

Engineering Bulletin

Rev G 6/2021
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**Valve Torques
And
Actuator Torque
Determination Information**



General Information:

This bulletin contains basic information on determining the actual valve torques to be used for actuator selection. The following pages contain valve torque graphs and tables for the various Sharpe® Valve models, along with Media and Service Factors which **MUST** be considered.

Ball Valve Torques:

The torque values listed in the following graphs and tables are breakaway torques from the closed position. Breakaway torques are determined by the measured torque after the valve has been in the closed position under pressure for a set time period, and are the highest torques expected.

Seat Materials:

The seat materials used in a valve will significantly influence the operating torque. Softer, lower-friction seats such as PTFE or TFM® will be lower in torque than the harder, higher friction factor materials such as Delrin® or PEEK. Different graphs and tables have been provided where the seat materials significantly affect the operating torque.

Service Application:

How the valve will be operated, and how frequently also affect the actuator selection and torque. Infrequent operation will require higher torque values than for valves in modulating services, for example. O₂ cleaning may also increase the torque values for the valves. Service factors are provided on page 3 of this bulletin.

For CRITICAL and SEVERE SERVICE applications along with CAVITY FILLED SEATS or O₂ CLEANED valves contact Sharpe® Valves for proper sizing information.

Line Media:

What is flowing through the valve can have the most significant effect on the valves operating torques. Fine solids, slurries, or very viscous fluids can have great effect, not only on torque, but also on valve service life. Media factors are also provided on page 3 of this bulletin.

Media and Service Factors:

Media Factors	Multiplier
Clean, particle free, non-lubricating (water, alcohol, etc.)	1.00
Clean, particle free, lubricating (oils, hydraulic fluid, etc)	0.80
Slurries or heavily corroded and contaminated systems	2.00
Gas or saturated steam clean and wet	1.00
Gas or superheated steam clean and dry	1.30
Gas, dirty unfiltered e.g. natural gas, Chlorine	1.50

Service Factors	Multiplier
Simple On and Off Operations	1.00
Throttling	1.20
Positioner Control	1.50
Once per day Operations	1.20
Once every two days or a "Plant Critical" Operation	1.50

Torque Determination Example:

2" Series 84 w/Nova Seats, 500 PSIG, Nitrogen Gas, On-Off Service, Fail Closed Actuator

<u>Basic Torque*</u>		<u>Media Factor</u>		<u>Service Factor</u>		<u>Operating Torque</u>		<u>Safety Factor</u>		<u>Sizing Torque</u>
320	X	1.30	X	1.00	=	416	X	1.30	=	541 Lbf-in

* From charts or tables.

➤ Notes:

- For **CRITICAL** and **SEVERE SERVICE** applications contact Sharpe® Valves for the proper sizing.
- For **CAVITY FILLED** seats and **O₂ CLEANED** valves contact Sharpe® Valves for the proper sizing.



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Sharpe® Series 11, 12 and 13 Dir-Act™ Breakaway Torques at Max Rating

Series 11 (1000 CWP)	
Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat
1/4", 3/8", 1/2"	40
3/4"	80
1"	110
1 1/4"	160
1 1/2"	190
2"	250

Series 12 (1500 CWP)	
Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat
1/4", 3/8", 1/2"	50
3/4"	100
1"	140
1 1/4"	200
1 1/2"	240
2"	320

Series 13 (1000 CWP: 1/4" - 2" ; 600 CWP: 2 1/2" - 4")	
Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat RTFE ("R") Seat
1/4", 3/8", 1/2"	40
3/4"	80
1"	110
1 1/4"	160
1 1/2"	190
2"	250
2 1/2"	500
3"	720
4"	800

Sharpe® Series 17 Butterfly Valve

Series 17				
Valve Size (in)	Seating Torque (lbf-in)			
	EPDM, Buna, and Viton® Seats			
	Line Pressure			
	50 psi	100 psi	150 psi	200 psi
2"	70	105	108	115
2 1/2"	100	126	136	152
3"	150	176	192	204
4"	230	260	328	352
5"	350	465	512	548
6"	460	680	831	907
8"	740	1110	1527	1697
10"	1330	1880	2530	2857
12"	2260	3150	3794	4338
14"	4070	4620	4870	5527
16"	5400	6285	6685	7484
18"	6300	8750	8958	10010
20"	8000	10800	11950	12667
24"	14600	16375	18680	20361
30"	-	-	33336	-
36"	-	-	46528	-
42"	-	-	79684	-
48"	-	-	111112	-

Sharpe® Series 5303 3-Piece Ball Valve Breakaway Torque at Max Rating

Series 5303 (1000 CWP: 1/4" - 2" ; 600 CWP: 2 1/2" - 4")	
Valve Size (in)	Breakaway Torque (lbf-in)
	RTFE ("R") Seat
1/4"	44
3/8"	52
1/2"	87
3/4"	104
1"	113
1 1/4"	130
1 1/2"	216
2"	303
2 1/2"	347
3"	390
4"	607

Sharpe® Valves does not recommend actuation on the Series 5303 ball valves as their stems are not live loaded. Please contact Sharpe® Valves with application information for proper series suggestions.

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3

Sharpe® Series Seal Welded Ball Valves

Breakaway Torques at Max Rating

50B74/6

Ball Valve

Series 50B74/6	
(2000 CWP: ¼" - 2")	
(1500 CWP: 2½ - 3)	
RTFE ("R") Seat	
Size	In-lbs
¼"	19
⅜"	19
½"	22
¾"	38
1"	91
1 ¼"	174
1 ½"	239
2"	287
2½"	470
3"	485

50C74/6

3000psi CWP Ball Valve

Series 50C74/6		
(3000 CWP)		
Valve Size (in)	Breakaway Torque (lbf-in)	
	Delrin® ("D") Seat	Peek ("P") Seat
¼"	142	226
⅜"	142	226
½"	184	246
¾"	407	513
1"	711	925
1 ¼"	807	1015
1 ½"	1149	1890
2"	1574	2005
3"	3047	-

50F74/6

6000psi CWP Ball Valve

Series 50F74/6	
(6000 CWP)	
Delrin® ("D") Seat	
Size	In-lbs
¼"	240
⅜"	268
½"	284
¾"	620
1"	1137
1 ¼"	1835
1 ½"	2140
2"	2285

Sharpe® Series 54574/6

2-Piece Ball Valve

Breakaway Torque at Max Rating

Series 54574/6	
(2000 CWP: ¼" - 1" ; 1500 CWP: 1¼" - 2")	
RTFE ("R") Seat	
Nova ("N") Seat	
Size	In-lbs
¼"	62
⅜"	62
½"	62
¾"	89
1"	89
1 ¼"	115
1 ½"	142
2"	159

Sharpe® Series N66

3-Piece Sanitary Ball Valve

Breakaway Torque at Max Rating

Series N66	
(1000 CWP: ½" - 2" ; 600 CWP: 2½" - 4")	
Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat
½"	36
¾"	43
1"	66
1 ½"	135
2"	180
2 ½"	248
3"	392
4"	819

Sharpe® Valves does not recommend actuation on the Series 5457 ball valves as their stems are not live loaded. Please contact Sharpe® Valves with application information for proper series suggestions.

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3

Sharpe® Series 66, 86, 88 and D88 Series

Breakaway Torque at Max Rating

(Class 600: ¼"-2" ; Class 300: 2½"-4")

[Series 86 only available ¼" to 1"]

TFM® ("M") Seats PTFE ("T") Seats

Valve Size (in)	Breakaway Torque (lbf-in)
¼", ½"	65
¾"	80
1"	120
1 ¼"	180
1 ½"	215
2"	300
2 ½"	680
3"	800
4"	1750

RTFE ("R") Seats

Valve Size (in)	Breakaway Torque (lbf-in)
¼", ½"	70
¾"	85
1"	126
1 ¼"	190
1 ½"	226
2"	315
2 ½"	715
3"	840
4"	1838

Sharpe® Series 75, 76 and 77- 3 & 4 Way Ball Valves

Breakaway Torques at Max Rating

Series 75

(1000 WOG: ½" - 2" ; 800 WOG: 3")

Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat
½"	63
¾"	68
1"	88
1 ½"	232
2"	544
3"	1278

Series 76

(1000 CWP)

Valve Size (in)	Breakaway Torque (lbf-in)	
	PTFE ("T") Seat	TFM® ("M") Seat
¼", ⅜", ½"	35	40
¾"	70	73
1"	82	100
1 ¼"	182	183
1 ½"	235	241
2"	495	501

Series 77

(600 CWP)

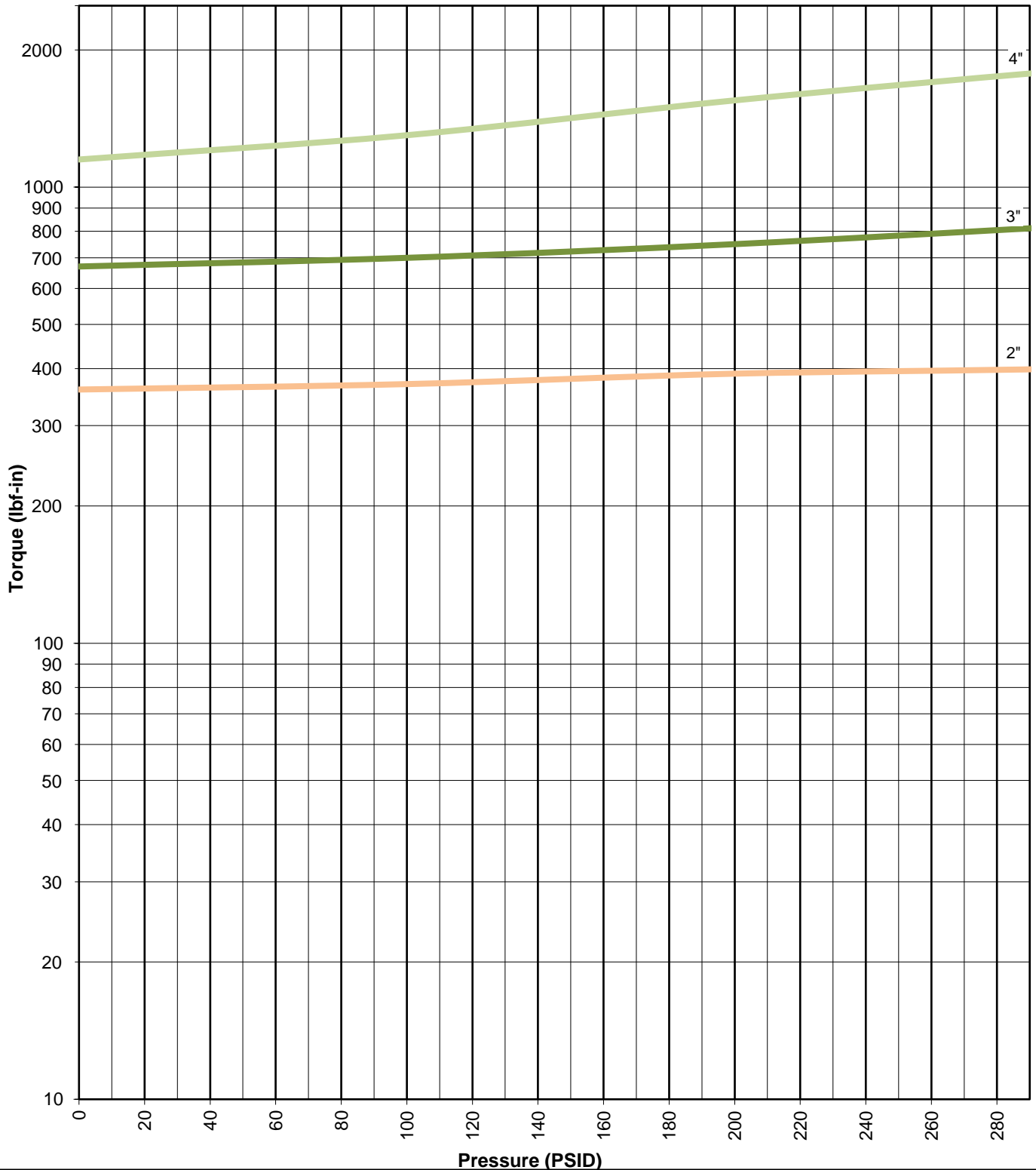
Valve Size (in)	Breakaway Torque (lbf-in)
	TFM® ("M") Seat
½"	113
¾"	165
1"	312
1 ½"	538
2"	755
2 ½"	1475
3"	1475
4"	1736

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3

SERIES 40 TORQUES

CLASS 150
TFM® ("M") SEATS
RTFE ("R") SEATS

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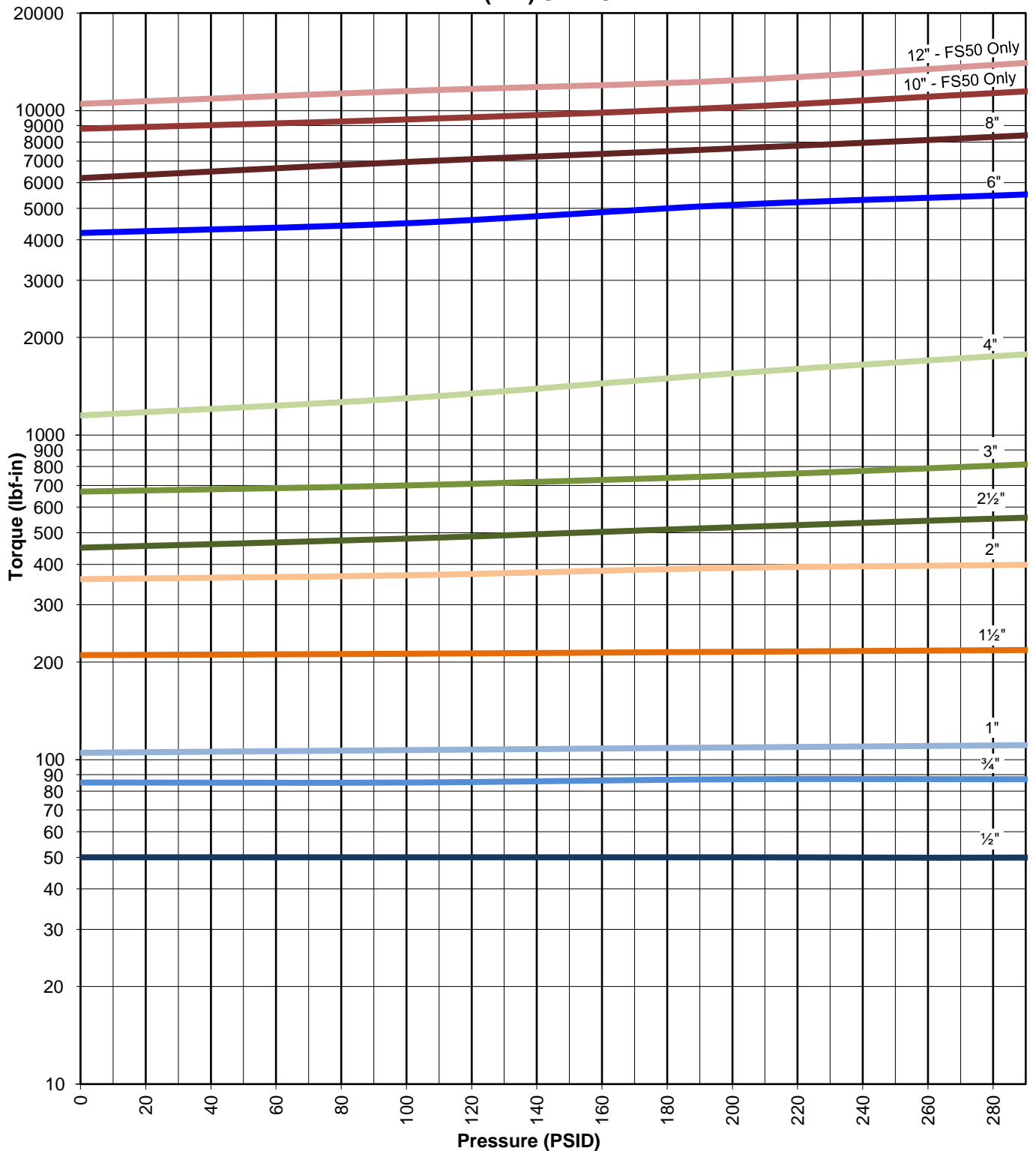
SERIES 50/FS50 TORQUES

