

DIAPHRAGM N-DECK

WELDED ATTACHMENT - BUTTON PUNCH 80KSI



N-Deck 32/3 Welded Pattern - Button Punch 80KSI

Support fastening	5/8" arc spot welds or equivalent
Side-lap fastening	Non-piercing Button Punch

F _u	62 ksi
F _y	60 ksi
F _{xx}	60 ksi

Loading	φ _{df}	Ω _{df}
Seismic	0.55	3.00
Wind	0.75	2.15
Other	0.55	3.00

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S _{nr} , plf ^{1,2}									K ₁ 1/ft
		Span, ft.									
		8	8.5	9	9.5	10	10.5	11	11.5	12	
3DR22 0.0295" 32/3	2	325	305	290							0.980
	3	340	320	300	285	270	260	245	235	225	0.932
	4	350	330	310	295	280	265	255	245	235	0.888
	5	365	345	325	305	290	275	265	255	240	0.849
	6	375	355	335	315	300	285	275	260	250	0.812
	7	390	365	345	325	310	295	280	270	260	0.779
	8	400	380	355	340	320	305	290	280	265	0.748
	9	415	390	370	350	330	315	300	285	275	0.720
	10	425	400	380	360	340	325	310	295	285	0.694
	11	440	415	390	370	350	335	320	305	290	0.669
	12	450	425	400	380	360	345	330	315	300	0.646
	I, in4/ft		Nominal Shear Strength due to Panel Buckling, S _{nb} , plf								
0.808		6643	5884	5249	4711	4252	3856	3514	3215	2952	

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S _{nr} , plf ^{1,2}									K ₁ 1/ft
		Span, ft.									
		9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	
3DR20 0.0358 32/3	2	380									1.079
	3	395	370	355	335	320	305	295			1.026
	4	405	385	365	345	330	315	305	290	280	0.978
	5	415	395	375	355	340	325	310	300	285	0.935
	6	425	405	385	365	350	335	320	305	295	0.895
	7	440	415	395	375	360	340	330	315	300	0.858
	8	450	425	405	385	365	350	335	320	310	0.824
	9	460	435	415	395	375	360	345	330	320	0.793
	10	470	445	425	405	385	370	355	340	325	0.764
	11	480	455	435	415	395	375	360	345	335	0.737
	12	495	465	445	420	405	385	370	355	340	0.712
	I, in4/ft		Nominal Shear Strength due to Panel Buckling, S _{nb} , plf								
0.989		7060	6337	5719	5187	4726	4324	3971	3660	3384	

DIAPHRAGM N-DECK WELDED ATTACHMENT - BUTTON PUNCH 80KSI

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S_{nr} plf ^{1,2}									K_1	
		Span, ft.										
		10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	1/ft	
3DR18 0.0474 32/3	3	450	430	410	390	375					1.181	
	4	460	440	420	400	385	370	355	340	330	1.126	
	5	470	450	430	410	390	375	360	350	335	1.076	
	6	480	460	435	420	400	385	370	355	345	1.030	
	7	490	465	445	425	410	390	375	365	350	0.987	
	8	500	475	455	435	415	400	385	370	355	0.949	
	9	510	485	465	445	425	410	390	380	365	0.913	
	10	520	495	475	450	435	415	400	385	370	0.879	
	11	530	505	480	460	440	425	410	390	380	0.848	
	12	540	515	490	470	450	430	415	400	385	0.819	
	13	550	525	500	480	460	440	425	405	395	0.792	
	l, in4/ft		Nominal Shear Strength due to Panel Buckling, S_{nb} plf									
	1.323		8782	7966	7258	6640	6099	5620	5196	4819	4481	

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S_{nr} plf ^{1,2}									K_1	
		Span, ft.										
		11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	1/ft	
3DR16 0.0598 32/3	3	455	435	415							1.327	
	4	465	445	425	410	390	380	365	350	340	1.265	
	5	475	455	435	415	400	385	370	360	345	1.208	
	6	480	460	440	425	410	395	380	365	355	1.157	
	7	490	470	450	430	415	400	385	370	360	1.109	
	8	500	480	460	440	425	405	395	380	365	1.065	
	9	510	485	465	450	430	415	400	385	375	1.025	
	10	520	495	475	455	440	420	405	395	380	0.988	
	11	530	505	485	465	445	430	415	400	385	0.953	
	12	535	515	490	470	455	435	420	405	395	0.920	
	13	545	520	500	480	460	445	430	415	400	0.890	
	l, in4/ft		Nominal Shear Strength due to Panel Buckling, S_{nb} plf									
	1.672		10299	9423	8654	7975	7374	6838	6358	5927	5538	

	ϕ_{df}	Ω_{df}
Buckling	0.80	2.00

¹ Nominal shear strength of bare deck shown above may be limited by shear buckling.

