

ICC-ES Evaluation Report**ESR-2047**

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This report is subject to renewal July 2017.www.icc-es.org | (800) 423-6587 | (562) 699-0543*A Subsidiary of the International Code Council®***DIVISION: 05 00 00—METALS**
Section: 05 31 00—Steel Decking**REPORT HOLDER:****EPIC METALS CORPORATION**
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www.epicmetals.com**EVALUATION SUBJECT:****EPICORE, ER2R, ER2RA, ER3.5, AND ER3.5A STEEL
DECK PANELS****1.0 EVALUATION SCOPE****Compliance with the following code:**2012, 2009, and 2006 *International Building Code®* (IBC)**Property evaluated:**

Structural

2.0 USES

The EPIC Metals steel deck panels are used in floor and roof decks, horizontal diaphragms, and composite floor and roof assemblies to support the code-required appropriate floor and roof loads.

3.0 DESCRIPTION

Epicore, ER2R, ER2RA, ER3.5, and ER3.5A steel deck panels are cold-formed from steel conforming to ASTM A653 SS Grade 40, with a minimum G60 galvanization coating designation. The panels are made from No. 14, 16, 18, 19, 20 or 22 gage steel [base-metal thicknesses of 0.0747, 0.0600, 0.0474, 0.0418, 0.0358 or 0.0295 inch (1.88, 1.52, 1.20, 1.06, 0.91 or 0.75 mm), respectively]. The panel profiles are as indicated in Figures 1 and 2 of this report. Panel descriptions are as follows:

1. Epicore: 2-inch-deep (51 mm) floor deck panel with embossments in the top flange for use in composite floor applications.
2. ER2R: 2-inch-deep (51 mm) nonacoustic roof deck panel.
3. ER2RA: 2-inch-deep (51 mm) acoustic roof deck panel with perforations in the bottom flanges for acoustical purposes.
4. ER3.5: 3.5-inch-deep (89 mm) nonacoustic roof deck panel.

5. ER3.5A: 3.5-inch-deep (89 mm) acoustic roof deck panel with perforations in the bottom flanges for acoustical purposes.

4.0 DESIGN AND INSTALLATION**4.1 General:**

The section properties and allowable load tables for the panels in this report have been established using the design base-metal thicknesses of the panels noted in Table 1. Allowable gravity and wind uplift loads must be based on section properties shown in Table 1. Allowable reactions based on web crippling must not exceed values shown in Table 7. The minimum concentrated live loads of IBC Section 1607 must be considered by the design professional based on the specific occupancy or use, as applicable.

4.2 Composite Decks with Vertical Load:

Epicore deck panels' maximum unshored spans and allowable superimposed uniform live loads for composite decks with various thicknesses of concrete are set forth in Tables 2, 3, 4, and 5, respectively. The concrete fill must comply with the applicable code, utilize normal weight and have a minimum compressive strength of 3000 psi (20.68 MPa). The decking must be clean and free of foreign materials prior to placement of concrete.

4.3 Bare (Non-Composite) Decks with Vertical Load:

The ER2R, ER2RA, ER3.5, and ER3.5A panels' allowable uniform loads (dead plus live) are shown in Table 6.

4.4 Diaphragm Design:

4.4.1 General: The one-third stress increase permitted for Allowable Stress Design, for load combinations in IBC Section 1605.3.2 including wind or seismic forces, must not be used for shear values in the diaphragm tables.

The horizontal diaphragm ASD shear and flexibility factors for the ER2R, ER2RA, ER3.5, and ER3.5A decks are shown in Tables 8a, 8b, 8c, and 8d. Typical steel deck diaphragm layouts are shown in Figures 7. End weld patterns for the various decks are shown in Figures 3 and 4.

All welding must be accomplished with a minimum $\frac{1}{8}$ -inch-diameter (3.2 mm) E60XX or E70XX filler metal rod complying with the appropriate AWS standard. Other weld requirements must conform to AWS D 1.3. Arc seam welds or fillet welds of deck side laps must comply with requirements shown in Figures 5a and 5b. Arc spot (puddle) welds to supporting members must comply with requirements shown in Figure 6.