CLASS 150

TFM® ("M") SEATS

NOVA ("N") SEATS

RTFE ("R") SEATS

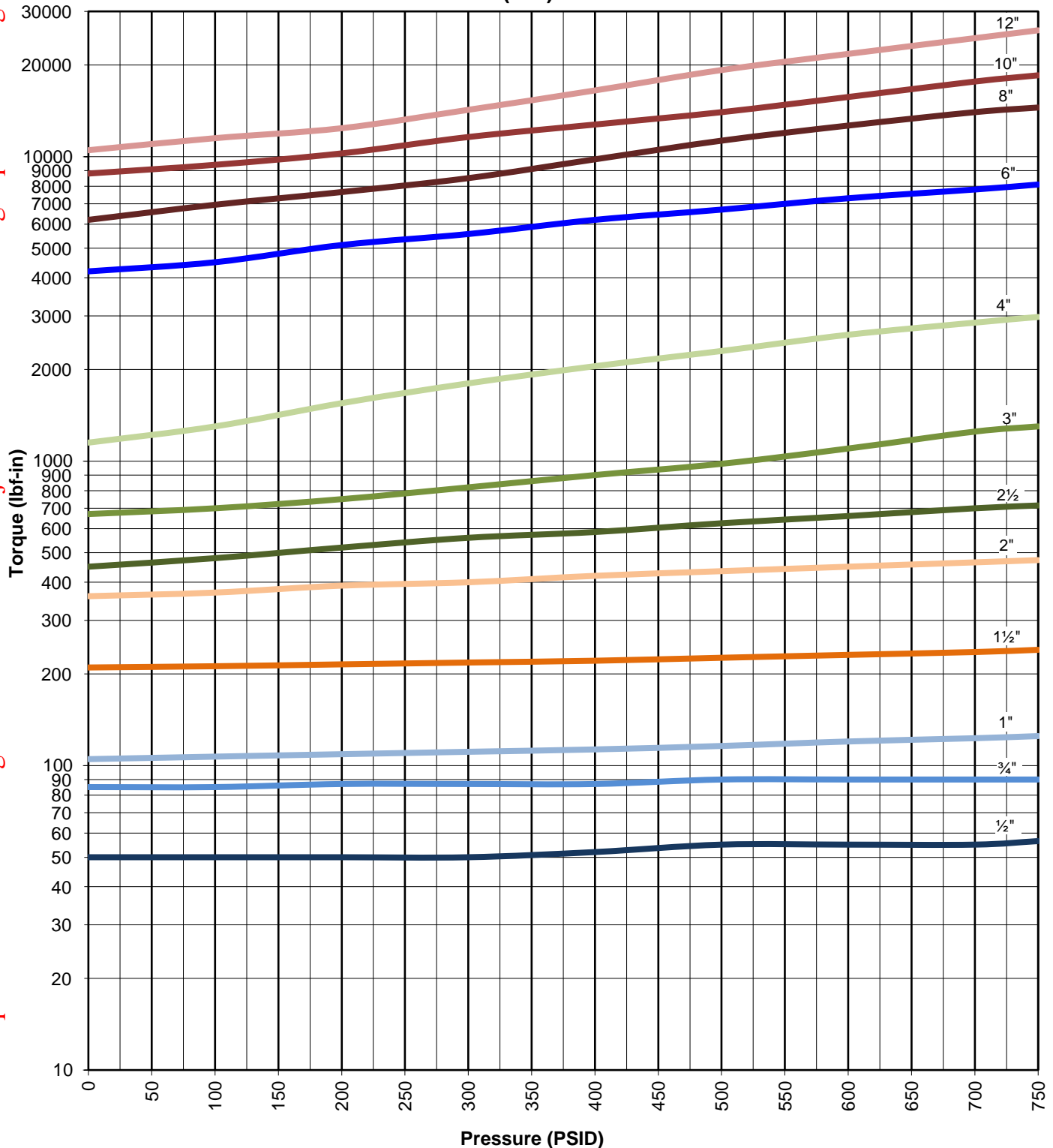


Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3

SERIES FS50 TORQUES

CLASS 300
TFM® ("M") SEATS
NOVA ("N") SEATS
RTFE ("R") SEATS

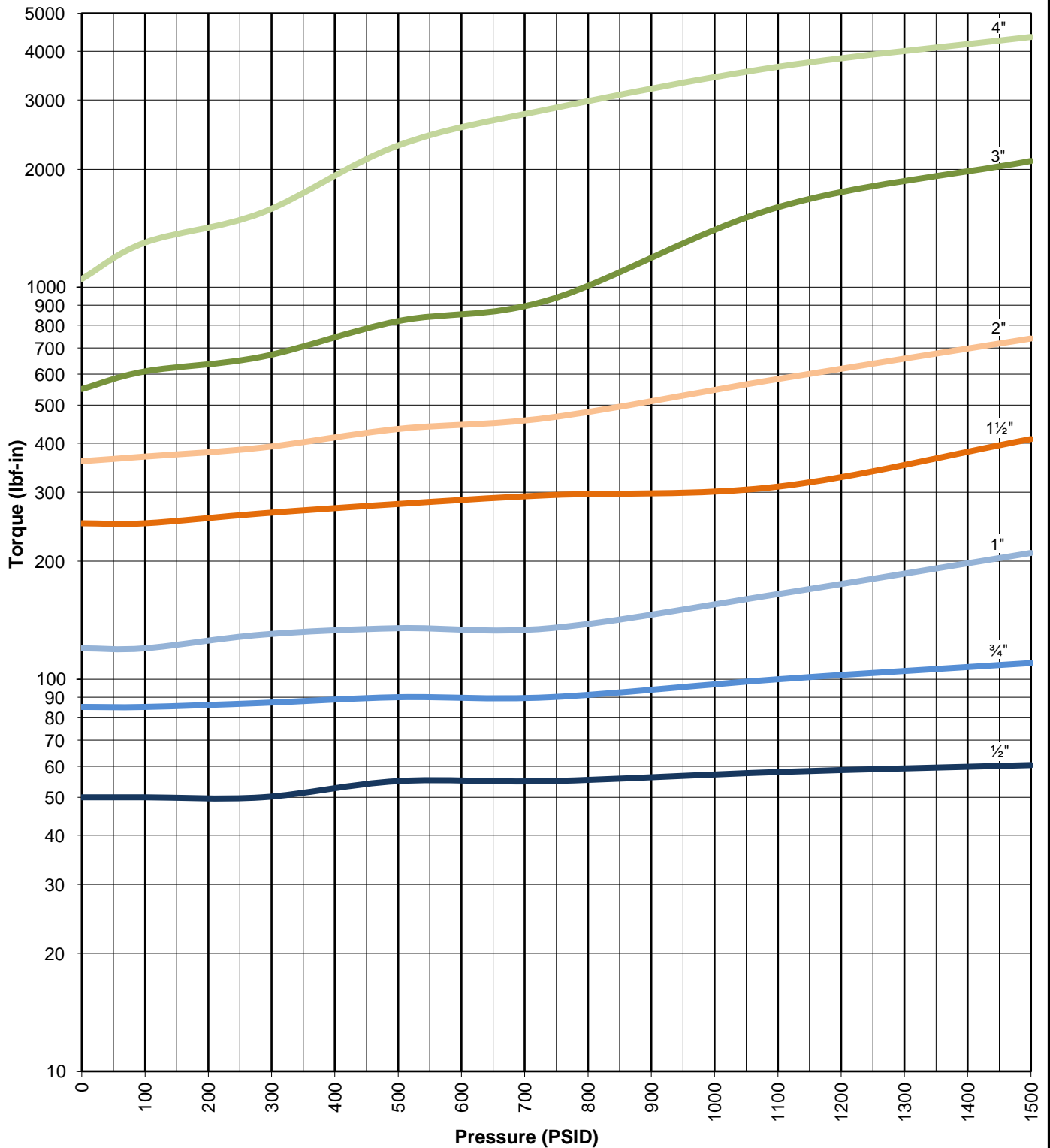
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SERIES FS50 TORQUES

CLASS 600
TFM® ("M") SEATS
NOVA ("N") SEATS
RTFE ("R") SEATS

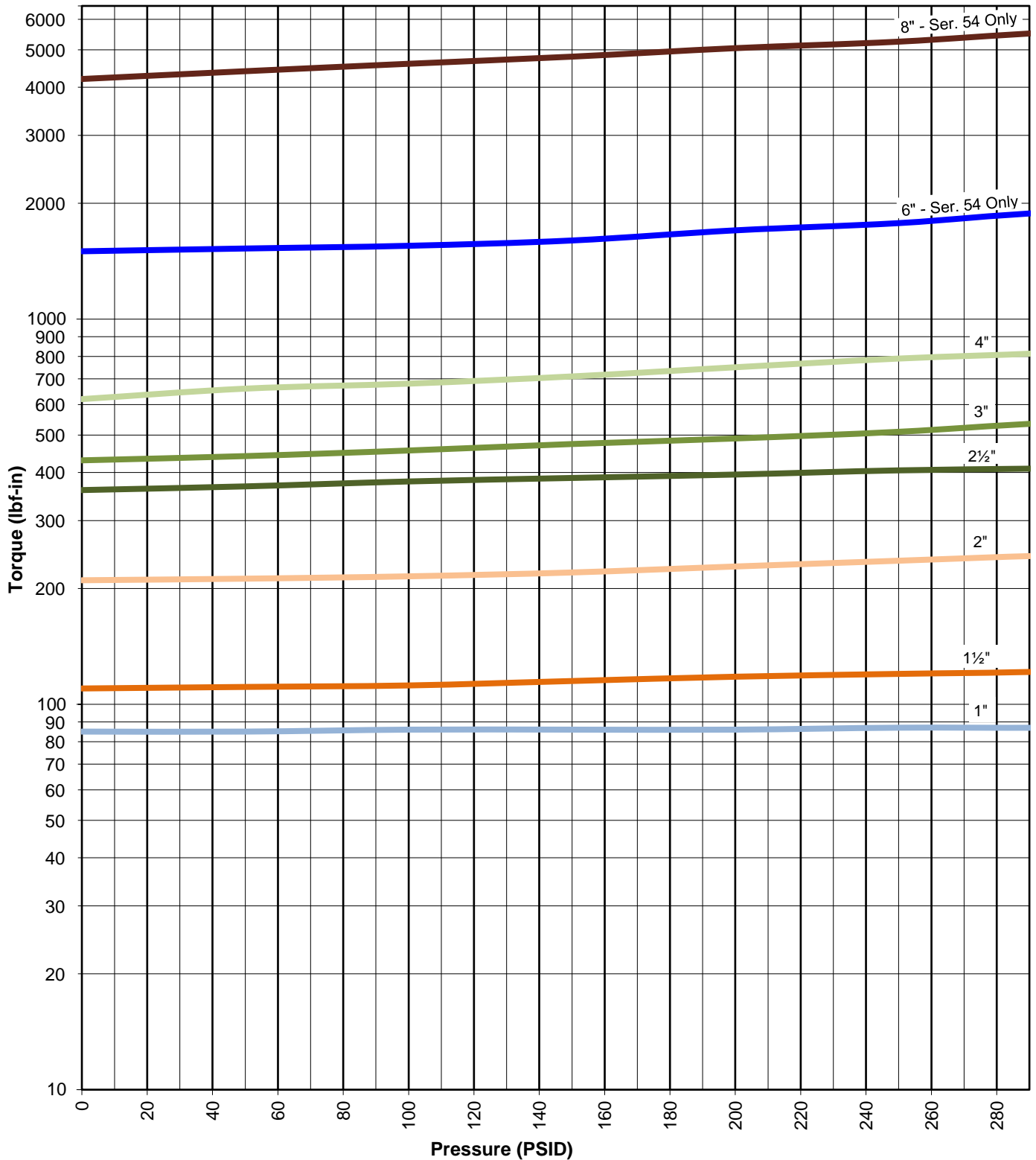
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SERIES 54/FS54 TORQUES

CLASS 150
TFM® ("M") SEATS
RTFE ("R") SEATS

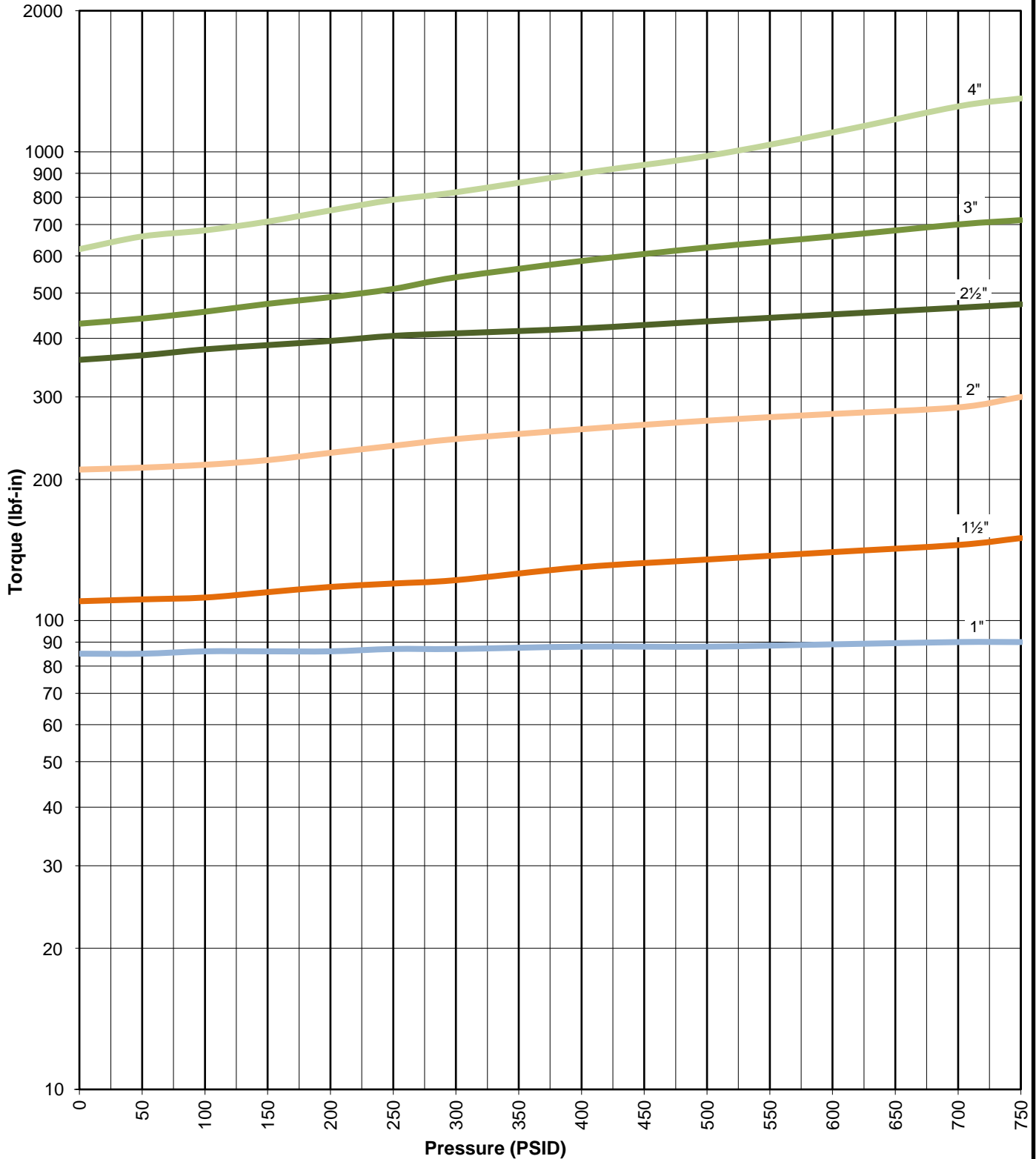
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SERIES FS54 TORQUES

CLASS 300
TFM® ("M") SEATS
RTFE ("R") SEATS

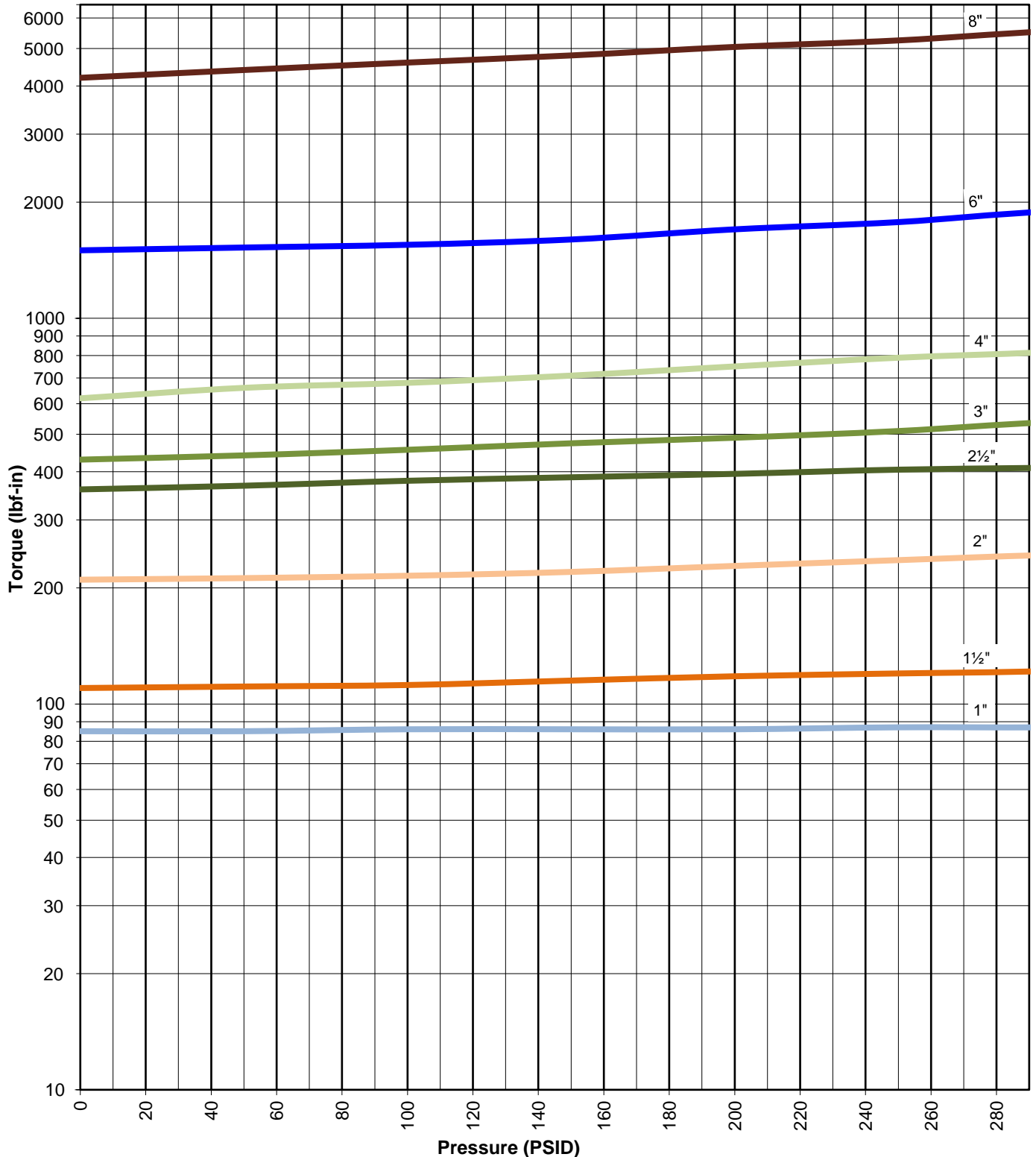
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SERIES D54 TORQUES

