

API Ballot 7122
TG DSE

Work Item Number	7073
Title of Work Item	DSC Additions to RP 7G-1
Ballot Revision Level	1
Type of Ballot (Initial, Comment, Comment resolution (reference API ballot#), 1 st Re-ballot, 2 nd Re-ballot, etc.)	Initial
Submitter Name(s)	Grant Pettit
API Document Modified	RP 7G-1
Impacted Documents	
Revision Key	Current API document in black, Additions in blue with gray highlight Deletions are in red-strikethrough , Instructions are in <i><italics in angle brackets></i>

Work Item Charge: Double-shouldered connection designs are intended to be added to the drill stem connections described in API drill stem standards based on prior work. This work item will develop formulas to describe the torsion and tensile capacities of these connections and update RP7G-1 accordingly.

Ballot Rationale: Soon the double-shouldered connection designs developed and tested in previous API work will be published. The industry will need guidance on the tensile and torsion capacities of these connections.

Ballot Text:

3.1 Terms and Definitions

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<Add new definitions, renumber as needed.>

3.1.11 double-shouldered connection (DSC)

A rotary-shouldered connection design with a secondary torque stop at the pin nose to increase torsional capacity. The DSCs considered in this standard are those designs given in API Spec 7-2. Other proprietary designs exist, but are not used in this standard nor subject to it.

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3.1.29 single-shouldered connection (SSC)

A rotary-shouldered connection design with the only torque stop (which is also the sealing face) located at the box face and pin shoulder of the connection. The SSCs considered in this standard are those designs given in API Spec 7-2. Other proprietary designs exist, but are not used in this standard nor subject to it.

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5 Properties of Drill Pipe and Tool Joints

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The torsional strength of a tool joint is a function of several variables. These include the strength of the steel, connection size, connection design (SSC or DSC), thread form ...

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Dimensional limits and properties of used pipe are listed in Table A.3 and Table A.4. The tool joint to pipe torsional ratios that are used here (≥ 0.80 for SSC designs) are recommendations only ...

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<The figures were reduced in number by plotting multiple connections on each graph, which also required removing the torsional strength to reduce the amount of data to be shown on each graph, so the text is being altered accordingly.>

Figure A.1 through Figure A.25-A.5 show the ~~theoretical torsional strength and~~ recommended makeup torque curves of several commonly used tool joint connections over a wide range of IDs and ODs. ~~Torsional strength is based on 120,000 psi minimum yield strength and calculated by Equation (G.10).~~ Recommended makeup torque is based on 72,000 psi stress and calculated by Equation (G.11).

~~The theoretical torsional strength for a used tool joint is determined by taking the following steps:~~

- ~~a) —Select the appropriately titled curve for the size and type tool joint connection being studied.~~
- ~~b) —Extend a horizontal line from the OD under consideration to the curve and read the torsional strength representing the box.~~
- ~~c) —Extend a vertical line from the ID to the curve and read the torsional strength representing the pin.~~

~~The smaller of the two torsional strengths thus obtained is the theoretical torsional strength of the tool joint.~~

It is emphasized that the values obtained from the curves are theoretical values ~~of torsional strength~~. Tool joints in the field, subject to many factors not included in determination of points for the curves, may vary from these values.

~~The curves are most useful to show the relative torsional strengths of joints for variations in OD and ID, both new and after wear. In each case, the smaller value should be used.~~

The recommended makeup torque for a used tool joint is determined by taking the following steps.

- 1) Select the appropriately titled curve for the size and type tool joint connection being studied [and locate the correct line.](#)
- 2) Extend a horizontal line from the OD under consideration to the curve and read the recommended makeup torque representing the box.
- 3) Extend a vertical line from the ID under consideration to the curve and reads the recommended makeup torque representing the pin.

The smaller of the two recommended makeup torques thus obtained is the recommended makeup torque for the tool joint.

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11.2 Interchangeable Connections

<This section will be split into two parts to describe the equivalent connection names (the current scope of 11.2) and double-shouldered connections.>

11.2.1 Equivalent Connections

Many sizes and styles of connections are interchangeable with certain others. These connections differ only in name and in some cases thread form. A table of interchangeable connections is provided in API 7-2.

11.2.2 Double-Shouldered Connections

Double-shouldered connections (DSCs) have been developed to increase the torsional capacity of single-shouldered connections (SSCs) by using a secondary torque stop at the pin nose of the connection. These DSCs were designed to be identical to the associated SSC design except for the addition of the secondary torque stop, and that secondary torque stop does not interfere or interact with an SSC design. Figure 1 shows the pattern; a DS pin will make up with an SS box, and vice versa, with no damage or interference. Both of these mixed cases perform as an SS connection, that is, the torsion capacities will be that of a single-shouldered design. However, if both the pin and box are double-shouldered then a higher torsion capacity and higher makeup torques can be relied upon.

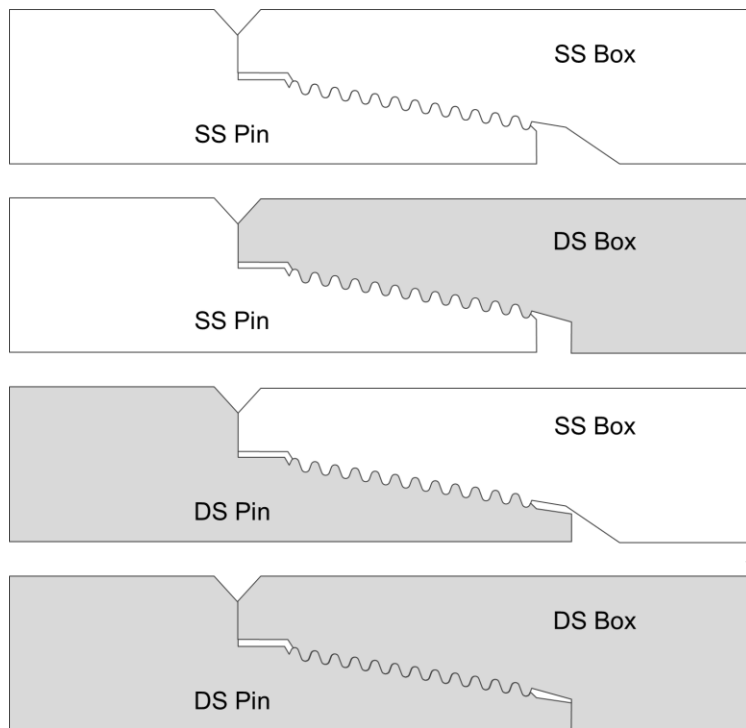


Figure 1—DSC and SSC schematic.

It is to be noted that, while a DSC and SSC can make up and perform properly, the user should carefully consider whether that's preferable. Dart passage, fatigue concerns, or confusion about the makeup torque to be applied are possible concerns; it may be preferable to still use crossovers between these interchangeable DS and SS connections.

11.3 Recommended Makeup Torque

Recommended makeup torque values for drill pipe tool joint connections are listed in Table A.2, Table A.3, And Table A.4 and also shown in Figure A.1 through Figure A.5.

Recommended makeup torques for drill collars connections ...

Recommended makeup torques for HWDP connections are given in Tables C.1 and C.2.

Recommended makeup torques for drill bits ...

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11.5 Bending Strength Ratio (BSR)

The BSR for drill collar connections with a variety of ODs and IDs are shown in Figure B.1 through Figure B.7.

Note that BSR does not apply to drill pipe or HWDP connections, nor does it apply to DSC connection designs. The effect ...

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11.6.1 Relief Grooves

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These laboratory tests ... and established the groove length limits for new and used products. Double-shouldered connection designs do not include any stress-relief feature options.

Table A.2—New Drill Pipe Properties

Label 1	Label 2	Grade	Upset Type	RSC Type ^a	New Drill Pipe									
					Box OD (in.)	Pin ID (in.)	Approx. Mass (lb/ft)	Makeup Torque ^b (ft-lb)	Tensile Yield Pipe Body (lb)	Tensile Yield Tool Joint (lb)	Torsional Yield Pipe Body (ft-lb)	Torsional Yield Tool Joint ^d (ft-lb)	Collapse Pressure Pipe Body (psi)	Max. Internal Pressure Pipe Body (psi)
2 3/8	4.85	E	EU	2 3/8 OH LW	3 1/8	2	4.95	2,716 P	97817	206416	4763	4,526 p	11040	10500
2 3/8	4.85	E	EU	2 3/8 SL H90	3 1/4	2	5.05	3,042 P	97817	202670	4763	5,075 p	11040	10500
2 3/8	4.85	E	EU	2 3/8 WO	3 3/8	2	5.15	2,541 P	97817	195677	4763	4,235 p	11040	10500
2 3/8	4.85	E	EU	NC26	3 3/8	1 3/4	5.26	4,125 B	97817	313681	4763	6,875 b	11040	10500
2 3/8	4.85	E	EU	NC26DS	3 3/8	1 3/4	5.26	5,313 B	97817	313,681	4763	8,854 B	11040	10500
2 3/8	6.65	E	EU	2 3/8 OH LW	3 1/4	1 3/4	6.89	3,783 B	138214	294620	6250	6,305 b	15599	15474
2 3/8	6.65	E	IU	2 3/8 PAC *	2 7/8	1 3/8	6.71	2,803 P	138214	238504	6250	4,672 P	15599	15474
2 3/8	6.65	E	EU	2 3/8 SL H90	3 1/4	2	6.78	3,042 P	138214	202850	6250	5,075 p	15599	15474
2 3/8	6.65	E	EU	NC26	3 3/8	1 3/4	7.02	4,125 B	138214	313681	6250	6,875 b	15599	15474
2 3/8	6.65	E	EU	NC26DS	3 3/8	1 3/4	7.02	5,313 B	138214	313,681	6250	8,854 B	15599	15474
2 3/8	6.65	X	EU	2 3/8 SL H90	3 1/4	1 13/16	6.99	4,109 P	175072	270223	7917	6,862 p	19759	19600
2 3/8	6.65	X	EU	NC26	3 3/8	1 3/4	7.11	4,125 B	175072	313681	7917	6,875 b	19759	19600
2 3/8	6.65	X	EU	NC26DS	3 3/8	1 3/4	7.11	5,313 B	175072	313,681	7917	8,854 B	19759	19600
2 3/8	6.65	G	EU	2 3/8 SL H90 *	3 1/4	1 13/16	6.99	4,109 P	193500	270223	8751	6,862 P	21839	21663
2 3/8	6.65	G	EU	NC26 *	3 3/8	1 3/4	7.11	4,125 B	193500	313681	8751	6,875 b	21839	21663
2 3/8	6.65	G	EU	NC26DS	3 3/8	1 3/4	7.11	5,313 B	193500	313,681	8751	8,854 B	21839	21663
2 7/8	6.85	E	EU	2 7/8 OH LW *	3 3/4	2 7/16	6.93	3,290 B	135902	223937	8083	5,464 P	10467	9907
2 7/8	6.85	E	EU	2 7/8 SL H90	3 7/8	2 7/16	7.05	4,504 P	135902	260783	8083	7,513 p	10467	9907
2 7/8	6.85	E	EU	2 7/8 WO	4 1/8	2 7/16	7.31	4,209 P	135902	277553	8083	7,015 p	10467	9907
2 7/8	6.85	E	EU	NC31	4 1/8	2 1/8	7.50	7,074 P	135902	447130	8083	11,790 p	10467	9907
2 7/8	6.85	E	EU	NC31DS	4 1/8	2 1/8	7.50	9,130 P	135902	447,130	8083	15,217 P	10467	9907
2 7/8	10.40	E	EU	2 7/8 OH SW *	3 7/8	2 5/32	10.59	5,194 P	214344	345566	11554	8,659 P	16509	16526
2 7/8	10.40	E	IU	2 7/8 PAC *	3 1/8	1 1/2	10.27	3,424 P	214344	272938	11554	5,706 P	16509	16526
2 7/8	10.40	E	EU	2 7/8 SL H90	3 7/8	2 5/32	10.59	6,732 P	214344	382765	11554	11,227 p	16509	16526
2 7/8	10.40	E	IU	2 7/8 XH	4 1/4	1 7/8	11.19	7,853 P	214344	505054	11554	13,088 p	16509	16526
2 7/8	10.40	E	IU	NC26 *	3 3/8	1 3/4	10.35	4,125 B	214344	313681	11554	6,875 B	16509	16526
2 7/8	10.40	E	IU	NC26DS	3 3/8	1 3/4	10.35	5,313 B	214344	313,681	11554	8,854 B	16509	16526
2 7/8	10.40	E	EU	NC31	4 1/8	2 1/8	10.92	7,074 P	214344	447130	11554	11,790 p	16509	16526

2 7/8	10.40	E	EU	NC31DS	4 1/8	2 1/8	10.92	9,130 P	214344	447,130	11554	15,217 P	16509	16526
2 7/8	10.40	X	EU	2 7/8 SL H90 *	3 7/8	2 5/32	10.74	6,732 P	271503	382329	14635	11,208 P	20911	20933
2 7/8	10.40	X	EU	2 7/8 SL H90	4	2	10.95	7,859 P	271503	443971	14635	13,119 p	20911	20933
2 7/8	10.40	X	EU	NC31	4 1/8	2	11.09	7,895 P	271503	495726	14635	13,158 p	20911	20933
2 7/8	10.40	X	EU	NC31DS	4 1/8	2	11.09	10,576 P	271503	495,726	14635	17,627 P	20911	20933
2 7/8	10.40	G	EU	2 7/8 SL H90	4	2	10.95	7,859 P	300082	443971	16176	13,119 p	23112	23137
2 7/8	10.40	G	EU	NC31	4 1/8	2	11.09	7,895 P	300082	495726	16176	13,158 p	23112	23137
2 7/8	10.40	G	EU	NC31DS	4 1/8	2	11.09	10,576 P	300082	495,726	16176	17,627 P	23112	23137
2 7/8	10.40	S	EU	2 7/8 SL H90	4 1/8	1 5/8	11.26	10,264 P	385820	572089	20798	17,130 p	29716	29747
2 7/8	10.40	S	EU	NC31	4 3/8	1 5/8	11.55	10,086 P	385820	623844	20798	16,809 p	29716	29747
2 7/8	10.40	S	EU	NC31DS	4 3/8	1 5/8	11.55	14,343 P	385820	623,844	20798	23,904 P	29716	29747
3 1/2	9.50	E	EU	3 1/2 OH LW	4 1/2	3	9.84	7,082 P	194264	392071	14146	11,803 p	10001	9525
3 1/2	9.50	E	EU	3 1/2 OH LW	4 3/4	3	10.34	7,082 P	194264	392071	14146	11,803 p	10001	9525
3 1/2	9.50	E	EU	3 1/2 SL H90	4 5/8	3	9.99	7,469 P	194264	366705	14146	12,458 p	10001	9525
3 1/2	9.50	E	EU	3 1/2 WO	4 3/4	3	10.14	7,633 P	194264	419797	14146	12,723 p	10001	9525
3 1/2	9.50	E	EU	NC38	4 3/4	2 11/16	10.60	10,843 P	194264	587308	14146	18,071 p	10001	9525
3 1/2	9.50	E	EU	NC38DS	4 3/4	2 11/16	10.60	13,662 P	194264	587,308	14146	22,770 P	10001	9525
3 1/2	9.50	E	EU	NC38	4 3/4	3	10.34	7,595 P	194264	419797	14146	12,657 p	10001	9525
3 1/2	9.50	E	EU	NC38DS	4 3/4	3	10.34	7,764 P	194264	419,797	14146	12,940 P	10001	9525
3 1/2	9.50	SS75	EU	NC38	4 3/4	2 11/16	10.72	9,934 P	194264	538133	14146	16,557 p	10001	9525
3 1/2	9.50	SS75	EU	NC38DS	4 3/4	2 11/16	10.72	13,662 P	194264	587,308	14146	22,770 P	10001	9525
3 1/2	13.30	E	EU	3 1/2 H90	5 1/4	2 3/4	14.37	14,043 B	271569	664050	18551	23,443 p	14113	13800
3 1/2	13.30	E	EU	3 1/2 OH SW	4 3/4	2 11/16	13.75	10,300 P	271569	559582	18551	17,167 p	14113	13800
3 1/2	13.30	E	EU	3 1/2 XH	4 3/4	2 7/16	13.91	10,120 P	271569	570939	18551	16,867 p	14113	13800
3 1/2	13.30	E	IU	NC31 *	4 1/8	2 1/8	13.40	7,074 P	271569	447130	18551	11,790 P	14113	13800
3 1/2	13.30	E	IU	NC31DS	4 1/8	2 1/8	13.40	9,130 P	271569	447,130	18551	15,217 P	14113	13800
3 1/2	13.30	E	EU	NC38	4 3/4	2 11/16	13.96	10,843 P	271569	587308	18551	18,071 p	14113	13800
3 1/2	13.30	E	EU	NC38DS	4 3/4	2 11/16	13.96	13,662 P	271569	587,308	18551	22,770 P	14113	13800
3 1/2	13.30	SS75	EU	NC38	4 3/4	2 11/16	14.05	9,934 P	271569	538133	18551	16,557 p	14113	13800
3 1/2	13.30	SS75	EU	NC38DS	4 3/4	2 11/16	14.05	13,662 P	271569	587,308	18551	22,770 P	14113	13800
3 1/2	13.30	X	EU	3 1/2 H90	5 1/4	2 3/4	14.60	14,043 B	343988	664050	23498	23,443 p	17877	17480
3 1/2	13.30	X	EU	3 1/2 SL H90 *	4 5/8	2 11/16	13.98	11,073 P	343988	533686	23498	18,438 P	17877	17480
3 1/2	13.30	X	EU	3 1/2 SL H90	4 3/4	2 9/16	14.06	12,408 P	343988	596066	23498	20,709 p	17877	17480
3 1/2	13.30	X	EU	NC38	5	2 9/16	14.62	12,057 P	343988	649158	23498	20,095 p	17877	17480
3 1/2	13.30	X	EU	NC38DS	5	2 9/16	14.62	15,826 P	343988	649,158	23498	26,377 P	17877	17480

3 1/2	13.30	SS95	EU	NC38	5	2 1/8	14.91	14,577 P	343988	772236	23498	24,294 p	17877	17480
3 1/2	13.30	SS95	EU	NC38DS	5	2 1/8	14.91	22,519 P	343988	842,440	23498	37,532 P	17877	17480
3 1/2	13.30	G	EU	3 1/2 SL H90	4 3/4	2 9/16	14.06	12,408 P	380197	596066	25972	20,709 p	19758	19320
3 1/2	13.30	G	EU	NC38	5	2 7/16	14.72	13,221 P	380197	708063	25972	22,035 p	19758	19320
3 1/2	13.30	G	EU	NC38DS	5	2 7/16	14.72	17,878 P	380197	708,063	25972	29,797 P	19758	19320
3 1/2	13.30	S	EU	3 1/2 SL H90	5	2 1/8	14.65	16,667 P	488825	789348	33392	27,809 p	25404	24840
3 1/2	13.30	S	EU	NC38	5	2 1/8	14.93	15,902 P	488825	842440	33392	26,503 P	25404	24840
3 1/2	13.30	S	EU	NC38DS	5	2 1/8	14.93	22,519 P	488825	842,440	33392	37,532 P	25404	24840
3 1/2	13.30	S	EU	NC40	5 3/8	2 7/16	15.13	17,858 P	488825	897161	33392	29,764 p	25404	24840
3 1/2	13.30	S	EU	NC40DS	5 3/8	2 7/16	15.13	24,429 P	488825	897,161	33392	40,715 P	25404	24840
3 1/2	13.30	V	EU	NC38 *	5	2 1/8	14.91	15,902 P	543135	842440	37125	26,503 P	28226	27600
3 1/2	13.30	V	EU	NC38DS	5	2 1/8	14.91	22,519 P	543135	842,440	37125	37,532 P	28226	27600
3 1/2	15.50	E	EU	NC38	5	2 9/16	16.58	12,057 P	322775	649158	21086	20,095 p	16774	16838
3 1/2	15.50	E	EU	NC38DS	5	2 9/16	16.58	15,826 P	322775	649,158	21086	26,377 P	16774	16838
3 1/2	15.50	SS75	EU	NC38	5	2 9/16	16.71	11,048 P	322775	594840	21086	18,413 p	16774	16838
3 1/2	15.50	SS75	EU	NC38DS	5	2 9/16	16.71	15,826 P	322775	649,158	21086	26,377 P	16774	16838
3 1/2	15.50	X	EU	NC38	5	2 7/16	16.84	13,221 P	408848	708063	26708	22,035 p	21247	21328
3 1/2	15.50	X	EU	NC38DS	5	2 7/16	16.84	17,878 P	408848	708,063	26708	29,797 P	21247	21328
3 1/2	15.50	SS95	EU	NC40	5 1/2	2 1/4	17.33	17,982 P	408848	898330	26708	29,969 p	21247	21328
3 1/2	15.50	SS95	EU	NC40DS	5 1/2	2 1/4	17.33	27,444 P	408848	979,996	26708	45,740 P	21247	21328
3 1/2	15.50	G	EU	NC38	5	2 1/8	17.06	15,902 P	451885	842440	29520	26,503 p	23484	23573
3 1/2	15.50	G	EU	NC38DS	5	2 1/8	17.06	22,519 P	451885	842,440	29520	37,532 P	23484	23573
3 1/2	15.50	G	EU	NC40	5 1/4	2 9/16	16.97	16,616 P	451885	838257	29520	27,693 p	23484	23573
3 1/2	15.50	G	EU	NC40DS	5 1/4	2 9/16	16.97	22,271 P	451885	838,257	29520	37,118 P	23484	23573
3 1/2	15.50	S	EU	NC38 *	5	2 1/8	17.05	15,902 P	580995	842440	37954	26,503 P	30194	30308
3 1/2	15.50	S	EU	NC38DS	5	2 1/8	17.05	22,519 P	580995	842,440	37954	37,532 P	30194	30308
3 1/2	15.50	S	EU	NC40	5 1/2	2 1/4	17.60	19,616 P	580995	979996	37954	32,693 p	30194	30308
3 1/2	15.50	S	EU	NC40DS	5 1/2	2 1/4	17.60	27,444 P	580995	979,996	37954	45,740 P	30194	30308
3 1/2	15.50	V	EU	NC40 *	5 1/2	2 1/4	17.33	19,616 P	645555	979996	42197	32,694 P	33549	33675
3 1/2	15.50	V	EU	NC40DS	5 1/2	2 1/4	17.33	27,444 P	645555	979,996	42197	45,740 P	33549	33675
4	11.85	E	IU	4 H90	5 1/2	2 13/16	13.00	21,185 P	230755	913708	19474	35,308 p	8381	8597
4	11.85	E	EU	4 OH LW	5 1/4	3 15/32	12.10	13,186 P	230755	621357	19474	21,903 p	8381	8597
4	11.85	E	EU	4 WO	5 1/4	3 7/16	12.91	17,186 P	230755	782987	19474	28,643 p	8381	8597
4	11.85	E	EU	NC46	6	3 1/4	13.52	19,937 P	230755	901164	19474	33,228 p	8381	8597
4	11.85	E	EU	NC46DS	6	3 1/4	13.52	26,198 P	230755	901,164	19474	43,664 P	8381	8597

4	14.00	E	IU	4 H90	5 1/2	2 13/16	15.43	21,185 P	285359	913708	23288	35,308 p	11354	10828
4	14.00	E	EU	4 OH SW	5 1/2	3 1/4	15.02	16,236 P	285359	759875	23288	27,060 p	11354	10828
4	14.00	E	IU	4 SH *	4 5/8	2 9/16	14.35	9,016 P	285359	512035	23288	15,026 P	11354	10828
4	14.00	E	IU	NC40	5 1/4	2 13/16	15.06	13,968 P	285359	711611	23288	23,279 p	11354	10828
4	14.00	E	IU	NC40DS	5 1/4	2 13/16	15.06	17,599 P	285359	711,611	23288	29,332 P	11354	10828
4	14.00	E	EU	NC46	6	3 1/4	15.91	19,937 P	285359	901164	23288	33,228 p	11354	10828
4	14.00	E	EU	NC46DS	6	3 1/4	15.91	26,198 P	285359	901,164	23288	43,664 P	11354	10828
4	14.00	SS75	EU	NC46	6	3 1/4	15.89	18,275 P	285359	826067	23288	30,459 p	11354	10828
4	14.00	SS75	EU	NC46DS	6	3 1/4	15.89	26,198 P	285359	901,164	23288	43,664 P	11354	10828
4	14.00	X	IU	4 H90	5 1/2	2 13/16	15.63	21,185 P	361454	913708	29498	35,308 p	14382	13716
4	14.00	X	IU	NC40	5 1/4	2 11/16	15.29	15,319 P	361454	776406	29498	25,531 p	14382	13716
4	14.00	X	IU	NC40DS	5 1/4	2 11/16	15.29	19,994 P	361454	776,406	29498	33,324 P	14382	13716
4	14.00	X	EU	NC46	6	3 1/4	16.21	19,937 P	361454	901164	29498	33,228 p	14382	13716
4	14.00	X	EU	NC46DS	6	3 1/4	16.21	26,198 P	361454	901,164	29498	43,664 P	14382	13716
4	14.00	SS95	EU	NC46	6	3	16.08	21,448 P	361454	961058	29498	35,747 p	14382	13716
4	14.00	SS95	EU	NC46DS	6	3	16.08	32,328 P	361454	1,048,427	29498	53,880 P	14382	13716
4	14.00	G	IU	4 H90	5 1/2	2 13/16	15.63	21,185 P	399502	913708	32603	35,308 p	15896	15159
4	14.00	G	IU	NC40	5 1/2	2 7/16	15.87	17,858 P	399502	897161	32603	29,764 p	15896	15159
4	14.00	G	IU	NC40DS	5 1/2	2 7/16	15.87	24,429 P	399502	897,161	32603	40,715 P	15896	15159
4	14.00	G	EU	NC46	6	3 1/4	16.21	19,937 P	399502	901164	32603	33,228 p	15896	15159
4	14.00	G	EU	NC46DS	6	3 1/4	16.21	26,198 P	399502	901,164	32603	43,664 P	15896	15159
4	14.00	S	IU	4 H90	5 1/2	2 13/16	15.63	21,180 P	513646	913708	41918	35,308 p	20141	19491
4	14.00	S	IU	NC40	5 1/2	2	16.14	21,758 P	513646	1080135	41918	36,262 p	20141	19491
4	14.00	S	IU	NC40DS	5 1/2	2	16.14	31,051 P	513646	1,080,135	41918	51,751 P	20141	19491
4	14.00	S	EU	NC46	6	3	16.44	23,399 P	513646	1048426	41918	38,998 p	20141	19491
4	14.00	S	EU	NC46DS	6	3	16.44	32,328 P	513646	1,048,427	41918	53,880 P	20141	19491
4	14.00	V	EU	NC46	6	3	16.08	23,398 P	570720	1048427	46604	38,997 p	21915	21656
4	14.00	V	EU	NC46DS	6	3	16.08	32,328 P	570720	1,048,427	46604	53,880 P	21915	21656
4	15.70	E	IU	4 H90	5 1/2	2 13/16	17.09	21,185 P	324118	913708	25810	35,308 p	12896	12469
4	15.70	E	IU	NC40	5 1/4	2 11/16	16.80	15,319 P	324118	776406	25810	25,531 p	12896	12469
4	15.70	E	IU	NC40DS	5 1/4	2 11/16	16.80	19,994 P	324118	776,406	25810	33,324 P	12896	12469
4	15.70	E	EU	NC46	6	3 1/4	17.54	19,937 P	324118	901164	25810	33,228 p	12896	12469
4	15.70	E	EU	NC46DS	6	3 1/4	17.54	26,198 P	324118	901,164	25810	43,664 P	12896	12469
4	15.70	X	IU	4 H90	5 1/2	2 13/16	17.23	21,185 P	410550	913708	32692	35,308 p	16335	15794
4	15.70	X	IU	NC40	5 1/2	2 7/16	17.52	17,858 P	410550	897161	32692	29,764 p	16335	15794

