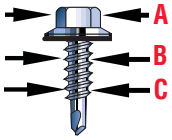
MASTER DRILLERS®

TECHNICAL DATA

CARBON & 410 STAINLESS STEEL

8-18 SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.244" - .250"
B	Major Diameter	.161" - .166"
C	Minor Diameter	.116" - .122"
	Stress Area	.00983 in.^{2}

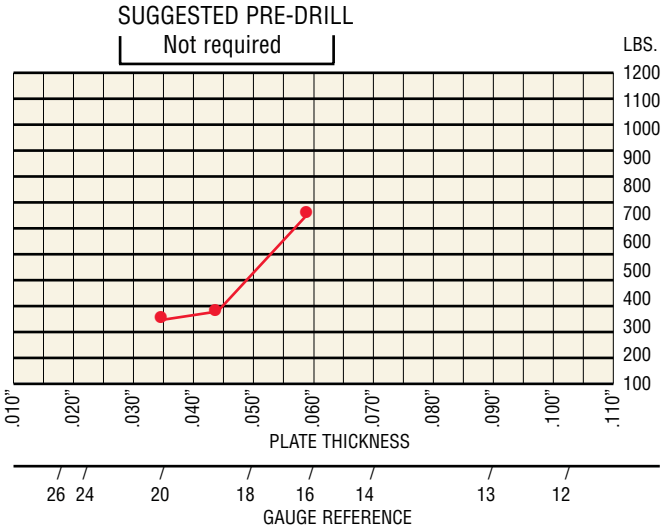
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

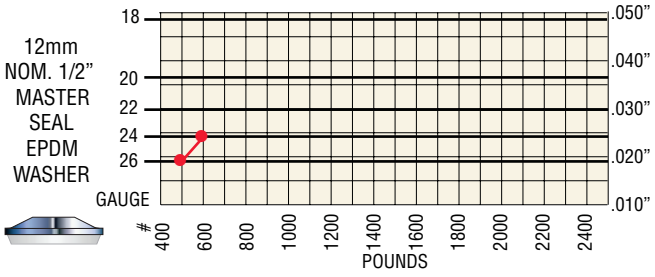
	Carbon	410 Stainless
Minimum Tensile Strength	1900 lbs.	2430 lbs.
Minimum Torsional Strength	48 in.-lbs.	95 in.-lbs.
Minimum Shear Strength	1150 lbs.	1460 lbs.

PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)

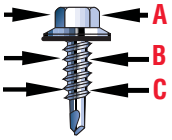


PULL-OVER STRENGTH



10-16 SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.182" - .189"
C	Minor Diameter	.135" - .141"
	Stress Area	.01289 in^2

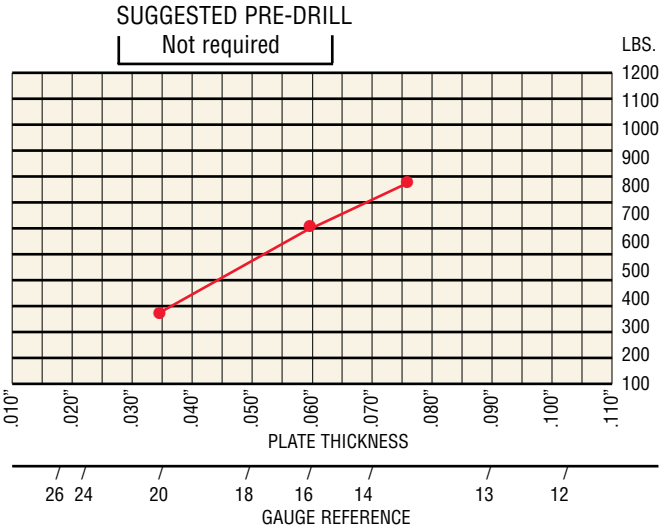
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

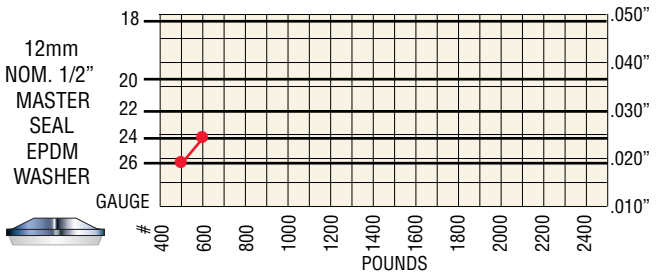
	Carbon	410 Stainless
Minimum Tensile Strength	2350 lbs.	3040 lbs.
Minimum Torsional Strength	65 in.-lbs.	105 in.-lbs.
Minimum Shear Strength	1460 lbs.	1820 lbs.

PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)



PULL-OVER STRENGTH



SHEAR STRENGTH - SEE INSIDE BACK COVER

REFER TO PAGE 23 FOR SHEAR & PULL-OUT VALUES TECHNICAL DATA

LELAND INDUSTRIES INC.

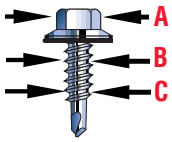
MASTER DRILLERS®

TECHNICAL DATA

CARBON & 410 STAINLESS STEEL

12-14 SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.209" - .215"
C	Minor Diameter	.157" - .164"
	Stress Area	.01661 in^2

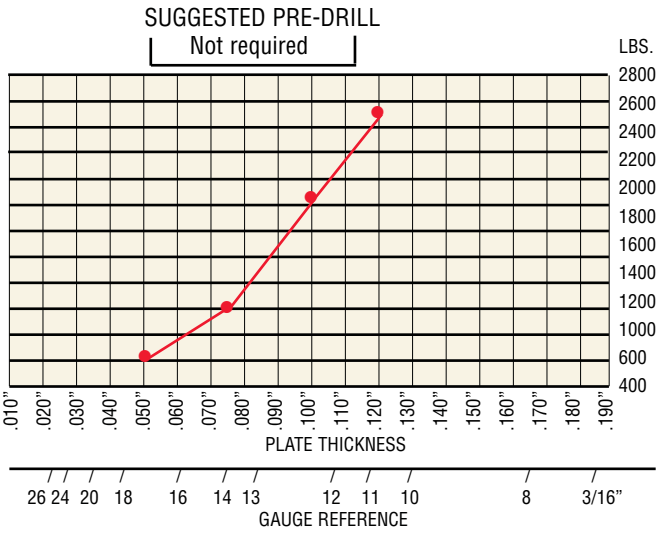
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

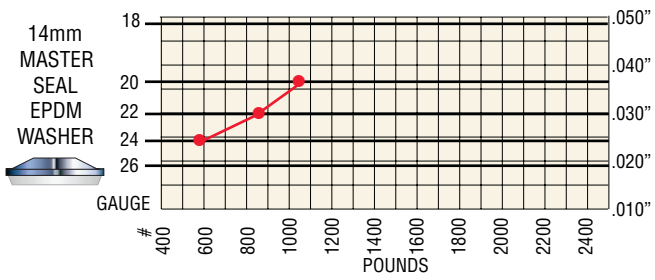
	Carbon	410 Stainless
Minimum Tensile Strength	3500 lbs.	4300 lbs.
Minimum Torsional Strength	88 in.-lbs.	130 in.-lbs.
Minimum Shear Strength	2100 lbs.	2590 lbs.

PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)

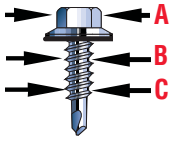


PULL-OVER STRENGTH



1/4-14 SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.367" - .375"
B	Major Diameter	.240" - .246"
C	Minor Diameter	.185" - .192
	Stress Area	.02444in^2

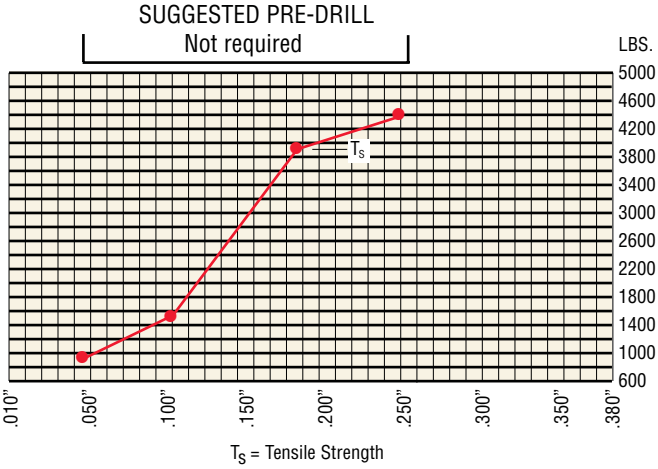
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