CLASS 150
TFM® ("M") SEATS
NOVA ("N") SEATS

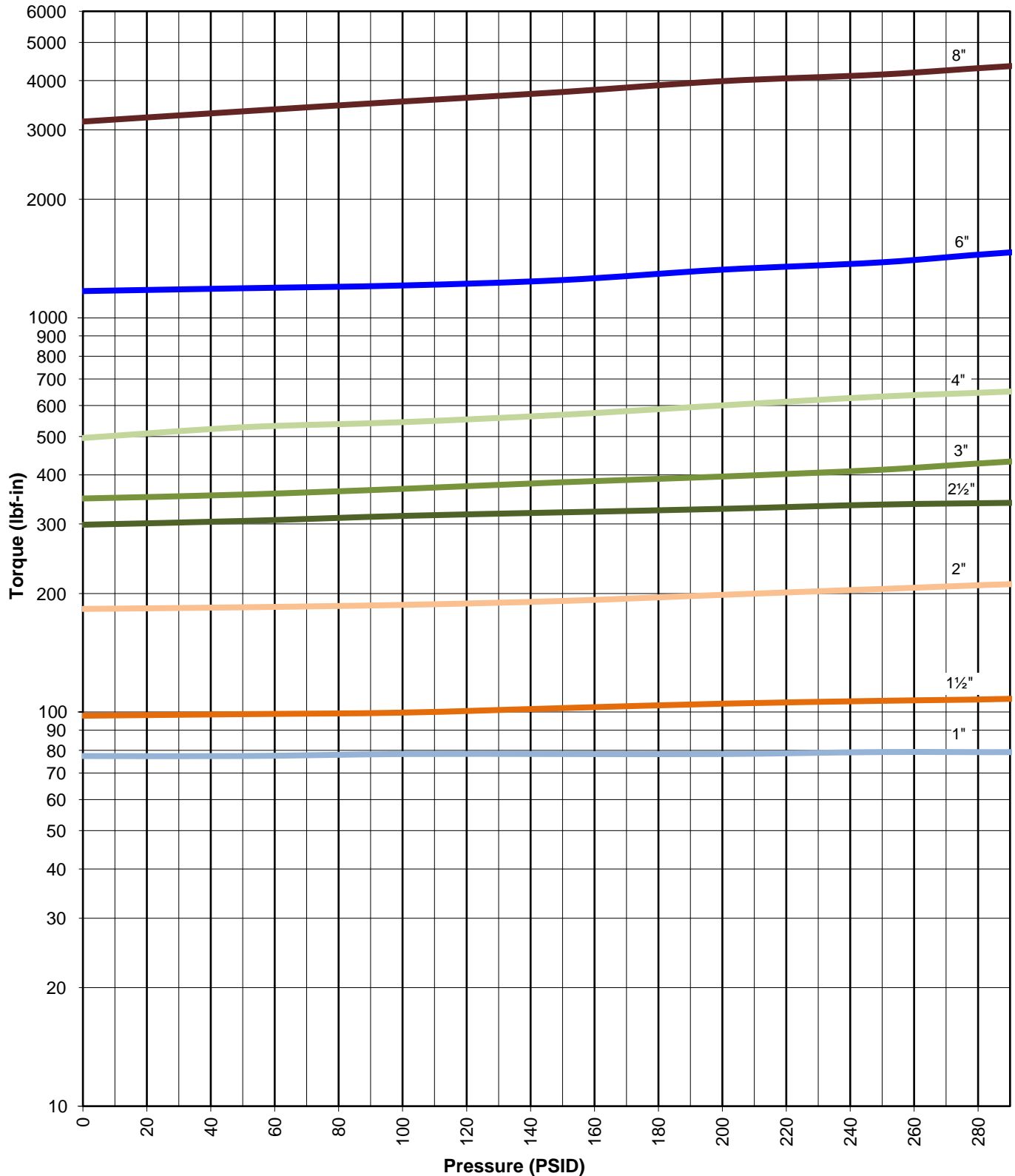
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SERIES D54 TORQUES

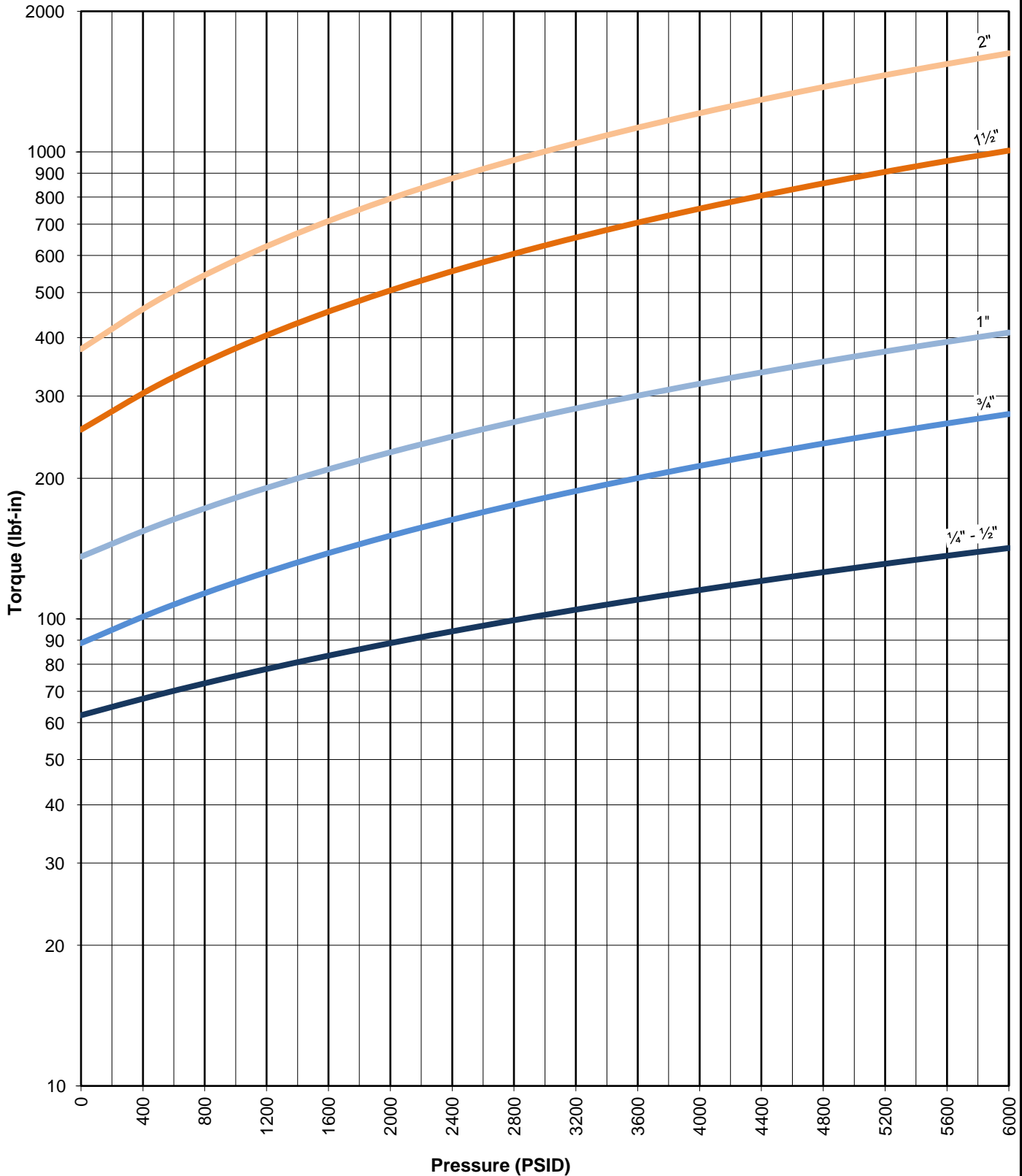
CLASS 150
PTFE ("T") SEATS

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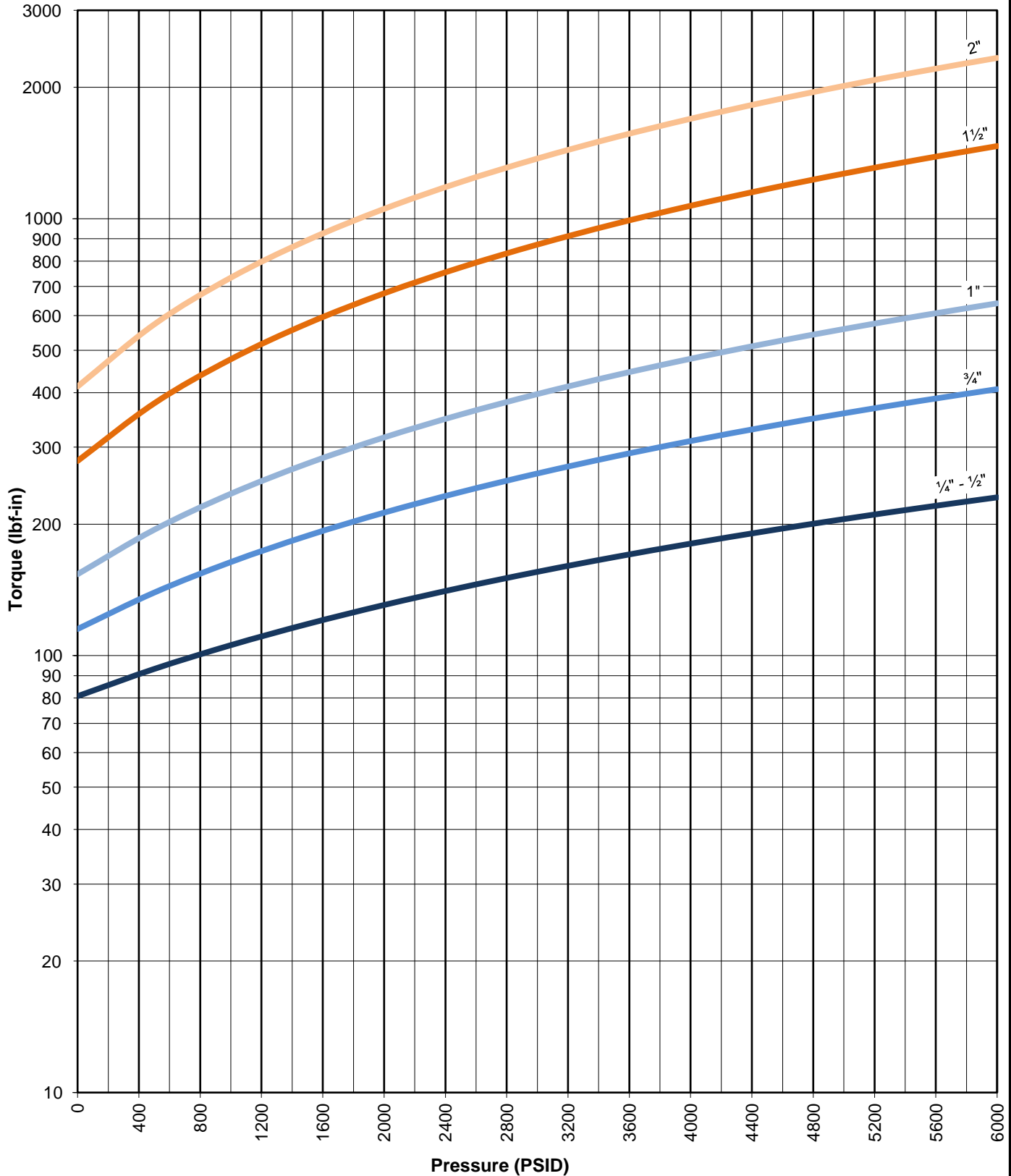
**SERIES 60 TORQUES
DELRIN® ("D") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



