750	69.90
Weight	323 (lbs) 146.5 (kg)	
Material	17 - 4SS	
Thread Form*	2 3/8 Hughes External Flush Mod	

Stator Specifications		
	Inch	mm
Overall Length	229.3	5823
Rubber Cut Back	8.0	203
Tube O.D.	4.75	120.7
Tube I.D.	3.75	95.3
Weight	396 (lbs) 180 (kg)	
Number of Stages	2.6	
Rubber Type	NBR-1A, NBR-HR	
Tube Material	4142 Seamless Tubing	

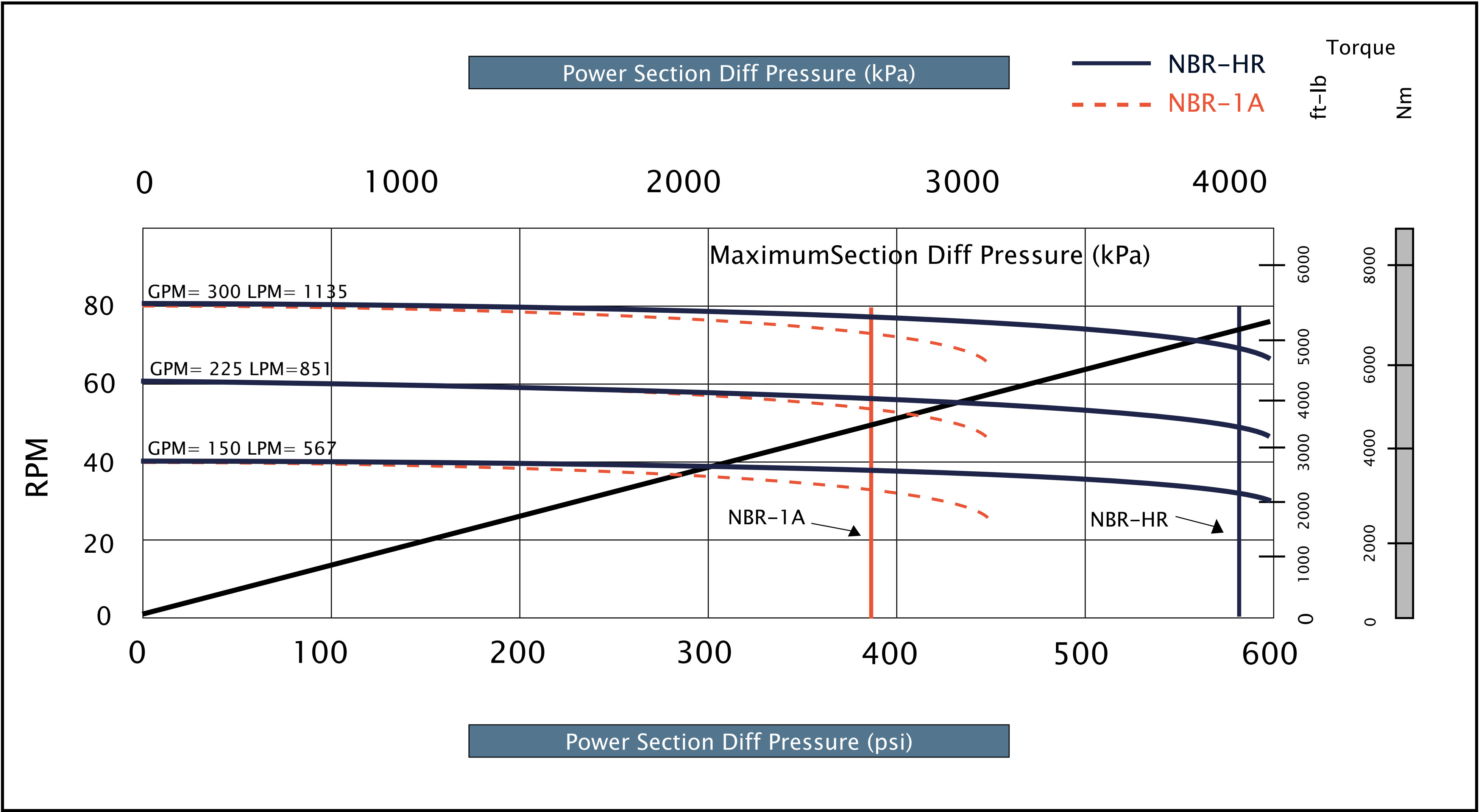
Fit Information		
NBR-1A	Minor Diameter	
Stator Size	Inch	mm
Standard	2.738	69.55
Oversize	2.762	70.15
Double Oversize		
Nominal Fit at 75 F (25 C)		
Standard	0.010	0.25
Oversize	-0.014	-0.36
Double Oversize		

* Alternate or custom thread forms are available.



Fit Information		
NBR - HR	Minor Diameter	
Stator Size	Inch	mm
Undersize	2.722	69.14
Standard	2.746	69.75
Oversize	2.758	70.05
Double Oversize		
Nominal Fit at 75 F (25 C)		
Undersize	0.026	0.66
Standard	0.002	0.05
Oversize	-0.010	-0.25
Double Oversize		

Performance Specifications		Performance Details		
			NBR-1A	NBR-HR
Torque Slope	8.974 ft-lb/psi 1.765 Nm/kPa	Max Diff Press psi (kPa)	390 (2690)	590 (4030)
Flow Range	150 to 300 GPM 570 to 1140 Litre/min	Max Torque ft-lb (Nm)	3500 (4750)	5250 (7120)
Rotation	0.263 Rev/Gal 0.070 Rev/Litre	Stall Diff Press psi (kPa)	590 (4030)	880 (6050)
Speed Range	39 to 79 RPM	Stall Torque ft-lb (Nm)	5250 (7120)	7880 (10680)
Off Bottom Press	45 psi 310 kPa	Max Recommended HP (kW)	53 (39)	75 (56)



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Model No: DD475782.6 ESX 4.75" 7/8 Lobes 2.6 Stages