	Carbon	410 Stainless
Minimum Tensile Strength	4300 lbs.	4350 lbs.
Minimum Torsional Strength	156 in.-lbs.	160 in.-lbs.
Minimum Shear Strength	2580 lbs.	2610 lbs.

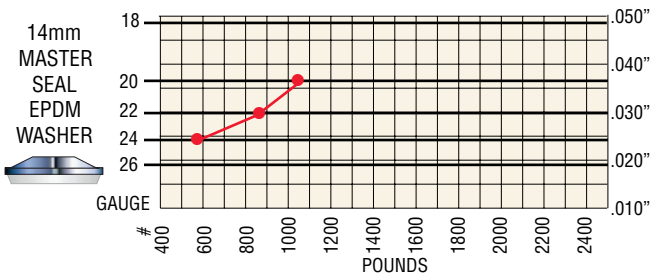
PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)



T_S = Tensile Strength

PULL-OVER STRENGTH



SHEAR STRENGTH - SEE INSIDE BACK COVER

REFER TO PAGE 23 FOR SHEAR & PULL-OUT VALUES TECHNICAL DATA

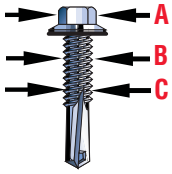
MASTER DRILLERS®

TECHNICAL DATA

CARBON & 410 STAINLESS STEEL

12-24 #4.5 CARBON STEEL SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.208" - .215"
C	Minor Diameter	.163" - .165"
	Stress Area	.0242 in.^{2}

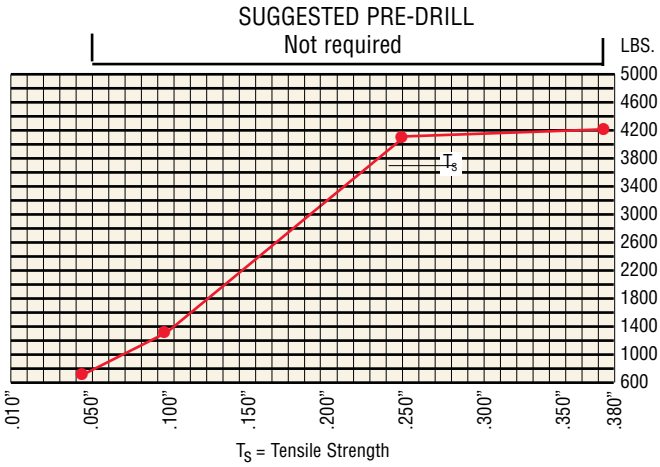
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

	Carbon	410 Stainless
Minimum Tensile Strength	3700 lbs.	4300 lbs.
Minimum Torsional Strength	88 in.-lbs.	130 in.-lbs.
Minimum Shear Strength	2230 lbs.	2590

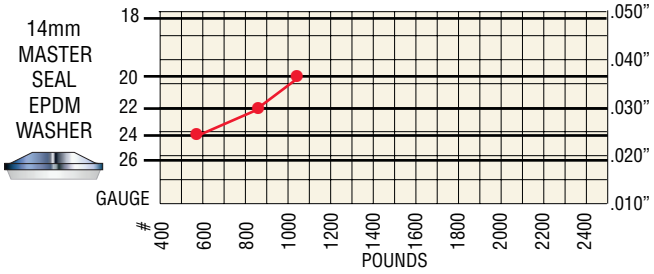
PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)



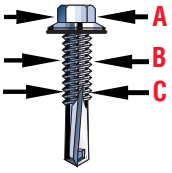
T_S = Tensile Strength

PULL-OVER STRENGTH



12-24 #5 SELF-DRILL

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.208" - .215"
C	Minor Diameter	.163" - .165"
	Stress Area	.0242 in.^{2}