**SERIES 60 TORQUES
PEEK ("P") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



SERIES 70/FS70 TORQUES

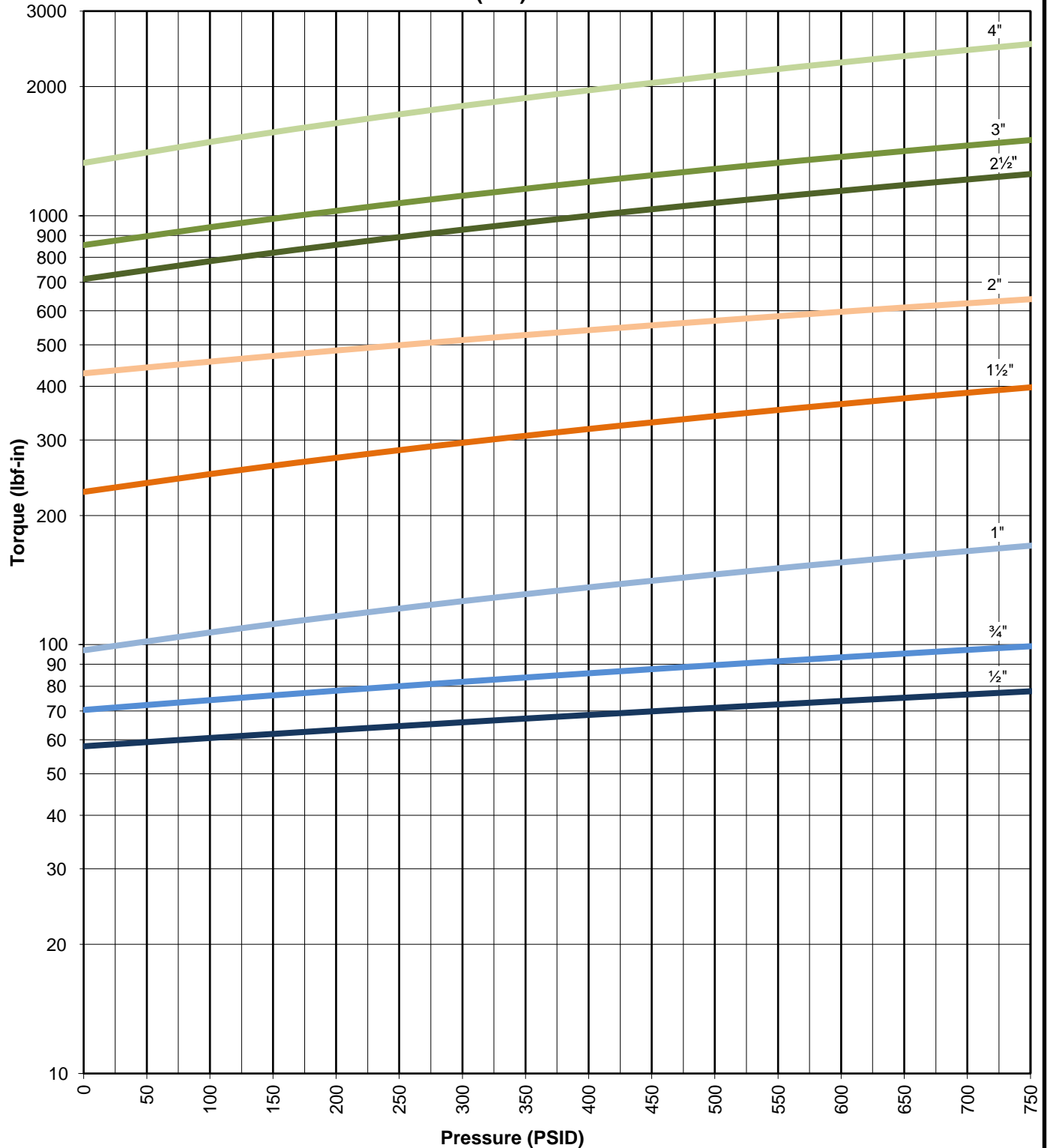
SUPER NOVA ("B") SEATS

TFM® ("M") SEATS

NOVA ("N") SEATS

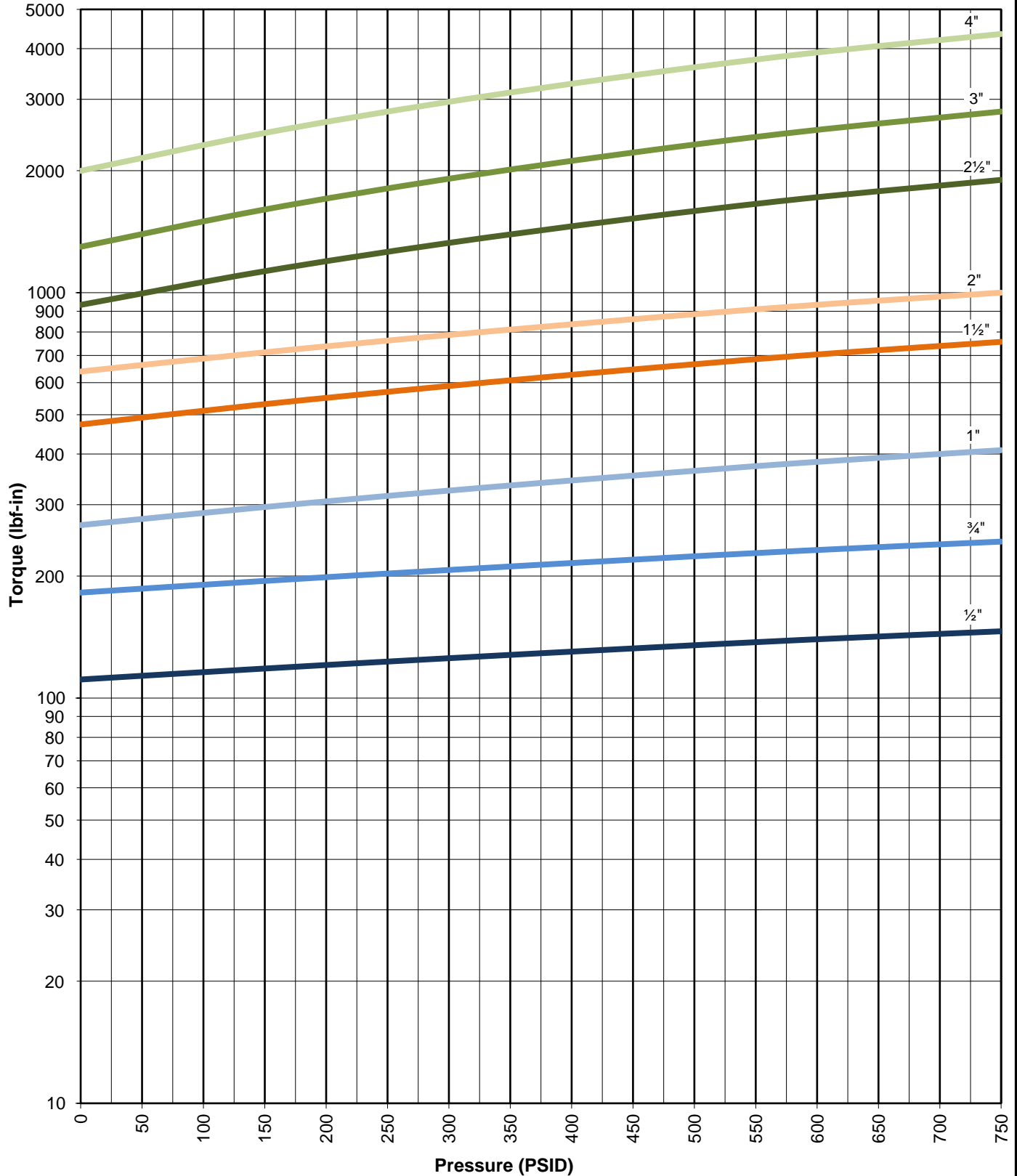
RTFE ("R") SEATS

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



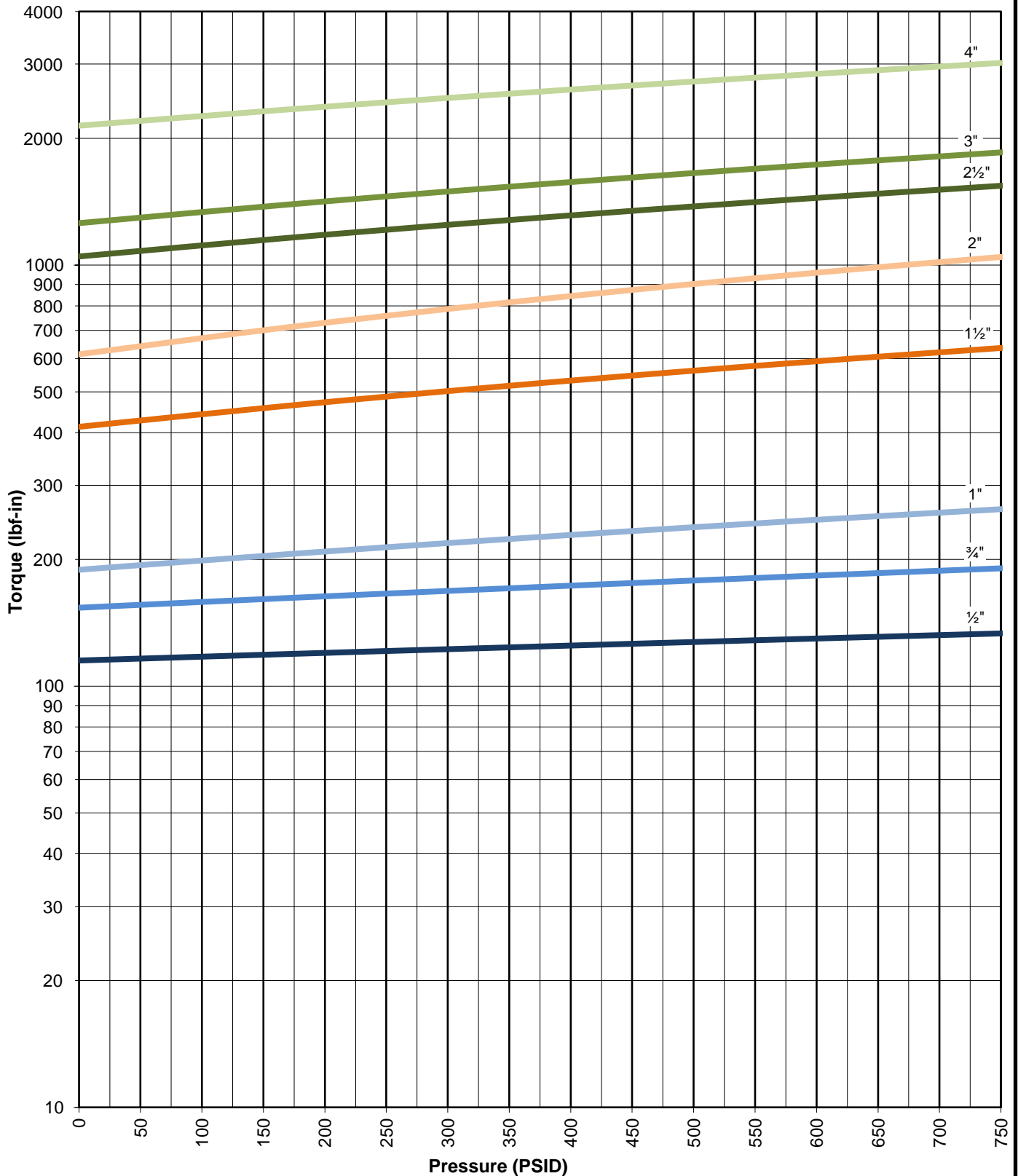
**SERIES C70/FSC70 TORQUES
PCTFE - Kel-F® ("K") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



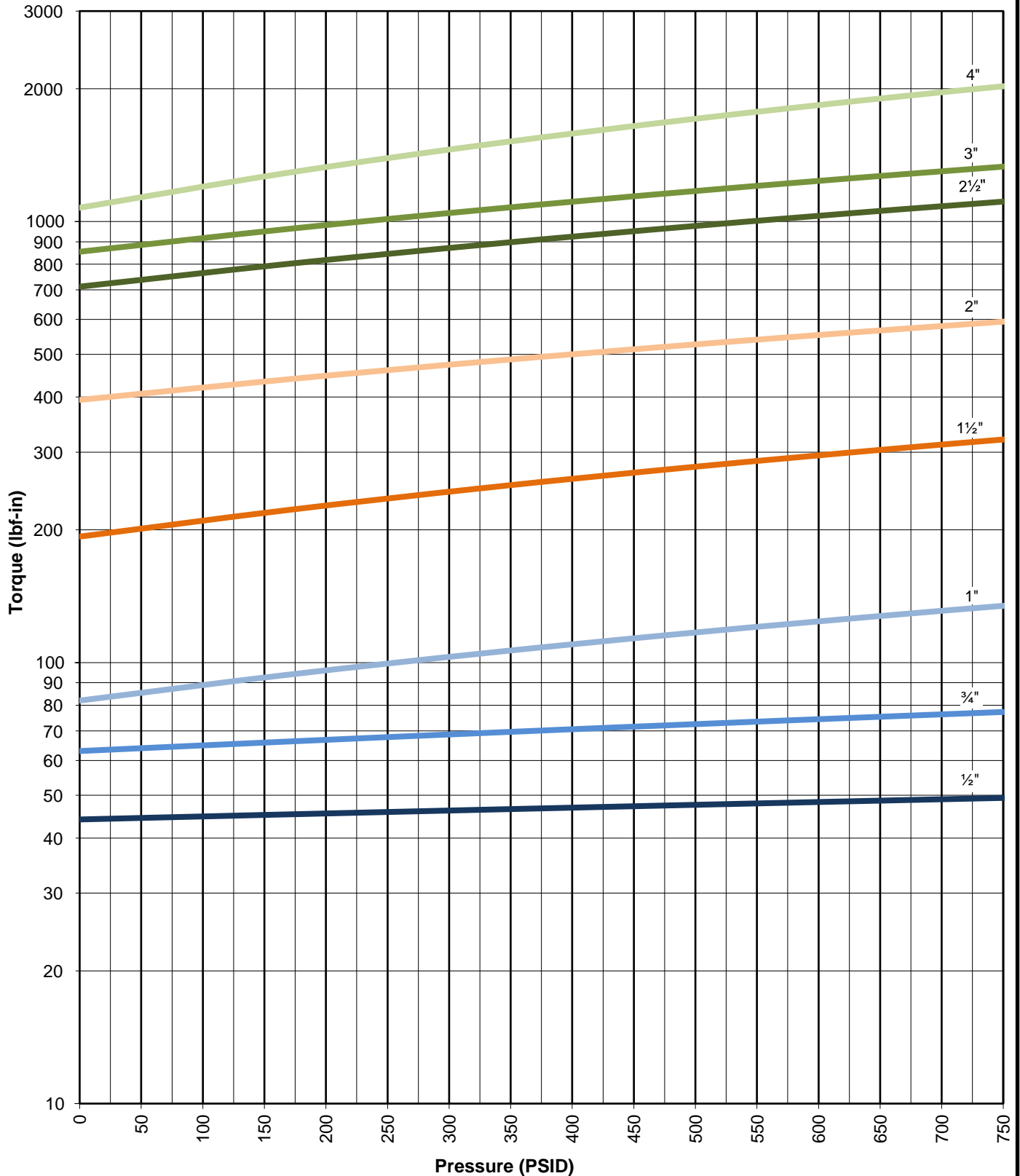
**SERIES 70 TORQUES
PEEK ("P") SEATS**

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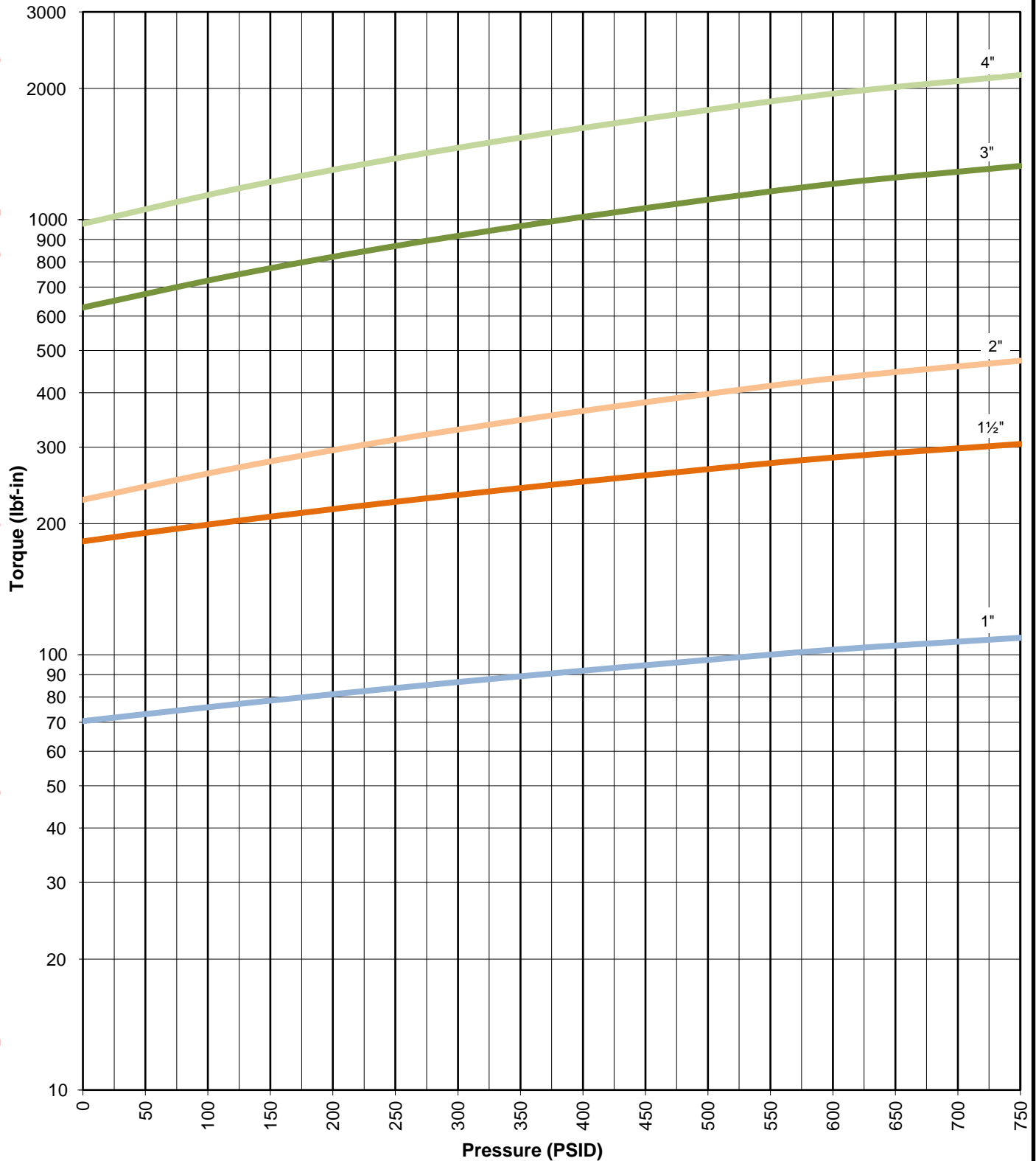
**SERIES 70/FS70 TORQUES
PTFE ("T") SEATS**

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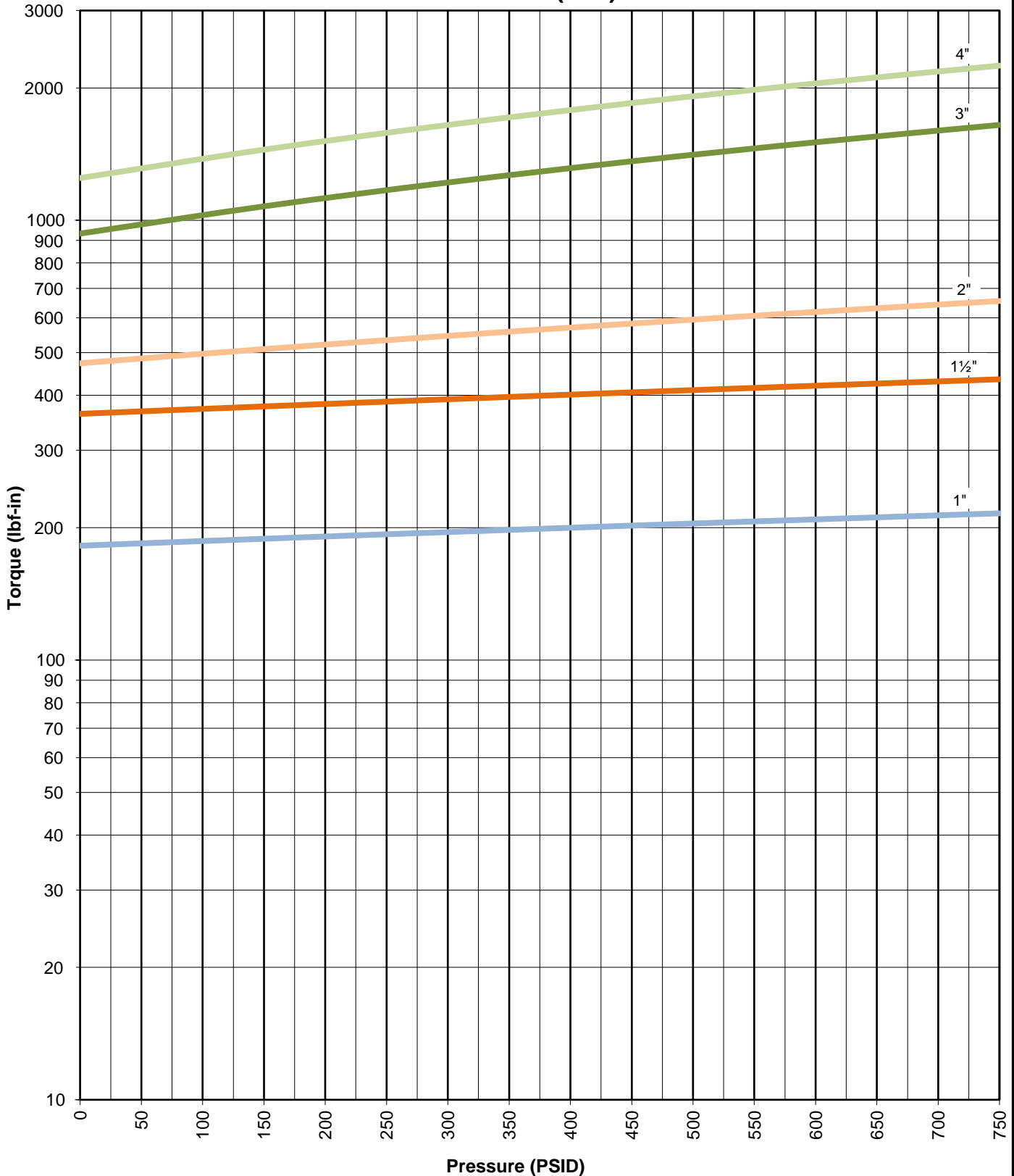
**SERIES 74/FS74 TORQUES
SUPER NOVA ("B") SEATS
NOVA ("N") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



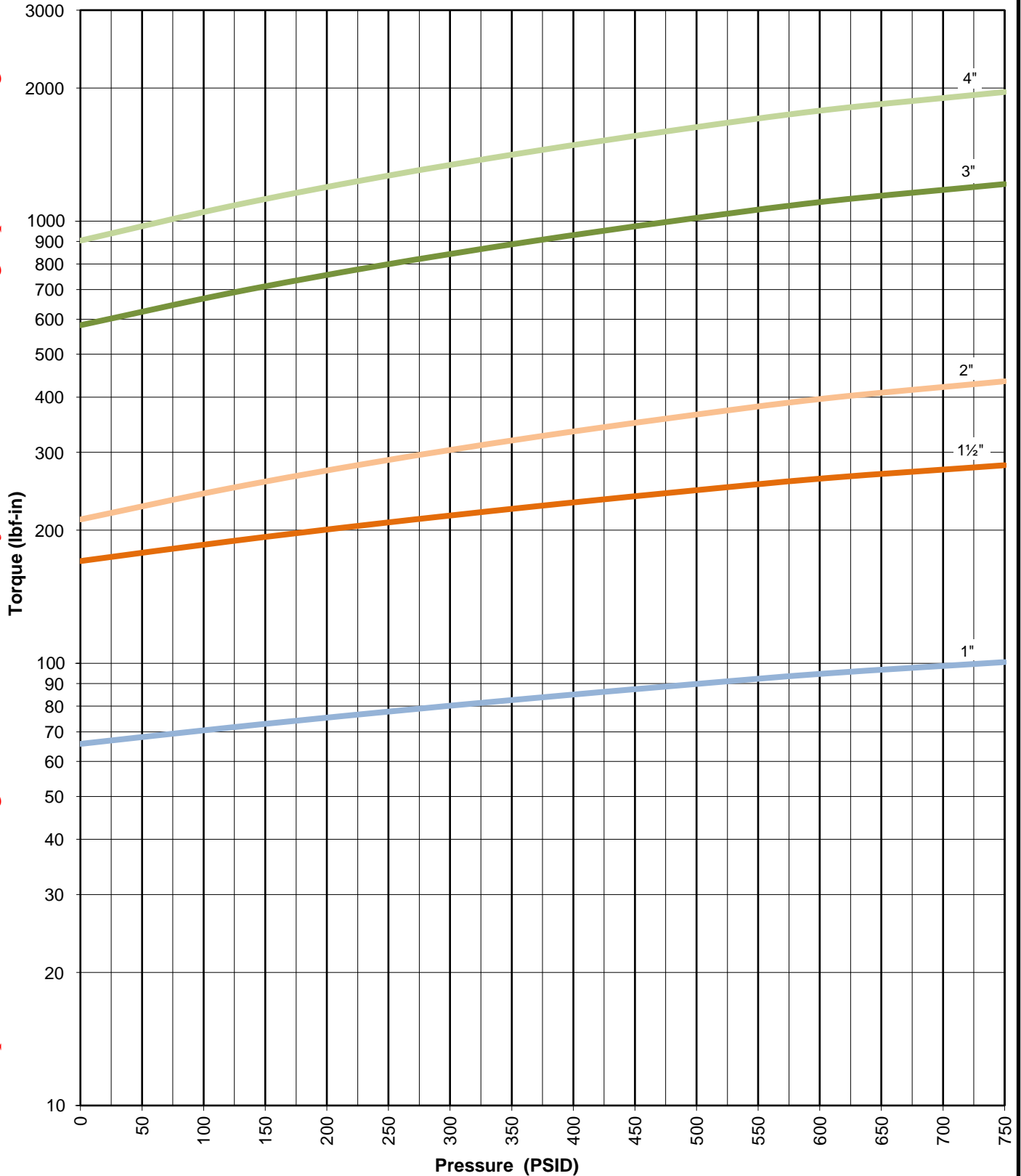
SERIES C74/FSC74 TORQUES PCTFE - Kel-F® ("K") SEATS