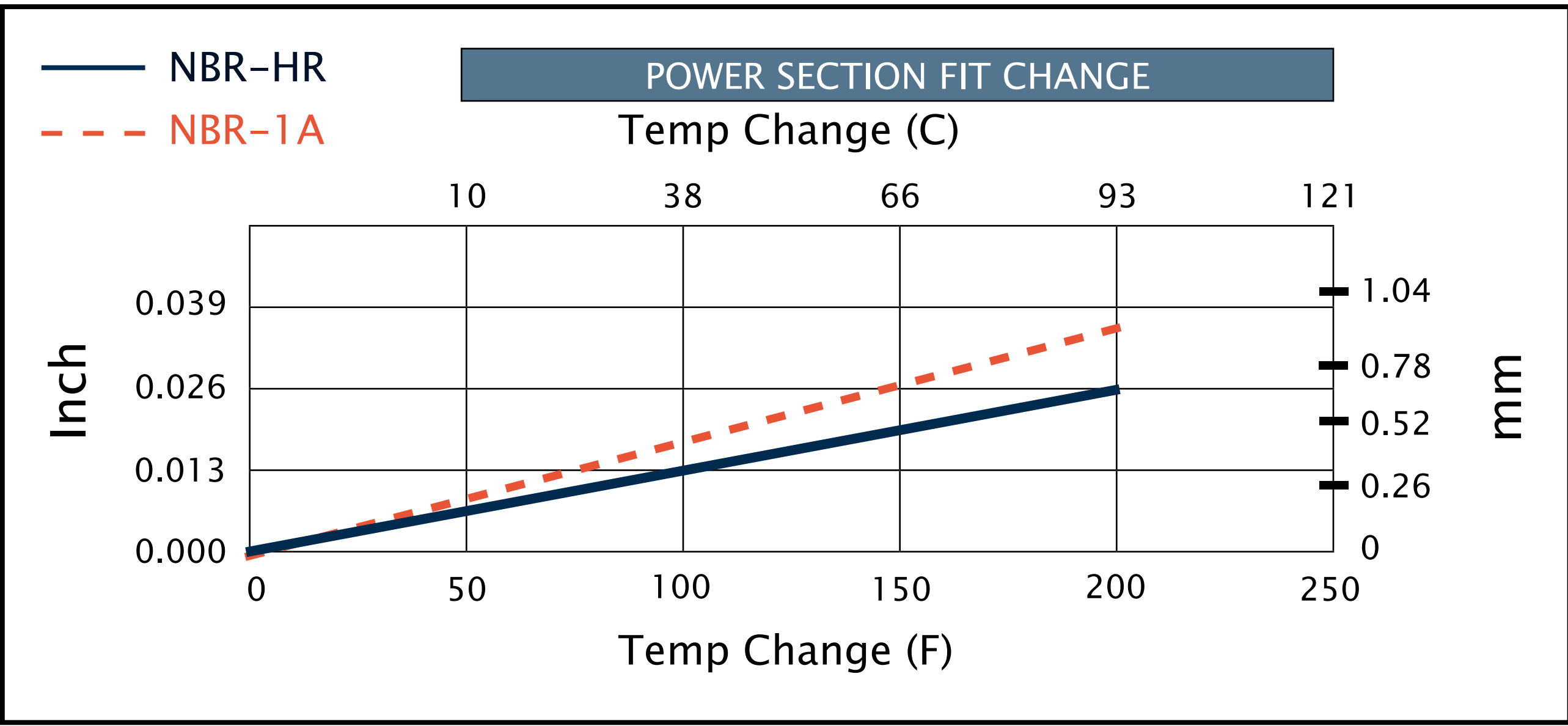
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Major Diameter	3.095	78.61
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Stator Specifications		
	Inch	mm
Overall Length	229.3	5823
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Tube O.D.	4.75	120.7
Tube I.D.	3.75	95.3
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Number of Stages	2.6	
Rubber Type	NBR-1A, NBR-HR	
Tube Material	4142 Seamless Tubing	

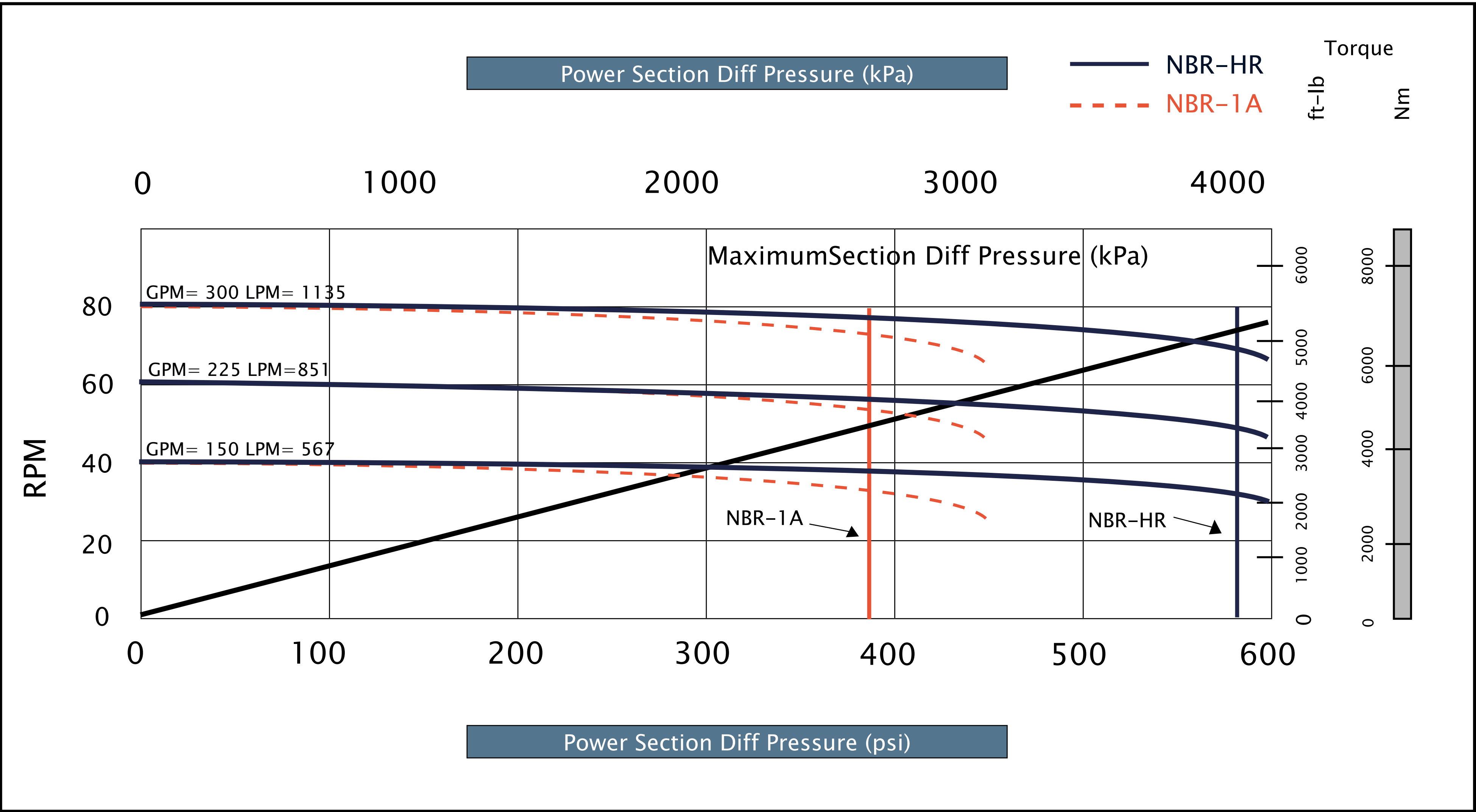
Fit Information		
NBR-1A	Minor Diameter	
Stator Size	Inch	mm
Standard	2.738	69.55
Oversize	2.762	70.15
Double Oversize		
Nominal Fit at 75 F (25 C)		
Standard	0.010	0.25
Oversize	-0.014	-0.36
Double Oversize		