4.4.2 Diaphragm Design Considerations: The diaphragm design must include the following considerations:

1. Diaphragm classification (flexible or rigid) must comply with Section 1602 of the IBC; the diaphragm deflection (Δ) must be calculated using the equation noted in Table 9 of this report.
2. Diaphragm flexibility limitations must comply with Table 9.
3. Diaphragm deflection limits must comply with Sections 12.10.1 or 12.12.2 of ASCE 7.
4. Horizontal shears must be distributed in accordance with Section 12.8.4 of ASCE 7.

4.5 Installation:

The deck panels must be installed in accordance with this report and the EPIC Metals Corporation published installation instructions. If there is a conflict between this report and the published installation instructions, this report governs.

5.0 CONDITIONS OF USE

The Epicore, ER2R, ER2RA, ER3.5, and ER3.5A steel deck panels described in this report comply with, or are suitable alternatives to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 Concrete-filled composite deck panels must not be used for loads that are predominantly vibratory, such as for operation of heavy machinery, reciprocating motors and moving loads.
- 5.2 Vertical load design of deck panels without a concrete fill must be based on section properties and web crippling values set forth in this report. Vertical load capacity of concrete-filled, composite deck systems must be as set forth in the tables in this evaluation report.
- 5.3 Special inspections must be provided in accordance Chapter 17 of the IBC.

5.4 Where use is as a diaphragm:

5.4.1 The one-third stress increase permitted for Allowable Stress Design, for load combinations noted in IBC Section 1605.3.2 including wind or seismic forces, must not be applied to shear values in the diaphragm tables.

5.4.2 Allowable shear values must be limited to values set forth in the tables of this report for the types of deck panels involved.

5.4.3 Diaphragm deflections must not exceed the permitted relative deflections of walls between the diaphragm level and the floor below. See Table 9 for diaphragm flexibility and deflection limitations.

5.5 Calculations and details demonstrating that the loads applied to the deck panels comply with this report must be submitted to the code official for approval. Calculations must be prepared, signed, and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.6 The minimum base-metal thickness of the steel deck panels must be 95 percent of the base-metal thickness noted in this report.

5.7 When the steel deck panels are used in a roof assembly, the panels must be covered with a code-complying roof covering.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Steel Deck Roof and Floor Systems (AC43), dated October 2010 (editorially revised September 2013).

7.0 IDENTIFICATION

The deck panels bear a label with the Epic Metals Corporation name and address, the job number, the deck panel type, the minimum base-metal thickness and yield strength, and the ICC-ES evaluation report number (ESR-2047).

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TABLE 1—EPICORE, ER2R, ER2RA, ER3.5, & ER3.5A SECTION PROPERTIES¹

DECK TYPE	BASE METAL THICKNESS (inch)	WEIGHT (psf)	AREA (inch ² / foot)	Moment of Inertia I (inch ⁴ / foot)		Section Modulus S (inch ³ / foot)	
				Positive, I _{DP}	Negative, I _{DN}	Positive, S _P	Negative, S _N
Epicore - 22	0.0295	2.2	0.65	0.38	0.33	0.27	0.25
ER2R - 22	0.0295	2.2	0.65	0.38	0.33	0.27	0.25
ER2RA - 22	0.0295	2.1	0.62	0.36	0.30	0.26	0.24
Epicore - 20	0.0358	2.7	0.79	0.47	0.42	0.34	0.31
ER2R - 20	0.0358	2.7	0.79	0.47	0.42	0.34	0.31
ER2RA - 20	0.0358	2.6	0.75	0.44	0.38	0.33	0.29
Epicore - 18	0.0474	3.6	1.04	0.63	0.60	0.47	0.43
ER2R - 18	0.0474	3.6	1.04	0.63	0.60	0.47	0.43
ER2RA - 18	0.0474	3.4	0.99	0.59	0.55	0.46	0.40
Epicore - 16	0.0600	4.5	1.33	0.79	0.78	0.59	0.57
ER2R - 16	0.0600	4.5	1.33	0.79	0.78	0.59	0.57
ER2RA - 16	0.0600	4.3	1.26	0.74	0.71	0.58	0.54
ER3.5 - 20	0.0358	3.2	0.95	1.83	1.69	0.69	0.81
ER3.5A - 20	0.0358	3.0	0.90	1.72	1.54	0.68	0.76
ER3.5 - 19	0.0418	3.8	1.11	2.17	2.01	0.86	0.96
ER3.5A - 19	0.0418	3.6	1.05	2.04	1.83	0.84	0.90
ER3.5 - 18	0.0474	4.3	1.26	2.49	2.32	1.01	1.10
ER3.5A - 18	0.0474	4.1	1.20	2.34	2.11	0.99	1.03
ER3.5 - 16	0.0600	5.4	1.59	3.18	3.03	1.36	1.41
ER3.5A - 16	0.0600	5.1	1.51	2.99	2.76	1.33	1.33