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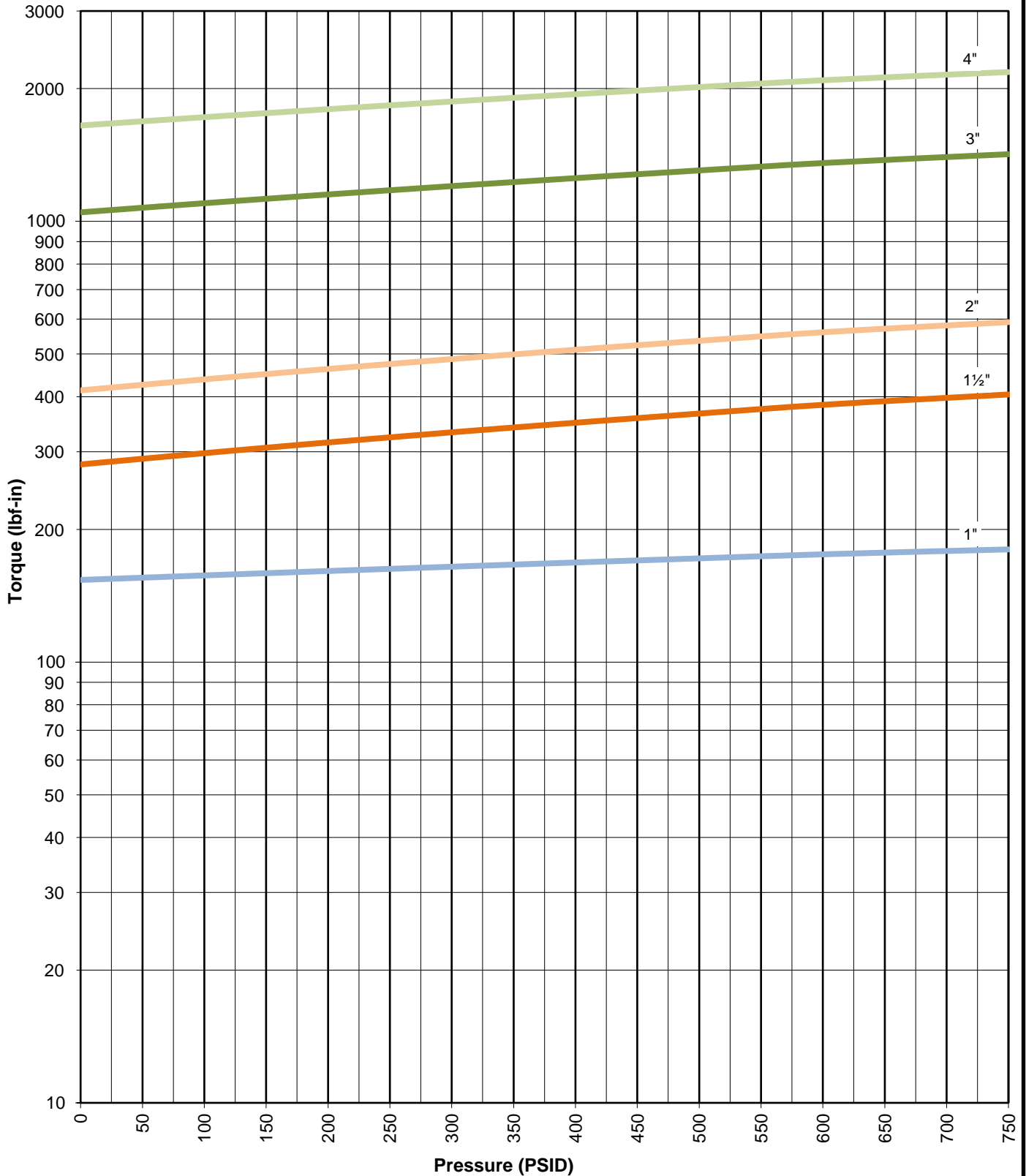
**SERIES 74/FS74 TORQUES
TFM® ("M") SEATS**

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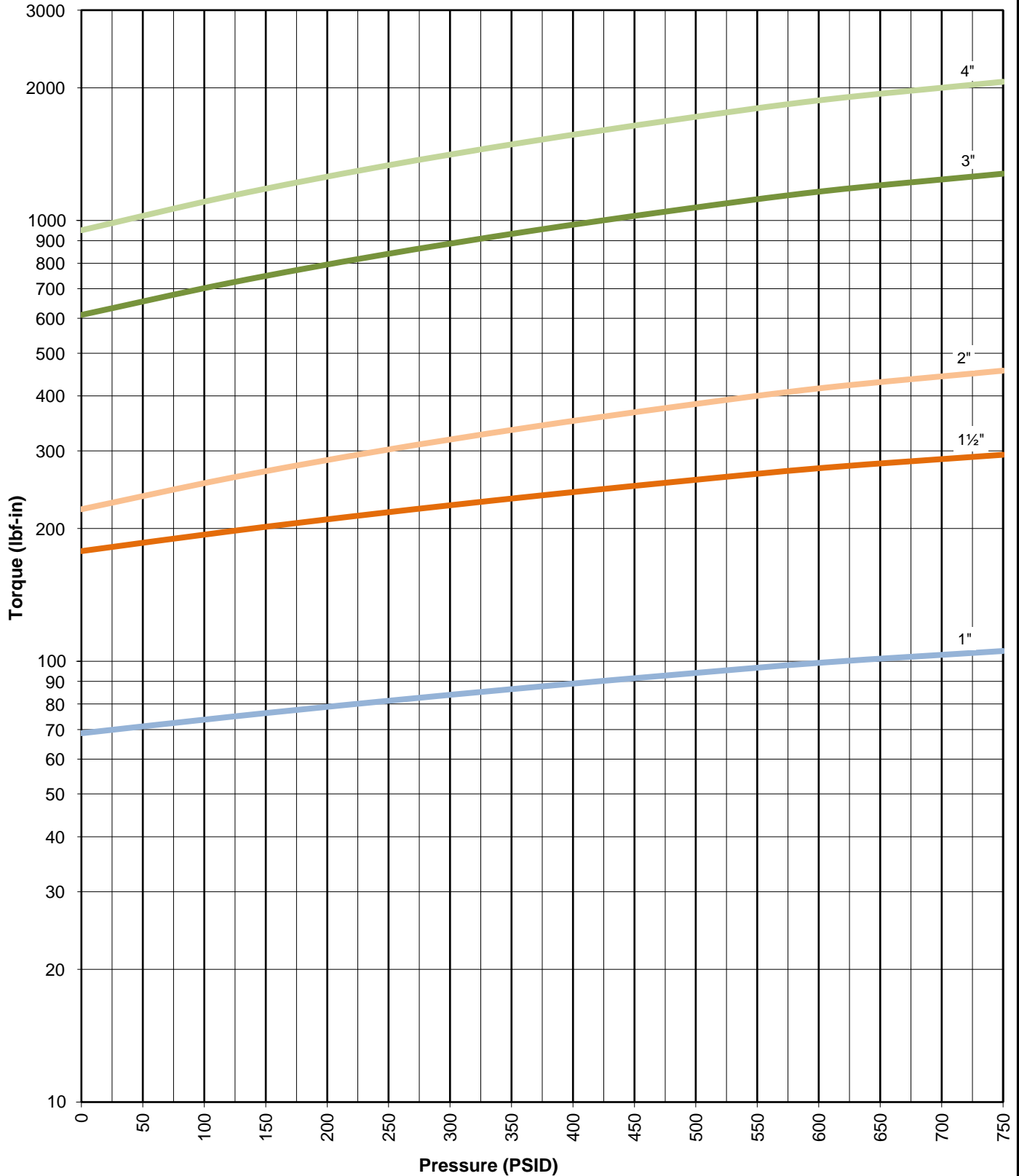
**SERIES 74 TORQUES
PEEK ("P") SEATS**

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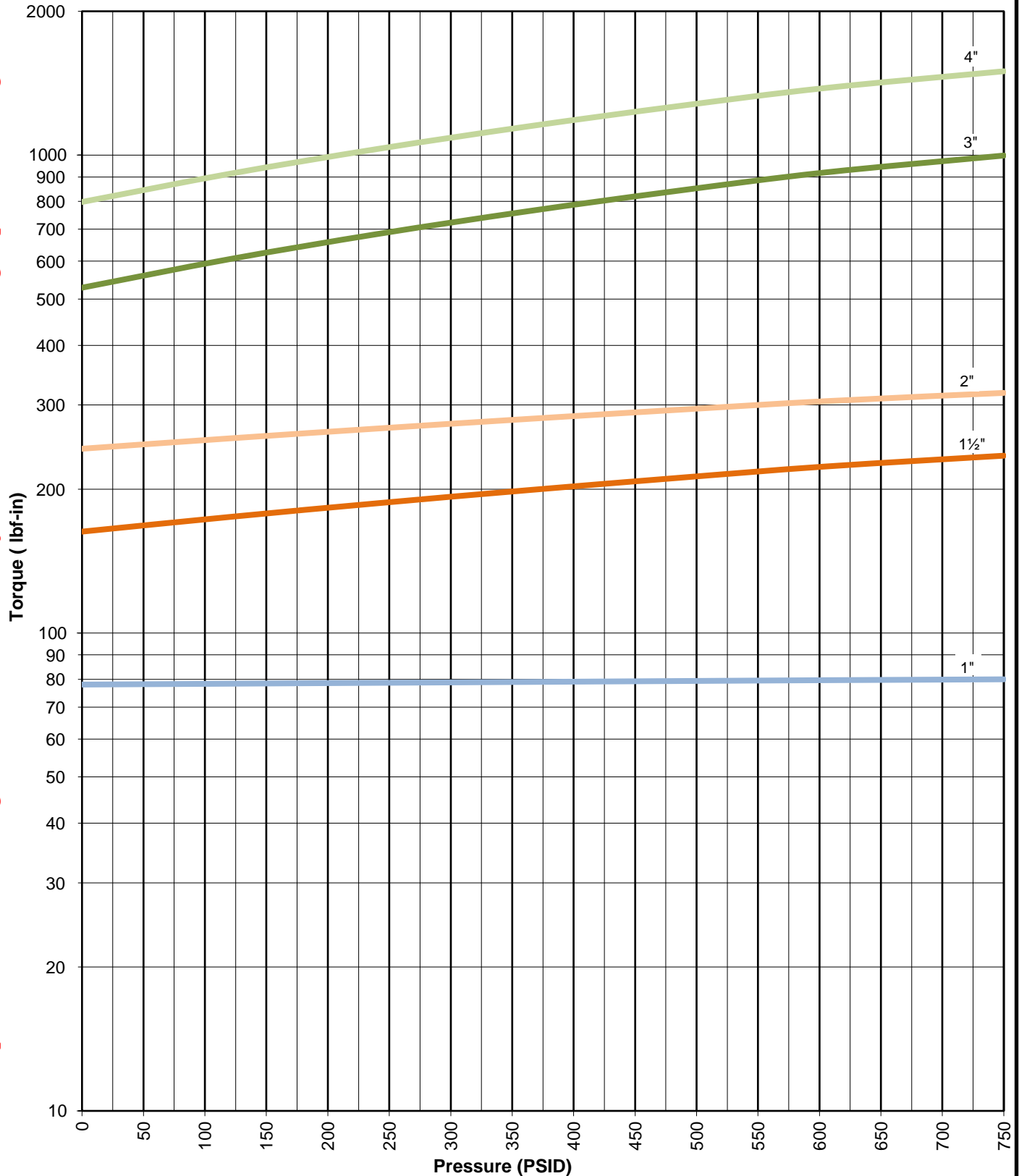
**SERIES 74/FS74 TORQUES
RTFE ("R") SEATS**

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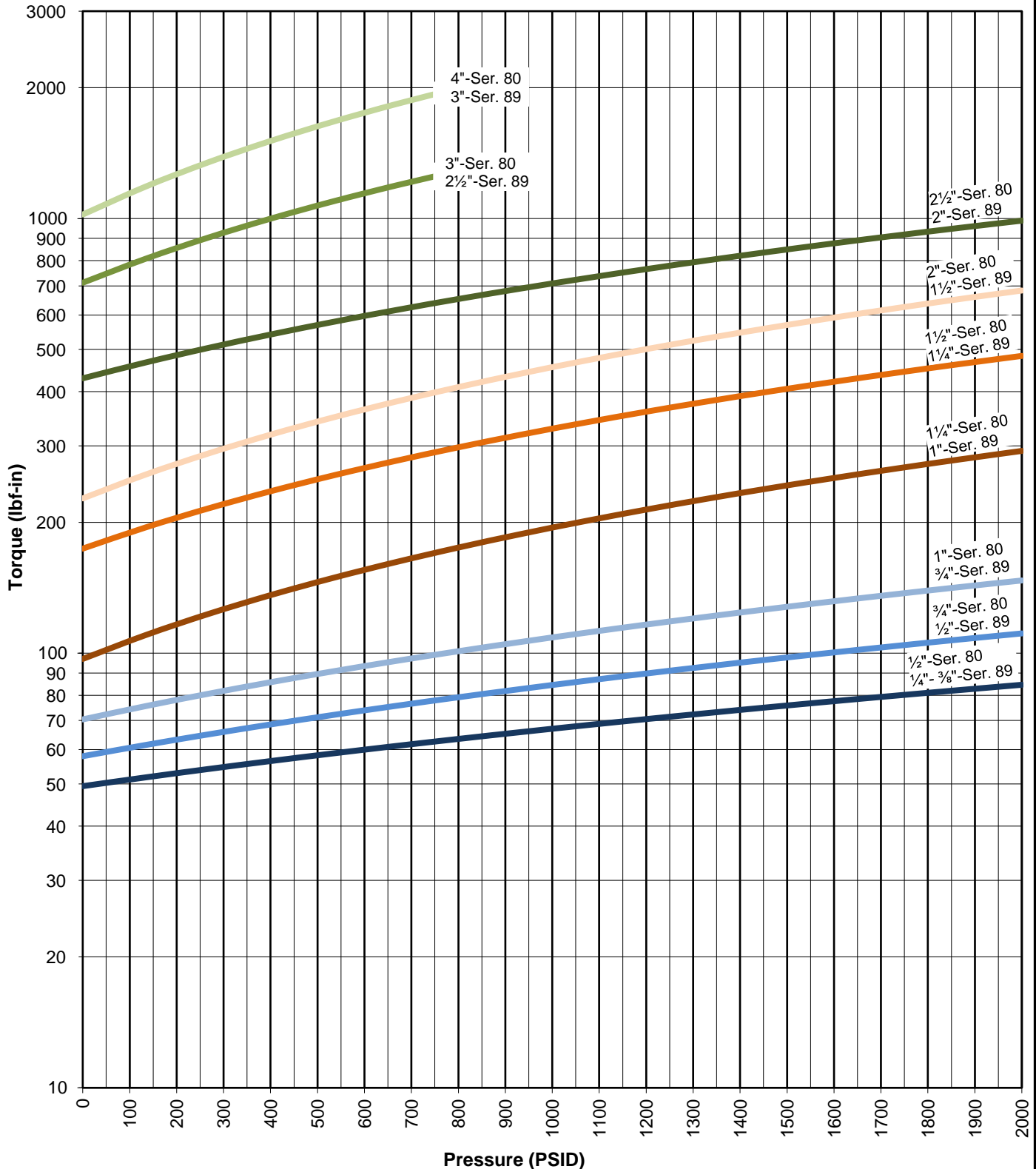
**SERIES 74/FS74 TORQUES
PTFE ("T") SEATS**

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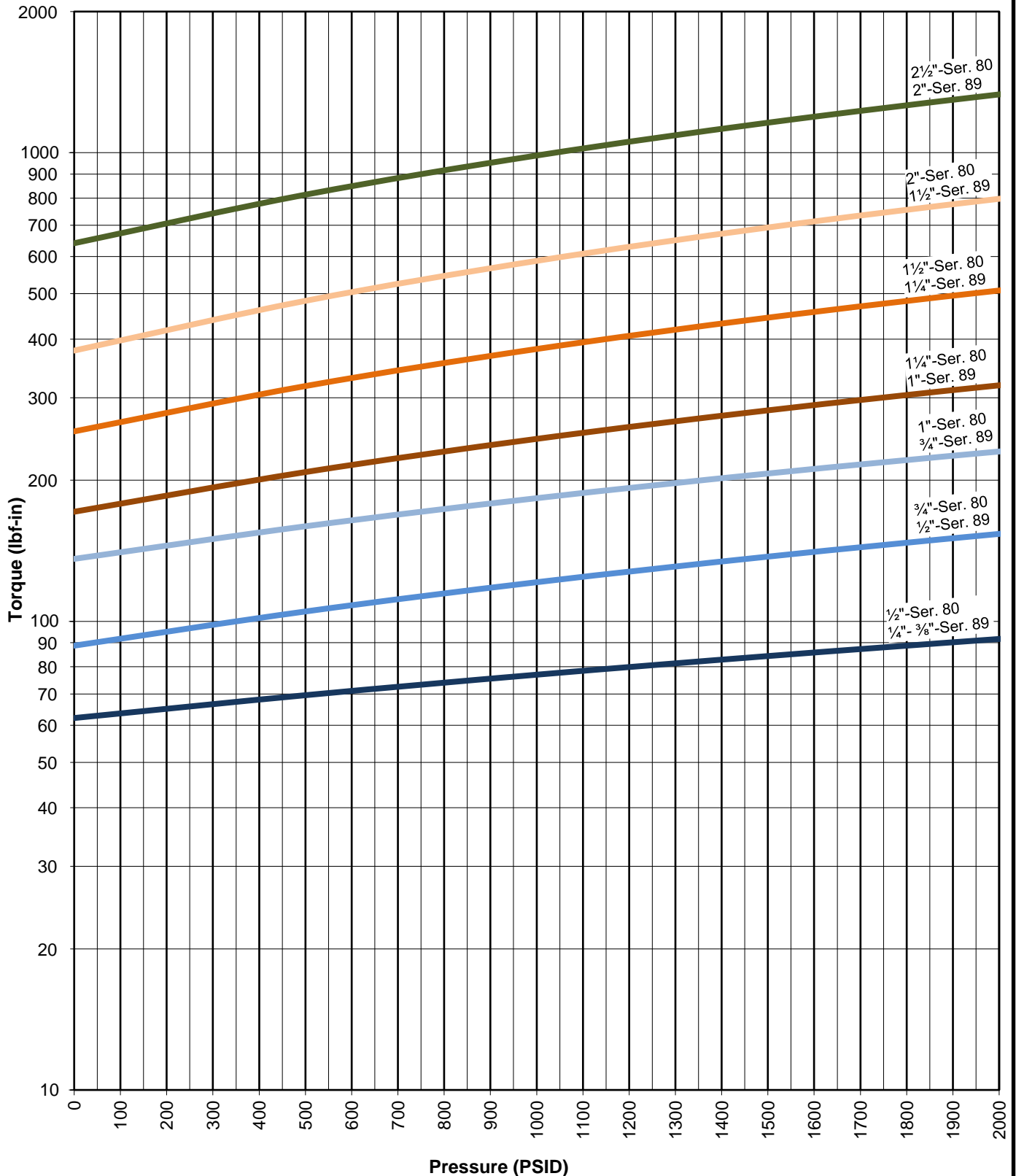
SERIES 80/89-FS80/89 TORQUES
SUPER NOVA ("B") SEATS
NOVA ("N") SEATS