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Fit Information		
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Undersize	2.722	69.14
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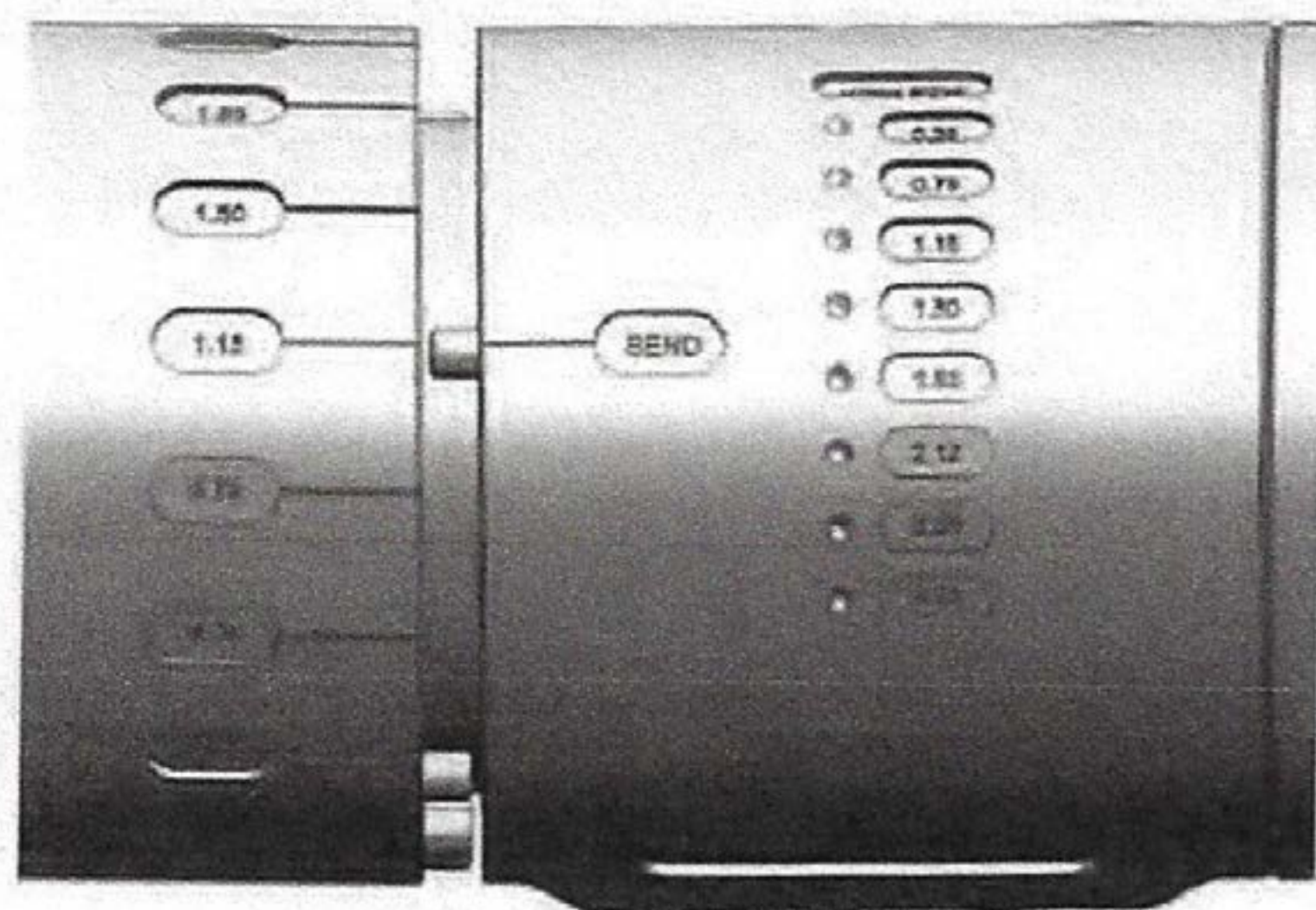


2.38° Adjustable Housing

The 2.38° Adjustable Housing bend setting is set in the same way as the 2°, 3°, and 4° housings, however, instead of teeth, there are pins and slots which must be aligned. The bend setting is shown by aligning the 'BEND' line on the adjusting ring with the desired angle line on the offset housing.

Determining High Side

For whatever bend setting the assembly is set at, the motor high side (short side) is indicated by the corresponding mark on the Adjusting Ring.



2.38° Adjusting Ring

Reset Adjusting Ring Position

If the Adjusting Ring teeth are not kept engaged and the ring is allowed to rotate when backing off the Lock housing, the internal Splined Mandrel will back off. This can also occur if the Adjusting Ring is rotated counterclockwise beyond the 0° bend setting.

If the Splined Mandrel backs off too far, the Lock Housing will bottom out on the splines when making up this connection. Because of this, the connection is not properly preloaded, which can lead to the Lock Housing or Splined Mandrel backing off down hole. In extreme cases, it is possible that the teeth can be sheared off when trying to torque up the connection.

In the event that the adjusting ring disengages from the offset housing and rotates counterclockwise beyond the 0° bend setting, the procedure outlined below should be followed to reset the adjusting ring to the proper position prior to setting the bend angle:

1. To ensure enough clearance to complete the following steps, engage the adjusting ring and back off only the lock housing 2 additional turns.
2. Slide the adjusting ring up until teeth disengage from the offset housing.
3. Screw the adjusting ring (and the splined mandrel) clockwise into the offset housing until the splined mandrel bottoms out & stops. If teeth engage while screwing in splined mandrel, repeat steps 1 and 2.
4. Back off 2 turns (counterclockwise rotation).
5. Rotate the adjusting ring clockwise to the "0.00" position.

The adjustable housing is now reset and can be set to the desired bend angle as indicated in the previous pages.



To calculate nozzle size directly

1. Find the required nozzle flow rate using previous steps 1 and 2.
2. Calculate nozzle flow area from the following equation:

$$A_n = \sqrt{\frac{Q_n^2 \times MW}{10858 \times \Delta P_0}} \text{ [in}^2\text{]}$$

3. Find the nozzle size by rounding down the result of the following:

$$\text{Nozzle Size (32nd inch)} = \sqrt{\frac{4 \times A_n}{\pi}} \times 32$$

Example

A total flow of 600 gpm is desired using a 6 1/4" 7/8 2.8 stage motor at a differential operating pressure of 240 psi. The desired speed is 100 RPM and the mud weight is 11 lb/gal (11 ppg).

The motor performance chart for the above motor shows that 320 gpm is required to turn the motor at 100 RPM and 240 psi. Subtracting this 320 gpm motor flow rate from the 600 gpm total flow rate gives a required nozzle flow rate of 280 gpm.

Adjusting this nozzle flow rate for 11 ppg mud gives an equivalent nozzle flow rate (Qe) of:

$$Q_e = Q_n \times \sqrt{\frac{MW \text{ [lb/gal]}}{8.3304 \text{ lb/gal}}} = 280 \text{ gpm} \times \sqrt{\frac{11 \text{ lb/gal}}{8.33 \text{ lb/gal}}}$$

$Q_e = 322 \text{ gpm}$

The above chart indicates that a 26/32 nozzle is required to bypass 322 gpm of water which is equivalent to an 11 ppg mud flow rate of 280 gpm at 240 psi.

A direct calculation yields:

$$A_n = \sqrt{\frac{Q_n^2 \times MW}{10858 \times \Delta P_0}} = \sqrt{\frac{280^2 \times 11}{10858 \times 240}} = .575 \text{ in}^2$$

$$\text{Nozzle Size (/32 in)} = \sqrt{\frac{4 \times A_n}{\pi}} \times 32 = \sqrt{\frac{4 \times .575}{\pi}} \times 32 = 27.4$$

Rounding down to the nearest nozzle size yields a 26/32 nozzle.

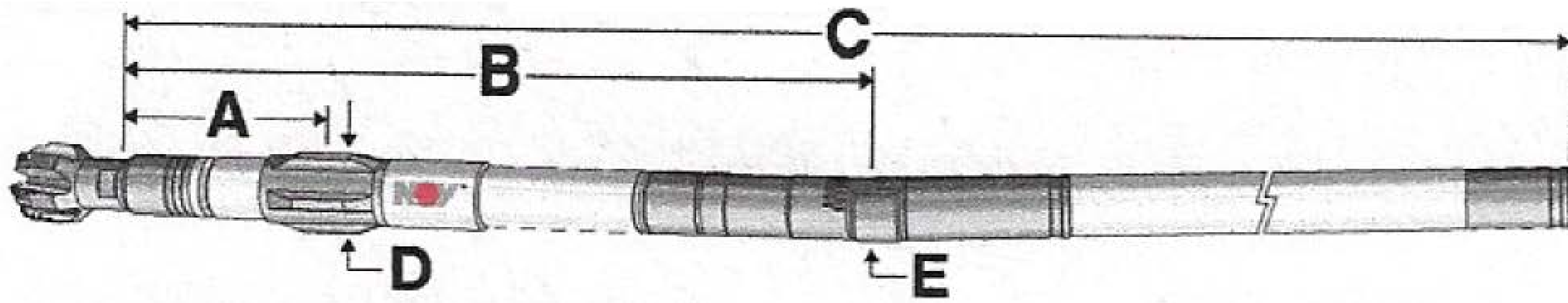
Nozzle Torque Values

Size	Socket Size in (mm)	Nozzle Type	Nozzle Carrier Torque lb-ft (N-m)
2 7/8	1 1/16 (27)	Reed 371748	100 (140)
3 3/8	1 1/16 (27)	Reed 371748	100 (140)
3 3/4	1 3/16 (30)	Reed 371748	200 (270)
4 3/4	1 1/2 (38)	Dresser 16527-xx	300 (410)
6 1/4	1 5/8 (41)	Dresser 90021 - 28	600 (800)
6 3/4	1 5/8 (41)	Dresser 90021 - 28	600 (800)
7 3/4	1 5/8 (41)	Dresser 90021 - 28	600 (800)
9 5/8	1 5/8 (41)	Dresser 90021 - 28	600 (800)
11 1/4	1 5/8 (41)	Dresser 90021 - 28	600 (800)