4	15.70	X	IU	NC40DS	5 1/2	2 7/16	17.52	24,429 P	410550	897,161	32692	40,715 P	16335	15794
4	15.70	X	EU	NC46	6	3	18.03	23,399 P	410550	1048427	32692	38,997 p	16335	15794
4	15.70	X	EU	NC46DS	6	3	18.03	32,328 P	410550	1,048,427	32692	53,880 P	16335	15794
4	15.70	X	EU	NC46	6	3 1/4	17.80	19,937 P	410550	901164	32692	33,228 p	16335	15794
4	15.70	X	EU	NC46DS	6	3 1/4	17.80	26,198 P	410550	901,164	32692	43,664 P	16335	15794
4	15.70	G	IU	4 H90	5 1/2	2 13/16	17.23	21,185 P	453765	913708	36134	35,308 p	18055	17456
4	15.70	G	IU	NC40	5 1/2	2 7/16	17.52	17,859 P	453765	897161	36134	29,764 p	18055	17456
4	15.70	G	IU	NC40DS	5 1/2	2 7/16	17.52	24,429 P	453765	897,161	36134	40,715 P	18055	17456
4	15.70	G	EU	NC46	6	3	18.03	23,399 P	453765	1048427	36134	38,997 p	18055	17456
4	15.70	G	EU	NC46DS	6	3	18.03	32,328 P	453765	1,048,427	36134	53,880 P	18055	17456
4	15.70	G	EU	NC46	6	3 1/4	17.80	19,937 P	453765	901164	36134	33,228 p	18055	17456
4	15.70	G	EU	NC46DS	6	3 1/4	17.80	26,198 P	453765	901,164	36134	43,664 P	18055	17456
4	15.70	S	IU	NC46	6	2 5/8	18.23	26,982 B	583413	1247230	46458	44,978 b	23213	22444
4	15.70	S	IU	NC46DS	6	2 5/8	18.23	38,895 B	583413	1,247,230	46458	64,825 B	23213	22444
4	15.70	S	EU	NC46	6	2 7/8	18.13	25,038 P	583413	1117640	46458	41,729 p	23213	22444
4	15.70	S	EU	NC46DS	6	2 7/8	18.13	35,192 P	583413	1,117,640	46458	58,653 P	23213	22444
4	15.70	S	EU	NC46	6	3	18.02	23,398 P	583413	1048426	46458	38,998 p	23213	22444
4	15.70	S	EU	NC46DS	6	3	18.02	32,328 P	583413	1,048,427	46458	53,880 P	23213	22444
4 1/2	13.75	E	IU	4 1/2 H90	6	3 1/4	15.23	23,120 P	270034	938403	25907	38,544 p	7173	7904
4 1/2	13.75	E	EU	4 1/2 OH SW	5 3/4	3 31/32	14.04	12,407 P	270034	554844	25907	20,678 p	7173	7904
4 1/2	13.75	E	EU	4 1/2 WO	6 1/8	3 7/8	14.77	19,290 P	270034	848619	25907	33,492 p	7173	7904
4 1/2	13.75	E	IU	NC46	6	3 3/8	15.12	18,117 P	270034	823115	25907	30,195 p	7173	7904
4 1/2	13.75	E	IU	NC46DS	6	3 3/8	15.12	22,933 P	270034	823,115	25907	38,221 P	7173	7904
4 1/2	13.75	E	EU	NC50	6 5/8	3 3/4	15.90	22,362 P	270034	939096	25907	37,269 p	7173	7904
4 1/2	13.75	E	EU	NC50DS	6 5/8	3 3/4	15.90	28,836 P	270034	939,096	25907	48,060 P	7173	7904
4 1/2	16.60	E	IEU	4 1/2 FH	6	3	18.14	20,620 P	330558	976156	30807	34,367 p	10392	9829
4 1/2	16.60	E	IEU	4 1/2 H90	6	3 1/4	17.92	23,126 P	330558	938403	30807	38,544 p	10392	9829
4 1/2	16.60	E	EU	4 1/2 OH SW	5 7/8	3 3/4	17.07	16,162 P	330558	713979	30807	26,936 p	10392	9829
4 1/2	16.60	E	IEU	NC38 *	5	2 11/16	16.79	10,842 P	330558	587308	30807	18,071 P	10392	9829
4 1/2	16.60	E	IEU	NC38DS	5	2 11/16	16.79	13,662 P	330558	587,308	30807	22,770 P	10392	9829
4 1/2	16.60	E	IEU	NC46	6 1/4	3 1/4	18.39	19,937 P	330558	901164	30807	33,228 p	10392	9829
4 1/2	16.60	E	IEU	NC46DS	6 1/4	3 1/4	18.39	26,198 P	330558	901,164	30807	43,664 P	10392	9829
4 1/2	16.60	E	EU	NC50	6 5/8	3 3/4	18.49	22,361 P	330558	939096	30807	37,269 p	10392	9829
4 1/2	16.60	E	EU	NC50DS	6 5/8	3 3/4	18.49	28,836 P	330558	939,096	30807	48,060 P	10392	9829
4 1/2	16.60	SS75	IEU	NC46	6 1/4	3 1/4	18.61	18,275 P	330558	826067	30807	30,459 p	10392	9829

4 1/2	16.60	SS75	IEU	NC46DS	6 1/4	3 1/4	18.61	26,198 P	330558	901,164	30807	43,664 P	10392	9829
4 1/2	16.60	SS75	EU	NC50	6 5/8	3 3/4	18.48	20,499 P	330558	860838	30807	34,164 p	10392	9829
4 1/2	16.60	SS75	EU	NC50DS	6 5/8	3 3/4	18.48	28,836 P	330558	939,096	30807	48,060 P	10392	9829
4 1/2	16.60	X	IEU	4 1/2 FH	6	2 3/4	18.70	23,695 P	418707	1111637	39022	39,491 p	12765	12450
4 1/2	16.60	X	IEU	4 1/2 FH	6	3	18.33	20,620 P	418707	976156	39022	34,367 p	12765	12450
4 1/2	16.60	X	IEU	4 1/2 H90	6	3	18.47	26,969 P	418707	1085391	39022	44,938 p	12765	12450
4 1/2	16.60	X	IEU	4 1/2 H90	6	3 1/4	18.11	23,120 P	418707	938403	39022	38,544 p	12765	12450
4 1/2	16.60	X	IEU	NC46	6 1/4	3	18.63	19,937 B	418707	1048426	39022	38,998 p	12765	12450
4 1/2	16.60	X	IEU	NC46DS	6 1/4	3	18.63	32,328 P	418707	1,048,427	39022	53,880 P	12765	12450
4 1/2	16.60	X	EU	NC50	6 5/8	3 3/4	18.86	22,361 P	418707	939095	39022	37,269 p	12765	12450
4 1/2	16.60	X	EU	NC50DS	6 5/8	3 3/4	18.86	28,836 P	418707	939,096	39022	48,060 P	12765	12450
4 1/2	16.60	SS95	IEU	NC46	6 1/4	2 3/4	18.97	24,397 P	418707	1085249	39022	40,661 p	12765	12450
4 1/2	16.60	SS95	IEU	NC46DS	6 1/4	2 3/4	18.97	37,922 P	418707	1,183,908	39022	63,203 P	12765	12450
4 1/2	16.60	SS95	EU	NC50	6 5/8	3 1/2	18.70	24,452 P	418707	1017426	39022	40,753 p	12765	12450
4 1/2	16.60	SS95	EU	NC50DS	6 5/8	3 1/2	18.70	36,582 P	418707	1,109,920	39022	60,970 P	12765	12450
4 1/2	16.60	G	IEU	4 1/2 FH	6	2 3/4	18.70	23,695 P	462781	1111637	43130	39,491 p	13825	13761
4 1/2	16.60	G	IEU	4 1/2 FH	6	3	18.33	23,695 P	462781	976156	43130	34,367 p	13825	13761
4 1/2	16.60	G	IEU	4 1/2 H90	6	3	18.33	26,969 P	462781	1085665	43130	44,948 p	13825	13761
4 1/2	16.60	G	IEU	NC46	6 1/4	3	18.63	23,399 P	462781	1048426	43130	38,998 p	13825	13761
4 1/2	16.60	G	IEU	NC46DS	6 1/4	3	18.63	32,328 P	462781	1,048,427	43130	53,880 P	13825	13761
4 1/2	16.60	G	EU	NC50	6 5/8	3 3/4	18.86	22,361 P	462781	939095	43130	37,269 p	13825	13761
4 1/2	16.60	G	EU	NC50DS	6 5/8	3 3/4	18.86	28,836 P	462781	939,096	43130	48,060 P	13825	13761
4 1/2	16.60	SS105	IEU	NC46	6 1/4	2 3/4	18.97	24,397 P	462781	1085249	43130	40,661 p	13825	13761
4 1/2	16.60	SS105	IEU	NC46DS	6 1/4	2 3/4	18.97	37,922 P	462781	1,183,908	43130	63,203 P	13825	13761
4 1/2	16.60	S	IEU	4 1/2 FH	6 1/4	2 1/2	19.19	26,528 P	595004	1235337	55453	44,214 p	16773	17693
4 1/2	16.60	S	IEU	4 1/2 H90	6	3	18.33	26,963 P	595004	1085665	55453	44,948 p	16773	17693
4 1/2	16.60	S	IEU	NC46	6 1/4	2 3/4	18.84	26,615 P	595004	1183908	55453	44,359 p	16773	17693
4 1/2	16.60	S	IEU	NC46DS	6 1/4	2 3/4	18.84	37,922 P	595004	1,183,908	55453	63,203 P	16773	17693
4 1/2	16.60	S	EU	NC50	6 5/8	3 1/2	19.13	26,674 P	595004	1109920	55453	44,456 p	16773	17693
4 1/2	16.60	S	EU	NC50DS	6 5/8	3 1/2	19.13	36,582 P	595004	1,109,920	55453	60,970 P	16773	17693
4 1/2	16.60	V	IEU	NC46 *	6 1/4	2 3/4	18.97	26,615 P	661110	1183908	61651	44,358 P	18106	19658
4 1/2	16.60	V	IEU	NC46DS	6 1/4	2 3/4	18.97	37,922 P	661110	1,183,908	61651	63,203 P	18106	19658
4 1/2	16.60	V	EU	NC50 *	6 5/8	3 1/2	18.70	26,675 P	661110	1109920	61651	44,458 P	18106	19658
4 1/2	16.60	V	EU	NC50DS	6 5/8	3 1/2	18.70	36,582 P	661110	1,109,920	61651	60,970 P	18106	19658
4 1/2	20.00	E	IEU	4 1/2 FH	6	3	21.64	20,620 P	412358	976156	36901	34,367 p	12964	12542

4 1/2	20.00	E	IEU	4 1/2 H90	6	3	21.64	26,969 P	412358	1085665	36901	44,948 p	12964	12542
4 1/2	20.00	E	IEU	NC46	6 1/4	3	22.14	23,399 P	412358	1048426	36901	38,998 p	12964	12542
4 1/2	20.00	E	IEU	NC46DS	6 1/4	3	22.14	32,328 P	412358	1,048,427	36901	53,880 P	12964	12542
4 1/2	20.00	E	EU	NC50	6 5/8	3 5/8	22.13	24,549 P	412358	1025980	36901	40,915 p	12964	12542
4 1/2	20.00	E	EU	NC50DS	6 5/8	3 5/8	22.13	32,781 P	412358	1,025,980	36901	54,635 P	12964	12542
4 1/2	20.00	SS75	IEU	NC46	6 1/4	3	18.61	21,448 P	412358	961058	36901	35,747 p	12964	12542
4 1/2	20.00	SS75	IEU	NC46DS	6 1/4	3	18.61	32,328 P	412358	1,048,427	36901	53,880 P	12964	12542
4 1/2	20.00	SS75	EU	NC50	6 5/8	3 5/8	22.16	22,504 P	412358	940482	36901	37,507 p	12964	12542
4 1/2	20.00	SS75	EU	NC50DS	6 5/8	3 5/8	22.16	32,781 P	412358	1,025,980	36901	54,635 P	12964	12542
4 1/2	20.00	X	IEU	4 1/2 FH	6	2 1/2	22.39	26,528 P	522320	1235337	46741	44,214 p	16421	15886
4 1/2	20.00	X	IEU	4 1/2 H90	6	3	21.91	26,969 P	522320	1085391	46741	44,938 p	16421	15886
4 1/2	20.00	X	IEU	4 1/2 H90	6	3 1/4	21.78	23,120 P	522320	938403	46741	38,544 p	16421	15886
4 1/2	20.00	X	IEU	NC46	6 1/4	2 3/4	22.64	26,615 P	522320	1183908	46741	44,359 p	16421	15886
4 1/2	20.00	X	IEU	NC46DS	6 1/4	2 3/4	22.64	37,922 P	522320	1,183,908	46741	63,203 P	16421	15886
4 1/2	20.00	X	EU	NC50	6 5/8	3 1/2	22.60	26,674 P	522320	1109920	46741	44,456 p	16421	15886
4 1/2	20.00	X	EU	NC50DS	6 5/8	3 1/2	22.60	36,582 P	522320	1,109,920	46741	60,970 P	16421	15886
4 1/2	20.00	SS95	IEU	NC46	6 1/4	2 1/4	22.59	29,589 P	522320	1301233	46741	49,315 p	16421	15886
4 1/2	20.00	SS95	IEU	NC46DS	6 1/4	2 1/4	22.59	47,503 P	522320	1,419,527	46741	79,172 P	16421	15886
4 1/2	20.00	SS95	EU	NC50	6 5/8	3	22.66	31,645 P	522320	1298206	46741	52,741 p	16421	15886
4 1/2	20.00	SS95	EU	NC50DS	6 5/8	3	22.66	50,330 P	522320	1,416,225	46741	83,883 P	16421	15886
4 1/2	20.00	G	IEU	4 1/2 FH	6	2 1/2	22.39	26,528 P	577301	1235337	51661	44,214 p	18149	17558
4 1/2	20.00	G	IEU	4 1/2 H90	6	3	22.00	26,963 P	577301	1085665	51661	44,948 p	18149	17558
4 1/2	20.00	G	IEU	NC46	6 1/4	2 1/2	22.83	29,578 P	577301	1307608	51661	49,297 p	18149	17558
4 1/2	20.00	G	IEU	NC46DS	6 1/4	2 1/2	22.83	42,980 P	577301	1,307,608	51661	71,633 P	18149	17558
4 1/2	20.00	G	EU	NC50	6 5/8	3 1/2	22.60	26,674 P	577301	1109920	51661	44,456 p	18149	17558
4 1/2	20.00	G	EU	NC50DS	6 5/8	3 1/2	22.60	36,582 P	577301	1,109,920	51661	60,970 P	18149	17558
4 1/2	20.00	SS105	IEU	NC46	6 1/4	2 1/4	22.59	29,589 P	577301	1301233	51661	49,315 p	18149	17558
4 1/2	20.00	SS105	IEU	NC46DS	6 1/4	2 1/4	22.59	47,503 P	577301	1,419,527	51661	79,172 P	18149	17558
4 1/2	20.00	S	IEU	NC46	6 1/4	2 1/4	23.00	32,279 P	742244	1419527	66421	53,800 p	23335	22575
4 1/2	20.00	S	IEU	NC46DS	6 1/4	2 1/4	23.00	47,503 P	742244	1,419,527	66421	79,172 P	23335	22575
4 1/2	20.00	S	EU	NC50	6 5/8	3	23.07	34,520 P	742244	1416225	66421	57,534 p	23335	22575
4 1/2	20.00	S	EU	NC50DS	6 5/8	3	23.07	50,330 P	742244	1,416,225	66421	83,883 P	23335	22575
4 1/2	20.00	V	IEU	NC46 *	6 1/4	2 1/4	22.59	32,279 P	824715	1419527	73846	53,799 P	25927	25083
4 1/2	20.00	V	IEU	NC46DS	6 1/4	2 1/4	22.59	47,503 P	824715	1,419,527	73846	79,172 P	25927	25083
4 1/2	20.00	V	EU	NC50 *	6 5/8	3	22.66	34,521 P	824715	1416225	73846	57,536 P	25927	25083

4 1/2	20.00	V	EU	NC50DS	6 5/8	3	22.66	50,330 P	824715	1,416,225	73846	83,883 P	25927	25083
4 1/2	22.82	E	IEU	NC46	6 1/4	3	24.56	23,398 P	471239	1048426	40912	38,998 p	14815	14583
4 1/2	22.82	E	IEU	NC46DS	6 1/4	3	24.56	32,328 P	471239	1,048,427	40912	53,880 P	14815	14583
4 1/2	22.82	E	EU	NC50	6 5/8	3 5/8	24.11	24,550 P	471239	1025980	40912	40,915 p	14815	14583
4 1/2	22.82	E	EU	NC50DS	6 5/8	3 5/8	24.11	32,781 P	471239	1,025,980	40912	54,635 P	14815	14583
4 1/2	22.82	X	IEU	4 1/2 FH	6 1/4	2 1/4	25.13	29,113 P	596903	1347256	51821	48,522 p	18765	18472
4 1/2	22.82	X	IEU	NC46	6 1/4	2 3/4	24.77	26,615 P	596903	1183908	51821	44,359 p	18765	18472
4 1/2	22.82	X	IEU	NC46DS	6 1/4	2 3/4	24.77	37,922 P	596903	1,183,908	51821	63,203 P	18765	18472
4 1/2	22.82	X	EU	NC50	6 5/8	3 1/2	24.24	26,675 P	596903	1109920	51821	44,456 p	18765	18472
4 1/2	22.82	X	EU	NC50DS	6 5/8	3 1/2	24.24	36,582 P	596903	1,109,920	51821	60,970 P	18765	18472
4 1/2	22.82	G	IEU	NC46	6 1/4	2 1/2	24.96	29,578 P	659734	1307608	57276	49,297 p	20741	20417
4 1/2	22.82	G	IEU	NC46DS	6 1/4	2 1/2	24.96	42,980 P	659734	1,307,608	57276	71,633 P	20741	20417
4 1/2	22.82	G	EU	NC50	6 5/8	3 1/4	24.72	30,731 P	659734	1268963	57276	51,217 p	20741	20417
4 1/2	22.82	G	EU	NC50DS	6 5/8	3 1/4	24.72	43,747 P	659734	1,268,963	57276	72,911 P	20741	20417
4 1/2	22.82	S	EU	NC50	6 5/8	2 3/4	25.41	38,037 P	848230	1551706	73641	63,393 p	26667	26250
4 1/2	22.82	S	EU	NC50DS	6 5/8	2 3/4	25.41	56,332 P	848230	1,551,706	73641	93,886 P	26667	26250
5	19.50	E	IEU	5 1/2 FH	7	3 3/4	22.32	37,749 B	395595	1448407	41167	62,903 b	9962	9503
5	19.50	E	IEU	5 1/2 FHDS	7	3 3/4	22.32	52,548 B	395595	1,448,407	41167	87,581 B	9962	9503
5	19.50	E	IEU	NC50	6 5/8	3 3/4	21.37	22,361 P	395595	939095	41167	37,269 p	9962	9503
5	19.50	E	IEU	NC50DS	6 5/8	3 3/4	21.37	28,836 P	395595	939,096	41167	48,060 P	9962	9503
5	19.50	X	IEU	5 1/2 FH	7	3 3/4	22.58	37,749 B	501087	1448407	52144	62,903 b	12026	12037
5	19.50	X	IEU	5 1/2 FHDS	7	3 3/4	22.58	52,548 B	501087	1,448,407	52144	87,581 B	12026	12037
5	19.50	X	IEU	5 H90	6 1/2	3 1/4	21.93	30,732 P	501087	1176265	52144	51,220 p	12026	12037
5	19.50	X	IEU	NC50	6 5/8	3 1/2	21.89	26,674 P	501087	1109920	52144	44,456 p	12026	12037
5	19.50	X	IEU	NC50DS	6 5/8	3 1/2	21.89	36,582 P	501087	1,109,920	52144	60,970 P	12026	12037
5	19.50	G	IEU	5 1/2 FH	7	3 3/4	22.58	37,749 B	553833	1448407	57633	62,903 b	12999	13304
5	19.50	G	IEU	5 1/2 FHDS	7	3 3/4	22.58	52,548 B	553833	1,448,407	57633	87,581 B	12999	13304
5	19.50	G	IEU	5 H90	6 1/2	3	22.15	34,805 P	553833	1323527	57633	58,008 p	12999	13304
5	19.50	G	IEU	NC50	6 5/8	3 1/4	22.14	30,730 P	553833	1268963	57633	51,217 p	12999	13304
5	19.50	G	IEU	NC50DS	6 5/8	3 1/4	22.14	43,747 P	553833	1,268,963	57633	72,911 P	12999	13304
5	19.50	S	IEU	5 1/2 FH	7 1/4	3 1/2	23.44	43,328 P	712070	1619231	74100	72,213 p	15672	17105
5	19.50	S	IEU	5 1/2 FHDS	7 1/4	3 1/2	23.44	62,032 P	712070	1,619,231	74100	103,387 P	15672	17105
5	19.50	S	IEU	NC50	6 5/8	2 3/4	22.58	38,036 P	712070	1551706	74100	63,393 p	15672	17105
5	19.50	S	IEU	NC50DS	6 5/8	2 3/4	22.58	56,332 P	712070	1,551,706	74100	93,886 P	15672	17105
5	25.60	E	IEU	5 1/2 FH	7	3 1/2	28.32	37,742 B	530144	1619231	52257	62,903 b	13500	13125

5	25.60	E	IEU	5 1/2 FHDS	7	3 1/2	28.32	54,136 B	530144	1,619,231	52257	90,226 B	13500	13125
5	25.60	E	IEU	NC50	6 5/8	3 1/2	27.37	26,674 P	530144	1109920	52257	44,456 p	13500	13125
5	25.60	E	IEU	NC50DS	6 5/8	3 1/2	27.37	36,582 P	530144	1,109,920	52257	60,970 P	13500	13125
5	25.60	SS75	IEU	5 1/2 FH	7	3 1/2	28.29	34,603 B	530144	1484295	52257	57,672 b	13500	13125
5	25.60	SS75	IEU	5 1/2 FHDS	7	3 1/2	28.29	54,136 B	530144	1,619,231	52257	90,226 B	13500	13125
5	25.60	SS75	IEU	NC50 *	6 5/8	3 1/2	27.36	24,452 P	530144	1017426	52257	40,753 P	13500	13125
5	25.60	SS75	IEU	NC50DS	6 5/8	3 1/2	27.36	36,582 P	530144	1,109,920	52257	60,970 P	13500	13125
5	25.60	X	IEU	5 1/2 FH	7	3 1/2	28.56	37,742 B	671515	1619231	66192	62,903 b	17100	16625
5	25.60	X	IEU	5 1/2 FHDS	7	3 1/2	28.56	54,136 B	671515	1,619,231	66192	90,226 B	17100	16625
5	25.60	X	IEU	NC50	6 5/8	3	28.09	34,520 P	671515	1416225	66192	57,534 b	17100	16625
5	25.60	X	IEU	NC50DS	6 5/8	3	28.09	50,330 P	671515	1,416,225	66192	83,883 P	17100	16625
5	25.60	SS95	IEU	5 1/2 FH	7 1/4	3 1/4	29.08	43,300 B	671515	1630084	66192	72,167 b	17100	16625
5	25.60	SS95	IEU	5 1/2 FHDS	7 1/4	3 1/4	29.08	68,949 B	671515	1,778,274	66192	114,916 B	17100	16625
5	25.60	G	IEU	5 1/2 FH	7 1/4	3 1/2	29.13	43,328 P	742201	1619231	73159	72,213 p	18900	18375
5	25.60	G	IEU	5 1/2 FHDS	7 1/4	3 1/2	29.13	62,032 P	742201	1,619,231	73159	103,387 P	18900	18375
5	25.60	G	IEU	NC50	6 5/8	2 3/4	28.30	38,036 P	742201	1551706	73159	63,393 b	18900	18375
5	25.60	G	IEU	NC50DS	6 5/8	2 3/4	28.30	56,332 P	742201	1,551,706	73159	93,886 P	18900	18375
5	25.60	S	IEU	5 1/2 FH	7 1/4	3 1/4	29.40	47,230 B	954259	1778274	94062	78,716 b	24300	23625
5	25.60	S	IEU	5 1/2 FHDS	7 1/4	3 1/4	29.40	68,949 B	954259	1,778,274	94062	114,916 B	24300	23625
5	25.60	V	IEU	5 1/2 FH *	7 1/4	3 1/4	29.08	47,237 B	1060290	1778274	104577	78,728 B	27000	26250
5	25.60	V	IEU	5 1/2 FHDS	7 1/4	3 1/4	29.08	68,949 B	1060290	1,778,274	104577	114,916 B	27000	26250
5	TW 0.750	SS95	IEU	5 1/2 FH	7 1/4	3 1/4	38.44	43,300 B	951314	1630084	85247	72,167 b	24225	24938
5	TW 0.750	SS95	IEU	5 1/2 FHDS	7 1/4	3 1/4	38.44	68,949 B	951314	1,778,274	85247	114,916 B	24225	24938
5	TW 0.750	V	IEU	5 1/2 FH *	7 1/4	3 1/4	38.44	47,237 B	1502074	1778274	134600	78,728 B	38250	39375
5	TW 0.750	V	IEU	5 1/2 FHDS	7 1/4	3 1/4	38.44	68,949 B	1502074	1,778,274	134600	114,916 B	38250	39375
5 1/2	21.90	E	IEU	5 1/2 FH	7	4	23.81	33,412 P	437116	1265802	50710	55,687 p	8413	8615
5 1/2	21.90	E	IEU	5 1/2 FHDS	7	4	23.81	44,529 P	437116	1,265,801	50710	74,214 P	8413	8615
5 1/2	21.90	SS75	IEU	5 1/2 FH	7	4	24.10	30,627 P	437116	1160318	50710	51,045 p	8413	8615
5 1/2	21.90	SS75	IEU	5 1/2 FHDS	7	4	24.10	44,529 P	437116	1,265,801	50710	74,214 P	8413	8615
5 1/2	21.90	X	IEU	5 1/2 FH	7	3 3/4	24.43	37,742 B	553681	1448407	64233	62,903 b	10019	10912
5 1/2	21.90	X	IEU	5 1/2 FHDS	7	3 3/4	24.43	52,548 B	553681	1,448,407	64233	87,581 B	10019	10912
5 1/2	21.90	X	IEU	5 1/2 H90	7	3 1/2	24.80	34,820 P	553681	1268877	64233	58,033 p	10019	10912
5 1/2	21.90	SS95	IEU	5 1/2 FH	7 1/2	3	26.12	47,720 P	553681	1765075	64233	79,534 p	10019	10912
5 1/2	21.90	SS95	IEU	5 1/2 FHDS	7 1/2	3	26.12	76,978 P	553681	1,925,536	64233	128,296 P	10019	10912
5 1/2	21.90	G	IEU	5 1/2 FH	7 1/4	3 1/2	25.28	43,328 P	611963	1619231	70994	72,213 p	10753	12061