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



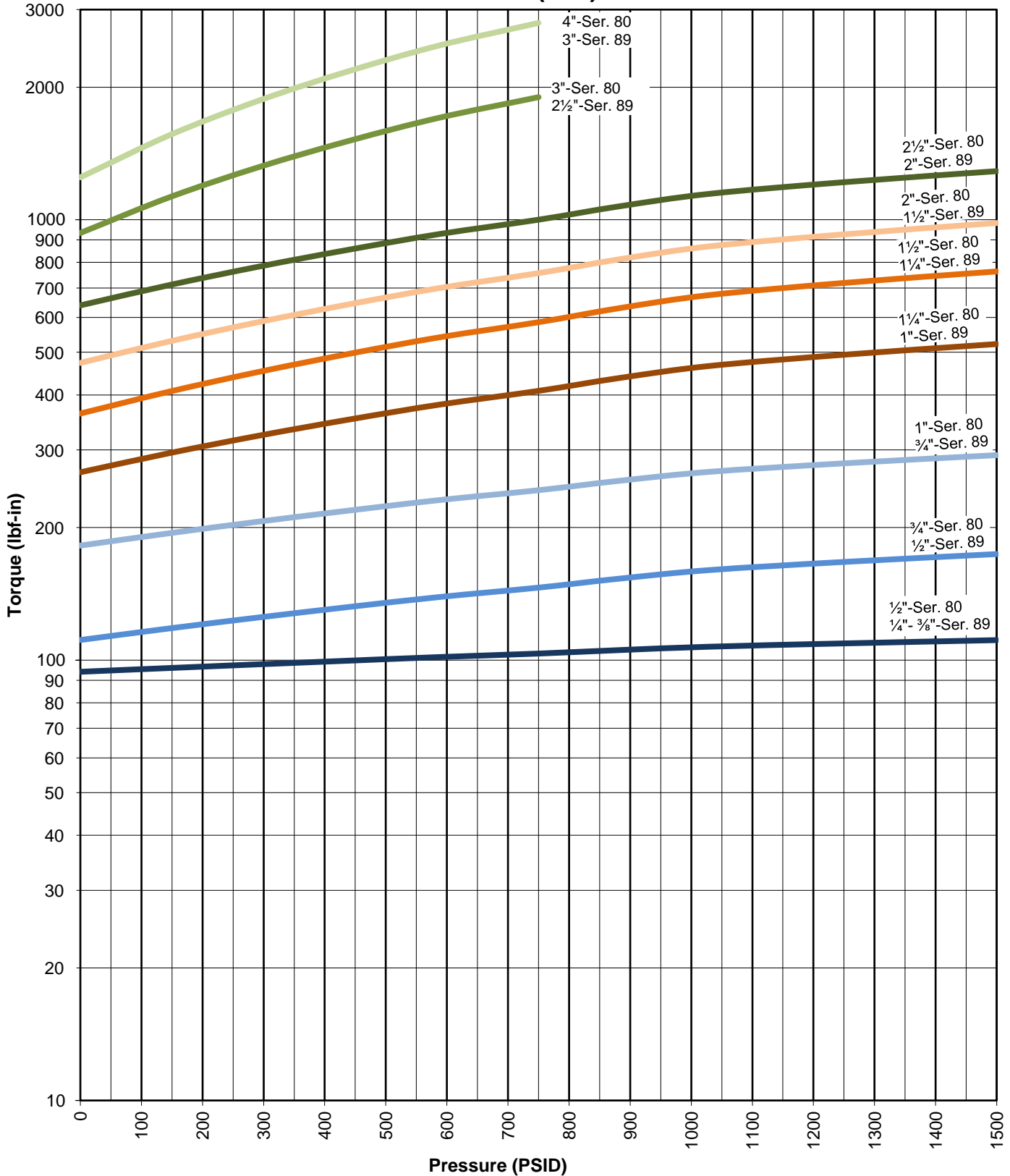
**SERIES 80/89 TORQUES
DELRIN® ("D") SEATS**

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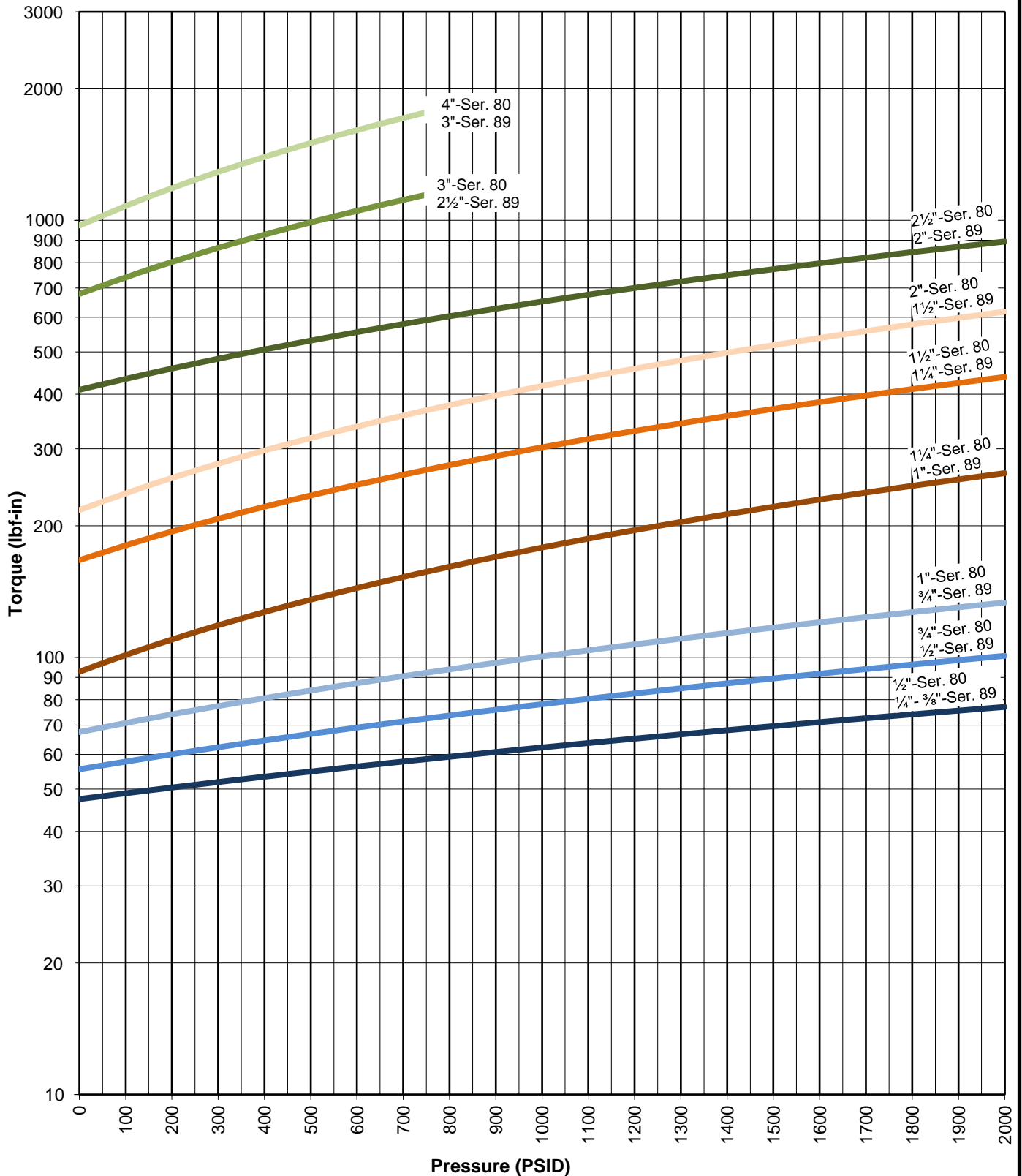
**SERIES C80/89-FSC80/89 TORQUES
PCTFE Kel-F® ("K") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



SERIES 80/89 - FS80/89 TORQUES TFM® ("M") SEATS

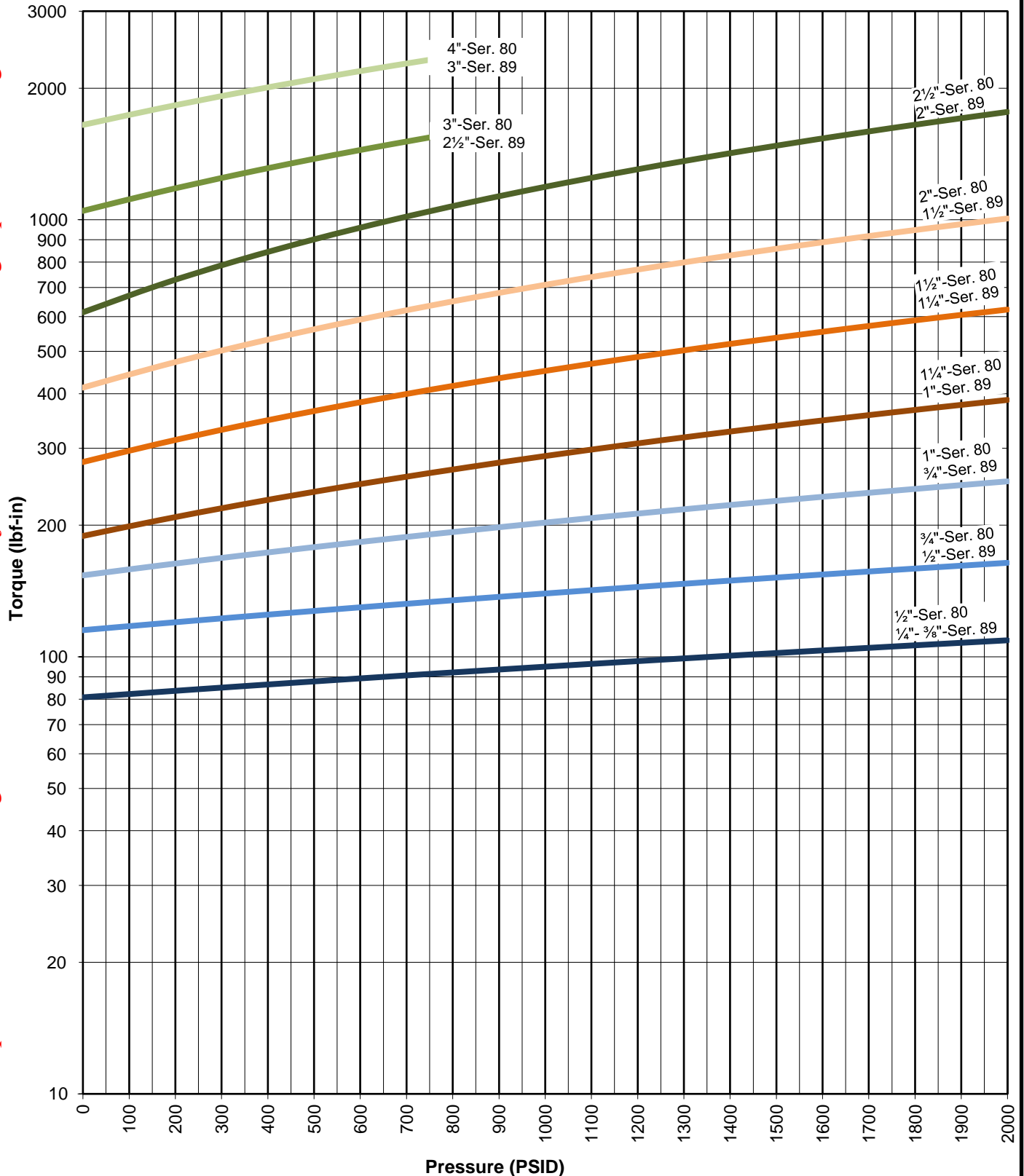
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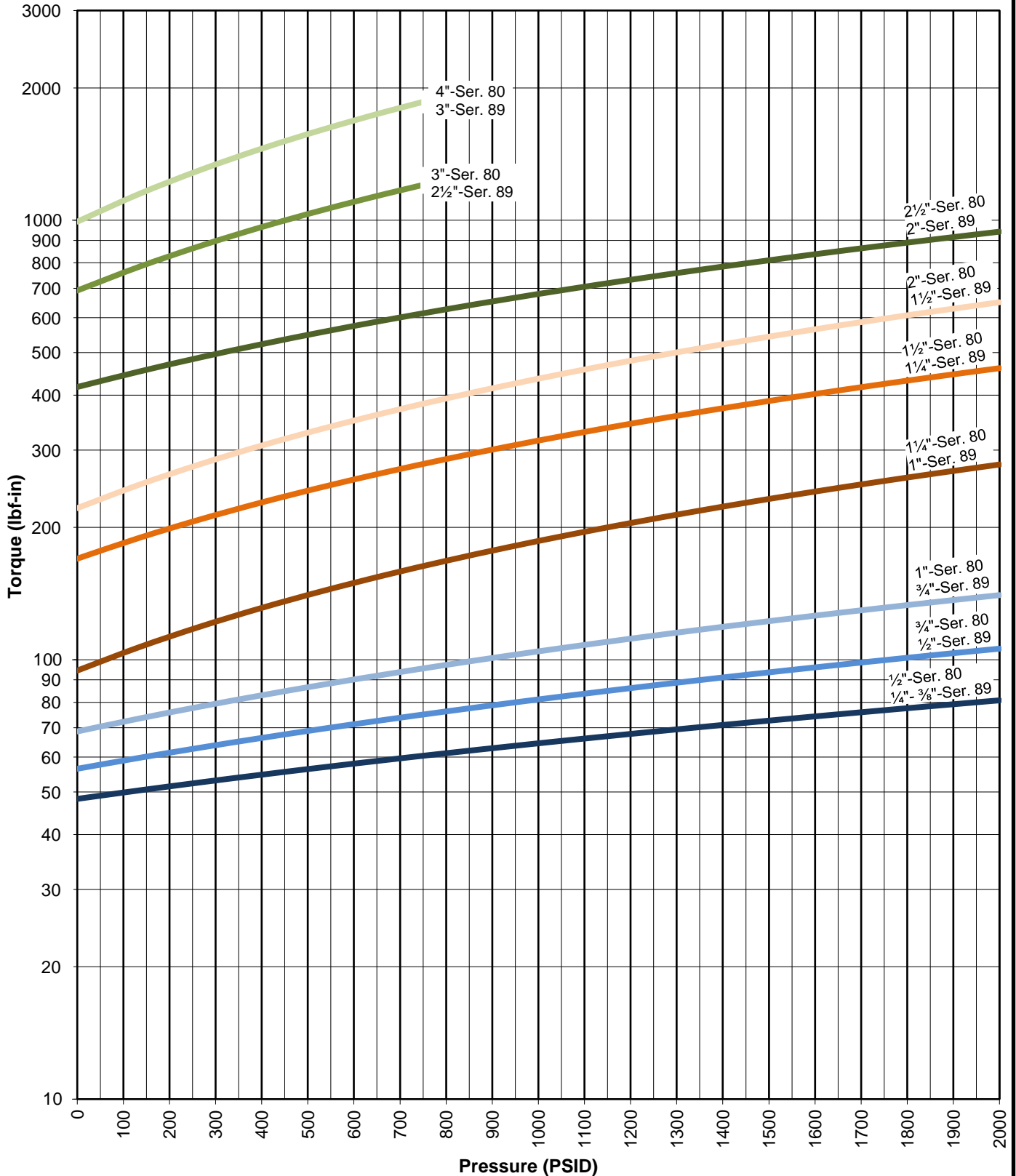
SERIES 80/89 TORQUES PEEK ("P") SEATS