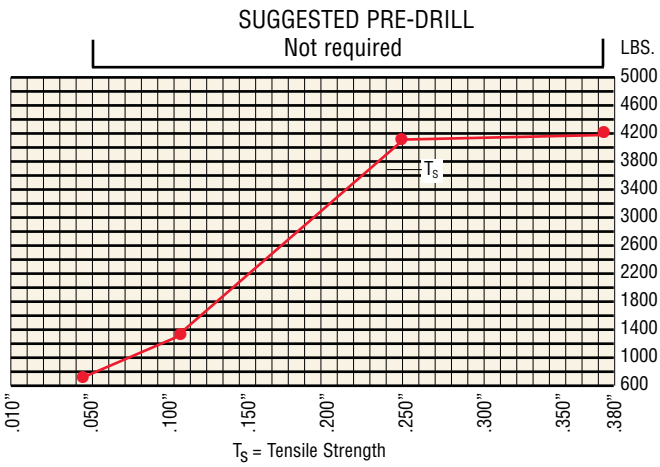
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

	Carbon	410 Stainless
Minimum Tensile Strength	3700 lbs.	4300 lbs.
Minimum Torsional Strength	88 in.-lbs.	130 in.-lbs.
Minimum Shear Strength	2230 lbs.	2590 lbs.

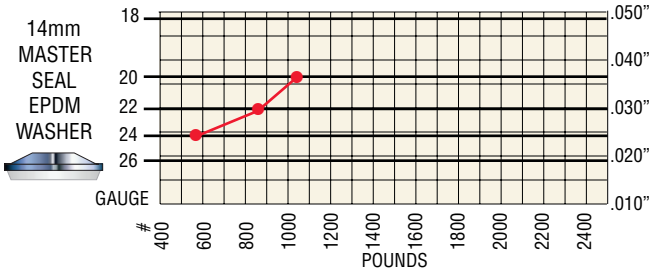
PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)



T_S = Tensile Strength

PULL-OVER STRENGTH



SHEAR STRENGTH - SEE INSIDE BACK COVER

REFER TO PAGE 23 FOR SHEAR & PULL-OUT VALUES TECHNICAL DATA

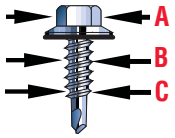
MASTER DRILLERS®

TECHNICAL DATA

CARBON & 410 STAINLESS STEEL

1/4-14 LAP STITCH SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.240" - .246"
C	Minor Diameter	.185" - .192"
	Stress Area	.02444 in.^{2}

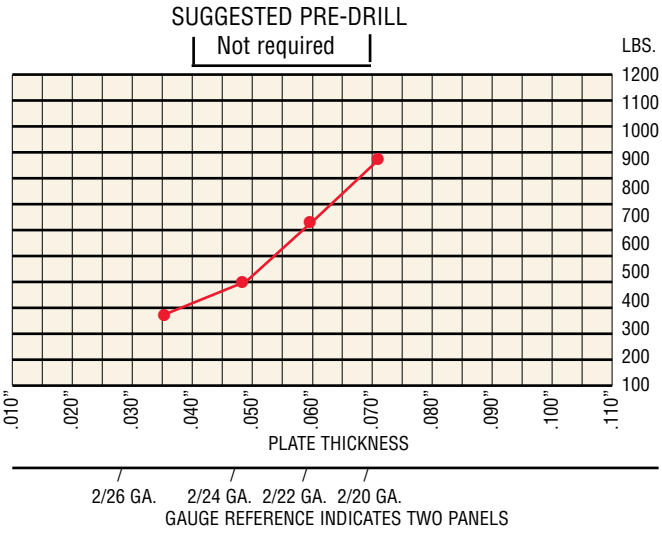
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

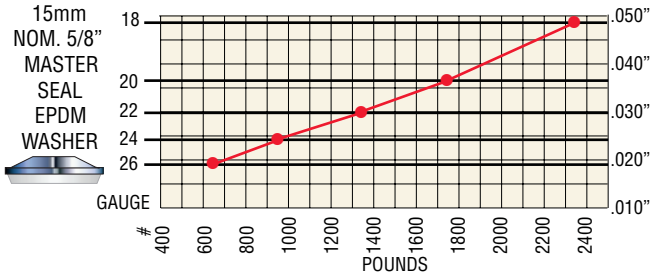
	Carbon	410 Stainless
Minimum Tensile Strength	4300 lbs.	4350 lbs.
Minimum Torsional Strength	156 in.-lbs.	160 in.-lbs.
Minimum Shear Strength	2580 lbs.	2610 lbs.

PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)

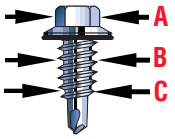


PULL-OVER STRENGTH



18-9 LAP-STITCH SELF-DRILLING

DIMENSIONAL PROPERTIES



A	Head Across Flats	.305" - .312"
B	Major Diameter	.300" - .306"
C	Minor Diameter	.209" - .217"
	Stress Area	.03071 in.^{2}

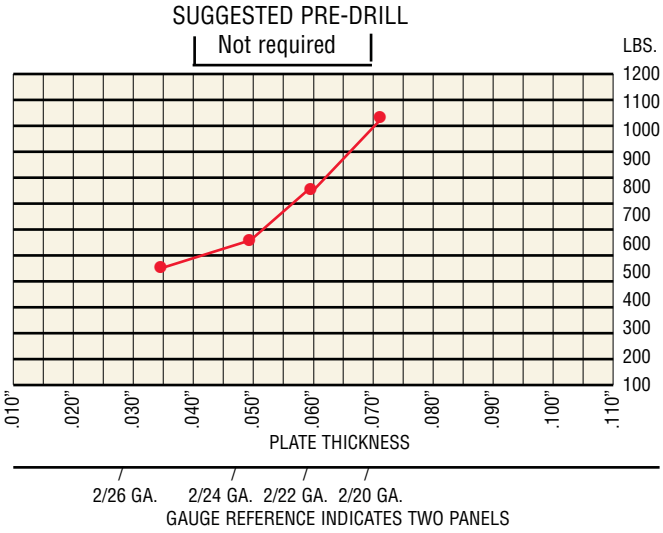
STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

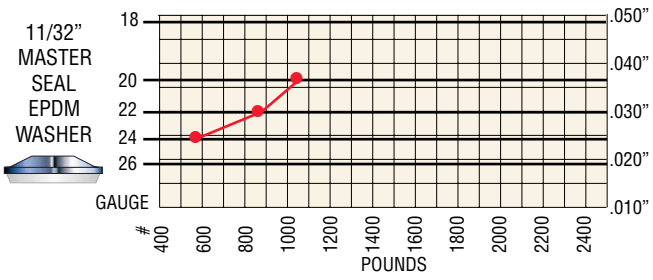
	Carbon	410 Stainless
Minimum Tensile Strength	4550 lbs.	6600 lbs.
Minimum Torsional Strength	250 in.-lbs.	210 in.-lbs.
Minimum Shear Strength	2570 lbs.	3950 lbs.

PULL-OUT STRENGTH

Expected pull-out strength from lab test per specified test plate thickness (70-85 R_b)



PULL-OVER STRENGTH



SHEAR STRENGTH - SEE INSIDE BACK COVER

REFER TO PAGE 23 FOR SHEAR & PULL-OUT VALUES TECHNICAL DATA

MASTER DRILLERS®

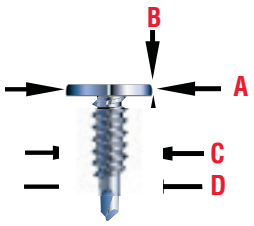
LOW PROFILE PANCAKE HEADS

TECHNICAL DATA

CARBON STEEL

#10-16 MASTER DRILLER

DIMENSIONAL PROPERTIES



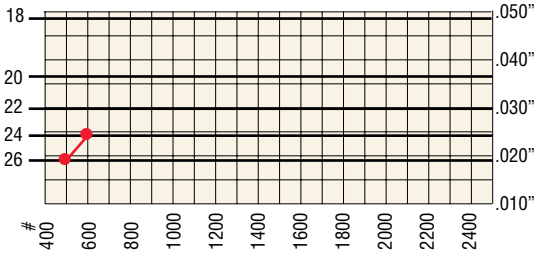
A	Head	.440” - .460”
B	Head Height	.045” - .055”
C	Major Diameter	.183” - .189”
D	Minor Diameter	.135” - .141”
	Stress Area	.01289 in.^{2}

STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

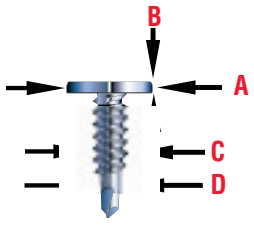
Minimum Tensile Strength	2350 lbs.
Minimum Torsional Strength	65 in.-lbs.
Minimum Shear Strength	1460 lbs.

PULL-OVER STRENGTH



#12-14 MASTER DRILLER

DIMENSIONAL PROPERTIES



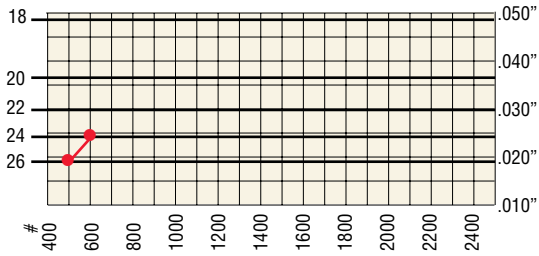
A	Head	.440” - .460”
B	Head Height	.065” - .075”
C	Major Diameter	.209” - .215”
D	Minor Diameter	.157” - .164”
	Stress Area	.01661 in.^{2}

STANDARD MECHANICAL REQUIREMENTS

FOR LELAND AVERAGE VALUES SEE PAGE 23

Minimum Tensile Strength	3500 lbs.
Minimum Torsional Strength	88 in.-lbs.
Minimum Shear Strength	2100 lbs.

PULL-OVER STRENGTH



DEFINITIONS RELATING TO TEST REPORTS

TENSILE STRENGTH

The maximum load sustained in axial stress expressed in pounds per square inch (p.s.i.).

TORQUE

Force exerted, multiplied by the distance through which the force acts expressed in inch-pounds, foot-pounds or Newton meters.

STRESS

Force per unit area (pounds per square inch, kilograms per square millimeter).

SHEAR

A force acting perpendicular to the bolt axis. Failure due to shear force is similar to a cutting action.

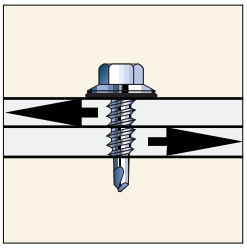
SHEAR STRENGTH - SEE INSIDE BACK COVER

REFER TO PAGE 23 FOR SHEAR & PULL-OUT VALUES TECHNICAL DATA

MASTER DRILLERS®

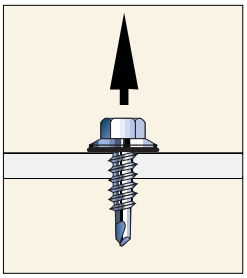
TECHNICAL DATA

Shear Values for Master Drillers in Carbon Steel Sheet



FASTENER DIAMETER	SELF DRILL POINT	GAUGE 2X26 (.036)	2X24 (.046)	2X22 (.060)	2X20 (.072)	2X18 (.096)	2X16 (.120)	2X14 (.150)	2X12 (.210)	2X1/8 (.250)	2X1/16 (.375)	2X1/14 (.500)
8-18	2	297	499	563	743	1063	1081	/	/	/	/	/
8-18	3	/	/	/	733	1093	1213	1217	/	/	/	/
10-16	2	315	481	592	833	1209	1271	/	/	/	/	/
10-16	3	/	/	/	731	1269	1543	1555	/	/	/	/
10-24	3	/	/	/	754	1211	1557	1697	/	/	/	/
12-14	2	368	603	626	901	1373	1761	2141	/	/	/	/
12-14	3	/	/	/	772	1361	1623	1973	1989	/	/	/
1/4-14	2	514	852	888	1247	1767	/	/	/	/	/	/
1/4-14	3	/	/	/	993	1445	2103	2587	2653	2823	/	/
12-24	4.5	/	/	/	/	/	/	/	2051	2703	/	/
12-24	5	/	/	/	/	/	/	/	/	2703	2723	2765