5 1/2	21.90	G	IEU	5 1/2 FHDS	7 1/4	3 1/2	25.28	62,032 P	611963	1,619,231	70994	103,387 P	10753	12061
5 1/2	21.90	S	IEU	5 1/2 FH	7 1/2	3	26.39	52,059 P	786809	1925536	91278	86,765 p	12679	15507
5 1/2	21.90	S	IEU	5 1/2 FHDS	7 1/2	3	26.39	76,978 P	786809	1,925,536	91278	128,296 P	12679	15507
5 1/2	21.90	V	IEU	5 1/2 FH	7 1/2	3	26.12	52,058 P	874230	1925536	101482	86,764 p	13476	17230
5 1/2	21.90	V	IEU	5 1/2 FHDS	7 1/2	3	26.12	76,978 P	874230	1,925,536	101482	128,296 P	13476	17230
5 1/2	24.70	E	IEU	5 1/2 FH	7	4	26.33	33,412 P	497222	1265802	56574	55,687 p	10464	9903
5 1/2	24.70	E	IEU	5 1/2 FHDS	7	4	26.33	44,529 P	497222	1,265,801	56574	74,214 P	10464	9903
5 1/2	24.70	SS75	IEU	5 1/2 FH	7	4	26.57	30,627 P	497222	1160318	56574	51,045 p	10464	9903
5 1/2	24.70	SS75	IEU	5 1/2 FHDS	7	4	26.57	44,529 P	497222	1,265,801	56574	74,214 P	10464	9903
5 1/2	24.70	X	IEU	5 1/2 FH	7 1/4	3 1/2	27.77	43,328 P	629814	1619231	71660	72,213 p	12933	12544
5 1/2	24.70	X	IEU	5 1/2 FHDS	7 1/4	3 1/2	27.77	62,032 P	629814	1,619,231	71660	103,387 P	12933	12544
5 1/2	24.70	SS95	IEU	5 1/2 FH	7 1/2	3	28.57	47,720 P	629814	1765075	71660	79,534 p	12933	12544
5 1/2	24.70	SS95	IEU	5 1/2 FHDS	7 1/2	3	28.57	76,978 P	629814	1,925,536	71660	128,296 P	12933	12544
5 1/2	24.70	G	IEU	5 1/2 FH	7 1/4	3 1/2	27.77	43,328 P	696111	1619231	79204	72,213 p	14013	13865
5 1/2	24.70	G	IEU	5 1/2 FHDS	7 1/4	3 1/2	27.77	62,032 P	696111	1,619,231	79204	103,387 P	14013	13865
5 1/2	24.70	S	IEU	5 1/2 FH	7 1/2	3	28.87	52,059 P	894999	1925536	101833	86,765 p	17023	17826
5 1/2	24.70	S	IEU	5 1/2 FHDS	7 1/2	3	28.87	76,978 P	894999	1,925,536	101833	128,296 P	17023	17826
5 1/2	24.70	V	IEU	5 1/2 FH *	7 1/2	3	28.57	52,058 P	994440	1925536	113217	86,764 P	18389	19807
5 1/2	24.70	V	IEU	5 1/2 FHDS	7 1/2	3	28.57	76,978 P	994440	1,925,536	113217	128,296 P	18389	19807
5 1/2	TW 0.500	V	IEU	5 1/2 FH *	7 1/4	3 1/2	31.11	43,327 P	1178097	1619231	130109	72,212 P	24793	23864
5 1/2	TW 0.500	V	IEU	5 1/2 FHDS	7 1/4	3 1/2	31.11	62,032 P	1178097	1,619,231	130109	103,387 P	24793	23864
5 1/2	TW 0.625	V	IEU	5 1/2 FH *	7 1/4	3 1/8	36.67	47,237 B	1435806	1853377	151702	78,728 B	30217	29830
5 1/2	TW 0.625	V	IEU	5 1/2 FHDS	7 1/4	3 1/8	36.67	69,491 B	1435806	1,853,377	151702	115,818 B	30217	29830
5 1/2	TW 0.750	V	IEU	5 1/2 FH *	7 1/2	3	42.24	52,058 P	1678789	1925536	169802	86,764 P	35331	35795
5 1/2	TW 0.750	V	IEU	5 1/2 FHDS	7 1/2	3	42.24	76,978 P	1678789	1,925,536	169802	128,296 P	35331	35795
5 7/8	23.40	E	IEU	5 1/2 FH	7	4	25.40	33,412 P	469013	1265801	58640	55,686 p	7453	8065
5 7/8	23.40	E	IEU	5 1/2 FHDS	7	4	25.40	44,529 P	469013	1,265,801	58640	74,214 P	7453	8065
5 7/8	23.40	X	IEU	5 1/2 FH	7 1/4	3 1/2	26.44	43,327 P	594083	1619231	74278	72,212 p	8774	10216
5 7/8	23.40	X	IEU	5 1/2 FHDS	7 1/4	3 1/2	26.44	62,032 P	594083	1,619,231	74278	103,387 P	8774	10216
5 7/8	23.40	G	IEU	5 1/2 FH	7 1/4	3 1/2	26.44	43,327 P	656619	1619231	82096	72,212 p	9362	11291
5 7/8	23.40	G	IEU	5 1/2 FHDS	7 1/4	3 1/2	26.44	62,032 P	656619	1,619,231	82096	103,387 P	9362	11291
5 7/8	23.40	S	IEU	5 1/2 FH *	7 1/4	3	26.88	47,237 B	844224	1925536	105553	78,728 B	10820	14517
5 7/8	23.40	S	IEU	5 1/2 FHDS	7 1/4	3	26.88	69,950 B	844224	1,925,536	105553	116,583 B	10820	14517
5 7/8	23.40	V	IEU	5 1/2 FH *	7 1/4	3	26.88	47,237 B	938026	1925536	117281	78,728 B	11380	16130
5 7/8	23.40	V	IEU	5 1/2 FHDS	7 1/4	3	26.88	69,950 B	938026	1,925,536	117281	116,583 B	11380	16130

5 7/8	26.30	E	IEU	5 1/2 FH	7	3 1/4	28.80	37,749 B	533890	1778274	65548	62,915 b	9559	9271
5 7/8	26.30	E	IEU	5 1/2 FHDS	7	3 1/4	28.80	55,261 B	533890	1,778,274	65548	92,102 B	9559	9271
5 7/8	26.30	X	IEU	5 1/2 FH	7 1/4	3 1/2	29.10	43,327 P	676261	1619231	83027	72,212 p	11502	11744
5 7/8	26.30	X	IEU	5 1/2 FHDS	7 1/4	3 1/2	29.10	62,032 P	676261	1,619,231	83027	103,387 P	11502	11744
5 7/8	26.30	G	IEU	5 1/2 FH *	7 1/4	3 1/2	29.10	43,327 P	747446	1619231	91767	72,212 P	12414	12980
5 7/8	26.30	G	IEU	5 1/2 FHDS	7 1/4	3 1/2	29.10	62,032 P	747446	1,619,231	91767	103,387 P	12414	12980
5 7/8	26.30	S	IEU	5 1/2 FH *	7 1/2	3 1/4	29.89	47,845 P	961002	1778274	117986	79,742 P	14888	16688
5 7/8	26.30	S	IEU	5 1/2 FHDS	7 1/2	3 1/4	29.89	69,825 P	961002	1,778,274	117986	116,374 P	14888	16688
5 7/8	26.30	V	IEU	5 1/2 FH *	7 1/2	3 1/4	29.89	47,845 P	1067780	1778274	131096	79,742 P	15979	18543
5 7/8	26.30	V	IEU	5 1/2 FHDS	7 1/2	3 1/4	29.89	69,825 P	1067780	1,778,274	131096	116,374 P	15979	18543
5 7/8	TW 0.625	S	IEU	5 1/2 FH *	7 1/2	3	40.13	52,058 P	1391627	1925536	159285	86,764 P	25668	25133
5 7/8	TW 0.625	S	IEU	5 1/2 FHDS	7 1/2	3	40.13	76,978 P	1391627	1,925,536	159285	128,296 P	25668	25133
5 7/8	TW 0.625	V	IEU	5 1/2 FH *	7 1/2	3	40.13	52,058 P	1546253	1925536	176983	86,764 P	28520	27926
5 7/8	TW 0.625	V	IEU	5 1/2 FHDS	7 1/2	3	40.13	76,978 P	1546253	1,925,536	176983	128,296 P	28520	27926
5 7/8	TW 0.750	S	IEU	5 1/2 FH *	7 1/2	3	45.54	52,058 P	1630192	1925536	179081	86,764 P	30068	30160
5 7/8	TW 0.750	S	IEU	5 1/2 FHDS	7 1/2	3	45.54	76,978 P	1630192	1,925,536	179081	128,296 P	30068	30160
5 7/8	TW 0.750	V	IEU	5 1/2 FH *	7 1/2	3	45.54	52,058 P	1811325	1925536	198979	86,764 P	33409	33511
5 7/8	TW 0.750	V	IEU	5 1/2 FHDS	7 1/2	3	45.54	76,978 P	1811325	1,925,536	198979	128,296 P	33409	33511
5 7/8	TW 0.813	S	IEU	5 1/2 FH *	7 1/2	3	48.51	52,058 P	1745405	1925536	187854	86,764 P	32193	32693
5 7/8	TW 0.813	S	IEU	5 1/2 FHDS	7 1/2	3	48.51	76,978 P	1745405	1,925,536	187854	128,296 P	32193	32693
5 7/8	TW 0.813	V	IEU	5 1/2 FH *	7 1/2	3	48.51	52,058 P	1939339	1925536	208727	86,764 P	35770	36326
5 7/8	TW 0.813	V	IEU	5 1/2 FHDS	7 1/2	3	48.51	76,978 P	1939339	1,925,536	208727	128,296 P	35770	36326
6 5/8	25.20	E	IEU	6 5/8 FH	8	5	27.57	43,934 P	489464	1447697	70580	73,224 p	4788	6538
6 5/8	25.20	E	IEU	6 5/8 FHDS	8	5	27.57	58,094 P	489464	1,448,416	70580	96,824 P	4788	6538
6 5/8	25.20	X	IEU	6 5/8 FH	8	5	27.57	43,934 P	619988	1448416	89402	73,224 p	5321	8281
6 5/8	25.20	X	IEU	6 5/8 FHDS	8	5	27.57	58,094 P	619988	1,448,416	89402	96,824 P	5321	8281
6 5/8	25.20	G	IEU	6 5/8 FH	8 1/4	4 3/4	28.63	51,280 P	685250	1678145	98812	85,467 p	5500	9153
6 5/8	25.20	G	IEU	6 5/8 FHDS	8 1/4	4 3/4	28.63	71,392 P	685250	1,678,145	98812	118,987 P	5500	9153
6 5/8	25.20	S	IEU	6 5/8 FH	8 1/2	4 1/4	30.06	65,012 P	881035	2102260	127044	108,353 p	6036	11768
6 5/8	25.20	S	IEU	6 5/8 FHDS	8 1/2	4 1/4	30.06	95,766 P	881035	2,102,260	127044	159,610 P	6036	11768
6 5/8	25.20	V	IEU	6 5/8 FH *	8 1/2	4 1/4	29.74	65,012 P	978930	2102260	141246	108,354 P	6253	13075
6 5/8	25.20	V	IEU	6 5/8 FHDS	8 1/2	4 1/4	29.74	95,766 P	978930	2,102,260	141246	159,610 P	6253	13075
6 5/8	27.70	E	IEU	6 5/8 FH	8	5	29.43	43,934 P	534199	1447697	76295	73,224 p	5894	7172
6 5/8	27.70	E	IEU	6 5/8 FHDS	8	5	29.43	58,094 P	534199	1,448,416	76295	96,824 P	5894	7172
6 5/8	27.70	X	IEU	6 5/8 FH	8 1/4	4 3/4	30.48	51,280 P	676651	1678145	96640	85,467 p	6755	9084

6 5/8	27.70	X	IEU	6 5/8 FHDS	8 1/4	4 3/4	30.48	71,392 P	676651	1,678,145	96640	118,987 P	6755	9084
6 5/8	27.70	G	IEU	6 5/8 FH	8 1/4	4 3/4	30.48	51,280 P	747877	1678145	106813	85,467 p	7103	10040
6 5/8	27.70	G	IEU	6 5/8 FHDS	8 1/4	4 3/4	30.48	71,392 P	747877	1,678,145	106813	118,987 P	7103	10040
6 5/8	27.70	S	IEU	6 5/8 FH	8 1/2	4 1/4	31.91	65,012 P	961556	2102260	137330	108,353 P	7813	12909
6 5/8	27.70	S	IEU	6 5/8 FHDS	8 1/2	4 1/4	31.91	95,766 P	961556	2,102,260	137330	159,610 P	7813	12909
6 5/8	27.70	V	IEU	6 5/8 FH *	8 1/2	4 1/4	31.56	65,012 P	1068405	2102260	152682	108,354 P	7975	14343
6 5/8	27.70	V	IEU	6 5/8 FHDS	8 1/2	4 1/4	31.56	95,766 P	1068405	2,102,260	152682	159,610 P	7975	14343
6 5/8	TW 0.522	V	IEU	6 5/8 FH *	8 1/2	4 1/4	38.53	65,012 P	1501257	2102260	204526	108,354 P	20060	20683
6 5/8	TW 0.522	V	IEU	6 5/8 FHDS	8 1/2	4 1/4	38.53	95,766 P	1501257	2,102,260	204526	159,610 P	20060	20683
6 5/8	TW 0.625	V	IEU	6 5/8 FH *	8 1/2	4 1/4	45.17	65,012 P	1767146	2102260	233509	108,354 P	25632	24764
6 5/8	TW 0.625	V	IEU	6 5/8 FHDS	8 1/2	4 1/4	45.17	95,766 P	1767146	2,102,260	233509	159,610 P	25632	24764
6 5/8	TW 0.750	V	IEU	6 5/8 FH *	8 1/2	4 1/4	52.39	65,012 P	2076396	2102260	264478	108,354 P	30117	29717
6 5/8	TW 0.750	V	IEU	6 5/8 FHDS	8 1/2	4 1/4	52.39	95,766 P	2076396	2,102,260	264478	159,610 P	30117	29717

NOTE All calculated values are based on the equations provided in Annex G.

The tool joint dimensions given in this table are considered to be standard with the drill pipe sizes as listed, but other combinations are possible. DSC dimensions in particular are simply copies of the associated SSC dimensions; smaller box ODs and larger pin IDs may be considered depending on the needs of the operation. In all cases engineering judgment must be applied.

Table A.3—Premium Used Drill Pipe Properties

Label 1	Label 2	Grade	RSC Type	Premium Class Used Drill Pipe									
				Min. OD Tool Joint a (in.)	Max. ID Tool Joint (in.)	Min. Box Shoulder Width Eccentric Wear b (in.)	Makeup Torque at Min. OD & Max. ID c (ft-lb)	Tensile Yield Pipe Body (lb)	Tensile Yield Tool Joint (lb)	Torsional Yield Pipe Body (ft-lb)	Torsional Yield Tool Joint (ft-lb)	Collapse Pressure Pipe Body (psi)	Max. Internal Pressure Pipe Body (psi)
2 3/8	4.85	E	2 3/8 OH LW	3 1/8	2 5/32	5/32	1,862	76,893	145,057	3,725	3,103	8,522	9,600
2 3/8	4.85	E	2 3/8 SL H90	3 3/32	2 3/16	5/32	1,877	76,893	128,485	3,725	3,129	8,522	9,600
2 3/8	4.85	E	2 3/8 WO	3 3/16	2 1/8	5/32	1,872	76,893	147,545	3,725	3,120	8,522	9,600
2 3/8	4.85	E	NC26	3 1/4	2 3/16	5/32	1,946	76,893	151,324	3,725	3,243	8,522	9,600
2 3/8	4.85	E	NC26DS	3 1/4	2 3/16	5/32	1,946 P	76,893	151,324	3,725	3,243 P	8,522	9,600
2 3/8	6.65	E	2 3/8 OH LW	3 1/8	2 1/16	5/32	2,377	107,616	182,332	4,811	3,961	13,378	14,147
2 3/8	6.65	E	2 3/8 PAC	2 25/32	1 1/2	5/32	2,382	107,616	204,634	4,811	3,969	13,378	14,147
2 3/8	6.65	E	2 3/8 SL H90	3 3/32	2 3/32	5/32	2,468	107,616	166,313	4,811	4,113	13,378	14,147
2 3/8	6.65	E	NC26	3 1/4	2 3/32	5/32	2,478	107,616	189,152	4,811	4,129	13,378	14,147
2 3/8	6.65	E	NC26DS	3 1/4	2 3/32	5/32	2,478 P	107,616	189,152	4,811	4,129 P	13,378	14,147
2 3/8	6.65	X	2 3/8 SL H90	3 3/32	2	5/32	3,037	136,313	202,484	6,093	5,062	16,945	17,920
2 3/8	6.65	X	NC26	3 1/4	2	5/32	2,990	136,313	225,324	6,093	4,984	16,945	17,920
2 3/8	6.65	X	NC26DS	3 1/4	2	5/32	3,209 P	136,313	225,324	6,093	5,349 P	16,945	17,920
2 3/8	6.65	G	2 3/8 SL H90	3 1/8	1 15/16	5/32	3,404	150,662	225,678	6,735	5,673	18,729	19,806
2 3/8	6.65	G	NC26	3 9/32	1 15/16	5/32	3,276	150,662	248,517	6,735	5,460	18,729	19,806
2 3/8	6.65	G	NC26DS	3 9/32	1 15/16	5/32	3,758 B	150,662	248,517	6,735	6,263 B	18,729	19,806
2 7/8	6.85	E	2 7/8 OH LW	3 17/32	2 15/32	5/32	3,071	106,946	209,309	6,332	5,118	7,640	9,057
2 7/8	6.85	E	2 7/8 SL H90	3 9/16	2 19/32	5/32	3,162	106,946	186,470	6,332	5,270	7,640	9,057
2 7/8	6.85	E	2 7/8 WO	3 11/16	2 9/16	5/32	3,259	106,946	218,648	6,332	5,431	7,640	9,057
2 7/8	6.85	E	NC31	3 25/32	2 21/32	5/32	3,118	106,946	207,737	6,332	5,197	7,640	9,057
2 7/8	6.85	E	NC31DS	3 25/32	2 21/32	5/32	3,118 P	106,946	207,737	6,332	5,197 P	7,640	9,057
2 7/8	10.40	E	2 7/8 OH SW	3 19/32	2 9/32	5/32	4,274	166,535	293,248	8,858	7,124	14,223	15,110
2 7/8	10.40	E	2 7/8 PAC	3 5/32	1 1/4	1/4	4,284	166,535	337,819	8,858	7,140	14,223	15,110
2 7/8	10.40	E	2 7/8 SL H90	3 9/16	2 7/16	5/32	4,149	166,535	260,561	8,858	6,915	14,223	15,110
2 7/8	10.40	E	2 7/8 XH	3 1/16	2 13/32	5/32	4,359	166,535	290,695	8,858	7,265	14,223	15,110
2 7/8	10.40	E	NC26	3 1/32	1 3/4	3/16	4,260	166,535	313,681	8,858	7,100	14,223	15,110
2 7/8	10.40	E	NC26DS	3 1/32	1 3/4	3/16	1,536 B	166,535	313,681	8,858	2,559 B	14,223	15,110
2 7/8	10.40	E	NC31	3 13/16	2 1/2	5/32	4,357	166,535	283,669	8,858	7,261	14,223	15,110

2 7/8	10.40	E	NC31DS	3 13/16	2 1/2	5/32	4,357 P	166,535	283,669	8,858	7,261 P	14,223	15,110
2 7/8	10.40	X	2 7/8 SL H90	3 11/16	2 5/16	3/16	5,516	210,945	316,521	11,220	9,193	18,016	19,139
2 7/8	10.40	X	NC31	3 29/32	2 11/32	3/16	5,534	210,945	354,999	11,220	9,224	18,016	19,139
2 7/8	10.40	X	NC31DS	3 29/32	2 11/32	3/16	6,370 P	210,945	354,999	11,220	10,616 P	18,016	19,139
2 7/8	10.40	G	2 7/8 SL H90	3 23/32	2 1/4	13/64	6,008	233,149	343,396	12,401	10,013	19,912	21,153
2 7/8	10.40	G	NC31	3 15/16	2 9/32	13/64	5,987	233,149	382,242	12,401	9,979	19,912	21,153
2 7/8	10.40	G	NC31DS	3 15/16	2 9/32	13/64	7,188 P	233,149	382,242	12,401	11,980 P	19,912	21,153
2 7/8	10.40	S	2 7/8 SL H90	3 27/32	2	17/64	7,749	299,764	443,534	15,945	12,915	25,602	27,197
2 7/8	10.40	S	NC31	4 1/16	2 1/32	17/64	7,694	299,764	483,853	15,945	12,823	25,602	27,197
2 7/8	10.40	S	NC31DS	4 1/16	2 1/32	17/64	10,224 P	299,764	483,853	15,945	17,039 P	25,602	27,197
3 1/2	9.50	E	3 1/2 OH LW	4 9/32	3 5/32	5/32	5,342	152,979	301,413	11,094	8,903	7,074	8,709
3 1/2	9.50	E	3 1/2 SL H90	4 3/16	3 5/32	5/32	5,519	152,979	275,517	11,094	9,198	7,074	8,709
3 1/2	9.50	E	3 1/2 WO	4 13/32	3 3/16	5/32	5,536	152,979	310,455	11,094	9,227	7,074	8,709
3 1/2	9.50	E	NC38	4 13/32	3 3/16	5/32	5,508	152,979	310,455	11,094	9,180	7,074	8,709
3 1/2	9.50	E	NC38DS	4 13/32	3 3/16	5/32	5,508 P	152,979	310,455	11,094	9,180 P	7,074	8,709
3 1/2	9.50	SS75	NC38	4 7/16	3 5/32	5/32	5,374	152,979	301,711	11,094	8,956	7,074	8,709
3 1/2	9.50	SS75	NC38DS	4 7/16	3 5/32	5/32	5,862 P	152,979	329,139	11,094	9,771 P	7,074	8,709
3 1/2	13.30	E	3 1/2 H90	4 17/32	3 9/32	5/32	7,054	212,150	360,932	14,361	11,757	12,015	12,617
3 1/2	13.30	E	3 1/2 OH SW	4 13/32	3	3/16	7,082	212,150	392,071	14,361	11,803	12,015	12,617
3 1/2	13.30	E	3 1/2 XH	4 11/32	2 25/32	3/16	6,971	212,150	401,864	14,361	11,619	12,015	12,617
3 1/2	13.30	E	NC31	4	2 1/8	15/64	6,895	212,150	447,130	14,361	11,491	12,015	12,617
3 1/2	13.30	E	NC31DS	4	2 1/8	15/64	8,900 B	212,150	447,130	14,361	14,833 B	12,015	12,617
3 1/2	13.30	E	NC38	4 1/2	3 1/16	11/64	6,910	212,150	384,086	14,361	11,517	12,015	12,617
3 1/2	13.30	E	NC38DS	4 1/2	3 1/16	11/64	6,910 P	212,150	384,086	14,361	11,517 P	12,015	12,617
3 1/2	13.30	SS75	NC38	4 17/32	3	3/16	6,962	212,150	384,814	14,361	11,603	12,015	12,617
3 1/2	13.30	SS75	NC38DS	4 17/32	3	3/16	7,764 P	212,150	419,797	14,361	12,940 P	12,015	12,617
3 1/2	13.30	X	3 1/2 H90	4 21/32	3 5/32	3/16	9,033	268,723	436,772	18,191	15,055	15,218	15,982
3 1/2	13.30	X	3 1/2 SL H90	4 3/8	2 7/8	13/64	8,738	268,723	435,388	18,191	14,564	15,218	15,982
3 1/2	13.30	X	NC38	4 19/32	2 7/8	7/32	8,824	268,723	489,010	18,191	14,706	15,218	15,982
3 1/2	13.30	X	NC38DS	4 19/32	2 7/8	7/32	10,086 B	268,723	489,010	18,191	16,811 B	15,218	15,982
3 1/2	13.30	SS95	NC38	4 21/32	2 13/16	1/4	8,781	268,723	478,970	18,191	14,634	15,218	15,982
3 1/2	13.30	SS95	NC38DS	4 21/32	2 13/16	1/4	11,386 P	268,723	522,513	18,191	18,977 P	15,218	15,982
3 1/2	13.30	G	3 1/2 SL H90	4 7/16	2 13/16	15/64	9,661	297,010	468,890	20,106	16,102	16,820	17,664
3 1/2	13.30	G	NC38	4 21/32	2 25/32	1/4	9,881	297,010	538,988	20,106	16,468	16,820	17,664
3 1/2	13.30	G	NC38DS	4 21/32	2 25/32	1/4	11,944 B	297,010	538,988	20,106	19,906 B	16,820	17,664

3 1/2	13.30	S	3 1/2 SL H90	4 19/32	2 17/32	5/16	12,736	381,870	610,538	25,850	21,227	21,626	22,711
3 1/2	13.30	S	NC38	4 13/16	2 1/2	21/64	12,616	381,870	678,979	25,850	21,026	21,626	22,711
3 1/2	13.30	S	NC38DS	4 13/16	2 1/2	21/64	16,827 B	381,870	678,979	25,850	28,045 B	21,626	22,711
3 1/2	13.30	S	NC40	5	2 15/16	9/32	12,564	381,870	643,871	25,850	20,940	21,626	22,711
3 1/2	13.30	S	NC40DS	5	2 15/16	9/32	15,085 P	381,870	643,871	25,850	25,142 P	21,626	22,711
3 1/2	13.30	V	NC38	4 29/32	2 11/32	3/8	14,060	424,300	750,309	28,740	23,433	24,029	25,234
3 1/2	13.30	V	NC38DS	4 29/32	2 11/32	3/8	19,344 P	424,300	750,309	28,740	32,240 P	24,029	25,234
3 1/2	15.50	E	NC38	4 17/32	2 31/32	3/16	7,787	250,620	437,377	16,146	12,978	14,472	15,394
3 1/2	15.50	E	NC38DS	4 17/32	2 31/32	3/16	8,231 B	250,620	437,377	16,146	13,719 B	14,472	15,394
3 1/2	15.50	SS75	NC38	4 19/32	2 29/32	7/32	7,883	250,620	432,651	16,146	13,139	14,472	15,394
3 1/2	15.50	SS75	NC38DS	4 19/32	2 29/32	7/32	9,606 P	250,620	471,983	16,146	16,011 P	14,472	15,394
3 1/2	15.50	X	NC38	4 21/32	2 25/32	1/4	9,881	317,452	538,988	20,452	16,468	18,331	19,499
3 1/2	15.50	X	NC38DS	4 21/32	2 25/32	1/4	11,944 B	317,452	538,988	20,452	19,906 B	18,331	19,499
3 1/2	15.50	SS95	NC40	4 29/32	3 3/32	15/64	9,842	317,452	508,799	20,452	16,404	18,331	19,499
3 1/2	15.50	SS95	NC40DS	4 29/32	3 3/32	15/64	11,777 P	317,452	555,053	20,452	19,629 P	18,331	19,499
3 1/2	15.50	G	NC38	4 23/32	2 21/32	9/32	10,959	350,868	603,047	22,605	18,265	20,260	21,552
3 1/2	15.50	G	NC38DS	4 23/32	2 21/32	9/32	13,971 B	350,868	603,047	22,605	23,285 B	20,260	21,552
3 1/2	15.50	G	NC40	4 15/16	3 1/16	1/4	11,109	350,868	573,185	22,605	18,515	20,260	21,552
3 1/2	15.50	G	NC40DS	4 15/16	3 1/16	1/4	12,454 P	350,868	573,185	22,605	20,756 P	20,260	21,552
3 1/2	15.50	S	NC38	4 29/32	2 11/32	3/8	14,060	451,115	750,309	29,063	23,433	26,049	27,710
3 1/2	15.50	S	NC38DS	4 29/32	2 11/32	3/8	19,344 P	451,115	750,309	29,063	32,240 P	26,049	27,710
3 1/2	15.50	S	NC40	5 3/32	2 13/16	21/64	13,968	451,115	711,611	29,063	23,280	26,049	27,710
3 1/2	15.50	S	NC40DS	5 3/32	2 13/16	21/64	17,599 P	451,115	711,611	29,063	29,332 P	26,049	27,710
3 1/2	15.50	V	NC40	5 5/32	2 21/32	23/64	15,649	501,239	792,145	32,312	26,081	28,943	30,789
3 1/2	15.50	V	NC40DS	5 5/32	2 21/32	23/64	20,574 P	501,239	792,145	32,312	34,291 P	28,943	30,789
4	11.85	E	4 H90	4 7/8	3 23/32	5/32	7,621	182,016	355,607	15,310	12,701	5,704	7,860
4	11.85	E	4 OH LW	5	3 27/32	5/32	7,493	182,016	362,912	15,310	12,489	5,704	7,860
4	11.85	E	4 WO	5 7/32	4	5/32	7,513	182,016	358,373	15,310	12,522	5,704	7,860
4	11.85	E	NC46	5 7/32	4 1/32	5/32	7,659	182,016	365,038	15,310	12,765	5,704	7,860
4	11.85	E	NC46DS	5 7/32	4 1/32	5/32	7,659 P	182,016	365,038	15,310	12,765 P	5,704	7,860
4	14.00	E	4 H90	4 15/16	3 5/8	5/32	8,976	224,182	420,495	18,196	14,960	9,012	9,900
4	14.00	E	4 OH SW	5 1/16	3 3/4	5/32	8,928	224,182	430,008	18,196	14,881	9,012	9,900
4	14.00	E	4 SH	4 7/16	2 19/32	15/64	8,732	224,182	496,848	18,196	14,554	9,012	9,900
4	14.00	E	NC40	4 13/16	3 1/4	3/16	8,833	224,182	461,634	18,196	14,721	9,012	9,900
4	14.00	E	NC40DS	4 13/16	3 1/4	3/16	8,833 P	224,182	461,634	18,196	14,721 P	9,012	9,900