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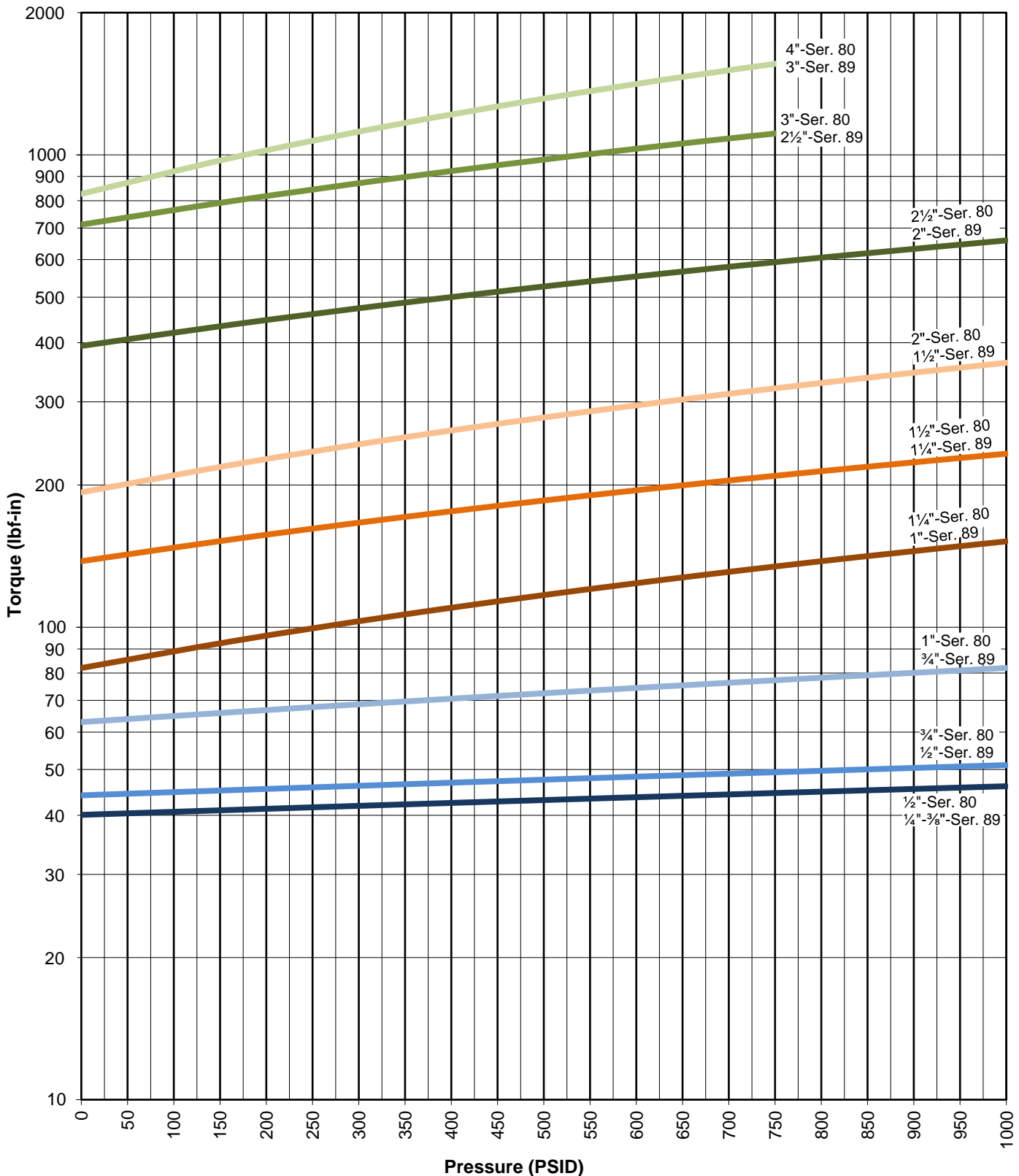
**SERIES 80/89 - FS80/89 TORQUES
RTFE ("R") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



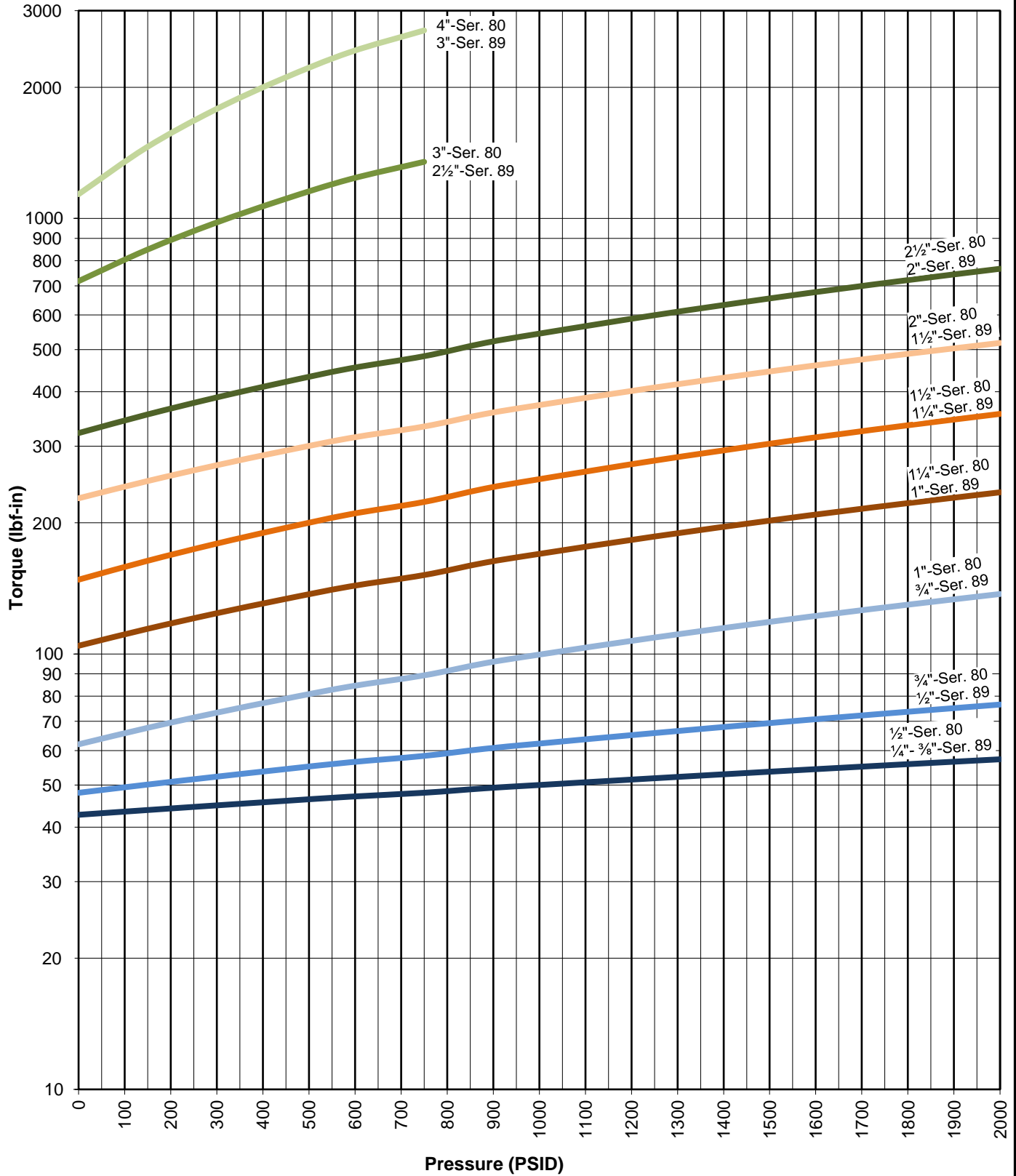
**SERIES 80/89 - FS80/89 TORQUES
PTFE ("T") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



SERIES 80/89 TORQUES UHMWPE ("U") SEATS

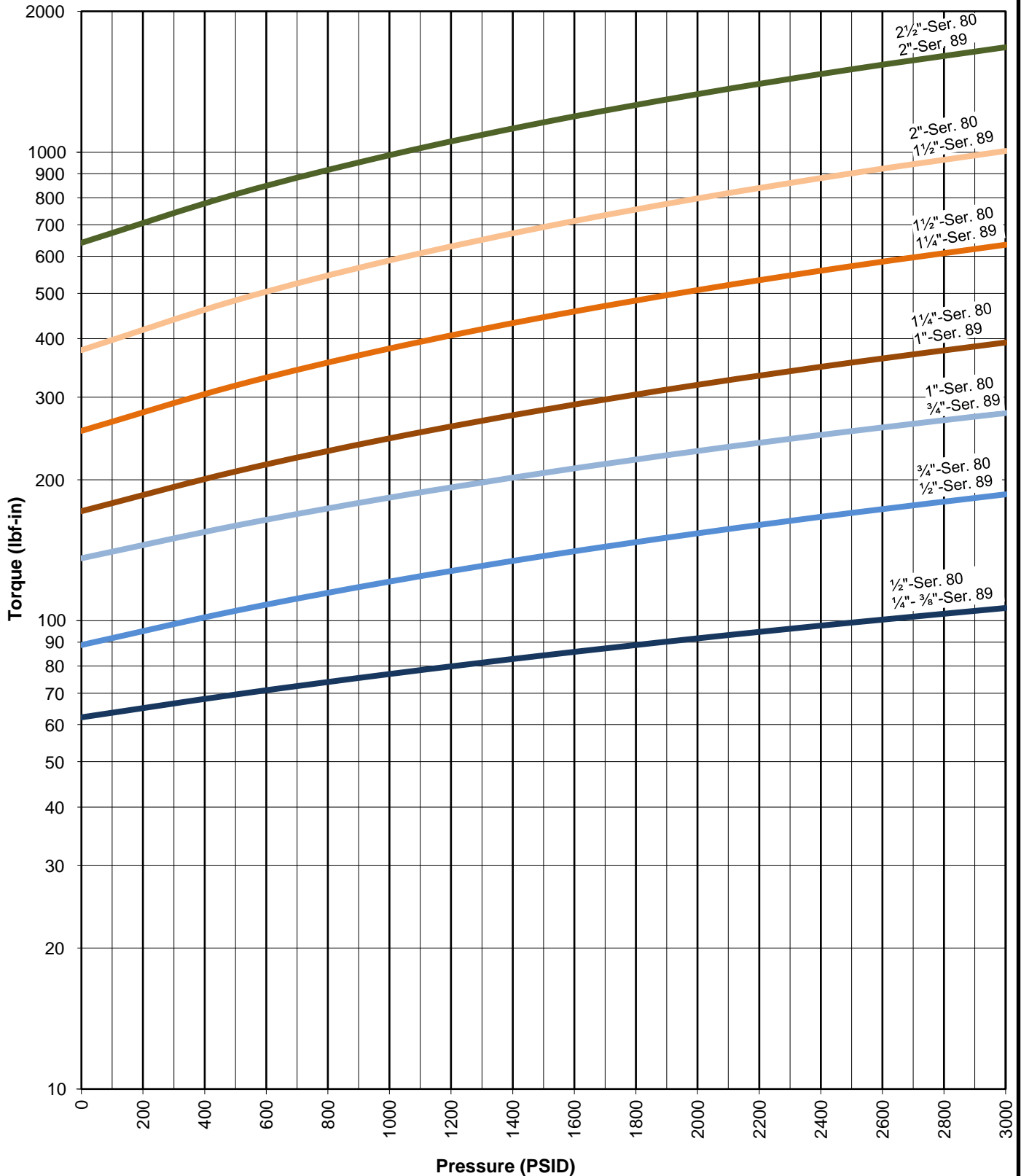
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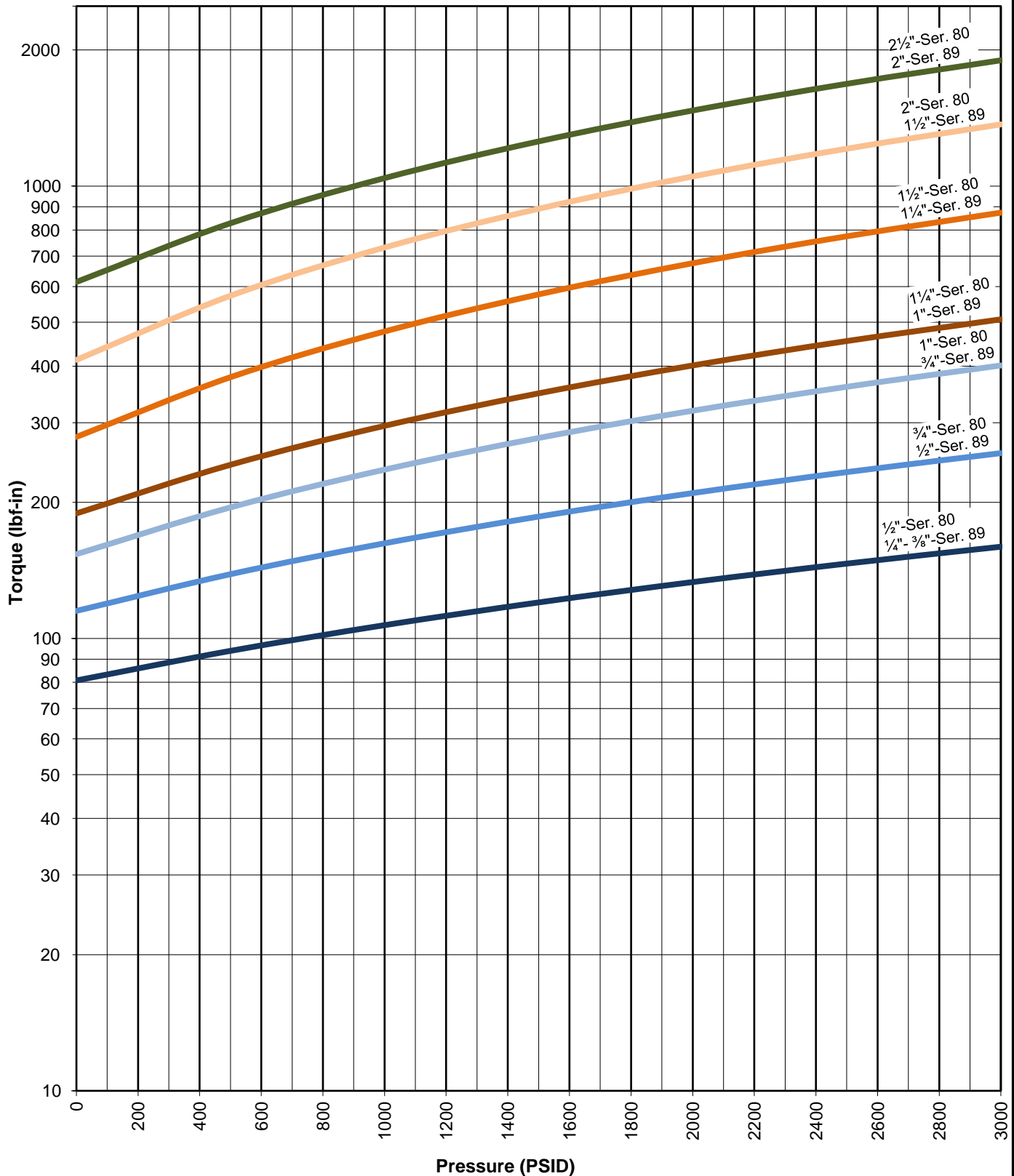
**SERIES HP80/89 TORQUES
DELRIN® ("D") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



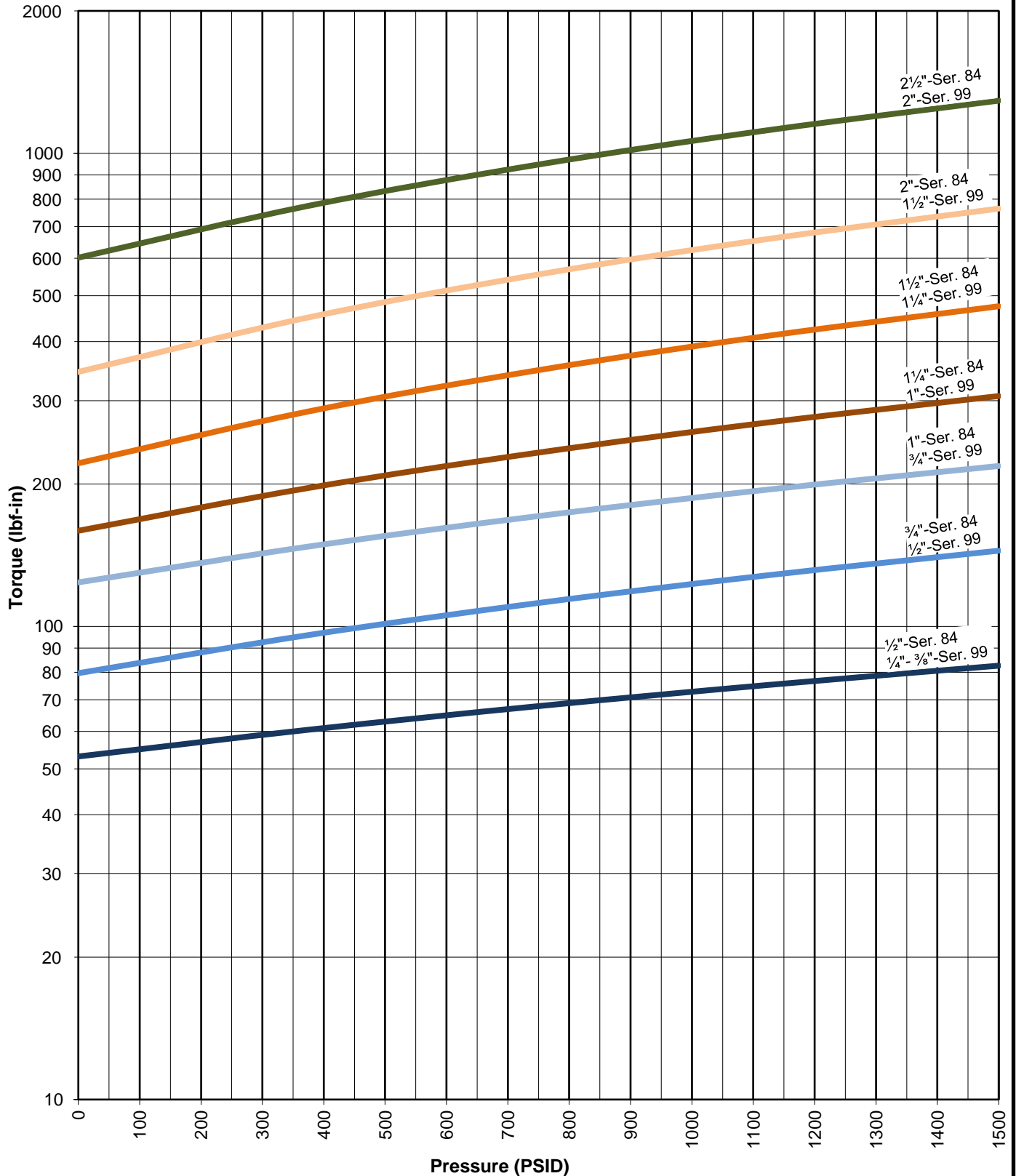
**SERIES HP80/89 TORQUES
PEEK ("P") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