4 3/4" 7/8 2.0 Stage

Specifications on this page are for an ST3 motor*



Alternate Stator Tube OD Available:

5 in (127mm)

Bit to Center of Stabilizer Blade	A	20 in (0.50m)
Bit to Bend	B	61 in (1.55m)
Bit to Top Sub	C	283 in (7.18m)
Max OD of Motor at Upset for Stabilizer	D	5.56 in (141mm)
Radius @ Adjusting Ring	E	2.78 in (71mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		5.56 in (141mm)
Max OD of Slick Motor w/ Straight Housing		5.13 in (130mm)
Bit to Max Slick OD w/Straight Housing		38.12 in (968mm)
Estimated Total Weight:		990 lbs (449 kg)
Common Top Connection:		3 1/2 REG, 3 1/2 IF
Common Btm Connection:		3 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4
0.39°	2.2	1.4	1.4	2.3	2.4	2.8	1.5	1.5	1.5
0.78°	5.0	4.2	2.8	5.0	4.9	5.2	4.3	4.1	4.1
1.15°	7.8	7.0	5.4	7.8	7.2	7.5	7.1	6.5	6.5
1.50°	10.4	9.5	7.9	10.4	9.5	9.7	9.8	8.8	8.8
1.83°	12.8	12.0	10.3	12.8	12.0	11.8	12.3	11.3	11.0
2.12°	14.9	14.1	12.4	14.9	14.1	13.6	14.5	13.5	12.9
** 2.25°	15.9	15.0	13.4	15.9	15.0	14.4	15.5	14.5	13.7
2.38°	16.9	16.0	14.3	16.9	16.0	15.3	16.5	15.5	14.6
2.60°	18.5	17.6	15.9	18.5	17.6	16.6	18.2	17.2	16.0
2.77°	19.7	18.8	17.1	19.7	18.8	17.7	19.5	18.5	17.1
2.89°	20.6	19.7	18.0	20.6	19.7	18.4	20.4	19.4	17.9
2.97°	21.2	20.3	18.6	21.2	20.0	19.0	21.0	20.0	18.4
3.00°	21.4	20.5	18.8	21.4	20.5	19.1	21.3	20.2	18.6

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

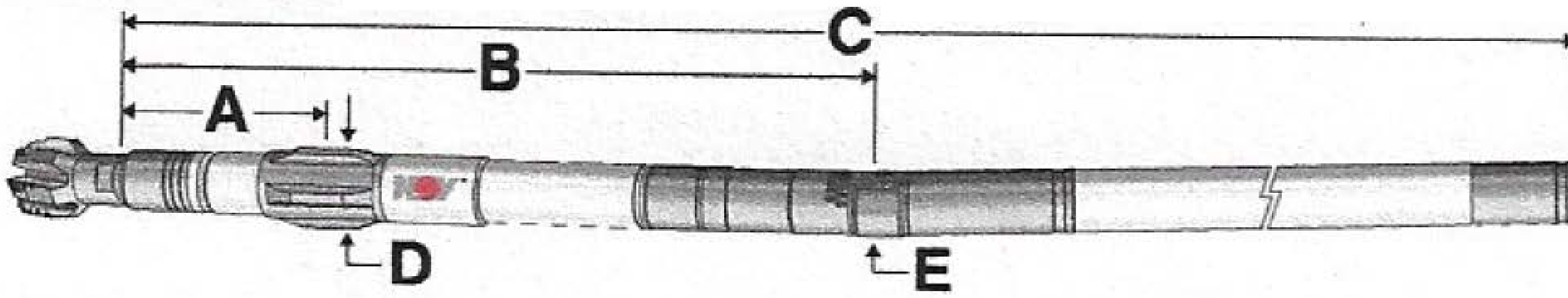
Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size			
	Deg/100ft	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4	6-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.50	1.83	1.83	1.50	1.83	1.83	1.50	1.83	1.83	1.83
6.0°	1.50	1.50	1.83	1.50	1.50	1.50	1.15	1.50	1.50	1.50
8.0°	1.15	1.15	1.83	1.15	1.15	1.15	1.15	1.15	1.15	1.15
10.0°	0.78	1.15	1.50	0.78	1.15	1.15	0.78	0.78	0.78	0.78
12.0°	0.78	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39	0.39
14.0°	0.39	0.39	0.78	0.39	0.39	0.39	0.39	0.00	0.00	0.00
16.0°	0.00	0.39	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18.0°	0.00	0.00	0.39	-	-	0.00	-	-	-	-
20.0°	-	0.00	0.00	-	-	-	-	-	-	-
22.0°	-	-	0.00	-	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



4 3/4" 7/8 2.6 Stage

Specifications on this page are for an ST3 motor*



Bit to Center of Stabilizer Blade	A	20 in (0.50m)
Bit to Bend	B	61 in (1.55m)
Bit to Top Sub	C	332 in (8.43m)
Max OD of Motor at Upset for Stabilizer	D	5.56 in (141mm)
Radius @ Adjusting Ring	E	2.78 in (71mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		5.56 in (141mm)
Max OD of Slick Motor w/ Straight Housing		5.13 in (130mm)
Bit to Max Slick OD w/Straight Housing		38.12 in (968mm)
Estimated Total Weight:		1170 lbs (531 kg)
Common Top Connection:		4 1/2 REG, 3 1/2 IF
Common Btm Connection:		4 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4
0.39°	1.8	1.3	1.2	1.9	2.0	2.3	1.4	1.4	1.4
0.78°	4.3	3.6	2.5	4.3	4.2	4.5	3.7	3.6	3.6
1.15°	6.7	6.0	4.6	6.7	6.3	6.5	6.2	5.8	5.8
1.50°	8.9	8.2	6.8	8.9	8.3	8.5	8.5	7.8	7.8
1.83°	11.0	10.3	8.9	11.0	10.3	10.3	10.7	9.8	9.7
2.12°	12.9	12.1	10.7	12.9	12.1	12.0	12.6	11.7	11.4
** 2.25°	13.7	13.0	11.5	13.7	13.0	12.7	13.5	12.6	12.2
2.38°	14.5	13.8	12.4	14.5	13.8	13.4	14.3	13.5	12.9
2.60°	16.0	15.2	13.7	16.0	15.2	14.6	15.8	14.9	14.2
2.77°	17.0	16.3	14.8	17.0	16.3	15.6	16.9	16.0	15.2
2.89°	17.8	17.1	15.6	17.8	17.1	16.2	17.7	16.8	15.9
2.97°	18.3	17.6	16.1	18.3	17.6	16.7	18.2	17.4	16.3
3.00°	18.5	17.8	16.3	18.5	17.8	16.9	18.4	17.6	16.5