4	14.00	E	NC46	5 9/32	3 15/16	5/32	9,237	224,182	435,448	18,196	15,396	9,012	9,900
4	14.00	E	NC46DS	5 9/32	3 15/16	5/32	9,237 B	224,182	435,448	18,196	15,396 B	9,012	9,900
4	14.00	SS75	NC46	5 5/16	3 29/32	5/32	8,949	224,182	420,337	18,196	14,914	9,012	9,900
4	14.00	SS75	NC46DS	5 5/16	3 29/32	5/32	9,762 P	224,182	458,550	18,196	16,270 P	9,012	9,900
4	14.00	X	4 H90	5 1/16	3 1/2	13/64	11,320	283,963	504,434	23,048	18,867	10,795	12,540
4	14.00	X	NC40	4 15/16	3 1/16	1/4	11,109	283,963	573,185	23,048	18,515	10,795	12,540
4	14.00	X	NC40DS	4 15/16	3 1/16	1/4	12,454 P	283,963	573,185	23,048	20,756 P	10,795	12,540
4	14.00	X	NC46	5 3/8	3 13/16	3/16	11,306	283,963	526,750	23,048	18,844	10,795	12,540
4	14.00	X	NC46DS	5 3/8	3 13/16	3/16	11,306 P	283,963	526,750	23,048	18,844 P	10,795	12,540
4	14.00	SS95	NC46	5 13/32	3 3/4	13/64	11,082	283,963	523,689	23,048	18,471	10,795	12,540
4	14.00	SS95	NC46DS	5 13/32	3 3/4	13/64	12,108 B	283,963	571,297	23,048	20,180 B	10,795	12,540
4	14.00	G	4 H90	5 3/32	3 13/32	7/32	12,471	313,854	565,456	25,474	20,786	11,622	13,860
4	14.00	G	NC40	5	2 15/16	9/32	12,564	313,854	643,871	25,474	20,940	11,622	13,860
4	14.00	G	NC40DS	5	2 15/16	9/32	15,085 P	313,854	643,871	25,474	25,142 P	11,622	13,860
4	14.00	G	NC46	5 7/16	3 3/4	7/32	12,320	313,854	571,297	25,474	20,533	11,622	13,860
4	14.00	G	NC46DS	5 7/16	3 3/4	7/32	12,338 P	313,854	571,297	25,474	20,564 P	11,622	13,860
4	14.00	S	4 H90	5 1/4	3 3/16	19/64	16,029	403,527	701,397	32,752	26,714	13,836	17,820
4	14.00	S	NC40	5 3/16	2 5/8	3/8	15,975	403,527	807,700	32,752	26,624	13,836	17,820
4	14.00	S	NC40DS	5 3/16	2 5/8	3/8	21,147 P	403,527	807,700	32,752	35,245 P	13,836	17,820
4	14.00	S	NC46	5 9/16	3 17/32	9/32	15,762	403,527	721,413	32,752	26,270	13,836	17,820
4	14.00	S	NC46DS	5 9/16	3 17/32	9/32	18,664 P	403,527	721,413	32,752	31,106 P	13,836	17,820
4	14.00	V	NC46	5 21/32	3 13/32	21/64	17,653	448,363	803,143	36,414	29,422	14,785	19,800
4	14.00	V	NC46DS	5 21/32	3 13/32	21/64	22,096 P	448,363	803,143	36,414	36,826 P	14,785	19,800
4	15.70	E	4 H90	5	3 19/32	11/64	9,838	253,851	441,756	20,067	16,397	10,914	11,400
4	15.70	E	NC40	4 7/8	3 5/32	7/32	9,985	253,851	518,237	20,067	16,641	10,914	11,400
4	15.70	E	NC40DS	4 7/8	3 5/32	7/32	10,403 P	253,851	518,237	20,067	17,338 P	10,914	11,400
4	15.70	E	NC46	5 5/16	3 29/32	5/32	9,762	253,851	458,550	20,067	16,270	10,914	11,400
4	15.70	E	NC46DS	5 5/16	3 29/32	5/32	9,762 P	253,851	458,550	20,067	16,270 P	10,914	11,400
4	15.70	X	4 H90	5 3/32	3 13/32	7/32	12,471	321,544	565,456	25,418	20,786	13,825	14,440
4	15.70	X	NC40	5	2 31/32	9/32	12,205	321,544	626,475	25,418	20,342	13,825	14,440
4	15.70	X	NC40DS	5	2 31/32	9/32	14,439 P	321,544	626,475	25,418	24,064 P	13,825	14,440
4	15.70	X	NC46	5 7/16	3 3/4	7/32	12,320	321,544	571,297	25,418	20,533	13,825	14,440
4	15.70	X	NC46DS	5 7/16	3 3/4	7/32	12,338 P	321,544	571,297	25,418	20,564 P	13,825	14,440
4	15.70	G	4 H90	5 5/32	3 11/32	1/4	13,720	355,391	605,217	28,094	22,867	15,190	15,960
4	15.70	G	NC40	5 1/16	2 27/32	5/16	13,622	355,391	694,952	28,094	22,703	15,190	15,960

4	15.70	G	NC40DS	5 1/16	2 27/32	5/16	16,982 P	355,391	694,952	28,094	28,303 P	15,190	15,960
4	15.70	G	NC46	5 15/32	3 21/32	15/64	13,552	355,391	636,737	28,094	22,587	15,190	15,960
4	15.70	G	NC46DS	5 15/32	3 21/32	15/64	14,812 B	355,391	636,737	28,094	24,687 B	15,190	15,960
4	15.70	S	NC46	5 21/32	3 13/32	21/64	17,653	456,931	803,143	36,120	29,422	18,593	20,520
4	15.70	S	NC46DS	5 21/32	3 13/32	21/64	22,096 P	456,931	803,143	36,120	36,826 P	18,593	20,520
4	15.70	S	NC46	5 21/32	3 13/32	21/64	17,653	456,931	803,143	36,120	29,422	18,593	20,520
4	15.70	S	NC46DS	5 21/32	3 13/32	21/64	22,096 P	456,931	803,143	36,120	36,826 P	18,593	20,520
4 1/2	13.75	E	4 1/2 H90	5 1/4	4	5/32	9,857	213,258	425,657	20,403	16,428	4,686	7,227
4 1/2	13.75	E	4 1/2 OH SW	5 3/8	4 3/32	11/64	10,188	213,258	459,860	20,403	16,979	4,686	7,227
4 1/2	13.75	E	4 1/2 WO	5 21/32	4 11/32	5/32	9,950	213,258	453,032	20,403	16,583	4,686	7,227
4 1/2	13.75	E	NC46	5 5/16	3 7/8	5/32	9,941	213,258	481,467	20,403	16,569	4,686	7,227
4 1/2	13.75	E	NC46DS	5 5/16	3 7/8	5/32	9,941 B	213,258	481,467	20,403	16,569 B	4,686	7,227
4 1/2	13.75	E	NC50	5 21/32	4 13/32	5/32	9,910	213,258	434,631	20,403	16,516	4,686	7,227
4 1/2	13.75	E	NC50DS	5 21/32	4 13/32	5/32	9,910 P	213,258	434,631	20,403	16,516 P	4,686	7,227
4 1/2	16.60	E	4 1/2 FH	5 11/32	3 21/32	3/16	11,434	260,165	564,466	24,139	19,057	7,525	8,987
4 1/2	16.60	E	4 1/2 H90	5 11/32	3 29/32	11/64	11,799	260,165	495,514	24,139	19,665	7,525	8,987
4 1/2	16.60	E	4 1/2 OH SW	5 7/16	4	13/64	11,857	260,165	531,374	24,139	19,761	7,525	8,987
4 1/2	16.60	E	NC38	4 25/32	2 19/32	5/16	11,758	260,165	633,972	24,139	19,597	7,525	8,987
4 1/2	16.60	E	NC38DS	4 25/32	2 19/32	5/16	15,296 P	260,165	633,972	24,139	25,493 P	7,525	8,987
4 1/2	16.60	E	NC46	5 13/32	3 25/32	13/64	11,815	260,165	549,116	24,139	19,691	7,525	8,987
4 1/2	16.60	E	NC46DS	5 13/32	3 25/32	13/64	11,815 P	260,165	549,116	24,139	19,691 P	7,525	8,987
4 1/2	16.60	E	NC50	5 3/4	4 5/16	11/64	11,783	260,165	511,667	24,139	19,638	7,525	8,987
4 1/2	16.60	E	NC50DS	5 3/4	4 5/16	11/64	11,783 P	260,165	511,667	24,139	19,638 P	7,525	8,987
4 1/2	16.60	SS75	NC46	5 7/16	3 23/32	7/32	11,750	260,165	543,853	24,139	19,583	7,525	8,987
4 1/2	16.60	SS75	NC46DS	5 7/16	3 23/32	7/32	13,263 B	260,165	593,294	24,139	22,105 B	7,525	8,987
4 1/2	16.60	SS75	NC50	5 25/32	4 1/4	3/16	11,930	260,165	515,262	24,139	19,884	7,525	8,987
4 1/2	16.60	SS75	NC50DS	5 25/32	4 1/4	3/16	13,015 P	260,165	562,104	24,139	21,691 P	7,525	8,987
4 1/2	16.60	X	4 1/2 FH	5 1/2	3 7/16	17/64	14,689	329,542	710,716	30,576	24,482	8,868	11,383
4 1/2	16.60	X	4 1/2 H90	5 15/32	3 23/32	15/64	15,208	329,542	630,259	30,576	25,346	8,868	11,383
4 1/2	16.60	X	NC46	5 17/32	3 19/32	17/64	14,795	329,542	679,443	30,576	24,659	8,868	11,383
4 1/2	16.60	X	NC46DS	5 17/32	3 19/32	17/64	16,898 P	329,542	679,443	30,576	28,163 P	8,868	11,383
4 1/2	16.60	X	NC50	5 27/32	4 5/32	7/32	14,837	329,542	636,380	30,576	24,729	8,868	11,383
4 1/2	16.60	X	NC50DS	5 27/32	4 5/32	7/32	15,017 P	329,542	636,380	30,576	25,028 P	8,868	11,383
4 1/2	16.60	SS95	NC46	5 19/32	3 1/2	19/64	14,887	329,542	680,278	30,576	24,811	8,868	11,383
4 1/2	16.60	SS95	NC46DS	5 19/32	3 1/2	19/64	19,534 P	329,542	742,121	30,576	32,557 P	8,868	11,383

4 1/2	16.60	SS95	NC50	5 29/32	4 3/32	1/4	14,699	329,542	627,895	30,576	24,498	8,868	11,383
4 1/2	16.60	SS95	NC50DS	5 29/32	4 3/32	1/4	17,242 P	329,542	684,976	30,576	28,736 P	8,868	11,383
4 1/2	16.60	G	4 1/2 FH	5 9/16	3 5/16	19/64	16,391	364,231	790,237	33,795	27,318	9,467	12,581
4 1/2	16.60	G	4 1/2 H90	5 17/32	3 5/8	17/64	16,861	364,231	695,147	33,795	28,102	9,467	12,581
4 1/2	16.60	G	NC46	5 19/32	3 1/2	19/64	16,240	364,231	742,121	33,795	27,067	9,467	12,581
4 1/2	16.60	G	NC46DS	5 19/32	3 1/2	19/64	19,534 P	364,231	742,121	33,795	32,557 P	9,467	12,581
4 1/2	16.60	G	NC50	5 29/32	4 1/16	1/4	16,622	364,231	708,998	33,795	27,703	9,467	12,581
4 1/2	16.60	G	NC50DS	5 29/32	4 1/16	1/4	18,333 B	364,231	708,998	33,795	30,555 B	9,467	12,581
4 1/2	16.60	SS105	NC46	5 21/32	3 3/8	21/64	16,580	364,231	754,522	33,795	27,634	9,467	12,581
4 1/2	16.60	SS105	NC46DS	5 21/32	3 3/8	21/64	22,896 B	364,231	823,115	33,795	38,160 B	9,467	12,581
4 1/2	16.60	S	4 1/2 FH	5 3/4	2 31/32	25/64	20,873	468,297	993,735	43,450	34,789	10,964	16,176
4 1/2	16.60	S	4 1/2 H90	5 11/16	3 3/8	1 1/32	21,098	468,297	860,080	43,450	35,164	10,964	16,176
4 1/2	16.60	S	NC46	5 25/32	3 5/32	25/64	21,235	468,297	957,768	43,450	35,392	10,964	16,176
4 1/2	16.60	S	NC46DS	5 25/32	3 5/32	25/64	28,523 B	468,297	957,768	43,450	47,538 B	10,964	16,176
4 1/2	16.60	S	NC50	6 1/16	3 13/16	21/64	21,006	468,297	894,549	43,450	35,010	10,964	16,176
4 1/2	16.60	S	NC50DS	6 1/16	3 13/16	21/64	26,509 B	468,297	894,549	43,450	44,181 B	10,964	16,176
4 1/2	16.60	V	NC46	5 7/8	3	7/16	23,398	520,330	1,048,427	48,308	38,997	11,537	17,973
4 1/2	16.60	V	NC46DS	5 7/8	3	7/16	32,328 P	520,330	1,048,427	48,308	53,880 P	11,537	17,973
4 1/2	16.60	V	NC50	6 5/32	3 11/16	3/8	23,464	520,330	982,906	48,308	39,106	11,537	17,973
4 1/2	16.60	V	NC50DS	6 5/32	3 11/16	3/8	30,827 P	520,330	982,906	48,308	51,378 P	11,537	17,973
4 1/2	20.00	E	4 1/2 FH	5 7/16	3 1/2	15/64	13,523	322,916	669,850	28,683	22,538	10,975	11,467
4 1/2	20.00	E	4 1/2 H90	5 7/16	3 25/32	7/32	14,086	322,916	586,081	28,683	23,477	10,975	11,467
4 1/2	20.00	E	NC46	5 1/2	3 21/32	1/4	13,815	322,916	636,737	28,683	23,025	10,975	11,467
4 1/2	20.00	E	NC46DS	5 1/2	3 21/32	1/4	15,099 P	322,916	636,737	28,683	25,165 P	10,975	11,467
4 1/2	20.00	E	NC50	5 13/16	4 3/16	13/64	14,071	322,916	611,805	28,683	23,451	10,975	11,467
4 1/2	20.00	E	NC50DS	5 13/16	4 3/16	13/64	14,071 B	322,916	611,805	28,683	23,451 B	10,975	11,467
4 1/2	20.00	SS75	NC46	5 17/32	3 9/16	17/64	13,786	322,916	642,143	28,683	22,977	10,975	11,467
4 1/2	20.00	SS75	NC46DS	5 17/32	3 9/16	17/64	17,506 B	322,916	700,520	28,683	29,176 B	10,975	11,467
4 1/2	20.00	SS75	NC50	5 7/8	4 1/8	15/64	14,151	322,916	605,706	28,683	23,586	10,975	11,467
4 1/2	20.00	SS75	NC50DS	5 7/8	4 1/8	15/64	16,134 P	322,916	660,770	28,683	26,889 P	10,975	11,467
4 1/2	20.00	X	4 1/2 FH	5 5/8	3 1/4	21/64	17,314	409,026	828,894	36,332	28,857	13,901	14,524
4 1/2	20.00	X	4 1/2 H90	5 9/16	3 9/16	9/32	17,921	409,026	737,485	36,332	29,868	13,901	14,524
4 1/2	20.00	X	NC46	5 21/32	3 13/32	21/64	17,653	409,026	803,143	36,332	29,422	13,901	14,524
4 1/2	20.00	X	NC46DS	5 21/32	3 13/32	21/64	22,096 P	409,026	803,143	36,332	36,826 P	13,901	14,524
4 1/2	20.00	X	NC50	5 15/16	4	17/64	17,485	409,026	756,491	36,332	29,142	13,901	14,524

4 1/2	20.00	X	NC50DS	5 15/16	4	17/64	20,145 B	409,026	756,491	36,332	33,575 B	13,901	14,524
4 1/2	20.00	SS95	NC46	5 23/32	3 9/32	23/64	17,863	409,026	808,434	36,332	29,772	13,901	14,524
4 1/2	20.00	SS95	NC46DS	5 23/32	3 9/32	23/64	25,394 P	409,026	881,928	36,332	42,324 P	13,901	14,524
4 1/2	20.00	SS95	NC50	6	3 29/32	19/64	17,630	409,026	757,486	36,332	29,383	13,901	14,524
4 1/2	20.00	SS95	NC50DS	6	3 29/32	19/64	23,327 B	409,026	826,348	36,332	38,879 B	13,901	14,524
4 1/2	20.00	G	4 1/2 FH	5 11/16	3 3/32	23/64	19,355	452,082	922,313	40,157	32,258	15,350	16,053
4 1/2	20.00	G	4 1/2 H90	5 5/8	3 15/32	5/16	19,539	452,082	799,611	40,157	32,566	15,350	16,053
4 1/2	20.00	G	NC46	5 23/32	3 9/32	23/64	19,487	452,082	881,928	40,157	32,478	15,350	16,053
4 1/2	20.00	G	NC46DS	5 23/32	3 9/32	23/64	25,394 P	452,082	881,928	40,157	42,324 P	15,350	16,053
4 1/2	20.00	G	NC50	6 1/32	3 29/32	5/16	19,542	452,082	826,348	40,157	32,569	15,350	16,053
4 1/2	20.00	G	NC50DS	6 1/32	3 29/32	5/16	23,701 P	452,082	826,348	40,157	39,501 P	15,350	16,053
4 1/2	20.00	SS105	NC46	5 25/32	3 5/32	25/64	19,466	452,082	877,954	40,157	32,443	15,350	16,053
4 1/2	20.00	SS105	NC46DS	5 25/32	3 5/32	25/64	28,523 B	452,082	957,768	40,157	47,538 B	15,350	16,053
4 1/2	20.00	S	NC46	5 15/16	2 7/8	1 5/32	25,038	581,248	1,117,640	51,630	41,729	18,806	20,640
4 1/2	20.00	S	NC46DS	5 15/16	2 7/8	1 5/32	35,192 P	581,248	1,117,640	51,630	58,653 P	18,806	20,640
4 1/2	20.00	S	NC50	6 7/32	3 19/32	1 3/32	25,087	581,248	1,047,241	51,630	41,812	18,806	20,640
4 1/2	20.00	S	NC50DS	6 7/32	3 19/32	1 3/32	33,745 P	581,248	1,047,241	51,630	56,242 P	18,806	20,640
4 1/2	20.00	V	NC46	6 1/32	2 21/32	33/64	27,756	645,831	1,231,676	57,402	46,260	20,405	22,933
4 1/2	20.00	V	NC46DS	6 1/32	2 21/32	33/64	39,881 P	645,831	1,231,676	57,402	66,468 P	20,405	22,933
4 1/2	20.00	V	NC50	6 5/16	3 7/16	29/64	27,713	645,831	1,150,785	57,402	46,189	20,405	22,933
4 1/2	20.00	V	NC50DS	6 5/16	3 7/16	29/64	38,428 P	645,831	1,150,785	57,402	64,046 P	20,405	22,933
4 1/2	22.82	E	NC46	5 9/16	3 9/16	9/32	15,280	367,566	700,520	31,587	25,467	12,655	13,333
4 1/2	22.82	E	NC46DS	5 9/16	3 9/16	9/32	17,785 P	367,566	700,520	31,587	29,641 P	12,655	13,333
4 1/2	22.82	E	NC50	5 7/8	4 1/8	15/64	15,438	367,566	660,770	31,587	25,730	12,655	13,333
4 1/2	22.82	E	NC50DS	5 7/8	4 1/8	15/64	16,134 P	367,566	660,770	31,587	26,889 P	12,655	13,333
4 1/2	22.82	X	4 1/2 FH	5 11/16	3 3/32	23/64	19,355	465,584	922,313	40,010	32,258	16,030	16,889
4 1/2	22.82	X	NC46	5 23/32	3 9/32	23/64	19,487	465,584	881,928	40,010	32,478	16,030	16,889
4 1/2	22.82	X	NC46DS	5 23/32	3 9/32	23/64	25,394 P	465,584	881,928	40,010	42,324 P	16,030	16,889
4 1/2	22.82	X	NC50	6	3 29/32	19/64	19,232	465,584	826,348	40,010	32,054	16,030	16,889
4 1/2	22.82	X	NC50DS	6	3 29/32	19/64	23,327 B	465,584	826,348	40,010	38,879 B	16,030	16,889
4 1/2	22.82	G	NC46	5 13/16	3 5/32	1 3/32	21,263	514,593	957,768	44,222	35,438	17,718	18,667
4 1/2	22.82	G	NC46DS	5 13/16	3 5/32	1 3/32	28,560 P	514,593	957,768	44,222	47,599 P	17,718	18,667
4 1/2	22.82	G	NC50	6 3/32	3 13/16	1 1/32	21,245	514,593	894,549	44,222	35,409	17,718	18,667
4 1/2	22.82	G	NC50DS	6 3/32	3 13/16	1 1/32	26,809 P	514,593	894,549	44,222	44,681 P	17,718	18,667
4 1/2	22.82	S	NC50	6 9/32	3 7/16	7/16	27,425	661,620	1,150,785	56,856	45,709	22,780	24,000

4 1/2	22.82	S	NC50DS	6 9/32	3 7/16	7/16	38,033 B	661,620	1,150,785	56,856	63,388 B	22,780	24,000
5	19.50	E	5 1/2 FH	6 3/8	4 25/32	3/16	15,744	311,535	619,229	32,285	26,239	7,041	8,688
5	19.50	E	5 1/2 FHDS	6 3/8	4 25/32	3/16	15,744 P	311,535	619,229	32,285	26,239 P	7,041	8,688
5	19.50	E	NC50	5 7/8	4 3/32	15/64	15,765	311,535	684,976	32,285	26,275	7,041	8,688
5	19.50	E	NC50DS	5 7/8	4 3/32	15/64	16,952 B	311,535	684,976	32,285	28,253 B	7,041	8,688
5	19.50	X	5 1/2 FH	6 1/2	4 19/32	1/4	20,210	394,612	784,898	40,895	33,683	8,241	11,005
5	19.50	X	5 1/2 FHDS	6 1/2	4 19/32	1/4	20,433 P	394,612	784,898	40,895	34,055 P	8,241	11,005
5	19.50	X	5 H90	5 27/32	3 27/32	9/32	19,859	394,612	779,012	40,895	33,098	8,241	11,005
5	19.50	X	NC50	6 1/32	3 7/8	5/16	20,113	394,612	849,266	40,895	33,522	8,241	11,005
5	19.50	X	NC50DS	6 1/32	3 7/8	5/16	24,746 P	394,612	849,266	40,895	41,243 P	8,241	11,005
5	19.50	G	5 1/2 FH	6 9/16	4 1/2	9/32	22,301	436,150	865,248	45,199	37,169	8,765	12,163
5	19.50	G	5 1/2 FHDS	6 9/16	4 1/2	9/32	24,377 B	436,150	865,248	45,199	40,629 B	8,765	12,163
5	19.50	G	5 H90	5 15/16	3 23/32	21/64	22,321	436,150	868,106	45,199	37,202	8,765	12,163
5	19.50	G	NC50	6 3/32	3 25/32	1 1/32	21,806	436,150	916,914	45,199	36,343	8,765	12,163
5	19.50	G	NC50DS	6 3/32	3 25/32	1 1/32	27,827 P	436,150	916,914	45,199	46,378 P	8,765	12,163
5	19.50	S	5 1/2 FH	6 3/4	4 1/4	3/8	28,034	560,764	1,071,415	58,113	46,723	10,029	15,638
5	19.50	S	5 1/2 FHDS	6 3/4	4 1/4	3/8	34,819 P	560,764	1,071,415	58,113	58,032 P	10,029	15,638
5	19.50	S	NC50	6 5/16	3 13/32	29/64	28,226	560,764	1,170,941	58,113	47,044	10,029	15,638
5	19.50	S	NC50DS	6 5/16	3 13/32	29/64	39,337 P	560,764	1,170,941	58,113	65,561 P	10,029	15,638
5	25.60	E	5 1/2 FH	6 1/2	4 5/8	1/4	19,475	414,690	757,747	40,544	32,458	11,458	12,000
5	25.60	E	5 1/2 FHDS	6 1/2	4 5/8	1/4	19,475 P	414,690	757,747	40,544	32,458 P	11,458	12,000
5	25.60	E	NC50	6 1/32	3 29/32	5/16	19,542	414,690	826,348	40,544	32,569	11,458	12,000
5	25.60	E	NC50DS	6 1/32	3 29/32	5/16	23,701 P	414,690	826,348	40,544	39,501 P	11,458	12,000
5	25.60	SS75	5 1/2 FH	6 17/32	4 17/32	17/64	19,482	414,690	768,762	40,544	32,470	11,458	12,000
5	25.60	SS75	5 1/2 FHDS	6 17/32	4 17/32	17/64	22,696 B	414,690	838,649	40,544	37,826 B	11,458	12,000
5	25.60	SS75	NC50	6 3/32	3 13/16	1 1/32	19,475	414,690	820,003	40,544	32,458	11,458	12,000
5	25.60	SS75	NC50DS	6 3/32	3 13/16	1 1/32	26,809 P	414,690	894,549	40,544	44,681 P	11,458	12,000
5	25.60	X	5 1/2 FH	6 21/32	4 3/8	21/64	25,245	525,274	969,805	51,356	42,075	14,514	15,200
5	25.60	X	5 1/2 FHDS	6 21/32	4 3/8	21/64	29,726 P	525,274	969,805	51,356	49,544 P	14,514	15,200
5	25.60	X	NC50	6 7/32	3 19/32	1 3/32	25,087	525,274	1,047,241	51,356	41,812	14,514	15,200
5	25.60	X	NC50DS	6 7/32	3 19/32	1 3/32	33,745 P	525,274	1,047,241	51,356	56,242 P	14,514	15,200
5	25.60	SS95	5 1/2 FH	6 23/32	4 9/32	23/64	25,064	525,274	959,098	51,356	41,774	14,514	15,200
5	25.60	SS95	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	525,274	1,046,289	51,356	55,935 P	14,514	15,200
5	25.60	G	5 1/2 FH	6 23/32	4 9/32	23/64	27,343	580,566	1,046,289	56,762	45,571	16,042	16,800
5	25.60	G	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	580,566	1,046,289	56,762	55,935 P	16,042	16,800