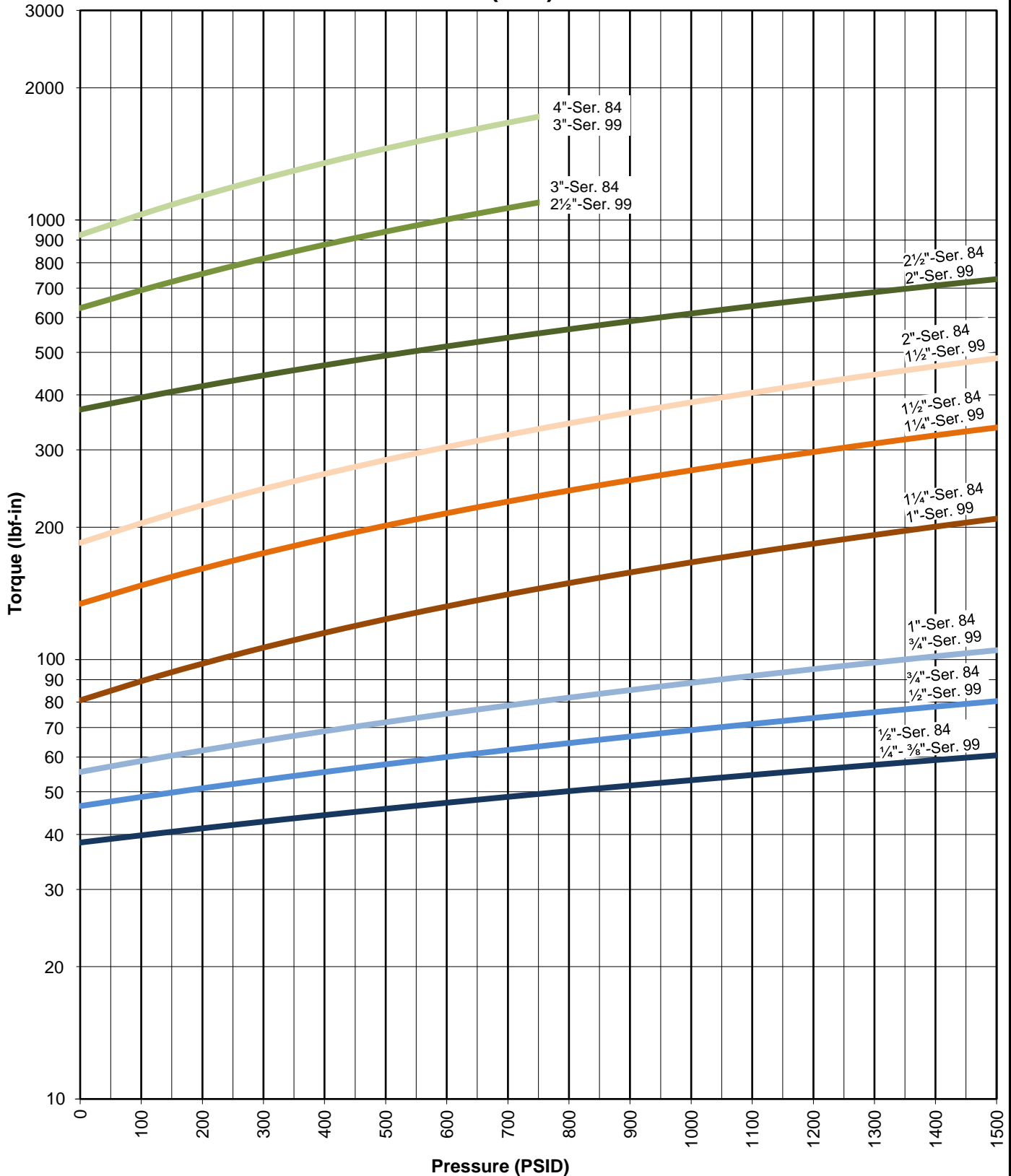
**SERIES 84/99-D84-V84 TORQUES
DELRIN® ("D") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



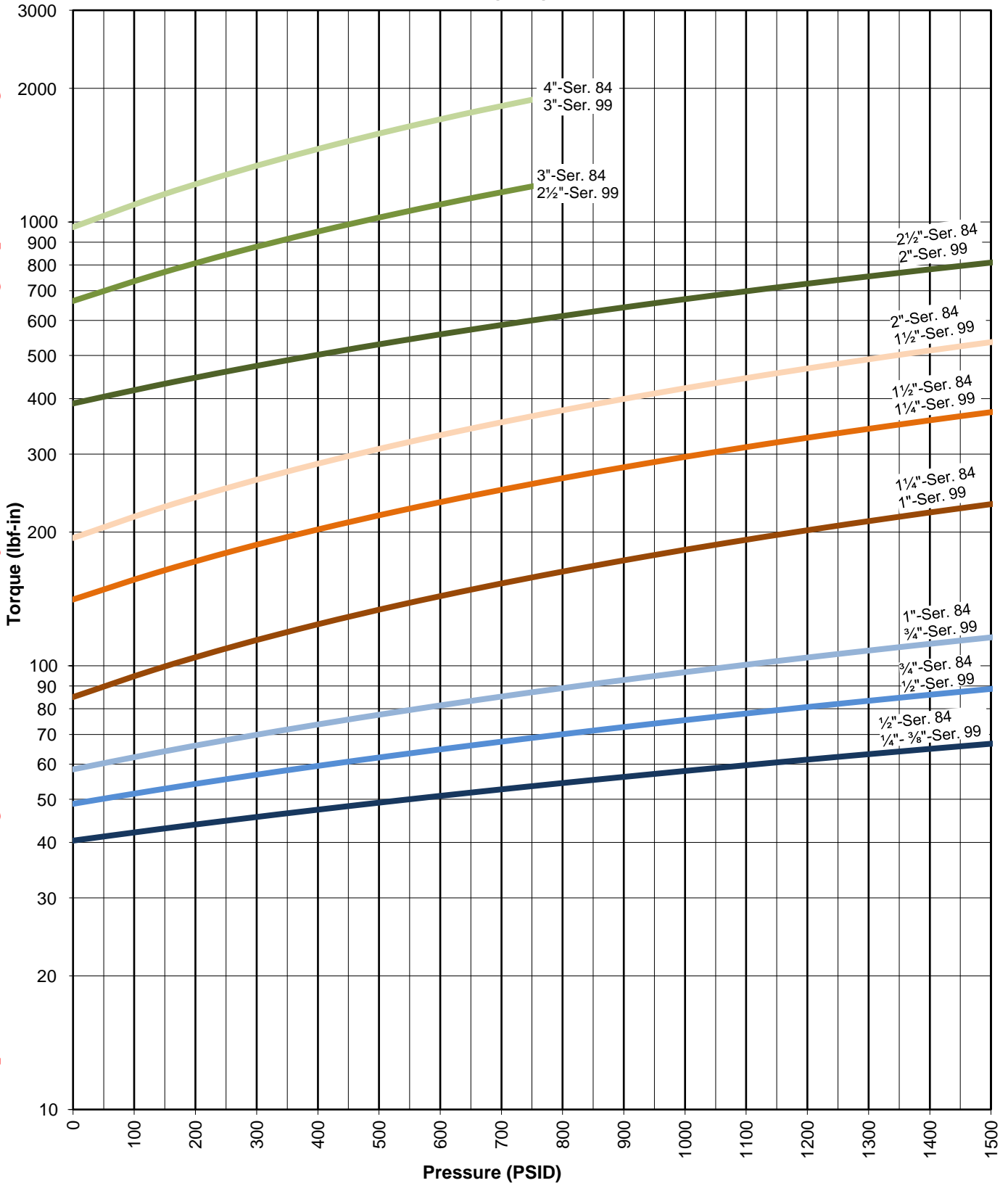
SERIES 84/99-CL84/99-FS84/99-D84-V84 TORQUES
TFM® ("M") SEATS

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



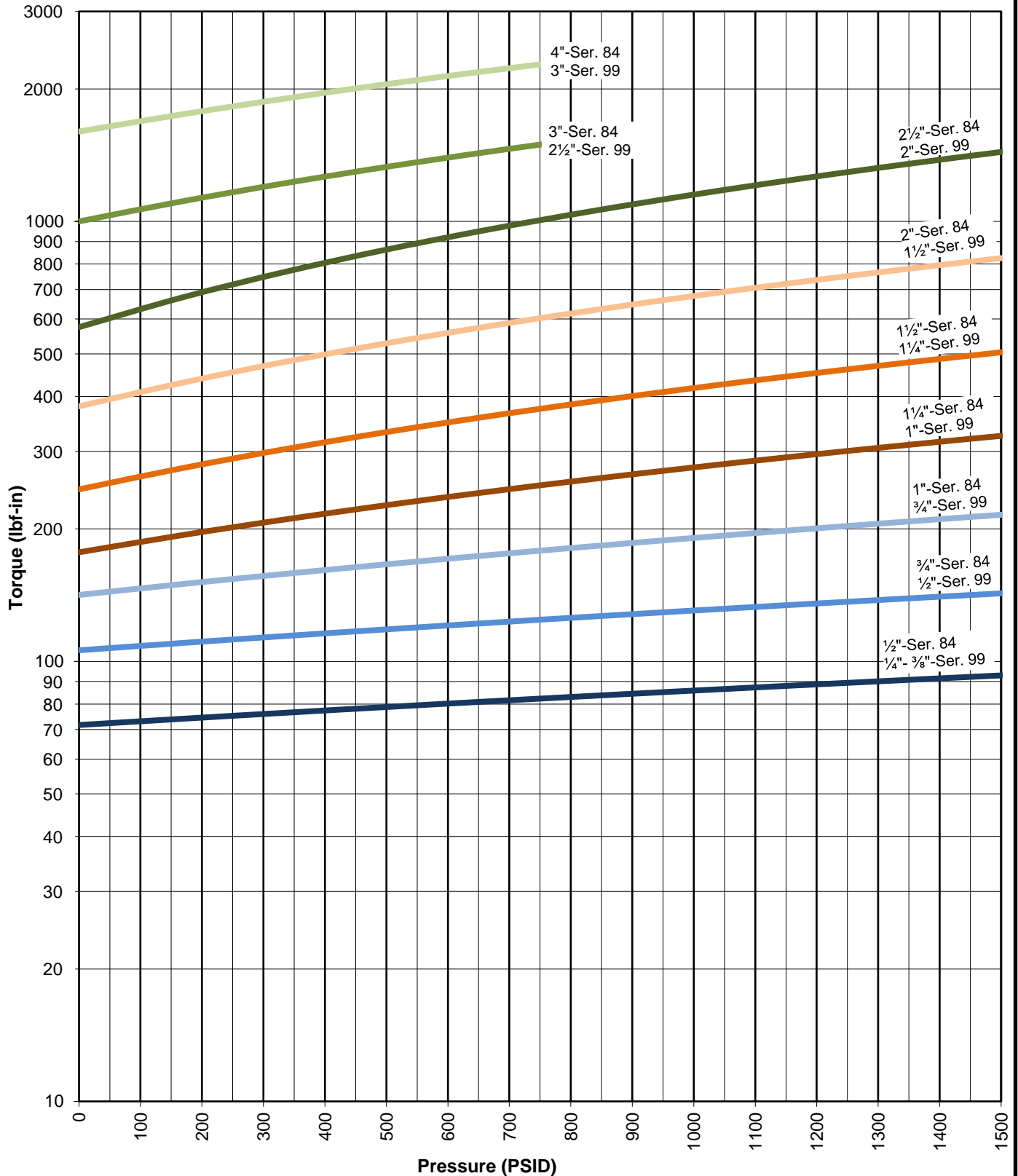
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NOVA ("N") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



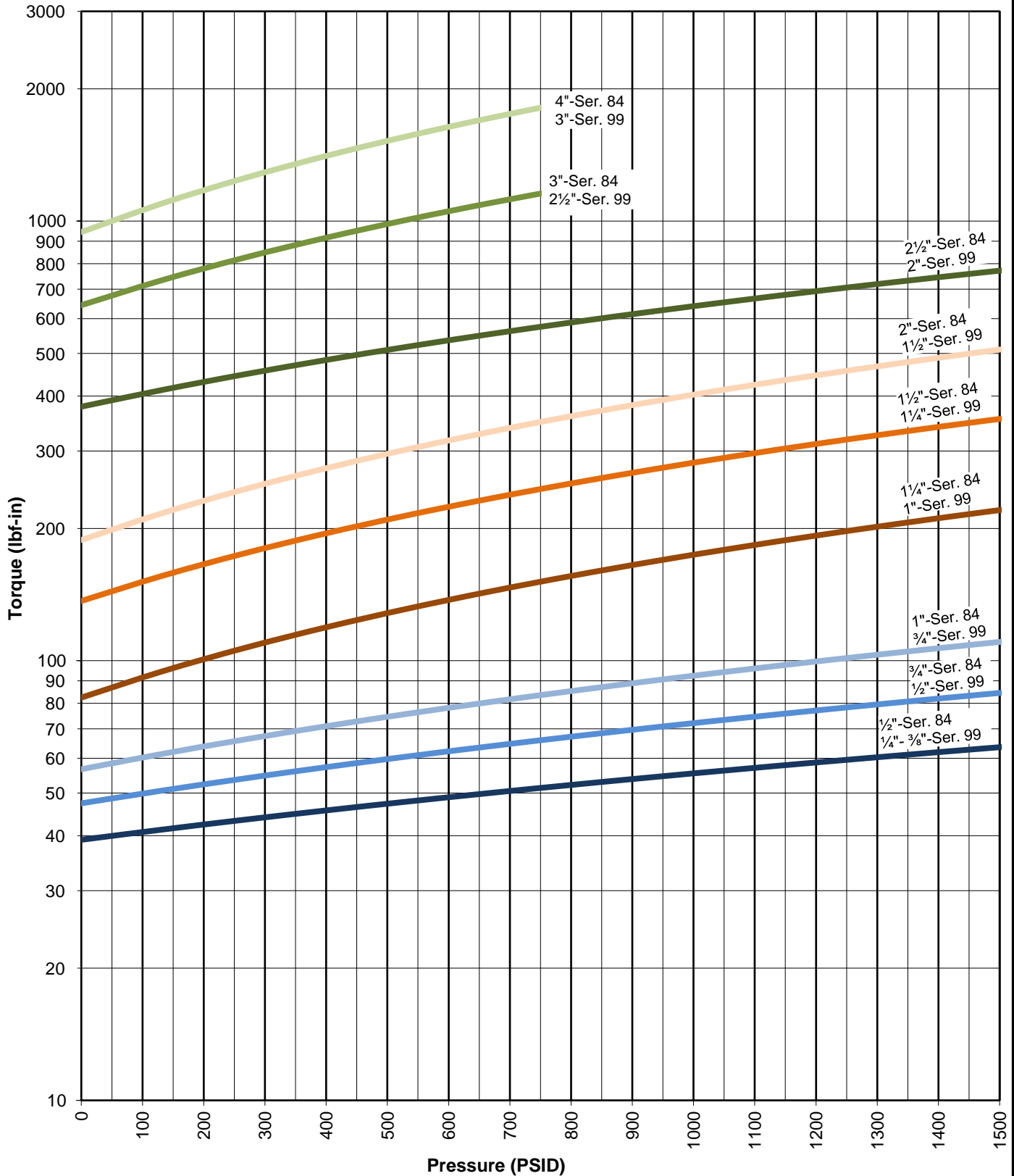
**SERIES 84/99-W84/99-D84-V84 TORQUES
PEEK ("P") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



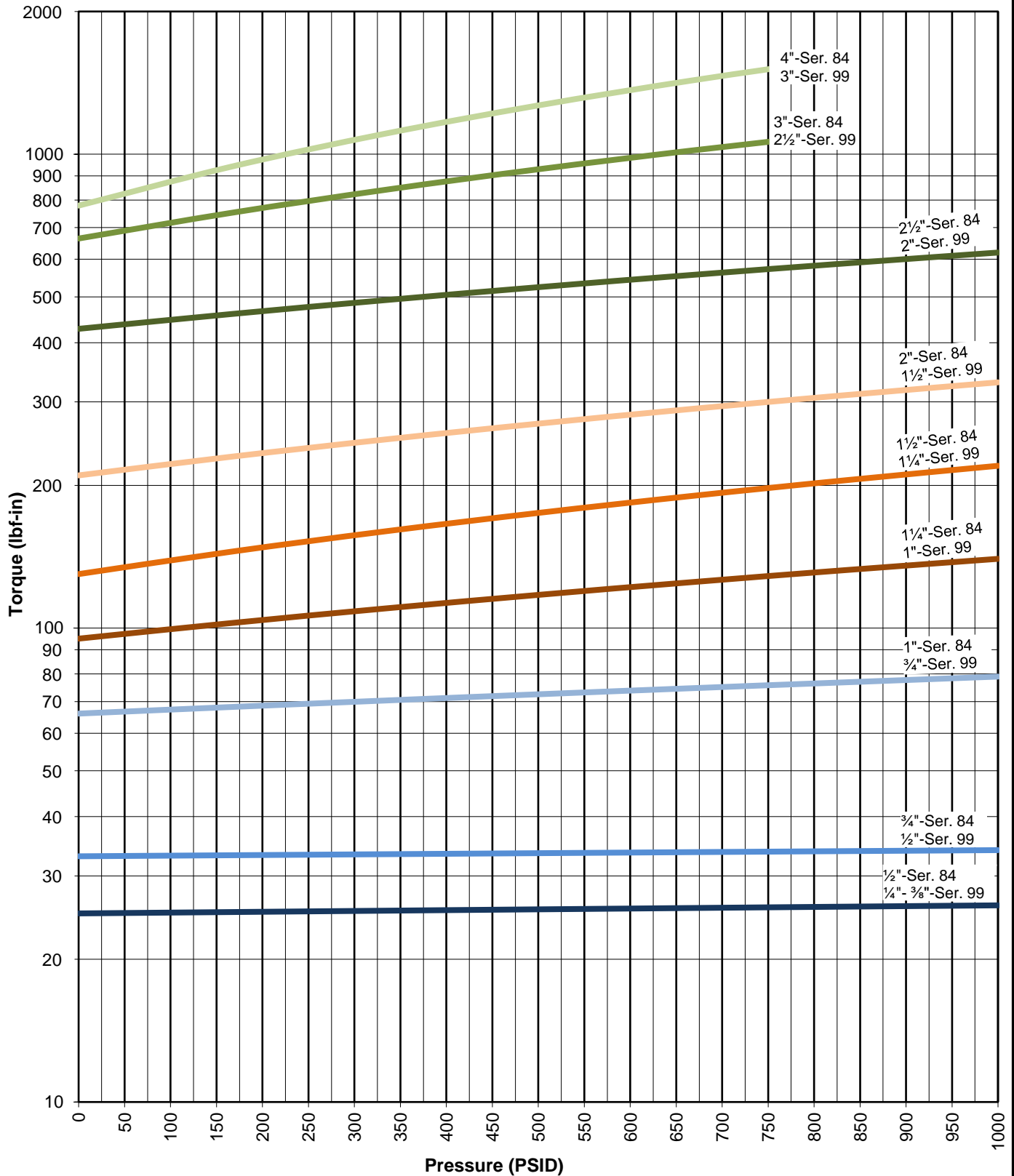
**SERIES 84/99-CL84/99-FS84/99-D84-V84 TORQUES
RTFE ("R") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



SERIES 84/99-CL84/99-FS84/99-D84-V84 TORQUES
PTFE ("T") SEATS

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3



**SERIES 84/99-D84-V84 TORQUES
UHMWPE ("U") SEATS**

Torque Values On This Page Must Be Used In Conjunction With The Sizing Equation On Page 3