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

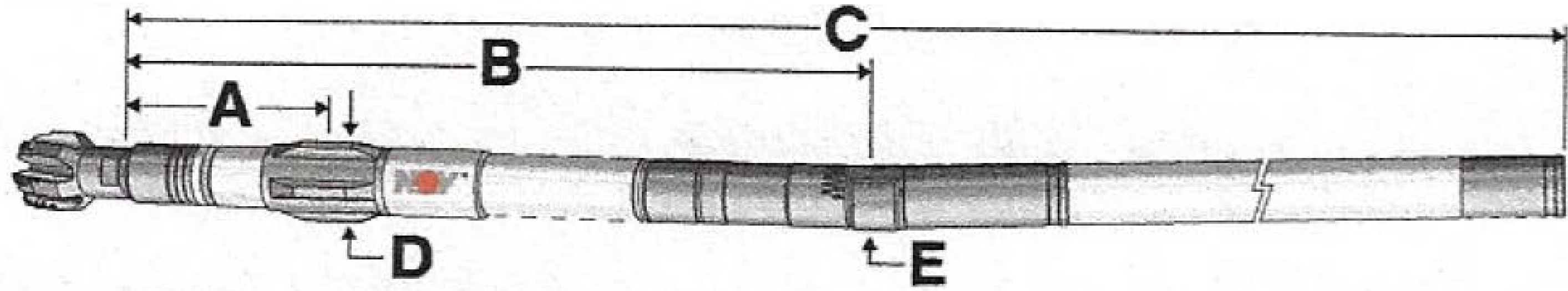
Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size			
	Deg/100ft	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4	6-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6.0°	1.50	1.83	1.83	1.50	1.83	1.83	1.50	1.50	1.50	1.50
8.0°	1.15	1.50	1.83	1.15	1.50	1.50	1.15	1.15	1.15	1.15
10.0°	0.78	1.15	1.50	0.78	1.15	1.15	0.78	1.15	0.78	0.78
12.0°	0.78	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39	0.39
14.0°	0.39	0.39	0.78	0.39	0.39	0.39	0.39	0	0	0
16.0°	0	0.39	0.78	0	0	0	0	0	0	0
18.0°	0.00	0.00	0.39	-	-	-	-	-	-	-
20.0°	-	0	0.39	-	-	-	-	-	-	-
22.0°	-	-	0	-	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



4 3/4" 7/8 2.9 Stage

Specifications on this page are for an ST3 motor*



Alternate Stator Tube OD Available:		5 in (127mm)
Bit to Center of Stabilizer Blade	A	20 in (0.50m)
Bit to Bend	B	61 in (1.55m)
Bit to Top Sub	C	353 in (8.96m)
Max OD of Motor at Upset for Stabilizer	D	5.56 in (141mm)
Radius @ Adjusting Ring	E	2.78 in (71mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		5.56 in (141mm)
Max OD of Slick Motor w/ Straight Housing		5.13 in (130mm)
Bit to Max Slick OD w/Straight Housing		38.12 in (968mm)
Estimated Total Weight:		1240 lbs (562 kg)
Common Top Connection:		3 1/2 REG, 3 1/2 IF
Common Btm Connection:		3 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4
0.39°	1.7	1.2	1.2	1.8	1.9	2.1	1.3	1.3	1.3
0.78°	4.0	3.4	2.3	4.0	4.0	4.2	3.5	3.5	3.5
1.15°	6.3	5.6	4.3	6.3	6.0	6.2	5.9	5.5	5.5
1.50°	8.4	7.7	6.4	8.4	7.9	8.1	8.1	7.5	7.5
1.83°	10.4	9.7	8.4	10.4	9.7	9.8	10.1	9.3	9.3
2.12°	12.2	11.5	10.1	12.2	11.5	11.4	11.9	11.1	10.9
** 2.25°	13.0	12.3	10.9	13.0	12.3	12.1	12.7	11.9	11.6
2.38°	13.8	13.1	11.7	13.8	13.1	12.7	13.6	12.7	12.3
2.60°	15.1	14.4	13.0	15.1	14.4	13.9	14.9	14.1	13.5
2.77°	16.1	15.4	14.0	16.1	15.4	14.8	16.0	15.2	14.5
2.89°	16.8	16.1	14.7	16.8	16.1	15.5	16.7	15.9	15.1
2.97°	17.3	16.6	15.2	17.3	16.6	15.9	17.2	16.4	15.6
3.00°	17.5	16.8	15.4	17.5	16.8	16.1	17.4	16.6	15.7

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling – Degrees

Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size			
	Deg/100ft	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4	6-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6.0°	1.50	1.83	1.83	1.50	1.83	1.83	1.50	1.83	1.50	1.50
8.0°	1.15	1.50	1.83	1.15	1.50	1.50	1.15	1.50	1.15	1.15
10.0°	0.78	1.15	1.50	0.78	1.15	1.15	0.78	1.15	0.78	0.78
12.0°	0.78	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39	0.39
14.0°	0.39	0.39	0.78	0.39	0.39	0.39	0.39	0.00	0.00	0.00
16.0°	0.00	0.39	0.39	0.00	0.00	0.00	0.00	0.00	-	-
18.0°	-	0.00	0.39	-	-	-	-	-	-	-
20.0°	-	0	0.39	-	-	-	-	-	-	-
22.0°	-	-	0	-	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



Motor Comparison Tables – Imperial

Size	Model	Series	Bit to Bend (in)	Pull to Re-Run (lbf)	Pull to Yield (lbf)
169	Black Max™		N/A	6,000	28,000
213	ST1	17	N/A	19,000	61,000
238	ST1	17	N/A	22,000	81,000
238	SR1	20	N/A	22,000	24,000
287	ST1	14	N/A	47,000	137,000
287	ST1	17	N/A	45,000	130,000
287	SR1	20	N/A	50,000	137,000
287	ST2H	24XH	N/A	47,000	137,000
313	ST2	24X	N/A	57,000	179,000
350	ST1	14	55.7	60,000	221,000
350	SR1	20	31.9	60,000	172,000
375	ST1	17	47.2	75,000	233,000
375	SR1	20	36.6	75,000	174,000
375	ST2	24	48.5	75,000	238,000
475	SR1	20	44.5	108,000	331,000
475	ST2	24	61.5	144,000	403,000
475	ST2	24X	65.5	144,000	403,000
475	ST2H	24XH	65.5	144,000	403,000
500	ST3	36	61.2	144,000	325,000
500	SR3	39	46.2	184,000	325,000
500	ML3	40	66.2	159,000	432,000
625	ST2	24	75.3	215,000	515,000
625	ST2	24X	79.3	215,000	515,000
625	ST2H	24XH	79.3	215,000	515,000
650	ST3	36	77.1	263,000	593,000
650	ML3	40	77.9	254,000	644,000
675	ST2	24	75.2	277,000	618,000
675	ST2	24X	79.2	277,000	618,000
675	ST2H	24XH	78.8	277,000	618,000
675	ST3	36	76.1	277,000	549,000
675	SR3	39	58.2	341,000	618,000
700	ML3	40	79.5	305,000	599,000
775	ST1	17	74.9	349,000	718,000
775	ST2	24	80.3	349,000	718,000
800	ST2	24	80.4	349,000	718,000
800	ST3	36	86.8	367,000	792,000
800	ML3	40	90.6	434,000	792,000
962	ST1	17	90.0	581,000	1,186,000
962	ST2	24X	92.7	581,000	1,186,000
962	ST2H	24XH	99.0	581,000	1,186,000
962	ST3	36	97.9	581,000	1,186,000
962	ML3	40	107.0	692,000	1,873,000
1125	ST2H	24	109.8	906,000	1,610,000