5	25.60	G	NC50	6 9/32	3 7/16	7/16	27,425	580,566	1,150,785	56,762	45,709	16,042	16,800
5	25.60	G	NC50DS	6 9/32	3 7/16	7/16	38,033 B	580,566	1,150,785	56,762	63,388 B	16,042	16,800
5	25.60	S	5 1/2 FH	6 15/16	3 29/32	1 5/32	35,358	746,443	1,335,659	72,979	58,929	20,510	21,600
5	25.60	S	5 1/2 FHDS	6 15/16	3 29/32	1 5/32	48,005 P	746,443	1,335,659	72,979	80,009 P	20,510	21,600
5	25.60	V	5 1/2 FH	7 1/16	3 23/32	1 7/32	39,130	829,380	1,470,404	81,137	65,217	22,332	24,000
5	25.60	V	5 1/2 FHDS	7 1/16	3 23/32	1 7/32	54,689 P	829,380	1,470,404	81,137	91,149 P	22,332	24,000
5	TW 0.750	SS95	5 1/2 FH	6 29/32	3 31/32	29/64	31,226	734,190	1,181,832	64,522	52,043	21,159	22,800
5	TW 0.750	SS95	5 1/2 FHDS	6 29/32	3 31/32	29/64	45,697 P	734,190	1,289,271	64,522	76,162 P	21,159	22,800
5	TW 0.750	V	5 1/2 FH	7 5/16	3 3/16	2 1/32	48,927	1,159,248	1,816,194	101,877	81,545	33,409	36,000
5	TW 0.750	V	5 1/2 FHDS	7 5/16	3 3/16	2 1/32	71,673 P	1,159,248	1,816,194	101,877	119,455 P	33,409	36,000
5 1/2	21.90	E	5 1/2 FH	6 15/32	4 5/8	15/64	19,179	344,780	757,747	39,863	31,965	5,730	7,876
5 1/2	21.90	E	5 1/2 FHDS	6 15/32	4 5/8	15/64	19,179 B	344,780	757,747	39,863	31,965 B	5,730	7,876
5 1/2	21.90	SS75	5 1/2 FH	6 17/32	4 9/16	17/64	19,196	344,780	744,210	39,863	31,993	5,730	7,876
5 1/2	21.90	SS75	5 1/2 FHDS	6 17/32	4 9/16	17/64	21,790 P	344,780	811,866	39,863	36,317 P	5,730	7,876
5 1/2	21.90	X	5 1/2 FH	6 5/8	4 13/32	5/16	24,420	436,721	943,942	50,494	40,699	6,542	9,977
5 1/2	21.90	X	5 1/2 FHDS	6 5/8	4 13/32	5/16	28,292 B	436,721	943,942	50,494	47,154 B	6,542	9,977
5 1/2	21.90	X	5 1/2 H90	6 7/32	4	1 1/32	24,694	436,721	915,142	50,494	41,157	6,542	9,977
5 1/2	21.90	SS95	5 1/2 FH	6 11/16	4 5/16	1 1/32	24,353	436,721	935,897	50,494	40,588	6,542	9,977
5 1/2	21.90	SS95	5 1/2 FHDS	6 11/16	4 5/16	1 1/32	32,196 B	436,721	1,020,978	50,494	53,659 B	6,542	9,977
5 1/2	21.90	G	5 1/2 FH	6 23/32	4 9/32	23/64	27,343	482,692	1,046,289	55,809	45,571	6,865	11,027
5 1/2	21.90	G	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	482,692	1,046,289	55,809	55,935 P	6,865	11,027
5 1/2	21.90	S	5 1/2 FH	6 15/16	3 15/16	1 5/32	34,713	620,604	1,312,557	71,754	57,855	7,496	14,177
5 1/2	21.90	S	5 1/2 FHDS	6 15/16	3 15/16	1 5/32	46,856 P	620,604	1,312,557	71,754	78,094 P	7,496	14,177
5 1/2	21.90	V	5 1/2 FH	7 1/32	3 3/4	33/64	38,513	689,560	1,448,407	79,775	64,188	7,616	15,753
5 1/2	21.90	V	5 1/2 FHDS	7 1/32	3 3/4	33/64	53,600 P	689,560	1,448,407	79,775	89,334 P	7,616	15,753
5 1/2	24.70	E	5 1/2 FH	6 9/16	4 17/32	9/32	21,668	391,285	838,649	44,320	36,113	7,635	9,055
5 1/2	24.70	E	5 1/2 FHDS	6 9/16	4 17/32	9/32	23,138 P	391,285	838,649	44,320	38,563 P	7,635	9,055
5 1/2	24.70	SS75	5 1/2 FH	6 19/32	4 7/16	19/64	21,410	391,285	841,403	44,320	35,684	7,635	9,055
5 1/2	24.70	SS75	5 1/2 FHDS	6 19/32	4 7/16	19/64	26,588 B	391,285	917,895	44,320	44,313 B	7,635	9,055
5 1/2	24.70	X	5 1/2 FH	6 23/32	4 9/32	23/64	27,343	495,627	1,046,289	56,139	45,571	9,011	11,469
5 1/2	24.70	X	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	495,627	1,046,289	56,139	55,935 P	9,011	11,469
5 1/2	24.70	SS95	5 1/2 FH	6 25/32	4 5/32	25/64	27,357	495,627	1,050,217	56,139	45,594	9,011	11,469
5 1/2	24.70	SS95	5 1/2 FHDS	6 25/32	4 5/32	25/64	38,231 B	495,627	1,145,691	56,139	63,719 B	9,011	11,469
5 1/2	24.70	G	5 1/2 FH	6 25/32	4 5/32	25/64	29,843	547,799	1,145,691	62,048	49,739	9,626	12,676
5 1/2	24.70	G	5 1/2 FHDS	6 25/32	4 5/32	25/64	38,231 B	547,799	1,145,691	62,048	63,719 B	9,626	12,676

5 1/2	24.70	S	5 1/2 FH	7 1/32	3 3/4	33/64	38,513	704,313	1,448,407	79,776	64,188	11,177	16,298
5 1/2	24.70	S	5 1/2 FHDS	7 1/32	3 3/4	33/64	53,600 P	704,313	1,448,407	79,776	89,334 P	11,177	16,298
5 1/2	24.70	V	5 1/2 FH	7 5/32	3 17/32	37/64	42,741	782,569	1,598,522	88,694	71,236	11,778	18,109
5 1/2	24.70	V	5 1/2 FHDS	7 5/32	3 17/32	37/64	61,013 P	782,569	1,598,522	88,694	101,689 P	11,778	18,109
5 1/2	TW 0.500	V	5 1/2 FH	7 5/16	3 3/16	2 1/32	48,927	923,628	1,816,194	101,327	81,545	18,398	21,818
5 1/2	TW 0.500	V	5 1/2 FHDS	7 5/16	3 3/16	2 1/32	71,673 P	923,628	1,816,194	101,327	119,455 P	18,398	21,818
5 1/2	TW 0.625	V	5 1/2 FH	7 1/2	2 23/32	3/4	56,425	1,119,192	2,077,124	116,989	94,042	25,850	27,273
5 1/2	TW 0.625	V	5 1/2 FHDS	7 1/2	2 23/32	3/4	84,262 P	1,119,192	2,077,124	116,989	140,437 P	25,850	27,273
5 1/2	TW 0.750	V	5 1/2 FH	7 5/8	2 9/32	1 3/16	62,393	1,300,619	2,283,291	129,484	103,988	30,621	32,727
5 1/2	TW 0.750	V	5 1/2 FHDS	7 5/8	2 9/32	1 3/16	93,969 B	1,300,619	2,283,291	129,484	156,616 B	30,621	32,727
5 7/8	23.40	E	5 1/2 FH	6 9/16	4 1/2	9/32	22,301	370,298	865,248	46,162	37,169	4,922	7,374
5 7/8	23.40	E	5 1/2 FHDS	6 9/16	4 1/2	9/32	24,377 B	370,298	865,248	46,162	40,629 B	4,922	7,374
5 7/8	23.40	X	5 1/2 FH	6 3/4	4 7/32	3/8	28,721	469,044	1,096,358	58,472	47,868	5,494	9,340
5 7/8	23.40	X	5 1/2 FHDS	6 3/4	4 7/32	3/8	36,068 P	469,044	1,096,358	58,472	60,113 P	5,494	9,340
5 7/8	23.40	G	5 1/2 FH	6 27/32	4 3/32	27/64	31,427	518,417	1,194,287	64,627	52,378	5,693	10,323
5 7/8	23.40	G	5 1/2 FHDS	6 27/32	4 3/32	27/64	40,962 P	518,417	1,194,287	64,627	68,270 P	5,693	10,323
5 7/8	23.40	S	5 1/2 FH	7 1/16	3 21/32	1 7/32	40,075	666,536	1,513,846	83,092	66,792	6,209	13,273
5 7/8	23.40	S	5 1/2 FHDS	7 1/16	3 21/32	1 7/32	56,452 B	666,536	1,513,846	83,092	94,086 B	6,209	13,273
5 7/8	23.40	V	5 1/2 FH	7 3/16	3 7/16	1 9/32	44,485	740,595	1,660,096	92,324	74,141	6,444	14,747
5 7/8	23.40	V	5 1/2 FHDS	7 3/16	3 7/16	1 9/32	64,040 P	740,595	1,660,096	92,324	106,734 P	6,444	14,747
5 7/8	26.30	E	5 1/2 FH	6 21/32	4 3/8	21/64	25,245	420,619	969,805	51,439	42,075	6,699	8,477
5 7/8	26.30	E	5 1/2 FHDS	6 21/32	4 3/8	21/64	29,726 P	420,619	969,805	51,439	49,544 P	6,699	8,477
5 7/8	26.30	X	5 1/2 FH	6 27/32	4 3/32	27/64	31,427	532,785	1,194,287	65,156	52,378	7,796	10,737
5 7/8	26.30	X	5 1/2 FHDS	6 27/32	4 3/32	27/64	40,962 P	532,785	1,194,287	65,156	68,270 P	7,796	10,737
5 7/8	26.30	G	5 1/2 FH	6 15/16	3 15/16	1 5/32	34,713	588,867	1,312,557	72,014	57,855	8,269	11,867
5 7/8	26.30	G	5 1/2 FHDS	6 15/16	3 15/16	1 5/32	46,856 P	588,867	1,312,557	72,014	78,094 P	8,269	11,867
5 7/8	26.30	S	5 1/2 FH	7 3/16	3 7/16	1 9/32	44,485	757,115	1,660,096	92,590	74,141	9,363	15,258
5 7/8	26.30	S	5 1/2 FHDS	7 3/16	3 7/16	1 9/32	64,040 P	757,115	1,660,096	92,590	106,734 P	9,363	15,258
5 7/8	26.30	V	5 1/2 FH	7 5/16	3 5/32	2 1/32	49,461	841,239	1,834,878	102,877	82,435	9,732	16,953
5 7/8	26.30	V	5 1/2 FHDS	7 5/16	3 5/32	2 1/32	72,582 P	841,239	1,834,878	102,877	120,970 P	9,732	16,953
5 7/8	TW 0.625	S	5 1/2 FH	7 9/16	2 1/2	2 5/32	59,542	1,086,795	2,184,717	123,241	99,237	21,867	22,979
5 7/8	TW 0.625	S	5 1/2 FHDS	7 9/16	2 1/2	2 5/32	89,372 P	1,086,795	2,184,717	123,241	148,953 P	21,867	22,979
5 7/8	TW 0.625	V	5 1/2 FH	7 23/32	2	55/64	65,729	1,207,550	2,396,775	136,934	109,548	24,296	25,532
5 7/8	TW 0.625	V	5 1/2 FHDS	7 23/32	2	55/64	99,235 P	1,207,550	2,396,775	136,934	165,392 P	24,296	25,532
5 7/8	TW 0.750	S	5 1/2 FH	7 23/32	1 31/32	55/64	66,071	1,265,983	2,408,464	137,173	110,119	25,931	27,574

5 7/8	TW 0.750	S	5 1/2 FHDS	7 23/32	1 131/32	55/64	99,769 P	1,265,983	2,408,464	137,173	166,281 P	25,931	27,574
5 7/8	TW 0.750	V	5 1/2 FH	7 29/32	1 1/8	61/64	73,321	1,406,648	2,654,484	152,414	122,202	28,812	30,638
5 7/8	TW 0.750	V	5 1/2 FHDS	7 29/32	1 1/8	61/64	110,509 P	1,406,648	2,654,484	152,414	184,182 P	28,812	30,638
5 7/8	TW 0.813	S	5 1/2 FH	7 25/32	1 11/16	57/64	68,919	1,351,472	2,505,381	143,097	114,865	27,934	29,891
5 7/8	TW 0.813	S	5 1/2 FHDS	7 25/32	1 11/16	57/64	104,129 P	1,351,472	2,505,381	143,097	173,548 P	27,934	29,891
5 7/8	TW 0.813	V	5 1/2 FH	7 31/32	7/16	63/64	76,326	1,501,636	2,755,726	158,997	127,210	31,038	33,212
5 7/8	TW 0.813	V	5 1/2 FHDS	7 31/32	7/16	63/64	114,156 P	1,501,636	2,755,726	158,997	190,260 P	31,038	33,212
6 5/8	25.20	E	6 5/8 FH	7 7/16	5 17/32	1/4	26,800	387,466	921,125	55,766	44,667	2,931	5,977
6 5/8	25.20	E	6 5/8 FHDS	7 7/16	5 17/32	1/4	26,861 B	387,466	921,125	55,766	44,768 B	2,931	5,977
6 5/8	25.20	X	6 5/8 FH	7 5/8	5 5/16	1 1/32	34,327	490,790	1,144,688	71,522	57,211	3,252	7,571
6 5/8	25.20	X	6 5/8 FHDS	7 5/8	5 5/16	1 1/32	40,436 P	490,790	1,144,688	71,522	67,393 P	3,252	7,571
6 5/8	25.20	G	6 5/8 FH	7 11/16	5 3/16	3/8	37,973	542,452	1,268,388	79,050	63,288	3,353	8,368
6 5/8	25.20	G	6 5/8 FHDS	7 11/16	5 3/16	3/8	47,324 B	542,452	1,268,388	79,050	78,873 B	3,353	8,368
6 5/8	25.20	S	6 5/8 FH	7 29/32	4 27/32	31/64	48,195	697,438	1,593,377	101,635	80,325	3,429	10,759
6 5/8	25.20	S	6 5/8 FHDS	7 29/32	4 27/32	31/64	65,993 B	697,438	1,593,377	101,635	109,989 B	3,429	10,759
6 5/8	25.20	V	6 5/8 FH	8 1/32	4 21/32	35/64	53,954	774,932	1,761,256	111,599	89,924	3,429	11,955
6 5/8	25.20	V	6 5/8 FHDS	8 1/32	4 21/32	35/64	76,189 P	774,932	1,761,256	111,599	126,981 P	3,429	11,955
6 5/8	27.70	E	6 5/8 FH	7 1/2	5 15/32	9/32	29,353	422,419	985,921	60,192	48,921	3,615	6,557
6 5/8	27.70	E	6 5/8 FHDS	7 1/2	5 15/32	9/32	31,177 P	422,419	985,921	60,192	51,962 P	3,615	6,557
6 5/8	27.70	X	6 5/8 FH	7 11/16	5 7/32	3/8	37,258	535,064	1,237,739	77,312	62,096	4,029	8,306
6 5/8	27.70	X	6 5/8 FHDS	7 11/16	5 7/32	3/8	45,854 P	535,064	1,237,739	77,312	76,423 P	4,029	8,306
6 5/8	27.70	G	6 5/8 FH	7 3/4	5 3/32	1 3/32	40,851	591,387	1,359,230	85,450	68,085	4,222	9,180
6 5/8	27.70	G	6 5/8 FHDS	7 3/4	5 3/32	1 3/32	52,597 B	591,387	1,359,230	85,450	87,661 B	4,222	9,180
6 5/8	27.70	S	6 5/8 FH	8	4 23/32	1 7/32	52,177	760,354	1,706,033	109,864	86,962	4,562	11,803
6 5/8	27.70	S	6 5/8 FHDS	8	4 23/32	1 7/32	73,003 P	760,354	1,706,033	109,864	121,671 P	4,562	11,803
6 5/8	27.70	V	6 5/8 FH	8 1/8	4 1/2	1 9/32	58,310	844,836	1,896,093	120,456	97,184	4,592	13,114
6 5/8	27.70	V	6 5/8 FHDS	8 1/8	4 1/2	1 9/32	83,950 P	844,836	1,896,093	120,456	139,917 P	4,592	13,114
6 5/8	TW 0.522	V	6 5/8 FH	8 1/2	3 3/4	2 5/32	77,397	1,180,461	2,479,251	160,030	128,996	13,201	18,910
6 5/8	TW 0.522	V	6 5/8 FHDS	8 1/2	3 3/4	2 5/32	117,168 P	1,180,461	2,479,251	160,030	195,280 P	13,201	18,910
6 5/8	TW 0.625	V	6 5/8 FH	8 11/16	3 9/32	7/8	87,724	1,384,264	2,789,882	181,600	146,207	19,879	22,642
6 5/8	TW 0.625	V	6 5/8 FHDS	8 11/16	3 9/32	7/8	134,534 P	1,384,264	2,789,882	181,600	224,224 P	19,879	22,642
6 5/8	TW 0.750	V	6 5/8 FH	8 7/8	2 23/32	3 1/32	98,409	1,618,706	3,107,968	204,000	164,015	25,759	27,170
6 5/8	TW 0.750	V	6 5/8 FHDS	8 7/8	2 23/32	3 1/32	151,946 P	1,618,706	3,107,968	204,000	253,243 P	25,759	27,170

Table A.4—Class 2 Used Drill Pipe Properties

Label 1	Label 2	Grade	RSC Type	Class 2 Used Drill Pipe									
				Min. OD Tool Joint a (in.)	Max. ID Tool Joint (in.)	Min. Box Shoulder Width Eccentric Wear b (in.)	Makeup Torque at Min. OD & Max. ID c (ft-lb)	Tensile Yield Pipe Body (lb)	Tensile Yield Tool Joint (lb)	Torsional Yield Pipe Body (ft-lb)	Torsional Yield Tool Joint (ft-lb)	Collapse Pressure Pipe Body (psi)	Max. Internal Pressure Pipe Body (psi)
2 3/8	4.85	E	2 3/8 OH LW	3 1/8	2 3/16	5/32	1,686	66,686	132,263	3,224	2,810	6,852	8,400
2 3/8	4.85	E	2 3/8 SL H90	3 3/32	2 7/32	5/32	1,676	66,686	115,507	3,224	2,793	6,852	8,400
2 3/8	4.85	E	2 3/8 WO	3 3/16	2 5/32	5/32	1,698	66,686	134,936	3,224	2,831	6,852	8,400
2 3/8	4.85	E	NC26	3 1/4	2 1/4	5/32	1,581	66,686	125,185	3,224	2,635	6,852	8,400
2 3/8	4.85	E	NC26DS	3 1/4	2 1/4	5/32	1,581 P	66,686	125,185	3,224	2,635 P	6,852	8,400
2 3/8	6.65	E	2 3/8 OH LW	3 1/8	2 1/8	5/32	2,035	92,871	157,666	4,130	3,392	12,138	12,379
2 3/8	6.65	E	2 3/8 PAC	2 23/32	1 19/32	5/32	2,045	92,871	177,298	4,130	3,408	12,138	12,379
2 3/8	6.65	E	2 3/8 SL H90	3 3/32	2 5/32	5/32	2,076	92,871	141,278	4,130	3,461	12,138	12,379
2 3/8	6.65	E	NC26	3 1/4	2 5/32	5/32	2,125	92,871	164,118	4,130	3,542	12,138	12,379
2 3/8	6.65	E	NC26DS	3 1/4	2 5/32	5/32	2,125 P	92,871	164,118	4,130	3,542 P	12,138	12,379
2 3/8	6.65	X	2 3/8 SL H90	3 3/32	2 1/16	5/32	2,660	117,636	178,554	5,232	4,434	15,375	15,680
2 3/8	6.65	X	NC26	3 1/4	2 1/16	5/32	2,651	117,636	201,394	5,232	4,418	15,375	15,680
2 3/8	6.65	X	NC26DS	3 1/4	2 1/16	5/32	2,651 P	117,636	201,394	5,232	4,418 P	15,375	15,680
2 3/8	6.65	G	2 3/8 SL H90	3 3/32	2 1/32	5/32	2,850	130,019	190,611	5,782	4,750	16,993	17,331
2 3/8	6.65	G	NC26	3 1/4	2 1/32	5/32	2,822	130,019	213,451	5,782	4,703	16,993	17,331
2 3/8	6.65	G	NC26DS	3 1/4	2 1/32	5/32	2,901 P	130,019	213,451	5,782	4,835 P	16,993	17,331
2 7/8	6.85	E	2 7/8 OH LW	3 17/32	2 1/2	5/32	2,843	92,801	194,675	5,484	4,738	6,055	7,925
2 7/8	6.85	E	2 7/8 SL H90	3 17/32	2 5/8	5/32	2,887	92,801	171,099	5,484	4,812	6,055	7,925
2 7/8	6.85	E	2 7/8 WO	3 11/16	2 5/8	5/32	2,770	92,801	188,091	5,484	4,616	6,055	7,925
2 7/8	6.85	E	NC31	3 25/32	2 11/16	5/32	2,864	92,801	191,998	5,484	4,773	6,055	7,925
2 7/8	6.85	E	NC31DS	3 25/32	2 11/16	5/32	2,864 P	92,801	191,998	5,484	4,773 P	6,055	7,925
2 7/8	10.40	E	2 7/8 OH SW	3 9/16	2 3/8	5/32	3,728	143,557	252,107	7,591	6,213	12,938	13,221
2 7/8	10.40	E	2 7/8 PAC	3 3/32	1 7/16	7/32	3,646	143,557	290,327	7,591	6,077	12,938	13,221
2 7/8	10.40	E	2 7/8 SL H90	3 9/16	2 17/32	5/32	3,704	143,557	216,659	7,591	6,173	12,938	13,221
2 7/8	10.40	E	2 7/8 XH	3 11/16	2 1/2	5/32	3,667	143,557	247,345	7,591	6,111	12,938	13,221
2 7/8	10.40	E	NC26	3 11/32	1 7/8	5/32	3,643	143,557	270,975	7,591	6,072	12,938	13,221
2 7/8	10.40	E	NC26DS	3 11/32	1 7/8	5/32	4,390 P	143,557	270,975	7,591	7,317 P	12,938	13,221
2 7/8	10.40	E	NC31	3 25/32	2 9/16	5/32	3,869	143,557	253,848	7,591	6,448	12,938	13,221

2 7/8	10.40	E	NC31DS	3 25/32	2 9/16	5/32	3,869 P	143,557	253,848	7,591	6,448 P	12,938	13,221
2 7/8	10.40	X	2 7/8 SL H90	3 5/8	2 13/32	5/32	4,756	181,839	274,827	9,615	7,927	16,388	16,746
2 7/8	10.40	X	NC31	3 27/32	2 7/16	5/32	4,835	181,839	312,753	9,615	8,059	16,388	16,746
2 7/8	10.40	X	NC31DS	3 27/32	2 7/16	5/32	5,098 P	181,839	312,753	9,615	8,496 P	16,388	16,746
2 7/8	10.40	G	2 7/8 SL H90	3 21/32	2 11/32	11/64	5,265	200,980	302,807	10,627	8,776	18,113	18,509
2 7/8	10.40	G	NC31	3 7/8	2 3/8	11/64	5,304	200,980	341,101	10,627	8,840	18,113	18,509
2 7/8	10.40	G	NC31DS	3 7/8	2 3/8	11/64	5,952 P	200,980	341,101	10,627	9,919 P	18,113	18,509
2 7/8	10.40	S	2 7/8 SL H90	3 25/32	2 5/32	15/64	6,725	258,403	382,329	13,663	11,208	23,288	23,798
2 7/8	10.40	S	NC31	4	2 3/16	15/64	6,647	258,403	421,727	13,663	11,079	23,288	23,798
2 7/8	10.40	S	NC31DS	4	2 3/16	15/64	8,371 P	258,403	421,727	13,663	13,952 P	23,288	23,798
3 1/2	9.50	E	3 1/2 OH LW	4 9/32	3 7/32	5/32	4,661	132,793	263,861	9,612	7,769	5,544	7,620
3 1/2	9.50	E	3 1/2 SL H90	4 3/16	3 7/32	5/32	4,747	132,793	237,965	9,612	7,911	5,544	7,620
3 1/2	9.50	E	3 1/2 WO	4 13/32	3 1/4	5/32	4,815	132,793	272,535	9,612	8,026	5,544	7,620
3 1/2	9.50	E	NC38	4 13/32	3 1/4	5/32	4,790	132,793	272,535	9,612	7,984	5,544	7,620
3 1/2	9.50	E	NC38DS	4 13/32	3 1/4	5/32	4,790 P	132,793	272,535	9,612	7,984 P	5,544	7,620
3 1/2	9.50	SS75	NC38	4 13/32	3 7/32	5/32	4,721	132,793	267,288	9,612	7,869	5,544	7,620
3 1/2	9.50	SS75	NC38DS	4 13/32	3 7/32	5/32	5,150 P	132,793	291,587	9,612	8,584 P	5,544	7,620
3 1/2	13.30	E	3 1/2 H90	4 1/2	3 3/8	5/32	6,104	183,398	302,120	12,365	10,174	10,858	11,040
3 1/2	13.30	E	3 1/2 OH SW	4 5/16	3 3/32	5/32	5,819	183,398	338,228	12,365	9,698	10,858	11,040
3 1/2	13.30	E	3 1/2 XH	4 1/4	2 7/8	5/32	5,946	183,398	351,887	12,365	9,909	10,858	11,040
3 1/2	13.30	E	NC31	3 15/16	2 9/32	13/64	5,987	183,398	382,242	12,365	9,979	10,858	11,040
3 1/2	13.30	E	NC31DS	3 15/16	2 9/32	13/64	7,188 P	183,398	382,242	12,365	11,980 P	10,858	11,040
3 1/2	13.30	E	NC38	4 7/16	3 1/8	5/32	6,214	183,398	347,639	12,365	10,357	10,858	11,040
3 1/2	13.30	E	NC38DS	4 7/16	3 1/8	5/32	6,214 P	183,398	347,639	12,365	10,357 P	10,858	11,040
3 1/2	13.30	SS75	NC38	4 15/32	3 3/32	5/32	6,017	183,398	335,458	12,365	10,028	10,858	11,040
3 1/2	13.30	SS75	NC38DS	4 15/32	3 3/32	5/32	6,563 P	183,398	365,955	12,365	10,939 P	10,858	11,040
3 1/2	13.30	X	3 1/2 H90	4 9/16	3 1/4	5/32	7,636	232,304	380,168	15,663	12,727	13,753	13,984
3 1/2	13.30	X	3 1/2 SL H90	4 5/16	2 31/32	11/64	7,643	232,304	383,754	15,663	12,739	13,753	13,984
3 1/2	13.30	X	NC38	4 17/32	3	3/16	7,594	232,304	419,797	15,663	12,657	13,753	13,984
3 1/2	13.30	X	NC38DS	4 17/32	3	3/16	7,764 P	232,304	419,797	15,663	12,940 P	13,753	13,984
3 1/2	13.30	SS95	NC38	4 9/16	2 15/16	13/64	7,579	232,304	416,874	15,663	12,631	13,753	13,984
3 1/2	13.30	SS95	NC38DS	4 9/16	2 15/16	13/64	8,999 P	232,304	454,772	15,663	14,999 P	13,753	13,984
3 1/2	13.30	G	3 1/2 SL H90	4 3/8	2 29/32	13/64	8,575	256,757	418,361	17,312	14,292	15,042	15,456
3 1/2	13.30	G	NC38	4 19/32	2 29/32	7/32	8,600	256,757	471,983	17,312	14,333	15,042	15,456
3 1/2	13.30	G	NC38DS	4 19/32	2 29/32	7/32	9,606 P	256,757	471,983	17,312	16,011 P	15,042	15,456