² Design Strengths: ASD Required strength (Service Applied Load) $\leq \text{Min} \{S_{nf} / \Omega_{df}, S_{nb} / \Omega_{db}\}$ • LRFD Required strength (Factored Applied Load) $\leq \text{Min} \{\phi_{df} S_{nf}, \phi_{db} S_{nb}\}$

N-Deck 32/5 Welded Pattern - Button Punch 80KSI

Support fastening	5/8" arc spot welds or equivalent
Side-lap fastening	Non-piercing Button Punch

F _u	62 ksi
F _y	60 ksi
F _{xx}	60 ksi

Loading	φ _{df}	Ω _{df}
Seismic	0.55	3.00
Wind	0.75	2.15
Other	0.55	3.00

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S _{nr} , plf ^{1,2}									K ₁ 1/ft
		Span, ft.									
		8	8.5	9	9.5	10	10.5	11	11.5	12	
3DR22 0.0295" 32/5	2	415	390	370							0.676
	3	430	405	380	360	340	325	310	295	285	0.653
	4	440	415	390	370	350	335	320	305	295	0.632
	5	455	425	405	380	360	345	330	315	300	0.611
	6	465	440	415	390	370	355	340	325	310	0.592
	7	480	450	425	405	380	365	345	330	320	0.574
	8	490	460	435	415	390	375	355	340	325	0.557
	9	505	475	445	425	400	385	365	350	335	0.542
	10	515	485	460	435	410	395	375	360	345	0.527
	11	530	495	470	445	420	400	385	365	350	0.512
	12	540	510	480	455	430	410	395	375	360	0.499
		I, in4/ft	Nominal Shear Strength due to Panel Buckling, S_{nb}, plf								
	0.808	6643	5884	5249	4711	4252	3856	3514	3215	2952	

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S _{nr} , plf ^{1,2}									K ₁ 1/ft
		Span, ft.									
		9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	
3DR20 0.0358 32/5	2	490									0.745
	3	500	475	450	430	410	390	375			0.720
	4	510	485	460	435	415	400	380	365	355	0.696
	5	520	495	470	445	425	410	390	375	360	0.673
	6	535	505	480	455	435	415	400	385	370	0.652
	7	545	515	490	465	445	425	405	390	375	0.633
	8	555	525	500	475	455	435	415	400	385	0.614
	9	565	535	510	485	465	445	425	405	390	0.597
	10	575	545	520	495	470	450	430	415	400	0.580
	11	590	555	530	505	480	460	440	425	405	0.564
	12	600	570	540	515	490	470	450	430	415	0.550
		I, in4/ft	Nominal Shear Strength due to Panel Buckling, S_{nb}, plf								
	0.989	7060	6337	5719	5187	4726	4324	3971	3660	3384	

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Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S_{nr} plf ^{1,2}									K_1
		Span, ft.									
		10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	1/ft
3DR18 0.0474 32/5	3	575	550	525	500	480					0.828
	4	585	555	530	510	485	470	450	435	415	0.801
	5	595	565	540	515	495	475	455	440	425	0.775
	6	605	575	550	525	505	485	465	450	430	0.751
	7	615	585	560	535	510	490	475	455	440	0.728
	8	625	595	570	545	520	500	480	460	445	0.707
	9	635	605	575	550	530	510	490	470	455	0.686
	10	645	615	585	560	535	515	495	475	460	0.667
	11	655	625	595	570	545	525	505	485	465	0.649
	12	665	635	605	580	555	530	510	490	475	0.632
	13	675	645	615	585	560	540	520	500	480	0.616
	l, in4/ft		Nominal Shear Strength due to Panel Buckling, S_{nb} plf								
	1.323		8782	7966	7258	6640	6099	5620	5196	4819	4481

Fastener Layout	Side-lap Conn/Span	Nominal Shear Strength, S_{nr} plf ^{1,2}									K_1
		Span, ft.									
		11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	1/ft
3DR16 0.0598 32/5	3	580	555	535							0.930
	4	590	565	540	520	500	480	465	450	435	0.899
	5	600	575	550	530	505	490	470	455	440	0.870
	6	610	580	560	535	515	495	480	460	445	0.843
	7	620	590	565	545	525	505	485	470	455	0.818
	8	625	600	575	550	530	510	490	475	460	0.794
	9	635	610	585	560	540	520	500	480	465	0.771
	10	645	615	590	570	545	525	505	490	475	0.750
	11	655	625	600	575	555	535	515	495	480	0.729
	12	665	635	610	585	560	540	520	505	485	0.710
	13	675	645	615	590	570	550	530	510	495	0.692
	l, in4/ft		Nominal Shear Strength due to Panel Buckling, S_{nb} plf								
	1.672		10299	9423	8654	7975	7374	6838	6358	5927	5538

	ϕ_{df}	Ω_{df}
Buckling	0.80	2.00

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