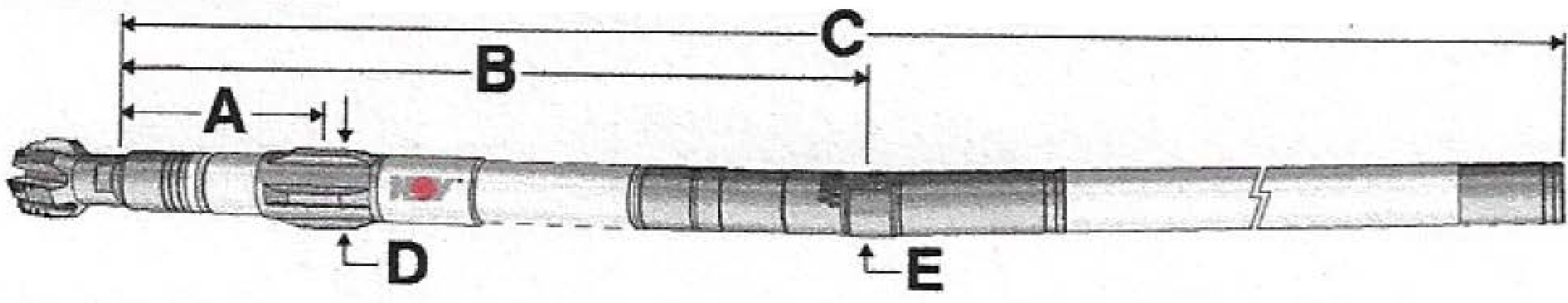
Weight on Bit Limits – Imperial

Size	Model	Series	Max WOB @ 100RPM (lbf)	Max WOB @ 200 RPM (lbf)	Max WOB @ 300 RPM (lbf)
169	Black Max™		2,200	1,800	1,600
213	ST1	17	12,000	10,000	8,000
238	ST1	17	12,000	10,000	9,000
238	SR1	20	13,000	11,000	10,000
287	ST1	14	22,000	18,000	16,000
287	ST1	17	22,000	18,000	16,000
287	SR1	20	23,000	19,000	17,000
287	ST2H	24XH	22,000	18,000	16,000
313	ST2	24X	21,000	17,000	15,000
350	ST1	14	25,000	20,000	18,000
350	SR1	20	25,000	20,000	18,000
375	ST1	17	29,000	24,000	21,000
375	SR1	20	29,000	24,000	21,000
375	ST2	24	29,000	24,000	21,000
475	SR1	20	54,000	44,000	39,000
475	ST2	24	53,000	43,000	38,000
475	ST2	24X	53,000	43,000	38,000
475	ST2H	24XH	53,000	43,000	38,000
500	ST3	36	53,000	43,000	38,000
500	SR3	39	58,000	47,000	42,000
500	ML3	40	87,000	69,000	60,000
625	ST2	24	76,000	62,000	55,000
625	ST2	24X	76,000	62,000	55,000
625	ST2H	24XH	76,000	62,000	55,000
650	ST3	36	90,000	73,000	65,000
650	ML3	40	115,000	92,000	80,000
675	ST2	24	98,000	80,000	71,000
675	ST2	24X	98,000	80,000	71,000
675	ST2H	24XH	98,000	80,000	71,000
675	ST3	36	98,000	80,000	71,000
675	SR3	39	103,000	84,000	74,000
700	ML3	40	144,000	114,000	100,000
775	ST1	17	127,000	103,000	91,000
775	ST2	24	127,000	103,000	91,000
800	ST2	24	127,000	103,000	91,000
800	ST3	36	128,000	104,000	92,000
800	ML3	40	187,000	149,000	130,000
962	ST1	17	213,000	173,000	154,000
962	ST2	24X	213,000	173,000	154,000
962	ST2H	24XH	213,000	173,000	154,000
962	ST3	36	213,000	173,000	154,000
962	ML3	40	325,000	258,000	225,000
1125	ST2H	24	216,000	176,000	156,000



4 3/4" 4/5 6.3 Stage

Specifications on this page are for an ST3 motor*



Alternate Stator Tube OD Available:		5 in (127 mm)
Bit to Center of Stabilizer Blade	A	20 in (0.50m)
Bit to Bend	B	61 in (1.55m)
Bit to Top Sub	C	310 in (7.87m)
Max OD of Motor at Upset for Stabilizer	D	5.56 in (141 mm)
Radius @ Adjusting Ring	E	2.78 in (71 mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		5.56 in (141 mm)
Max OD of Slick Motor w/ Straight Housing		5.13 in (130mm)
Bit to Max Slick OD w/Straight Housing		38.12 in (968mm)
Estimated Total Weight:		1090 lbs (494 kg)
Common Top Connection:		3 1/2 REG, 3 1/2 IF
Common Btm Connection:		3 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4
0.39°	1.9	1.3	1.3	2.1	2.2	2.5	1.4	1.4	1.4
0.78°	4.6	3.9	2.6	4.6	4.5	4.8	4.0	3.8	3.8
1.15°	7.1	6.4	4.9	7.1	6.7	7.0	6.6	6.1	6.1
1.50°	9.5	8.7	7.3	9.5	8.8	9.0	9.0	8.2	8.2
1.83°	11.8	11.0	9.5	11.8	11.0	10.9	11.4	10.4	10.2
2.12°	13.7	12.9	11.4	13.7	12.9	12.7	13.4	12.5	12.0
** 2.25°	14.6	13.8	12.3	14.6	13.8	13.4	14.3	13.4	12.8
2.38°	15.5	14.7	13.2	15.5	14.7	14.2	15.2	14.3	13.6
2.60°	17.0	16.2	14.6	17.0	16.2	15.5	16.8	15.9	15.0
2.77°	18.2	17.4	15.8	18.2	17.4	16.5	18.0	17.0	16.0
2.89°	19.0	18.2	16.6	19.0	18.2	17.2	18.8	17.9	16.7
2.97°	19.5	18.7	17.1	19.5	18.7	17.6	19.4	18.5	17.2
3.00°	19.7	18.9	17.3	19.7	18.9	17.8	19.6	18.7	17.4

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size			
	Deg/100ft	6	6-1/4	6-3/4	6	6-1/4	6-3/4	6	6-1/4	6-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6.0°	1.50	1.50	1.83	1.50	1.50	1.50	1.50	1.50	1.50	1.50
8.0°	1.15	1.50	1.83	1.15	1.50	1.15	1.15	1.15	1.15	1.15
10.0°	0.78	1.15	1.50	0.78	1.15	1.15	0.78	0.78	0.78	0.78
12.0°	0.78	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39	0.39
14.0°	0.39	0.39	0.78	0.39	0.39	0.39	0.39	0.00	0.00	0.00
16.0°	0.00	0.39	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18.0°	0.00	0.00	0.39	-	-	-	-	-	-	-
20.0°	-	-	0.00	-	-	-	-	-	-	-
22.0°	-	-	0.00	-	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