3 1/2	13.30	S	3 1/2 SL H90	4 1/2	2 23/32	17/64	10,717	330,116	517,763	22,258	17,862	18,396	19,872
3 1/2	13.30	S	NC38	4 23/32	2 11/16	9/32	10,842	330,116	587,308	22,258	18,071	18,396	19,872
3 1/2	13.30	S	NC38DS	4 23/32	2 11/16	9/32	13,662 P	330,116	587,308	22,258	22,770 P	18,396	19,872
3 1/2	13.30	S	NC40	4 29/32	3 3/32	15/64	10,737	330,116	555,053	22,258	17,895	18,396	19,872
3 1/2	13.30	S	NC40DS	4 29/32	3 3/32	15/64	11,777 P	330,116	555,053	22,258	19,629 P	18,396	19,872
3 1/2	13.30	V	NC38	4 25/32	2 9/16	5/16	12,057	366,795	649,158	24,746	20,095	19,941	22,080
3 1/2	13.30	V	NC38DS	4 25/32	2 9/16	5/16	15,826 P	366,795	649,158	24,746	26,377 P	19,941	22,080
3 1/2	15.50	E	NC38	4 15/32	3 1/16	5/32	6,770	215,967	384,086	13,828	11,284	13,174	13,470
3 1/2	15.50	E	NC38DS	4 15/32	3 1/16	5/32	6,770 B	215,967	384,086	13,828	11,284 B	13,174	13,470
3 1/2	15.50	SS75	NC38	4 1/2	3 1/32	11/64	6,649	215,967	368,531	13,828	11,082	13,174	13,470
3 1/2	15.50	SS75	NC38DS	4 1/2	3 1/32	11/64	7,254 P	215,967	402,034	13,828	12,089 P	13,174	13,470
3 1/2	15.50	X	NC38	4 19/32	2 29/32	7/32	8,600	273,558	471,983	17,515	14,333	16,686	17,062
3 1/2	15.50	X	NC38DS	4 19/32	2 29/32	7/32	9,606 P	273,558	471,983	17,515	16,011 P	16,686	17,062
3 1/2	15.50	SS95	NC40	4 27/32	3 7/32	13/64	8,451	273,558	440,629	17,515	14,086	16,686	17,062
3 1/2	15.50	SS95	NC40DS	4 27/32	3 7/32	13/64	9,220 P	273,558	480,686	17,515	15,366 P	16,686	17,062
3 1/2	15.50	G	NC38	4 5/8	2 13/16	15/64	9,350	302,354	522,513	19,359	15,583	18,443	18,858
3 1/2	15.50	G	NC38DS	4 5/8	2 13/16	15/64	11,115 B	302,354	522,513	19,359	18,525 B	18,443	18,858
3 1/2	15.50	G	NC40	4 27/32	3 3/16	13/64	9,591	302,354	499,554	19,359	15,986	18,443	18,858
3 1/2	15.50	G	NC40DS	4 27/32	3 3/16	13/64	9,692 B	302,354	499,554	19,359	16,154 B	18,443	18,858
3 1/2	15.50	S	NC38	4 25/32	2 9/16	5/16	12,057	388,741	649,158	24,890	20,095	23,712	24,246
3 1/2	15.50	S	NC38DS	4 25/32	2 9/16	5/16	15,826 P	388,741	649,158	24,890	26,377 P	23,712	24,246
3 1/2	15.50	S	NC40	4 31/32	2 31/32	17/64	11,959	388,741	626,475	24,890	19,932	23,712	24,246
3 1/2	15.50	S	NC40DS	4 31/32	2 31/32	17/64	14,149 B	388,741	626,475	24,890	23,582 B	23,712	24,246
3 1/2	15.50	V	NC40	5 1/16	2 27/32	5/16	13,622	431,934	694,952	27,672	22,703	26,347	26,940
3 1/2	15.50	V	NC40DS	5 1/16	2 27/32	5/16	16,982 P	431,934	694,952	27,672	28,303 P	26,347	26,940
4	11.85	E	4 H90	4 7/8	3 25/32	5/32	6,782	158,132	311,429	13,281	11,303	4,311	6,878
4	11.85	E	4 OH LW	4 31/32	3 29/32	5/32	6,502	158,132	317,260	13,281	10,836	4,311	6,878
4	11.85	E	4 WO	5 7/32	4 1/16	5/32	6,452	158,132	310,881	13,281	10,754	4,311	6,878
4	11.85	E	NC46	5 7/32	4 3/32	5/32	6,590	158,132	317,178	13,281	10,983	4,311	6,878
4	11.85	E	NC46DS	5 7/32	4 3/32	5/32	6,590 P	158,132	317,178	13,281	10,983 P	4,311	6,878
4	14.00	E	4 H90	4 7/8	3 23/32	5/32	7,621	194,363	355,607	15,738	12,701	7,295	8,663
4	14.00	E	4 OH SW	5	3 27/32	5/32	7,468	194,363	362,912	15,738	12,447	7,295	8,663
4	14.00	E	4 SH	4 3/8	2 23/32	13/64	7,570	194,363	434,262	15,738	12,616	7,295	8,663
4	14.00	E	NC40	4 3/4	3 11/32	5/32	7,655	194,363	403,373	15,738	12,758	7,295	8,663
4	14.00	E	NC40DS	4 3/4	3 11/32	5/32	7,655 P	194,363	403,373	15,738	12,758 P	7,295	8,663

4	14.00	E	NC46	5 7/32	4 1/32	5/32	7,659	194,363	365,038	15,738	12,765	7,295	8,663
4	14.00	E	NC46DS	5 7/32	4 1/32	5/32	7,659 P	194,363	365,038	15,738	12,765 P	7,295	8,663
4	14.00	SS75	NC46	5 1/4	3 31/32	5/32	7,828	194,363	377,815	15,738	13,046	7,295	8,663
4	14.00	SS75	NC46DS	5 1/4	3 31/32	5/32	8,539 B	194,363	412,162	15,738	14,232 B	7,295	8,663
4	14.00	X	4 H90	4 31/32	3 19/32	5/32	9,663	246,193	441,756	19,935	16,105	8,570	10,973
4	14.00	X	NC40	4 27/32	3 3/16	13/64	9,591	246,193	499,554	19,935	15,986	8,570	10,973
4	14.00	X	NC40DS	4 27/32	3 3/16	13/64	9,692 B	246,193	499,554	19,935	16,154 B	8,570	10,973
4	14.00	X	NC46	5 5/16	3 29/32	5/32	9,762	246,193	458,550	19,935	16,270	8,570	10,973
4	14.00	X	NC46DS	5 5/16	3 29/32	5/32	9,762 P	246,193	458,550	19,935	16,270 P	8,570	10,973
4	14.00	SS95	NC46	5 11/32	3 27/32	11/64	9,764	246,193	462,184	19,935	16,273	8,570	10,973
4	14.00	SS95	NC46DS	5 11/32	3 27/32	11/64	10,652 B	246,193	504,201	19,935	17,753 B	8,570	10,973
4	14.00	G	4 H90	5 1/32	3 17/32	3/16	10,830	272,108	483,725	22,034	18,050	9,134	12,128
4	14.00	G	NC40	4 29/32	3 3/32	15/64	10,737	272,108	555,053	22,034	17,895	9,134	12,128
4	14.00	G	NC40DS	4 29/32	3 3/32	15/64	11,777 P	272,108	555,053	22,034	19,629 P	9,134	12,128
4	14.00	G	NC46	5 11/32	3 27/32	11/64	10,652	272,108	504,201	22,034	17,753	9,134	12,128
4	14.00	G	NC46DS	5 11/32	3 27/32	11/64	10,652 B	272,108	504,201	22,034	17,753 B	9,134	12,128
4	14.00	S	4 H90	5 5/32	3 11/32	1/4	13,720	349,852	605,217	28,329	22,867	10,520	15,593
4	14.00	S	NC40	5 1/16	2 27/32	5/16	13,622	349,852	694,952	28,329	22,703	10,520	15,593
4	14.00	S	NC40DS	5 1/16	2 27/32	5/16	16,982 P	349,852	694,952	28,329	28,303 P	10,520	15,593
4	14.00	S	NC46	5 1/2	3 21/32	1/4	13,815	349,852	636,737	28,329	23,025	10,520	15,593
4	14.00	S	NC46DS	5 1/2	3 21/32	1/4	15,099 P	349,852	636,737	28,329	25,165 P	10,520	15,593
4	14.00	V	NC46	5 9/16	3 9/16	9/32	15,280	388,725	700,520	31,496	25,467	11,035	17,325
4	14.00	V	NC46DS	5 9/16	3 9/16	9/32	17,785 P	388,725	700,520	31,496	29,641 P	11,035	17,325
4	15.70	E	4 H90	4 29/32	3 11/16	5/32	8,296	219,738	377,420	17,315	13,826	9,531	9,975
4	15.70	E	NC40	4 25/32	3 9/32	11/64	8,440	219,738	442,397	17,315	14,067	9,531	9,975
4	15.70	E	NC40DS	4 25/32	3 9/32	11/64	8,440 B	219,738	442,397	17,315	14,067 B	9,531	9,975
4	15.70	E	NC46	5 1/4	3 31/32	5/32	8,539	219,738	412,162	17,315	14,232	9,531	9,975
4	15.70	E	NC46DS	5 1/4	3 31/32	5/32	8,539 B	219,738	412,162	17,315	14,232 B	9,531	9,975
4	15.70	X	4 H90	5 1/32	3 17/32	3/16	10,830	278,335	483,725	21,932	18,050	11,468	12,635
4	15.70	X	NC40	4 29/32	3 3/32	15/64	10,737	278,335	555,053	21,932	17,895	11,468	12,635
4	15.70	X	NC40DS	4 29/32	3 3/32	15/64	11,777 P	278,335	555,053	21,932	19,629 P	11,468	12,635
4	15.70	X	NC46	5 11/32	3 27/32	11/64	10,652	278,335	504,201	21,932	17,753	11,468	12,635
4	15.70	X	NC46DS	5 11/32	3 27/32	11/64	10,652 B	278,335	504,201	21,932	17,753 B	11,468	12,635
4	15.70	G	4 H90	5 1/16	31 5/32	13/64	11,760	307,633	524,959	24,241	19,600	12,374	13,965
4	15.70	G	NC40	4 31/32	3	17/64	11,843	307,633	608,896	24,241	19,738	12,374	13,965

4	15.70	G	NC40DS	4 31/32	3	17/64	13,784 P	307,633	608,896	24,241	22,974 P	12,374	13,965
4	15.70	G	NC46	5 13/32	3 25/32	13/64	11,815	307,633	549,116	24,241	19,691	12,374	13,965
4	15.70	G	NC46DS	5 13/32	3 25/32	13/64	11,815 P	307,633	549,116	24,241	19,691 P	12,374	13,965
4	15.70	S	NC46	5 17/32	3 9/16	17/64	15,039	395,528	700,520	31,166	25,066	14,840	17,955
4	15.70	S	NC46DS	5 17/32	3 9/16	17/64	17,506 B	395,528	700,520	31,166	29,176 B	14,840	17,955
4	15.70	S	NC46	5 17/32	3 9/16	17/64	15,039	395,528	700,520	31,166	25,066	14,840	17,955
4	15.70	S	NC46DS	5 17/32	3 9/16	17/64	17,506 B	395,528	700,520	31,166	29,176 B	14,840	17,955
4 1/2	13.75	E	4 1/2 H90	5 7/32	4 1/16	5/32	8,858	185,389	378,165	17,715	14,764	3,397	6,323
4 1/2	13.75	E	4 1/2 OH SW	5 5/16	4 5/32	5/32	8,915	185,389	411,263	17,715	14,858	3,397	6,323
4 1/2	13.75	E	4 1/2 WO	5 21/32	4 13/32	5/32	9,111	185,389	401,491	17,715	15,185	3,397	6,323
4 1/2	13.75	E	NC46	5 1/4	3 31/32	5/32	8,539	185,389	412,162	17,715	14,232	3,397	6,323
4 1/2	13.75	E	NC46DS	5 1/4	3 31/32	5/32	8,539 B	185,389	412,162	17,715	14,232 B	3,397	6,323
4 1/2	13.75	E	NC50	5 21/32	4 15/32	5/32	8,645	185,389	382,353	17,715	14,408	3,397	6,323
4 1/2	13.75	E	NC50DS	5 21/32	4 15/32	5/32	8,645 P	185,389	382,353	17,715	14,408 P	3,397	6,323
4 1/2	16.60	E	4 1/2 FH	5 9/32	3 3/4	5/32	10,050	225,771	499,026	20,908	16,750	5,951	7,863
4 1/2	16.60	E	4 1/2 H90	5 9/32	4	5/32	10,045	225,771	425,657	20,908	16,742	5,951	7,863
4 1/2	16.60	E	4 1/2 OH SW	5 3/8	4 3/32	11/64	10,188	225,771	459,860	20,908	16,979	5,951	7,863
4 1/2	16.60	E	NC38	4 11/16	2 3/4	17/64	10,217	225,771	555,278	20,908	17,028	5,951	7,863
4 1/2	16.60	E	NC38DS	4 11/16	2 3/4	17/64	12,538 P	225,771	555,278	20,908	20,897 P	5,951	7,863
4 1/2	16.60	E	NC46	5 11/32	3 7/8	11/64	10,280	225,771	481,467	20,908	17,133	5,951	7,863
4 1/2	16.60	E	NC46DS	5 11/32	3 7/8	11/64	10,280 P	225,771	481,467	20,908	17,133 P	5,951	7,863
4 1/2	16.60	E	NC50	5 11/16	4 3/8	5/32	10,537	225,771	460,494	20,908	17,562	5,951	7,863
4 1/2	16.60	E	NC50DS	5 11/16	4 3/8	5/32	10,537 P	225,771	460,494	20,908	17,562 P	5,951	7,863
4 1/2	16.60	SS75	NC46	5 3/8	3 13/16	3/16	10,364	225,771	482,854	20,908	17,274	5,951	7,863
4 1/2	16.60	SS75	NC46DS	5 3/8	3 13/16	3/16	11,306 P	225,771	526,750	20,908	18,844 P	5,951	7,863
4 1/2	16.60	SS75	NC50	5 23/32	4 11/32	5/32	10,232	225,771	445,658	20,908	17,053	5,951	7,863
4 1/2	16.60	SS75	NC50DS	5 23/32	4 11/32	5/32	11,162 P	225,771	486,172	20,908	18,603 P	5,951	7,863
4 1/2	16.60	X	4 1/2 FH	5 13/32	3 9/16	7/32	12,821	285,977	628,249	26,483	21,368	6,828	9,960
4 1/2	16.60	X	4 1/2 H90	5 3/8	3 27/32	3/16	12,950	285,977	541,166	26,483	21,583	6,828	9,960
4 1/2	16.60	X	NC46	5 7/16	3 23/32	7/32	12,818	285,977	593,294	26,483	21,363	6,828	9,960
4 1/2	16.60	X	NC46DS	5 7/16	3 23/32	7/32	13,263 B	285,977	593,294	26,483	22,105 B	6,828	9,960
4 1/2	16.60	X	NC50	5 25/32	4 1/4	3/16	13,015	285,977	562,104	26,483	21,691	6,828	9,960
4 1/2	16.60	X	NC50DS	5 25/32	4 1/4	3/16	13,015 P	285,977	562,104	26,483	21,691 P	6,828	9,960
4 1/2	16.60	SS95	NC46	5 1/2	3 5/8	1/4	13,102	285,977	603,333	26,483	21,836	6,828	9,960
4 1/2	16.60	SS95	NC46DS	5 1/2	3 5/8	1/4	15,987 B	285,977	658,182	26,483	26,644 B	6,828	9,960

4 1/2	16.60	SS95	NC50	5 13/16	4 3/16	13/64	12,898	285,977	560,822	26,483	21,497	6,828	9,960
4 1/2	16.60	SS95	NC50DS	5 13/16	4 3/16	13/64	14,071 B	285,977	611,805	26,483	23,451 B	6,828	9,960
4 1/2	16.60	G	4 1/2 FH	5 15/32	3 15/32	1/4	14,231	316,080	690,375	29,271	23,718	7,185	11,009
4 1/2	16.60	G	4 1/2 H90	5 7/16	3 25/32	7/32	14,086	316,080	586,081	29,271	23,477	7,185	11,009
4 1/2	16.60	G	NC46	5 1/2	3 5/8	1/4	14,293	316,080	658,182	29,271	23,821	7,185	11,009
4 1/2	16.60	G	NC46DS	5 1/2	3 5/8	1/4	15,987 B	316,080	658,182	29,271	26,644 B	7,185	11,009
4 1/2	16.60	G	NC50	5 13/16	4 3/16	13/64	14,071	316,080	611,805	29,271	23,451	7,185	11,009
4 1/2	16.60	G	NC50DS	5 13/16	4 3/16	13/64	14,071 B	316,080	611,805	29,271	23,451 B	7,185	11,009
4 1/2	16.60	SS105	NC46	5 9/16	3 17/32	9/32	14,448	316,080	661,295	29,271	24,081	7,185	11,009
4 1/2	16.60	SS105	NC46DS	5 9/16	3 17/32	9/32	18,664 P	316,080	721,413	29,271	31,106 P	7,185	11,009
4 1/2	16.60	S	4 1/2 FH	5 21/32	3 3/16	1 1/32	18,162	406,388	866,814	37,634	30,270	7,923	14,154
4 1/2	16.60	S	4 1/2 H90	5 19/32	3 17/32	19/64	18,480	406,388	758,377	37,634	30,800	7,923	14,154
4 1/2	16.60	S	NC46	5 21/32	3 3/8	21/64	18,088	406,388	823,115	37,634	30,146	7,923	14,154
4 1/2	16.60	S	NC46DS	5 21/32	3 3/8	21/64	22,896 B	406,388	823,115	37,634	38,160 B	7,923	14,154
4 1/2	16.60	S	NC50	5 31/32	3 31/32	9/32	18,355	406,388	779,960	37,634	30,592	7,923	14,154
4 1/2	16.60	S	NC50DS	5 31/32	3 31/32	9/32	21,546 B	406,388	779,960	37,634	35,911 B	7,923	14,154
4 1/2	16.60	V	NC46	5 3/4	3 7/32	3/8	20,382	451,542	920,216	41,841	33,971	8,098	15,727
4 1/2	16.60	V	NC46DS	5 3/4	3 7/32	3/8	26,994 P	451,542	920,216	41,841	44,989 P	8,098	15,727
4 1/2	16.60	V	NC50	6 1/32	3 7/8	5/16	20,113	451,542	849,266	41,841	33,522	8,098	15,727
4 1/2	16.60	V	NC50DS	6 1/32	3 7/8	5/16	24,746 P	451,542	849,266	41,841	41,243 P	8,098	15,727
4 1/2	20.00	E	4 1/2 FH	5 3/8	3 5/8	13/64	11,944	279,502	585,911	24,747	19,907	9,631	10,033
4 1/2	20.00	E	4 1/2 H90	5 11/32	3 7/8	11/64	12,207	279,502	518,432	24,747	20,345	9,631	10,033
4 1/2	20.00	E	NC46	5 13/32	3 3/4	13/64	12,090	279,502	571,297	24,747	20,150	9,631	10,033
4 1/2	20.00	E	NC46DS	5 13/32	3 3/4	13/64	12,108 B	279,502	571,297	24,747	20,180 B	9,631	10,033
4 1/2	20.00	E	NC50	5 3/4	4 9/32	11/64	12,401	279,502	536,978	24,747	20,668	9,631	10,033
4 1/2	20.00	E	NC50DS	5 3/4	4 9/32	11/64	12,401 P	279,502	536,978	24,747	20,668 P	9,631	10,033
4 1/2	20.00	SS75	NC46	5 15/32	3 11/16	15/64	12,210	279,502	563,849	24,747	20,350	9,631	10,033
4 1/2	20.00	SS75	NC46DS	5 15/32	3 11/16	15/64	14,187 P	279,502	615,108	24,747	23,645 P	9,631	10,033
4 1/2	20.00	SS75	NC50	5 25/32	4 1/4	3/16	11,930	279,502	515,262	24,747	19,884	9,631	10,033
4 1/2	20.00	SS75	NC50DS	5 25/32	4 1/4	3/16	13,015 P	279,502	562,104	24,747	21,691 P	9,631	10,033
4 1/2	20.00	X	4 1/2 FH	5 1/2	3 13/32	17/64	14,945	354,035	730,872	31,346	24,908	11,598	12,709
4 1/2	20.00	X	4 1/2 H90	5 15/32	3 23/32	15/64	15,208	354,035	630,259	31,346	25,346	11,598	12,709
4 1/2	20.00	X	NC46	5 9/16	3 9/16	9/32	15,280	354,035	700,520	31,346	25,467	11,598	12,709
4 1/2	20.00	X	NC46DS	5 9/16	3 9/16	9/32	17,785 P	354,035	700,520	31,346	29,641 P	11,598	12,709
4 1/2	20.00	X	NC50	5 7/8	4 1/8	15/64	15,438	354,035	660,770	31,346	25,730	11,598	12,709

4 1/2	20.00	X	NC50DS	5 7/8	4 1/8	15/64	16,134 P	354,035	660,770	31,346	26,889 P	11,598	12,709
4 1/2	20.00	SS95	NC46	5 19/32	3 15/32	19/64	15,172	354,035	699,092	31,346	25,287	11,598	12,709
4 1/2	20.00	SS95	NC46DS	5 19/32	3 15/32	19/64	20,198 B	354,035	762,646	31,346	33,664 B	11,598	12,709
4 1/2	20.00	SS95	NC50	5 29/32	4 1/16	1/4	15,237	354,035	649,915	31,346	25,394	11,598	12,709
4 1/2	20.00	SS95	NC50DS	5 29/32	4 1/16	1/4	18,333 B	354,035	708,998	31,346	30,555 B	11,598	12,709
4 1/2	20.00	G	4 1/2 FH	5 19/32	3 9/32	5/16	16,885	391,302	809,657	34,645	28,142	12,520	14,047
4 1/2	20.00	G	4 1/2 H90	5 17/32	3 5/8	17/64	16,861	391,302	695,147	34,645	28,102	12,520	14,047
4 1/2	20.00	G	NC46	5 5/8	3 15/32	5/16	16,714	391,302	762,646	34,645	27,857	12,520	14,047
4 1/2	20.00	G	NC46DS	5 5/8	3 15/32	5/16	20,396 P	391,302	762,646	34,645	33,994 P	12,520	14,047
4 1/2	20.00	G	NC50	5 15/16	4 1/16	17/64	16,628	391,302	708,998	34,645	27,714	12,520	14,047
4 1/2	20.00	G	NC50DS	5 15/16	4 1/16	17/64	18,341 P	391,302	708,998	34,645	30,568 P	12,520	14,047
4 1/2	20.00	SS105	NC46	5 11/16	3 11/32	1 1/32	17,029	391,302	772,662	34,645	28,382	12,520	14,047
4 1/2	20.00	SS105	NC46DS	5 11/16	3 11/32	1 1/32	23,762 P	391,302	842,904	34,645	39,603 P	12,520	14,047
4 1/2	20.00	S	NC46	5 13/16	3 1/8	1 3/32	21,697	503,103	976,268	44,544	36,162	15,033	18,060
4 1/2	20.00	S	NC46DS	5 13/16	3 1/8	1 3/32	29,330 P	503,103	976,268	44,544	48,883 P	15,033	18,060
4 1/2	20.00	S	NC50	6 3/32	3 25/32	1 1/32	21,806	503,103	916,914	44,544	36,343	15,033	18,060
4 1/2	20.00	S	NC50DS	6 3/32	3 25/32	1 1/32	27,827 P	503,103	916,914	44,544	46,378 P	15,033	18,060
4 1/2	20.00	V	NC46	5 29/32	2 31/32	29/64	23,814	559,003	1,066,006	49,523	39,690	16,139	20,067
4 1/2	20.00	V	NC46DS	5 29/32	2 31/32	29/64	33,056 P	559,003	1,066,006	49,523	55,094 P	16,139	20,067
4 1/2	20.00	V	NC50	6 3/16	3 21/32	25/64	24,009	559,003	1,004,535	49,523	40,015	16,139	20,067
4 1/2	20.00	V	NC50DS	6 3/16	3 21/32	25/64	31,809 P	559,003	1,004,535	49,523	53,014 P	16,139	20,067
4 1/2	22.82	E	NC46	5 15/32	3 11/16	15/64	13,320	317,497	615,108	27,161	22,200	11,458	11,667
4 1/2	22.82	E	NC46DS	5 15/32	3 11/16	15/64	14,187 P	317,497	615,108	27,161	23,645 P	11,458	11,667
4 1/2	22.82	E	NC50	5 25/32	4 7/32	3/16	13,234	317,497	587,047	27,161	22,056	11,458	11,667
4 1/2	22.82	E	NC50DS	5 25/32	4 7/32	3/16	13,234 B	317,497	587,047	27,161	22,056 B	11,458	11,667
4 1/2	22.82	X	4 1/2 FH	5 19/32	3 9/32	5/16	16,885	402,163	809,657	34,404	28,142	14,514	14,779
4 1/2	22.82	X	NC46	5 19/32	3 15/32	19/64	16,551	402,163	762,646	34,404	27,585	14,514	14,779
4 1/2	22.82	X	NC46DS	5 19/32	3 15/32	19/64	20,198 B	402,163	762,646	34,404	33,664 B	14,514	14,779
4 1/2	22.82	X	NC50	5 29/32	4 1/16	1/4	16,622	402,163	708,998	34,404	27,703	14,514	14,779
4 1/2	22.82	X	NC50DS	5 29/32	4 1/16	1/4	18,333 B	402,163	708,998	34,404	30,555 B	14,514	14,779
4 1/2	22.82	G	NC46	5 11/16	3 11/32	1 1/32	18,577	444,496	842,904	38,026	30,962	16,042	16,333
4 1/2	22.82	G	NC46DS	5 11/16	3 11/32	1 1/32	23,762 P	444,496	842,904	38,026	39,603 P	16,042	16,333
4 1/2	22.82	G	NC50	5 31/32	3 31/32	9/32	18,355	444,496	779,960	38,026	30,592	16,042	16,333
4 1/2	22.82	G	NC50DS	5 31/32	3 31/32	9/32	21,546 B	444,496	779,960	38,026	35,911 B	16,042	16,333
4 1/2	22.82	S	NC50	6 5/32	3 21/32	3/8	23,717	571,495	1,004,535	48,890	39,528	20,510	21,000