Pull-out Values (lbs.) for Carbon Steel Master Drillers



SIZE	SELF DRILL POINT	GAUGE 26	24	22	18	16	14	12	1/8	3/16	1/4
8-18	2	122	196	268	494	706	962	1561	/	/	/
	3	123	194	242	473	666	913	1427	2290	/	/
10-16	2	134	217	275	550	787	1036	1656	/	/	/
	3	127	211	269	502	711	970	1477	2080	/	/
10-24	3	124	203	254	498	704	903	1378	2073	2615	/
12-14	2	159	246	292	608	851	1184	1859	2517	3523	/
	3	145	214	286	554	760	1066	1634	2423	3001	/
12-24	4.5	/	/	/	498	700	989	1535	2444	3488	3847
	5	/	/	/	490	702	916	1530	2210	3704	4002
1/4-14	2	169	268	317	648	925	1155	/	/	4696	/
	3	144	234	296	613	883	1148	1861	2409	4553	5036
1/4-20	3	143	228	274	559	784	1008	1681	2545	3557	/
	4	/	/	/	557	791	1119	1806	2553	4300	4592

FASTENER STRENGTH COMPARISON CHART

STANDARD MECHANICAL REQUIREMENTS				LELAND AVERAGE VALUES		
FASTENER DIAMETER	MINIMUM TENSILE	MINIMUM TORQUE	MINIMUM SHEAR	LELAND TENSILE	LELAND TORQUE	LELAND SHEAR
8-18	1900 lbs.	48 in. lbs.	1150 lbs.	2433 lbs.	54 in. lbs.	1460 lbs.
10-12	2350 lbs.	65 in. lbs.	1460 lbs.	3300 lbs.	80 in. lbs.	1940 lbs.
10-16	2350 lbs.	65 in. lbs.	1460 lbs.	3133 lbs.	81 in. lbs.	1880 lbs.
10-24	2350 lbs.	65 in. lbs.	1500 lbs.	USE MINIMUM STANDARD		
12-11	3500 lbs.	90 in. lbs.	2100 lbs.	4666 lbs.	125 in. lbs.	2800 lbs.
12-14	3500 lbs.	88 in. lbs.	2100 lbs.	4300 lbs.	127 in. lbs.	2580 lbs.
12-24	3700 lbs.	88 in. lbs.	2230 lbs.	4800 lbs.	131 in. lbs.	2880 lbs.

STANDARD MECHANICAL REQUIREMENTS				LELAND AVERAGE VALUES		
FASTENER DIAMETER	MINIMUM TENSILE	MINIMUM TORQUE	MINIMUM SHEAR	LELAND TENSILE	LELAND TORQUE	LELAND SHEAR
14-10	4300 lbs.	156 in. lbs.	2580 lbs.	4966 lbs.	185 in. lbs.	2980 lbs.
14-14	4300 lbs.	156 in. lbs.	2580 lbs.	5700 lbs.	200 in. lbs.	3420 lbs.
1/4-14	4300 lbs.	156 in. lbs.	2580 lbs.	5700 lbs.	200 in. lbs.	3420 lbs.
1/4-20	4300 lbs.	156 in. lbs.	2580 lbs.	4300 lbs.	156 in. lbs.	2580 lbs.
17-12	5200 lbs.	170 in. lbs.	3120 lbs.	USE MINIMUM STANDARD		
18-9	4550 lbs.	250 in. lbs.	2570 lbs.	4766 lbs.	160 in. lbs.	2860 lbs.
				(UNHARDENED PART)		

LELAND VALUES LISTED ARE AVERAGES ACHIEVED UNDER LABORATORY CONDITIONS AND APPLY TO LELAND MANUFACTURED FASTENERS ONLY. APPROPRIATE SAFETY FACTORS SHOULD BE APPLIED TO THESE VALUES FOR DESIGN PURPOSES.

SHEAR STRENGTH - SEE INSIDE BACK COVER