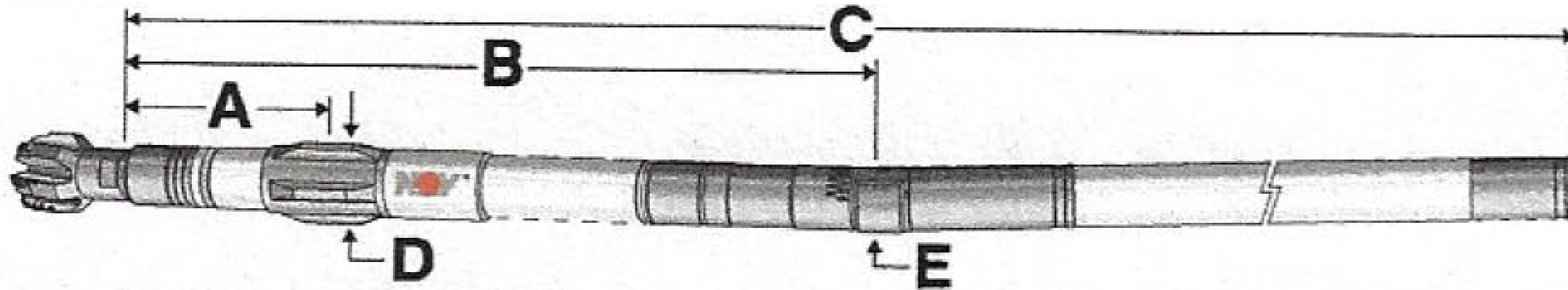
Motor Comparison Tables – Imperial

Size	Model	Series	Bit to Bend (in)	Pull to Re-Run (lbf)	Pull to Yield (lbf)
169	Black Max™		N/A	6,000	28,000
213	ST1	17	N/A	19,000	61,000
238	ST1	17	N/A	22,000	81,000
238	SR1	20	N/A	22,000	24,000
287	ST1	14	N/A	47,000	137,000
287	ST1	17	N/A	45,000	130,000
287	SR1	20	N/A	50,000	137,000
287	ST2H	24XH	N/A	47,000	137,000
313	ST2	24X	N/A	57,000	179,000
350	ST1	14	55.7	60,000	221,000
350	SR1	20	31.9	60,000	172,000
375	ST1	17	47.2	75,000	233,000
375	SR1	20	36.6	75,000	174,000
375	ST2	24	48.5	75,000	238,000
475	SR1	20	44.5	108,000	331,000
475	ST2	24	61.5	144,000	403,000
475	ST2	24X	65.5	144,000	403,000
475	ST2H	24XH	65.5	144,000	403,000
500	ST3	36	61.2	144,000	325,000
500	SR3	39	46.2	184,000	325,000
500	ML3	40	66.2	159,000	432,000
625	ST2	24	75.3	215,000	515,000
625	ST2	24X	79.3	215,000	515,000
625	ST2H	24XH	79.3	215,000	515,000
650	ST3	36	77.1	263,000	593,000
650	ML3	40	77.9	254,000	644,000
675	ST2	24	75.2	277,000	618,000
675	ST2	24X	79.2	277,000	618,000
675	ST2H	24XH	78.8	277,000	618,000
675	ST3	36	76.1	277,000	549,000
675	SR3	39	58.2	341,000	618,000
700	ML3	40	79.5	305,000	599,000
775	ST1	17	74.9	349,000	718,000
775	ST2	24	80.3	349,000	718,000
800	ST2	24	80.4	349,000	718,000
800	ST3	36	86.8	367,000	792,000
800	ML3	40	90.6	434,000	792,000
962	ST1	17	90.0	581,000	1,186,000
962	ST2	24X	92.7	581,000	1,186,000
962	ST2H	24XH	99.0	581,000	1,186,000
962	ST3	36	97.9	581,000	1,186,000
962	ML3	40	107.0	692,000	1,873,000
1125	ST2H	24	109.8	906,000	1,610,000



6 1/4" 7/8 2.9 Stage

Specifications on this page are for an ST3 motor*



Alternate Stator Tube OD Available: 6 1/2 in (165mm)

Bit to Center of Stabilizer Blade	A	28 in (0.71m)
Bit to Bend	B	77 in (1.96 m)
Bit to Top Sub	C	353 in (8.98 m)
Max OD of Motor at Upset for Stabilizer	D	7.38 in (187 mm)
Radius @ Adjusting Ring	E	3.50 in (89mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		7.00 in (178 mm)
Max OD of Slick Motor w/ Straight Housing		6.63 in (168 mm)
Bit to Max Slick OD w/Straight Housing		8.90 in (226 mm)
Estimated Total Weight:		2150 lbs (975 kg)
Common Top Connection:		4 1/2 REG, 1 1/2 IF, 4 1/2 H-90, 4 1/2 XH, 5H-90
Common Btm Connection:		4 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2
0.39°	1.2	1.1	1.1	2.1	2.3	2.4	1.5	1.5	1.5
0.78°	3.2	2.3	2.3	4.1	4.3	4.4	3.6	3.6	3.6
1.15°	5.4	4.2	3.7	6.0	6.2	6.3	5.5	5.5	5.5
1.50°	7.5	6.2	5.7	7.7	8.0	8.0	7.4	7.4	7.4
1.83°	9.4	8.1	7.6	9.4	9.6	9.7	9.2	9.2	9.2
2.12°	11.1	9.8	9.3	11.1	11.1	11.2	10.9	10.7	10.7
** 2.25°	11.9	10.5	10.0	11.9	11.7	11.8	11.7	11.4	11.4
2.38°	12.6	11.3	10.8	12.6	12.4	12.5	12.5	12.1	12.1
2.60°	13.9	12.6	12.0	13.9	13.5	13.6	13.9	13.3	13.3
2.77°	14.9	13.6	13.0	14.9	14.4	14.4	15.0	14.2	14.2
2.89°	15.6	14.2	13.7	15.6	15.0	15.0	15.7	14.8	14.8
2.97°	16.1	14.7	14.2	16.1	15.4	15.4	16.2	15.3	15.3
3.00°	16.3	14.9	14.3	16.3	15.5	15.6	16.4	15.4	15.4

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

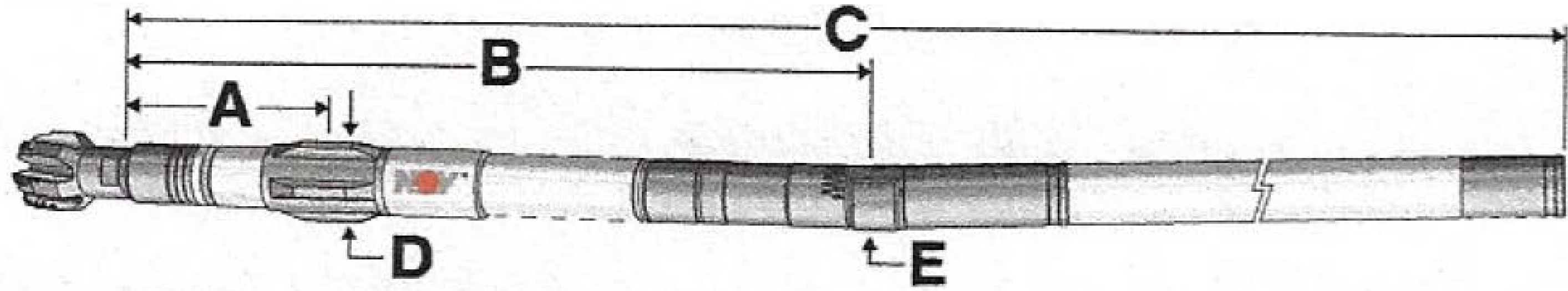
Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size			
	Deg/100ft	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2	8-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.50	1.83	1.83	1.83
8.0°	1.50	1.83	1.83	1.50	1.83	1.83	1.15	1.50	1.50	1.50
10.0°	1.15	1.50	1.50	1.15	1.50	1.50	1.15	1.15	1.15	1.15
12.0°	0.78	1.15	1.15	0.78	1.15	1.15	0.78	0.78	0.78	0.78
14.0°	0.39	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39	0.39
16.0°	0.00	0.39	0.78	0.39	0.39	0.39	0.00	0.00	0.00	0.00
18.0°	0.00	0.39	0.39	0.00	0.00	0.00	-	-	-	-
20.0°	-	0.00	0.00	-	-	-	-	-	-	-
22.0°	-	-	-	-	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



6 1/4" 7/8 4.8 Stage

Specifications on this page are for an ST3 motor*



Alternate Stator Tube OD Available: 6 1/2 in (165mm)