4 1/2	22.82	S	NC50DS	6 5/32	3 21/32	3/8	31,425 B	571,495	1,004,535	48,890	52,374 B	20,510	21,000
5	19.50	E	5 1/2 FH	6 5/16	4 7/8	5/32	13,461	270,432	533,909	27,976	22,434	5,514	7,602
5	19.50	E	5 1/2 FHDS	6 5/16	4 7/8	5/32	13,461 P	270,432	533,909	27,976	22,434 P	5,514	7,602
5	19.50	E	NC50	5 13/16	4 7/32	13/64	13,626	270,432	587,047	27,976	22,710	5,514	7,602
5	19.50	E	NC50DS	5 13/16	4 7/32	13/64	13,626 P	270,432	587,047	27,976	22,710 P	5,514	7,602
5	19.50	X	5 1/2 FH	6 13/32	4 23/32	13/64	17,134	342,548	675,188	35,436	28,556	6,262	9,629
5	19.50	X	5 1/2 FHDS	6 13/32	4 23/32	13/64	17,134 B	342,548	675,188	35,436	28,556 B	6,262	9,629
5	19.50	X	5 H90	5 25/32	3 31/32	1/4	17,451	342,548	686,973	35,436	29,084	6,262	9,629
5	19.50	X	NC50	5 15/16	4 1/32	17/64	17,218	342,548	732,837	35,436	28,697	6,262	9,629
5	19.50	X	NC50DS	5 15/16	4 1/32	17/64	19,431 P	342,548	732,837	35,436	32,384 P	6,262	9,629
5	19.50	G	5 1/2 FH	6 15/32	4 5/8	15/64	19,179	378,605	757,747	39,166	31,965	6,552	10,643
5	19.50	G	5 1/2 FHDS	6 15/32	4 5/8	15/64	19,179 B	378,605	757,747	39,166	31,965 B	6,552	10,643
5	19.50	G	5 H90	5 27/32	3 7/8	9/32	19,307	378,605	756,279	39,166	32,179	6,552	10,643
5	19.50	G	NC50	6	3 15/16	19/64	18,966	378,605	803,246	39,166	31,611	6,552	10,643
5	19.50	G	NC50DS	6	3 15/16	19/64	22,647 P	378,605	803,246	39,166	37,744 P	6,552	10,643
5	19.50	S	5 1/2 FH	6 5/8	4 13/32	5/16	24,420	486,778	943,942	50,356	40,699	7,079	13,684
5	19.50	S	5 1/2 FHDS	6 5/8	4 13/32	5/16	28,292 B	486,778	943,942	50,356	47,154 B	7,079	13,684
5	19.50	S	NC50	6 3/16	3 5/8	25/64	24,550	486,778	1,025,980	50,356	40,916	7,079	13,684
5	19.50	S	NC50DS	6 3/16	3 5/8	25/64	32,781 P	486,778	1,025,980	50,356	54,635 P	7,079	13,684
5	25.60	E	5 1/2 FH	6 13/32	4 23/32	13/64	17,134	358,731	675,188	34,947	28,556	10,338	10,500
5	25.60	E	5 1/2 FHDS	6 13/32	4 23/32	13/64	17,134 B	358,731	675,188	34,947	28,556 B	10,338	10,500
5	25.60	E	NC50	5 15/16	4 1/32	17/64	17,218	358,731	732,837	34,947	28,697	10,338	10,500
5	25.60	E	NC50DS	5 15/16	4 1/32	17/64	19,431 P	358,731	732,837	34,947	32,384 P	10,338	10,500
5	25.60	SS75	5 1/2 FH	6 15/32	4 21/32	15/64	17,175	358,731	669,544	34,947	28,625	10,338	10,500
5	25.60	SS75	5 1/2 FHDS	6 15/32	4 21/32	15/64	18,736 P	358,731	730,411	34,947	31,227 P	10,338	10,500
5	25.60	SS75	NC50	5 31/32	3 31/32	9/32	16,826	358,731	714,964	34,947	28,043	10,338	10,500
5	25.60	SS75	NC50DS	5 31/32	3 31/32	9/32	21,546 B	358,731	779,960	34,947	35,911 B	10,338	10,500
5	25.60	X	5 1/2 FH	6 17/32	4 17/32	17/64	21,253	454,392	838,649	44,267	35,422	12,640	13,300
5	25.60	X	5 1/2 FHDS	6 17/32	4 17/32	17/64	22,696 B	454,392	838,649	44,267	37,826 B	12,640	13,300
5	25.60	X	NC50	6 3/32	3 25/32	1 1/32	21,806	454,392	916,914	44,267	36,343	12,640	13,300
5	25.60	X	NC50DS	6 3/32	3 25/32	1 1/32	27,827 P	454,392	916,914	44,267	46,378 P	12,640	13,300
5	25.60	SS95	5 1/2 FH	6 19/32	4 7/16	19/64	21,410	454,392	841,403	44,267	35,684	12,640	13,300
5	25.60	SS95	5 1/2 FHDS	6 19/32	4 7/16	19/64	26,588 B	454,392	917,895	44,267	44,313 B	12,640	13,300
5	25.60	G	5 1/2 FH	6 5/8	4 7/16	19/64	23,826	502,223	917,895	48,926	39,710	13,685	14,700
5	25.60	G	5 1/2 FHDS	6 5/8	4 7/16	19/64	27,121 P	502,223	917,895	48,926	45,201 P	13,685	14,700

5	25.60	G	NC50	6 5/32	3 21/32	3/8	23,717	502,223	1,004,535	48,926	39,528	13,685	14,700
5	25.60	G	NC50DS	6 5/32	3 21/32	3/8	31,425 B	502,223	1,004,535	48,926	52,374 B	13,685	14,700
5	25.60	S	5 1/2 FH	6 13/16	4 1/8	1 3/32	30,757	645,715	1,170,081	62,905	51,261	16,587	18,900
5	25.60	S	5 1/2 FHDS	6 13/16	4 1/8	1 3/32	39,754 P	645,715	1,170,081	62,905	66,256 P	16,587	18,900
5	25.60	V	5 1/2 FH	6 29/32	3 31/32	29/64	34,065	717,461	1,289,271	69,937	56,774	17,896	21,000
5	25.60	V	5 1/2 FHDS	6 29/32	3 31/32	29/64	45,697 P	717,461	1,289,271	69,937	76,162 P	17,896	21,000
5	TW 0.750	SS95	5 1/2 FH	6 25/32	4 3/16	25/64	26,953	630,665	1,027,690	54,938	44,922	19,393	19,950
5	TW 0.750	SS95	5 1/2 FHDS	6 25/32	4 3/16	25/64	37,306 P	630,665	1,121,116	54,938	62,177 P	19,393	19,950
5	TW 0.750	V	5 1/2 FH	7 1/8	3 9/16	9/16	42,151	995,787	1,577,629	86,744	70,252	30,621	31,500
5	TW 0.750	V	5 1/2 FHDS	7 1/8	3 9/16	9/16	59,984 P	995,787	1,577,629	86,744	99,974 P	30,621	31,500
5 1/2	21.90	E	5 1/2 FH	6 13/32	4 23/32	13/64	17,134	299,533	675,188	34,582	28,556	4,334	6,892
5 1/2	21.90	E	5 1/2 FHDS	6 13/32	4 23/32	13/64	17,134 B	299,533	675,188	34,582	28,556 B	4,334	6,892
5 1/2	21.90	SS75	5 1/2 FH	6 7/16	4 21/32	7/32	16,640	299,533	669,544	34,582	27,733	4,334	6,892
5 1/2	21.90	SS75	5 1/2 FHDS	6 7/16	4 21/32	7/32	18,153 B	299,533	730,411	34,582	30,255 B	4,334	6,892
5 1/2	21.90	X	5 1/2 FH	6 17/32	4 17/32	17/64	21,253	379,409	838,649	43,804	35,422	4,733	8,730
5 1/2	21.90	X	5 1/2 FHDS	6 17/32	4 17/32	17/64	22,696 B	379,409	838,649	43,804	37,826 B	4,733	8,730
5 1/2	21.90	X	5 1/2 H90	6 3/32	4 5/32	9/32	21,301	379,409	795,031	43,804	35,501	4,733	8,730
5 1/2	21.90	SS95	5 1/2 FH	6 19/32	4 15/32	19/64	21,185	379,409	817,358	43,804	35,308	4,733	8,730
5 1/2	21.90	SS95	5 1/2 FHDS	6 19/32	4 15/32	19/64	25,803 P	379,409	891,664	43,804	43,005 P	4,733	8,730
5 1/2	21.90	G	5 1/2 FH	6 19/32	4 7/16	19/64	23,357	419,346	917,895	48,414	38,928	4,899	9,649
5 1/2	21.90	G	5 1/2 FHDS	6 19/32	4 7/16	19/64	26,588 B	419,346	917,895	48,414	44,313 B	4,899	9,649
5 1/2	21.90	S	5 1/2 FH	6 13/16	4 5/32	1 3/32	30,082	539,160	1,145,691	62,247	50,137	5,465	12,405
5 1/2	21.90	S	5 1/2 FHDS	6 13/16	4 5/32	1 3/32	38,535 P	539,160	1,145,691	62,247	64,225 P	5,465	12,405
5 1/2	21.90	V	5 1/2 FH	6 29/32	4	29/64	33,412	599,066	1,265,801	69,206	55,686	5,607	13,784
5 1/2	21.90	V	5 1/2 FHDS	6 29/32	4	29/64	44,529 P	599,066	1,265,801	69,206	74,214 P	5,607	13,784
5 1/2	24.70	E	5 1/2 FH	6 15/32	4 21/32	15/64	18,736	339,533	730,411	38,383	31,227	6,050	7,923
5 1/2	24.70	E	5 1/2 FHDS	6 15/32	4 21/32	15/64	18,736 P	339,533	730,411	38,383	31,227 P	6,050	7,923
5 1/2	24.70	SS75	5 1/2 FH	6 1/2	4 19/32	1/4	18,526	339,533	719,490	38,383	30,876	6,050	7,923
5 1/2	24.70	SS75	5 1/2 FHDS	6 1/2	4 19/32	1/4	20,433 P	339,533	784,898	38,383	34,055 P	6,050	7,923
5 1/2	24.70	X	5 1/2 FH	6 19/32	4 7/16	19/64	23,357	430,076	917,895	48,619	38,928	6,957	10,035
5 1/2	24.70	X	5 1/2 FHDS	6 19/32	4 7/16	19/64	26,588 B	430,076	917,895	48,619	44,313 B	6,957	10,035
5 1/2	24.70	SS95	5 1/2 FH	6 21/32	4 11/32	21/64	23,365	430,076	912,526	48,619	38,942	6,957	10,035
5 1/2	24.70	SS95	5 1/2 FHDS	6 21/32	4 11/32	21/64	30,469 B	430,076	995,483	48,619	50,781 B	6,957	10,035
5 1/2	24.70	G	5 1/2 FH	6 11/16	4 11/32	1 1/32	25,948	475,347	995,483	53,737	43,247	7,329	11,092
5 1/2	24.70	G	5 1/2 FHDS	6 11/16	4 11/32	1 1/32	31,014 P	475,347	995,483	53,737	51,691 P	7,329	11,092

5 1/2	24.70	S	5 1/2 FH	6 7/8	4	7/16	33,187	611,160	1,265,801	69,090	55,311	8,115	14,261
5 1/2	24.70	S	5 1/2 FHDS	6 7/8	4	7/16	44,231 B	611,160	1,265,801	69,090	73,719 B	8,115	14,261
5 1/2	24.70	V	5 1/2 FH	7	3 13/16	1/2	37,264	679,067	1,403,860	76,813	62,107	8,316	15,845
5 1/2	24.70	V	5 1/2 FHDS	7	3 13/16	1/2	51,392 P	679,067	1,403,860	76,813	85,654 P	8,316	15,845
5 1/2	TW 0.500	V	5 1/2 FH	7 1/8	3 9/16	9/16	42,151	799,928	1,577,629	87,501	70,252	14,313	19,091
5 1/2	TW 0.500	V	5 1/2 FHDS	7 1/8	3 9/16	9/16	59,984 P	799,928	1,577,629	87,501	99,974 P	14,313	19,091
5 1/2	TW 0.625	V	5 1/2 FH	7 9/32	3 7/32	41/64	48,389	966,408	1,797,326	100,541	80,648	23,349	23,864
5 1/2	TW 0.625	V	5 1/2 FHDS	7 9/32	3 7/32	41/64	70,754 P	966,408	1,797,326	100,541	117,923 P	23,349	23,864
5 1/2	TW 0.750	V	5 1/2 FH	7 13/32	2 29/32	45/64	53,416	1,119,487	1,977,722	110,662	89,026	27,946	28,636
5 1/2	TW 0.750	V	5 1/2 FHDS	7 13/32	2 29/32	45/64	79,287 B	1,119,487	1,977,722	110,662	132,145 B	27,946	28,636
5 7/8	23.40	E	5 1/2 FH	6 1/2	4 5/8	1/4	19,475	321,861	757,747	40,073	32,458	3,608	6,452
5 7/8	23.40	E	5 1/2 FHDS	6 1/2	4 5/8	1/4	19,475 P	321,861	757,747	40,073	32,458 P	3,608	6,452
5 7/8	23.40	X	5 1/2 FH	6 5/8	4 13/32	5/16	24,420	407,691	943,942	50,759	40,699	4,029	8,172
5 7/8	23.40	X	5 1/2 FHDS	6 5/8	4 13/32	5/16	28,292 B	407,691	943,942	50,759	47,154 B	4,029	8,172
5 7/8	23.40	G	5 1/2 FH	6 23/32	4 9/32	23/64	27,343	450,605	1,046,289	56,103	45,571	4,219	9,033
5 7/8	23.40	G	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	450,605	1,046,289	56,103	55,935 P	4,219	9,033
5 7/8	23.40	S	5 1/2 FH	6 15/16	3 15/16	1 5/32	34,713	579,350	1,312,557	72,132	57,855	4,557	11,613
5 7/8	23.40	S	5 1/2 FHDS	6 15/16	3 15/16	1 5/32	46,856 P	579,350	1,312,557	72,132	78,094 P	4,557	11,613
5 7/8	23.40	V	5 1/2 FH	7 1/32	3 3/4	33/64	38,513	643,722	1,448,407	80,147	64,188	4,582	12,904
5 7/8	23.40	V	5 1/2 FHDS	7 1/32	3 3/4	33/64	53,600 P	643,722	1,448,407	80,147	89,334 P	4,582	12,904
5 7/8	26.30	E	5 1/2 FH	6 9/16	4 17/32	9/32	21,668	365,201	838,649	44,586	36,113	5,206	7,417
5 7/8	26.30	E	5 1/2 FHDS	6 9/16	4 17/32	9/32	23,138 P	365,201	838,649	44,586	38,563 P	5,206	7,417
5 7/8	26.30	X	5 1/2 FH	6 23/32	4 9/32	23/64	27,343	462,588	1,046,289	56,475	45,571	5,862	9,395
5 7/8	26.30	X	5 1/2 FHDS	6 23/32	4 9/32	23/64	33,561 P	462,588	1,046,289	56,475	55,935 P	5,862	9,395
5 7/8	26.30	G	5 1/2 FH	6 13/16	4 5/32	1 3/32	30,082	511,282	1,145,691	62,420	50,137	6,104	10,384
5 7/8	26.30	G	5 1/2 FHDS	6 13/16	4 5/32	1 3/32	38,535 P	511,282	1,145,691	62,420	64,225 P	6,104	10,384
5 7/8	26.30	S	5 1/2 FH	7 1/32	3 23/32	33/64	38,908	657,362	1,470,404	80,254	64,847	6,566	13,351
5 7/8	26.30	S	5 1/2 FHDS	7 1/32	3 23/32	33/64	54,382 B	657,362	1,470,404	80,254	90,637 B	6,566	13,351
5 7/8	26.30	V	5 1/2 FH	7 5/32	3 1/2	37/64	43,327	730,403	1,619,231	89,172	72,212	6,848	14,834
5 7/8	26.30	V	5 1/2 FHDS	7 5/32	3 1/2	37/64	62,032 P	730,403	1,619,231	89,172	103,387 P	6,848	14,834
5 7/8	TW 0.625	S	5 1/2 FH	7 11/32	3 1/16	43/64	50,921	939,348	1,889,825	106,085	84,868	18,829	20,106
5 7/8	TW 0.625	S	5 1/2 FHDS	7 11/32	3 1/16	43/64	75,085 B	939,348	1,889,825	106,085	125,141 B	18,829	20,106
5 7/8	TW 0.625	V	5 1/2 FH	7 1/2	2 11/16	3/4	56,885	1,043,721	2,093,047	117,872	94,809	20,437	22,340
5 7/8	TW 0.625	V	5 1/2 FHDS	7 1/2	2 11/16	3/4	85,022 P	1,043,721	2,093,047	117,872	141,703 P	20,437	22,340
5 7/8	TW 0.750	S	5 1/2 FH	7 1/2	2 23/32	3/4	56,425	1,091,036	2,077,124	117,494	94,042	23,600	24,128

5 7/8	TW 0.750	S	5 1/2 FHDS	7 1/2	2 23/32	3/4	84,262 P	1,091,036	2,077,124	117,494	140,437 P	23,600	24,128
5 7/8	TW 0.750	V	5 1/2 FH	7 21/32	2 1/4	53/64	62,800	1,212,262	2,296,637	130,549	104,667	26,223	26,809
5 7/8	TW 0.750	V	5 1/2 FHDS	7 21/32	2 1/4	53/64	94,618 P	1,212,262	2,296,637	130,549	157,697 P	26,223	26,809
5 7/8	TW 0.813	S	5 1/2 FH	7 9/16	2 9/16	2 5/32	58,677	1,162,915	2,154,897	122,231	97,795	25,510	26,154
5 7/8	TW 0.813	S	5 1/2 FHDS	7 9/16	2 9/16	2 5/32	87,961 P	1,162,915	2,154,897	122,231	146,602 P	25,510	26,154
5 7/8	TW 0.813	V	5 1/2 FH	7 23/32	2 1/32	55/64	65,381	1,292,128	2,384,902	135,812	108,968	28,344	29,060
5 7/8	TW 0.813	V	5 1/2 FHDS	7 23/32	2 1/32	55/64	98,693 P	1,292,128	2,384,902	135,812	164,488 P	28,344	29,060
6 5/8	25.20	E	6 5/8 FH	7 3/8	5 5/8	7/32	24,091	337,236	822,552	48,497	40,151	2,227	5,230
6 5/8	25.20	E	6 5/8 FHDS	7 3/8	5 5/8	7/32	24,091 B	337,236	822,552	48,497	40,151 B	2,227	5,230
6 5/8	25.20	X	6 5/8 FH	7 1/2	5 7/16	9/32	29,543	427,166	1,018,042	61,430	49,238	2,343	6,625
6 5/8	25.20	X	6 5/8 FHDS	7 1/2	5 7/16	9/32	32,168 B	427,166	1,018,042	61,430	53,613 B	2,343	6,625
6 5/8	25.20	G	6 5/8 FH	7 19/32	5 11/32	21/64	33,341	472,131	1,113,302	67,896	55,568	2,346	7,322
6 5/8	25.20	G	6 5/8 FHDS	7 19/32	5 11/32	21/64	38,607 P	472,131	1,113,302	67,896	64,345 P	2,346	7,322
6 5/8	25.20	S	6 5/8 FH	7 25/32	5 1/16	27/64	42,051	607,026	1,389,143	87,295	70,084	2,346	9,414
6 5/8	25.20	S	6 5/8 FHDS	7 25/32	5 1/16	27/64	54,654 P	607,026	1,389,143	87,295	91,091 P	2,346	9,414
6 5/8	25.20	V	6 5/8 FH	7 7/8	4 29/32	1 5/32	46,709	674,473	1,535,945	97,053	77,848	2,346	10,460
6 5/8	25.20	V	6 5/8 FHDS	7 7/8	4 29/32	1 5/32	63,145 B	674,473	1,535,945	97,053	105,241 B	2,346	10,460
6 5/8	27.70	E	6 5/8 FH	7 13/32	5 19/32	15/64	25,295	367,455	855,594	52,308	42,158	2,765	5,737
6 5/8	27.70	E	6 5/8 FHDS	7 13/32	5 19/32	15/64	25,295 P	367,455	855,594	52,308	42,158 P	2,765	5,737
6 5/8	27.70	X	6 5/8 FH	7 9/16	5 3/8	5/16	32,319	465,443	1,081,733	66,257	53,865	3,037	7,267
6 5/8	27.70	X	6 5/8 FHDS	7 9/16	5 3/8	5/16	36,731 B	465,443	1,081,733	66,257	61,219 B	3,037	7,267
6 5/8	27.70	G	6 5/8 FH	7 21/32	5 9/32	23/64	35,308	514,437	1,175,889	73,231	58,847	3,113	8,032
6 5/8	27.70	G	6 5/8 FHDS	7 21/32	5 9/32	23/64	42,253 P	514,437	1,175,889	73,231	70,422 P	3,113	8,032
6 5/8	27.70	S	6 5/8 FH	7 27/32	4 15/16	29/64	45,232	661,419	1,506,953	94,155	75,386	3,148	10,327
6 5/8	27.70	S	6 5/8 FHDS	7 27/32	4 15/16	29/64	60,730 B	661,419	1,506,953	94,155	101,217 B	3,148	10,327
6 5/8	27.70	V	6 5/8 FH	7 31/32	4 25/32	33/64	50,380	734,909	1,650,073	104,679	83,966	3,148	11,475
6 5/8	27.70	V	6 5/8 FHDS	7 31/32	4 25/32	33/64	69,771 P	734,909	1,650,073	104,679	116,284 P	3,148	11,475
6 5/8	TW 0.522	V	6 5/8 FH	8 9/32	4 3/16	43/64	66,636	1,023,915	2,151,961	138,511	111,060	9,601	16,546
6 5/8	TW 0.522	V	6 5/8 FHDS	8 9/32	4 3/16	43/64	98,604 P	1,023,915	2,151,961	138,511	164,340 P	9,601	16,546
6 5/8	TW 0.625	V	6 5/8 FH	8 15/32	3 13/16	49/64	75,925	1,198,346	2,434,704	156,715	126,542	15,660	19,811
6 5/8	TW 0.625	V	6 5/8 FHDS	8 15/32	3 13/16	49/64	114,655 P	1,198,346	2,434,704	156,715	191,092 P	15,660	19,811
6 5/8	TW 0.750	V	6 5/8 FH	8 5/8	3 7/16	2 7/32	84,423	1,397,812	2,690,940	175,336	140,705	23,176	23,774
6 5/8	TW 0.750	V	6 5/8 FHDS	8 5/8	3 7/16	2 7/32	129,035 P	1,397,812	2,690,940	175,336	215,058 P	23,176	23,774

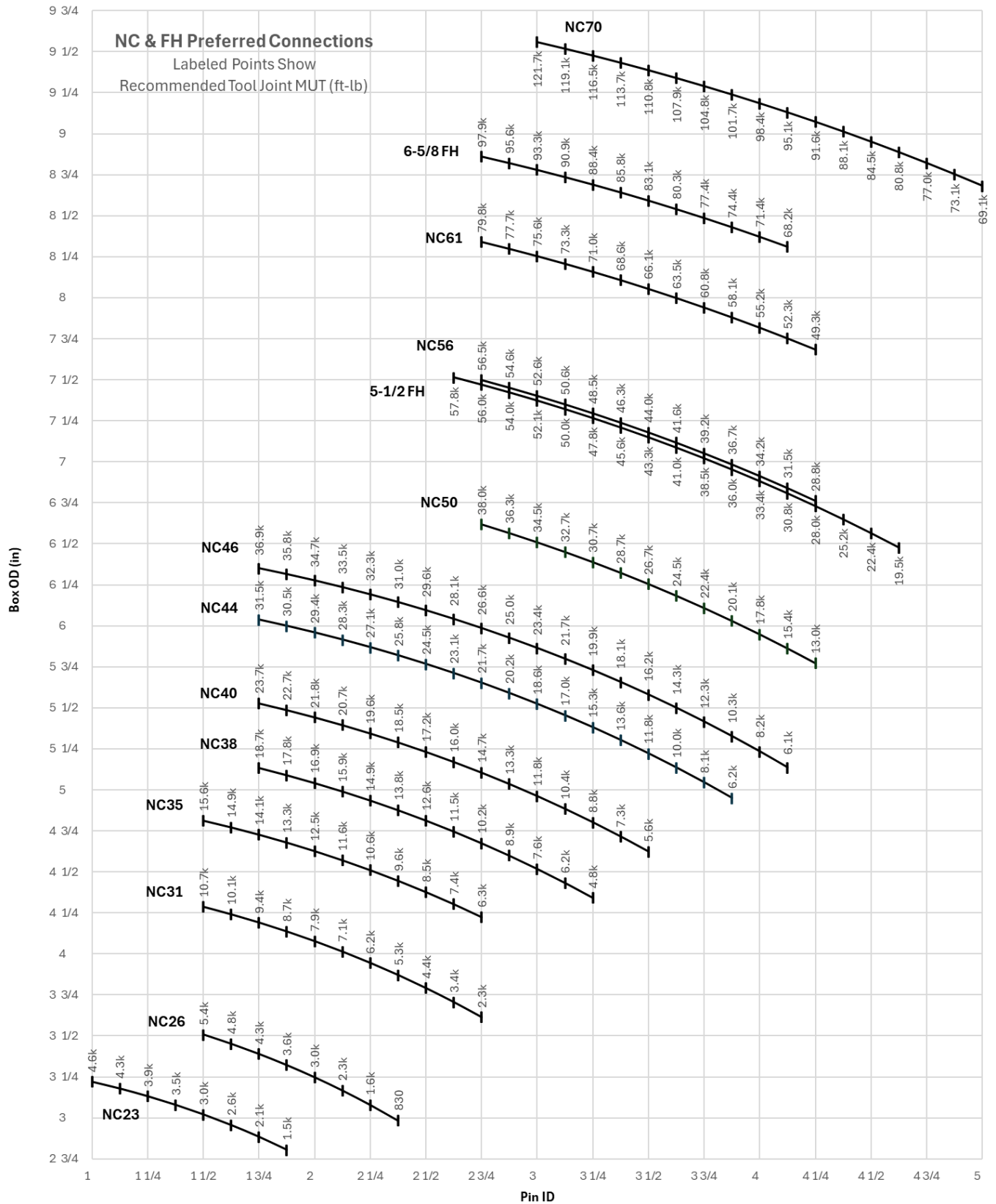


Figure A.1—NC & Preferred Connections Recommended Makeup Torques

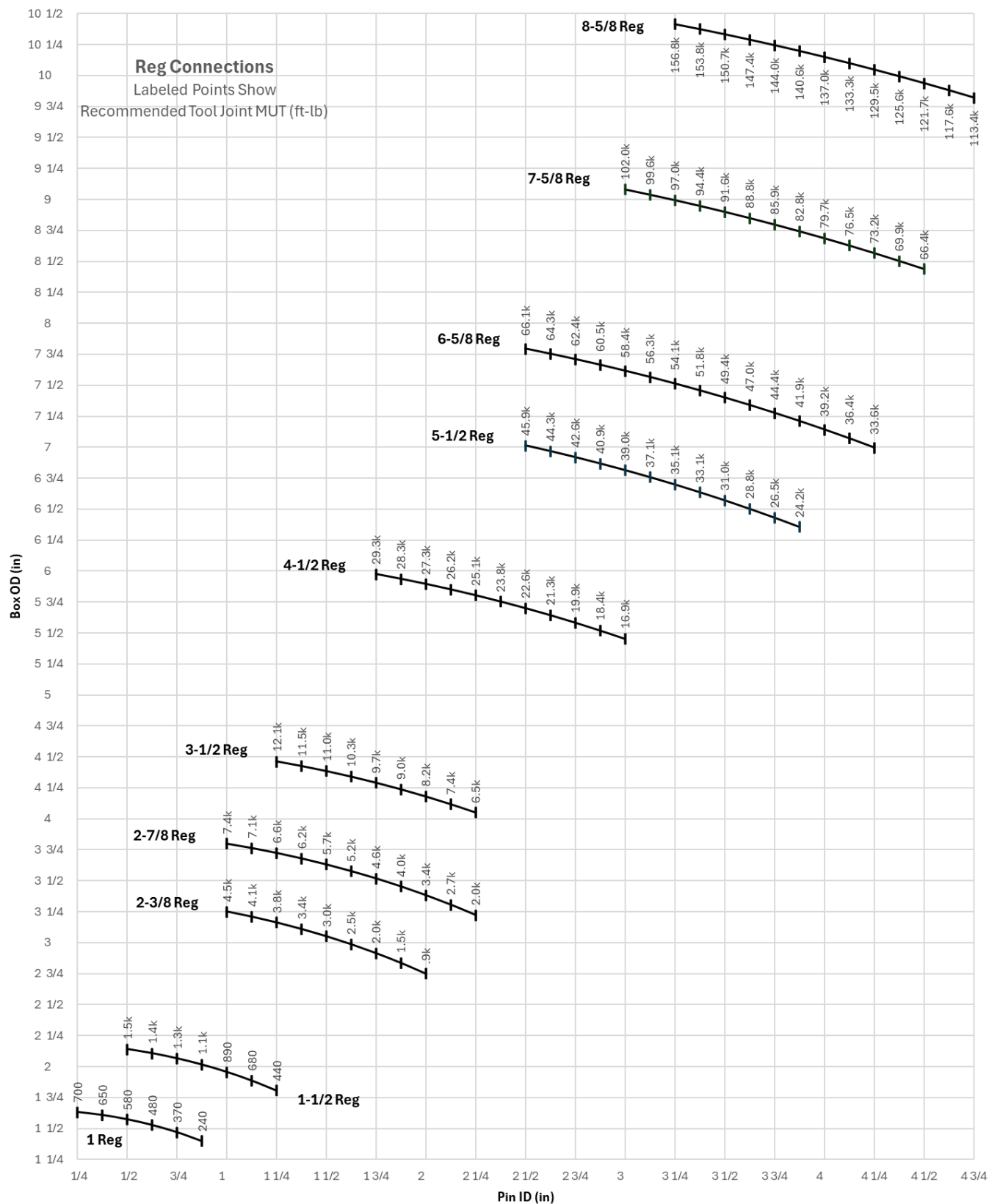


Figure A.2—Regular Connections Recommended Makeup Torques

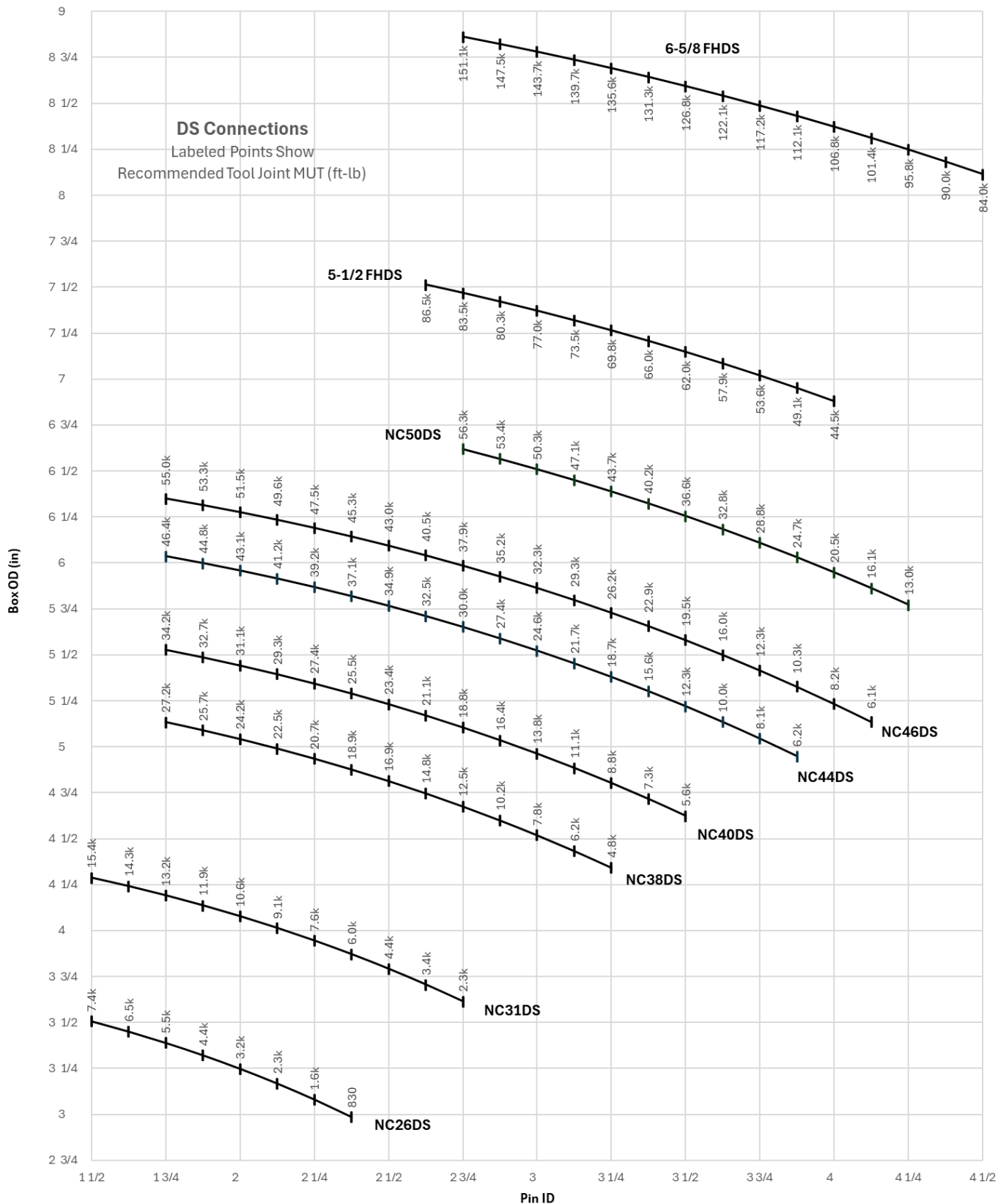


Figure A.3—Double-Shouldered Connections Recommended Make-up Torques

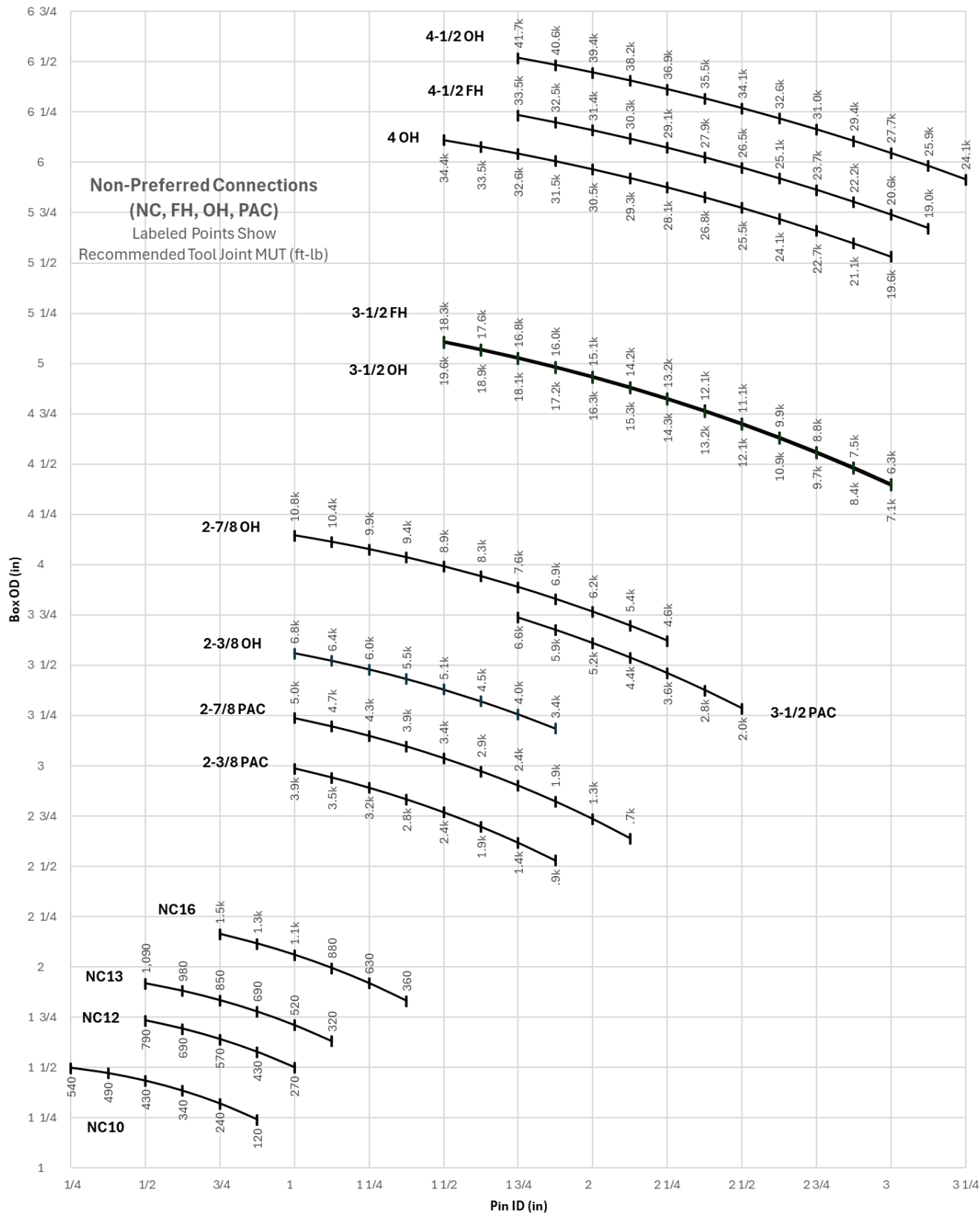


Figure A.4—Non-Preferred NC, FH, OH, PAC Connections Recommended Makeup Torques

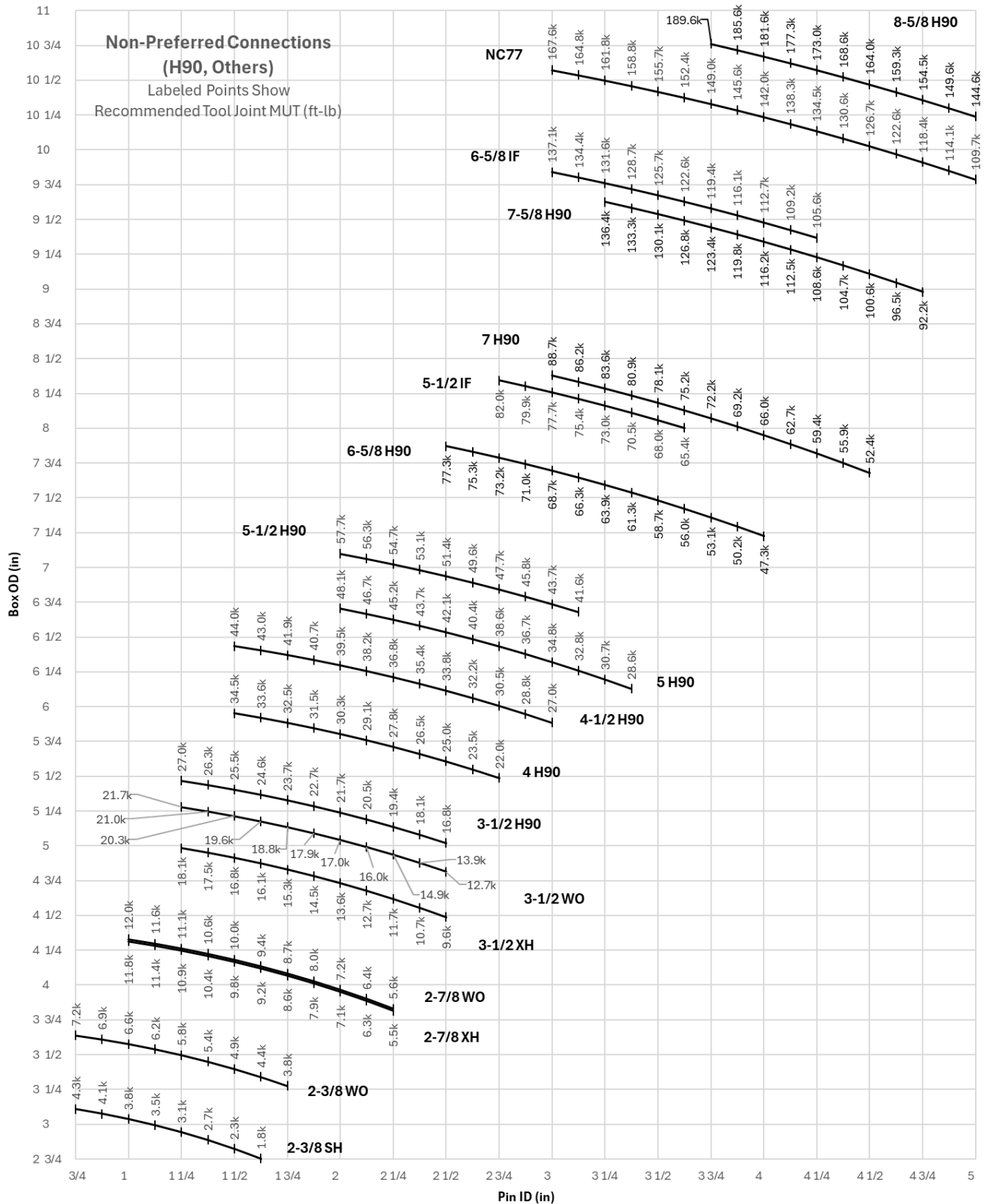


Figure A.5—Non-Preferred H90 and Other Connections Recommended Makeup Torques

API Ballot

Table C.1—New Heavy Weight Drill Pipe Properties

Size	RSC Type	Tube OD (in.)	Box OD (in.)	Center Upset Diameter (in.)	Tube ID (in.)	Pin ID (in.)	Approx Adjusted Weight of Drill Pipe a (lb/ft)	Approx Area Moment of Inertia b (in.4)	Tool Joint			Tube	
									Yield Tension c (lbf)	Yield Torsion d (ft-lbf)	Makeup Torque e (ft-lbf)	Yield Tension f (lbf)	Yield Torsion g (ft-lbf)
3 1/2	NC38	3 1/2	4 3/4	4	2 1/16	2 1/16	25.55	7.39	649,760	16,743	9,513	313,051	18,256
3 1/2	NC38DS	3 1/2	4 3/4	4	2 1/16	2 1/16	25.55	7.39	649,760	25,759	14,092	313,051	18,256
3 1/2	NC38	3 1/2	4 3/4	4	2 1/16	2 3/16	25.37	7.38	601,163	16,743	9,513	313,051	18,256
3 1/2	NC38DS	3 1/2	4 3/4	4	2 1/16	2 3/16	25.37	7.38	601,163	25,333	13,842	313,051	18,256
3 1/2	NC38	3 1/2	4 3/4	4	2 1/4	2 1/4	23.39	6.98	575,853	16,743	9,513	276,097	16,920
3 1/2	NC38DS	3 1/2	4 3/4	4	2 1/4	2 1/4	23.39	6.98	575,853	25,074	13,693	276,097	16,920
3 1/2	NC38	3 1/2	4 3/4	4	2 1/4	2 3/8	23.19	6.98	523,206	16,500	9,513	276,097	16,920
3 1/2	NC38DS	3 1/2	4 3/4	4	2 1/4	2 3/8	23.19	6.98	523,206	22,949	13,333	276,097	16,920
3 1/2	NC38	3 1/2	4 7/8	4	2 1/16	2 1/16	25.96	7.42	649,760	20,133	11,439	313,051	18,256
3 1/2	NC38DS	3 1/2	4 7/8	4	2 1/16	2 1/16	25.96	7.42	649,760	30,212	16,804	313,051	18,256
3 1/2	NC38	3 1/2	4 7/8	4	2 1/16	2 3/16	25.78	7.41	601,163	19,053	11,416	313,051	18,256
3 1/2	NC38DS	3 1/2	4 7/8	4	2 1/16	2 3/16	25.78	7.41	601,163	27,434	16,507	313,051	18,256
3 1/2	NC38	3 1/2	4 7/8	4	2 1/4	2 1/4	23.8	7.01	575,853	18,222	11,398	276,097	16,920
3 1/2	NC38DS	3 1/2	4 7/8	4	2 1/4	2 1/4	23.8	7.01	575,853	25,982	16,330	276,097	16,920
3 1/2	NC38	3 1/2	4 7/8	4	2 1/4	2 3/8	23.61	7.01	523,206	16,500	10,916	276,097	16,920
3 1/2	NC38DS	3 1/2	4 7/8	4	2 1/4	2 3/8	23.61	7.01	523,206	22,949	14,641	276,097	16,920
3 1/2	NC38	3 1/2	5	4	2 1/16	2 1/16	26.39	7.44	649,760	20,657	13,291	313,051	18,256
3 1/2	NC38DS	3 1/2	5	4	2 1/16	2 1/16	26.39	7.44	649,760	30,212	18,791	313,051	18,256
3 1/2	NC38	3 1/2	5	4	2 1/16	2 3/16	26.21	7.44	601,163	19,053	12,375	313,051	18,256
3 1/2	NC38DS	3 1/2	5	4	2 1/16	2 3/16	26.21	7.44	601,163	27,434	17,204	313,051	18,256
3 1/2	NC38	3 1/2	5	4	2 1/4	2 1/4	24.23	7.04	575,853	18,222	11,900	276,097	16,920
3 1/2	NC38DS	3 1/2	5	4	2 1/4	2 1/4	24.23	7.04	575,853	25,982	16,374	276,097	16,920
3 1/2	NC38	3 1/2	5	4	2 1/4	2 3/8	24.03	7.03	523,206	16,500	10,916	276,097	16,920
3 1/2	NC38DS	3 1/2	5	4	2 1/4	2 3/8	24.03	7.03	523,206	22,949	14,641	276,097	16,920

4	NC40	4	5 1/4	4 1/2	2 1/2	2 1/2	30.75	12.06	633,902	21,191	13,795	382,740	26,264
4	NC40DS	4	5 1/4	4 1/2	2 1/2	2 1/2	30.75	12.06	633,902	29,094	18,357	382,740	26,264
4	NC40	4	5 1/4	4 1/2	2 9/16	2 9/16	29.9	11.85	605,217	20,199	13,229	368,397	25,650
4	NC40DS	4	5 1/4	4 1/2	2 9/16	2 9/16	29.9	11.85	605,217	27,341	17,356	368,397	25,650
4	NC40	4	5 1/4	4 1/2	2 9/16	2 11/16	29.68	11.84	545,821	18,154	12,061	368,397	25,650
4	NC40DS	4	5 1/4	4 1/2	2 9/16	2 11/16	29.68	11.84	545,821	23,702	15,277	368,397	25,650
4 1/2	NC46	4 1/2	6 1/4	5	2 11/16	2 11/16	42.08	20.01	933,409	35,293	22,323	520,936	39,092
4 1/2	NC46DS	4 1/2	6 1/4	5	2 11/16	2 11/16	42.08	20.01	933,409	51,700	31,748	520,936	39,092
4 1/2	NC46	4 1/2	6 1/4	5	2 3/4	2 3/4	41.18	19.74	902,699	34,086	21,635	505,581	38,423
4 1/2	NC46DS	4 1/2	6 1/4	5	2 3/4	2 3/4	41.18	19.74	902,699	49,599	30,548	505,581	38,423
4 1/2	NC46	4 1/2	6 1/4	5	2 3/4	2 7/8	40.93	19.73	839,253	31,602	20,217	505,581	38,423
4 1/2	NC46DS	4 1/2	6 1/4	5	2 3/4	2 7/8	40.93	19.73	839,253	45,244	28,062	505,581	38,423
4 1/2	NC46	4 1/2	6 1/4	5	2 13/16	2 13/16	40.25	19.45	871,313	32,855	20,932	489,888	37,710
4 1/2	NC46DS	4 1/2	6 1/4	5	2 13/16	2 13/16	40.25	19.45	871,313	47,447	29,320	489,888	37,710
5	NC50	5	6 5/8	5 1/2	3	3	50.13	30.12	1,099,010	44,963	28,231	644,621	53,765
5	NC50DS	5	6 5/8	5 1/2	3	3	50.13	30.12	1,099,010	67,041	40,895	644,621	53,765
5	NC50	5	6 5/8	5 1/2	3	3 1/16	50	30.12	1,064,925	43,513	27,404	644,621	53,765
5	NC50DS	5	6 5/8	5 1/2	3	3 1/16	50	30.12	1,064,925	64,510	39,451	644,621	53,765
5 1/2	5 1/2 FH	5 1/2	7	6	3 1/4	3 1/4	60.02	44.04	1,270,136	50,829	31,768	799,860	72,653
5 1/2	5 1/2 FHDS	5 1/2	7	6	3 1/4	3 1/4	60.02	44.04	1,270,136	78,433	47,522	799,860	72,653
5 1/2	5 1/2 FH	5 1/2	7	6	3 3/8	3 3/8	57.81	43.1	1,202,641	50,829	31,768	762,737	70,722
5 1/2	5 1/2 FHDS	5 1/2	7	6	3 3/8	3 3/8	57.81	43.1	1,202,641	77,630	46,993	762,737	70,722
5 1/2	5 1/2 FH	5 1/2	7	6	3 3/8	3 1/2	57.51	43.08	1,132,691	50,829	31,768	762,737	70,722
5 1/2	5 1/2 FHDS	5 1/2	7	6	3 3/8	3 1/2	57.51	43.08	1,132,691	74,375	46,365	762,737	70,722
5 1/2	5 1/2 FH	5 1/2	7	6	3 7/8	3 7/8	48.13	38.08	908,117	40,451	28,873	600,749	60,657
5 1/2	5 1/2 FHDS	5 1/2	7	6	3 7/8	3 7/8	48.13	38.08	908,117	55,891	38,653	600,749	60,657
5 1/2	5 1/2 FH	5 1/2	7	6	4	4	45.5	36.47	828,350	36,793	26,577	556,877	57,472
5 1/2	5 1/2 FHDS	5 1/2	7	6	4	4	45.5	36.47	828,350	49,289	34,508	556,877	57,472
5 1/2	5 1/2 FH	5 1/2	7 1/4	6	3 1/4	3 1/4	61.24	44.35	1,270,136	57,281	39,436	799,860	72,653
5 1/2	5 1/2 FHDS	5 1/2	7 1/4	6	3 1/4	3 1/4	61.24	44.35	1,270,136	85,593	57,299	799,860	72,653
5 1/2	5 1/2 FH	5 1/2	7 1/4	6	3 3/8	3 3/8	59.03	43.39	1,202,641	54,115	37,450	762,737	70,722
5 1/2	5 1/2 FHDS	5 1/2	7 1/4	6	3 3/8	3 3/8	59.03	43.39	1,202,641	80,094	53,847	762,737	70,722

5 1/2	5 1/2 FH	5 1/2	7 1/4	6	3 3/8	3 1/2	58.74	43.38	1,132,691	50,847	35,399	762,737	70,722
5 1/2	5 1/2 FHDS	5 1/2	7 1/4	6	3 3/8	3 1/2	58.74	43.38	1,132,691	74,375	50,257	762,737	70,722

NOTE: Approximate adjusted weight and approximate area moment of inertia are calculated using nominal dimensions; all the other properties are calculated based on least material condition (this includes considering a pin ID tolerance of +1/8 inch in the tool joint calculations).

Table C.2—Used Heavy Weight Drill Pipe Properties

Size	RSC Type	Minimum Box OD a (in.)	Maximum Pin ID a (in.)	Min. Box Shoulder Width Eccentric Wear a (in.)	Yield Tension b (lbf)	Yield Torsion c (ft-lbf)	Makeup Torque at Minimum Box OD and Maximum Pin ID d (ft-lbf)	Minimum Center Upset Diameter a (in.)
3 1/2	NC38	4 21/32	2 19/32	1/4	481,950	15,096	8,577	3.75
3 1/2	NC38DS	4 21/32	2 19/32	1/4	481,950	19,664	11,173	3.75
4	NC40	5 3/32	2 9/16	21/64	661,913	22,023	12,513	4.25
4	NC40DS	5 3/32	2 9/16	21/64	661,913	29,558	16,794	4.25
4 1/2	NC46	5 25/32	2 15/16	25/64	871,313	32,443	18,433	4.75
4 1/2	NC46DS	5 25/32	2 15/16	25/64	871,313	45,298	25,738	4.75
5	NC50	6 1/8	3 17/32	23/64	865,393	34,843	19,797	5.25
5	NC50DS	6 1/8	3 17/32	23/64	865,393	47,555	27,020	5.25
5 1/2	5 1/2 FH	6 25/32	3 15/16	25/64	947,080	41,449	25,906	5.75
5 1/2	5 1/2 FHDS	6 25/32	3 15/16	25/64	947,080	58,007	35,014	5.75
6 7/8	5 1/2 FH	6 25/32	3 15/16	25/64	947,080	41,449	25,906	6.125
6 7/8	5 1/2 FHDS	6 25/32	3 15/16	25/64	947,080	58,007	35,014	6.125
6 5/8	6 5/8 FH	7 25/32	4 27/32	27/64	1,155,959	58,754	36,721	6.875
6 5/8	6 5/8 FHDS	7 25/32	4 27/32	27/64	1,155,959	80,539	50,337	6.875

G.5 Tensile and Torque Calculations for Rotary Shouldered Connections

The tensile yield strength for both SSCs and DSCs is calculated by Equation (G.9). Torque for yielding SSCs is calculated by Equation (G.10); yielding for DSCs is calculated by Equation (G.11). The makeup torque (T_m) for SSCs is calculated by Equation (G.11) (G.12); the makeup torque for DSCs is calculated by Equation (G.13).

...

$$\begin{aligned}
 T1 &= Y_{m,b} \cdot A_b \left[\frac{A_{NDS}}{A_p} \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_{NDS} \right) + \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_s \right) \right] \\
 T2 &= Y_{m,p} \left[A_{NDS} \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_{NDS} \right) + A_p \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_s \right) \right] \\
 T_y &= \min\{T1, T2\}
 \end{aligned}
 \tag{G.11}$$

where:

- T1 is the torque required to yield the box;
- T2 is the torque required to yield the pin;
- Y_m is the material minimum yield strength for the box (b) or pin (p), psi
- $R_{NDS} = \frac{1}{4}(D_{nose} - ID)$
- $A_{NDS} = \frac{\pi}{4}(D_{nose}^2 - ID^2)$
- NOTE: For SSCs take this area to be zero for the above equations.
- D_{nose} is the outer diameter of the pin nose, in.;

...

$$T_m = \frac{SA}{12} \left(\frac{p}{2\pi} + \frac{R_t f}{\cos \theta} + R_s f \right) \tag{G.11}(G.12)$$

...

78,000 psi for SR25.

$$\begin{aligned}
 T_{m,b} &= SA_b \left[\frac{A_{NDS}}{A_p} \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_{NDS} \right) + \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_s \right) \right] \\
 T_{m,p} &= S \left[A_{NDS} \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_{NDS} \right) + A_p \left(\frac{p}{2\pi} + \frac{fR_t}{\cos \theta} + fR_s \right) \right] \\
 T_m &= \min\{T_{m,b}, T_{m,p}\}
 \end{aligned}
 \tag{G.13}$$

<Renumber other equations as needed.>

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G.8 Used Drill Pipe Dimensional Limits

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- minimum box shoulder eccentric wear is the larger of 5/32 in. or 1/2 (minimum OD tool joint – Q_c) – 3/64 rounded to the nearest 1/64 in.

This calculation process is only used with SSCs; the higher torsion capacities of DSCs makes this unhelpful. In Tables A.3 and A.4 of this standard the DSC connection sizes simply mimic the associated SSC sizes.

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API Ballot