Bit to Center of Stabilizer Blade	A	28 in (0.71m)
Bit to Bend	B	77 in (1.96 m)
Bit to Top Sub	C	328 in (8.33 m)
Max OD of Motor at Upset for Stabilizer	D	7.38 in (187 mm)
Radius @ Adjusting Ring	E	3.50 in (89mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		7.00 in (178 mm)
Max OD of Slick Motor w/ Straight Housing		6.63 in (168 mm)
Bit to Max Slick OD w/Straight Housing		8.90 in (226 mm)
Estimated Total Weight:		1990 lbs (903 kg)
Common Top Connection:		4 1/2 REG, 4 1/2 IF, 4 1/2 H-90, 4 1/2 XH, 5 H-90
Common Btm Connection:		4 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2
0.39°	1.2	1.2	1.2	2.3	2.6	2.7	1.5	1.6	1.6
0.78°	3.5	2.4	2.4	4.4	4.6	4.7	3.8	3.8	3.8
1.15°	5.8	4.5	3.9	6.3	6.6	6.7	5.8	5.8	5.8
1.50°	8.0	6.6	6.1	8.2	8.5	8.6	7.8	7.8	7.8
1.83°	10.1	8.7	8.1	10.1	10.2	10.3	9.7	9.7	9.7
2.12°	11.9	10.5	9.9	11.9	11.8	11.8	11.6	11.3	11.3
** 2.25°	12.7	11.3	10.7	12.7	12.5	12.5	12.5	12.1	12.1
2.38°	13.5	12.1	11.5	13.5	13.1	13.2	13.4	12.8	12.8
2.60°	14.9	13.4	12.9	14.9	14.3	14.4	14.8	14.0	14.0
2.77°	15.9	14.5	13.9	15.9	15.2	15.3	16.0	15.0	15.0
2.89°	16.7	15.2	14.6	16.7	15.9	15.9	16.8	15.7	15.7
2.97°	17.2	15.7	15.1	17.2	16.3	16.3	17.3	16.1	16.1
3.00°	17.4	15.9	15.3	17.4	16.4	16.5	17.5	16.3	16.3

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

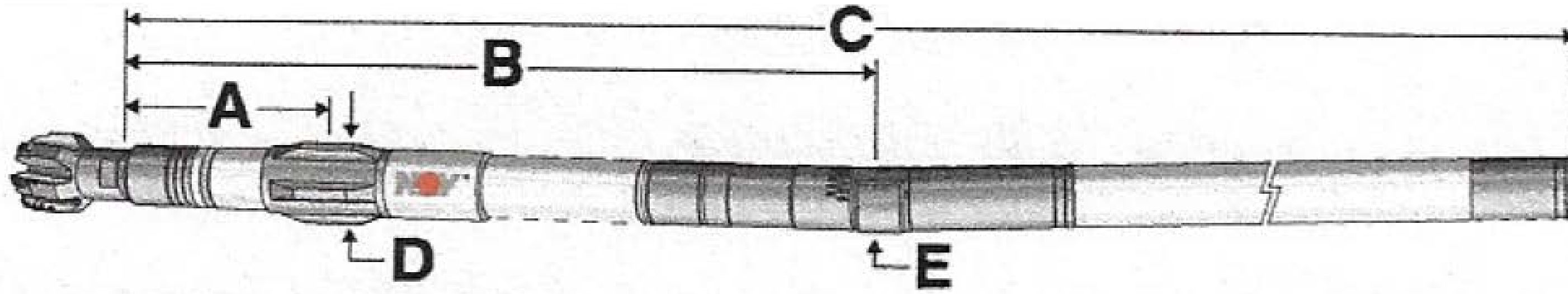
Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg/100ft	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2	8-3/4	7-7/8	8-1/2
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
4.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.50	1.83	1.83
8.0°	1.50	1.83	1.83	1.50	1.83	1.83	1.15	1.50	1.50
10.0°	1.15	1.50	1.50	1.15	1.50	1.50	0.78	1.15	1.15
12.0°	0.78	1.15	1.15	0.78	1.15	1.15	0.78	0.78	0.78
14.0°	0.39	0.78	1.15	0.78	0.78	0.78	0.39	0.39	0.39
16.0°	0.39	0.78	0.78	0.39	0.39	0.39	0.00	0.00	0.00
18.0°	0.00	0.39	0.39	0.00	0.00	0.00	-	-	-
20.0°	-	0.00	0.00	-	-	-	-	-	-
22.0°	-	-	0.00	-	-	-	-	-	-
24.0°	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



6 3/4" 7/8 2.9 Stage

Specifications on this page are for an ST3 motor*



Bit to Center of Stabilizer Blade	A	24 in (0.61 m)
Bit to Bend	B	76 in (1.93 m)
Bit to Top Sub	C	344 in (8.72 m)
Max OD of Motor at Upset for Stabilizer	D	7.63 in (194 mm)
Radius @ Adjusting Ring	E	3.75 in (95 mm)
Max Effective OD of Slick Motor @ Adjusting Ring @ 0°		7.50 in (191 mm)
Max OD of Slick Motor w/ Straight Housing		7.13 in (181 mm)
Bit to Max Slick OD w/Straight Housing		51.36 in (1305 mm)
Estimated Total Weight:		2440 lbs (1107 kg)
Common Top Connection:		4 1/2 REG, 4 1/2 IF, 4 1/2 H-90, 4 1/2 XH, 5 H-90
Common Btm Connection:		4 1/2 REG

Predicted Build Rates – Degrees / 100ft (30m)

Bend Setting	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg	8-1/2	8-3/4	9-7/8	8-1/2	8-3/4	9-7/8	8-1/2	8-3/4
0.39°	1.2	1.2	1.1	2.1	2.2	2.7	1.4	1.4	1.4
0.78°	3.0	2.5	2.3	4.1	4.2	4.6	3.5	3.5	3.5
1.15°	5.2	4.7	3.3	6.0	6.1	6.5	5.5	5.5	5.5
1.50°	7.3	6.8	4.5	7.8	7.9	8.2	7.4	7.4	7.4
1.83°	9.3	8.7	6.4	9.5	9.5	9.9	9.2	9.2	9.2
2.12°	11.0	10.5	8.1	11.0	11.0	11.3	10.8	10.8	10.8
** 2.25°	11.8	11.2	8.9	11.8	11.7	12.0	11.6	11.5	11.5
2.38°	12.5	12.0	9.6	12.5	12.4	12.6	12.5	12.2	12.2
2.60°	13.9	13.3	10.9	13.9	13.5	13.8	13.9	13.4	13.4
2.77°	14.9	14.3	11.9	14.9	14.3	14.6	15.0	14.3	14.3
2.89°	15.6	15.0	12.6	15.6	15.0	15.2	15.7	15.0	14.9
2.97°	16.1	15.5	13.0	16.1	15.5	15.6	16.2	15.5	15.4
3.00°	16.2	15.7	13.2	16.2	15.7	15.8	16.4	15.7	15.5

** 2.25° only available with a 2.38° Adjustable Assembly

Maximum Adjustable Bend Setting For Rotary Drilling–Degrees

Hole Curvature	Slick Hole Size			Single Stabilizer Hole Size			Two Stabilizers Hole Size		
	Deg/100ft	8-1/2	8-3/4	9-7/8	8-1/2	8-3/4	9-7/8	8-1/2	8-3/4
0.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
2.5°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
5.0°	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.50	1.50
7.5°	1.50	1.83	1.83	1.15	1.15	1.50	1.50	1.15	1.15
10.0°	1.15	1.15	1.83	0.78	0.78	0.78	0.78	0.78	0.78
12.5°	0.78	0.78	1.50	0.39	0.39	0.39	0.00	0.00	0.00
15.0°	0.39	0.39	1.15	0.00	0.00	0.00	-	-	-
17.5°	0.00	0.00	0.78	-	-	-	-	-	-
20.0°	-	-	0.39	-	-	-	-	-	-
22.5°	-	-	0.00	-	-	-	-	-	-
25.0°	-	-	-	-	-	-	-	-	-
27.5°	-	-	-	-	-	-	-	-	-
30.0°	-	-	-	-	-	-	-	-	-

A dash, '-', indicates that no rotation is recommended in that hole curvature. Stabilizers are considered to be 1/8" undergauge.



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