For SI: 1 inch = 25.4 mm, 1 psf = 4.88 kg/m², 1 inch² per foot = 2.12 x 10⁻³ mm²/m, 1 inch³ per foot = 5.38 x 10⁴ mm³/m, 1 inch⁴ per foot = 1.36 x 10⁷ mm⁴/m, 1 psi = 6.89 kPa.

¹Values based on a steel yield strength of 40,000 psi.

TABLE 2—EPICORE MAXIMUM UNSHORED CLEAR SPANS^{1,2,3,4,5,6,7}

SPAN	OVERALL SLAB DEPTH (Inches)	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8
	SLAB WEIGHT (psf)	49	55	61	67	73	80	86	92	98
	DESIGNATION									
Simple	Epicore - 22	7'-3"	6'-11"	6'-7"	6'-5"	6'-2"	6'-0"	5'-10"	5'-8"	5'-6"
	Epicore - 20	8'-4"	7'-11"	7'-7"	7'-4"	7'-1"	6'-10"	6'-8"	6'-5"	6'-3"
	Epicore - 18	10'-1"	9'-8"	9'-3"	8'-10"	8'-7"	8'-3"	8'-0"	7'-9"	7'-7"
	Epicore - 16	11'-3"	10'-10"	10'-5"	10'-1"	9'-9"	9'-5"	9'-1"	8'-10"	8'-7"
2	Epicore - 22	7'-11"	7'-7"	7'-3"	7'-0"	6'-9"	6'-6"	6'-4"	6'-1"	5'-11"
	Epicore - 20	8'-9"	8'-5"	8'-1"	7'-9"	7'-6"	7'-3"	7'-0"	6'-10"	6'-7"
	Epicore - 18	10'-3"	9'-10"	9'-5"	9'-1"	8'-9"	8'-6"	8'-3"	8'-0"	7'-9"
	Epicore - 16	11'-9"	11'-3"	10'-10"	10'-5"	10'-1"	9'-9"	9'-5"	9'-2"	8'-11"
3 or more	Epicore - 22	8'-2"	7'-10"	7'-6"	7'-3"	6'-11"	6'-9"	6'-6"	6'-4"	6'-2"
	Epicore - 20	9'-1"	8'-8"	8'-4"	8'-0"	7'-9"	7'-6"	7'-3"	7'-0"	6'-10"
	Epicore - 18	10'-8"	10'-2"	9'-9"	9'-5"	9'-1"	8'-9"	8'-6"	8'-3"	8'-0"
	Epicore - 16	12'-2"	11'-8"	11'-2"	10'-9"	10'-5"	10'-1"	9'-9"	9'-6"	9'-3"

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 4.88 kg/m², 1 psi = 6.89 kPa, 1 pcf = 16.02 kg/m³

¹Runways and planking must be used for all concrete placement.

²Slab weights are approximate, +/- 2 psf, and include deck weight

³Applies to normal-weight concrete (145 pcf) with a minimum compressive strength, f_c, of 3,000 psi.

⁴Minimum bearing length must be 2 inches at end supports and 4 inches at interior supports.

⁵Construction live loads: Uniform= 20 psf; Concentrated= 150 lbf per ft. width.

⁶Values based on LRFD.

⁷Overall slab depth refers to the nominal concrete depth measured from the top of the concrete to the bottom of the steel deck.

TABLE 3—EPICORE DESIGN UNFACTORED SUPERIMPOSED UNIFORM LIVE LOADS (psf)^{1,2,3,4}
FOR SIMPLE SPAN CONDITION
 $f_y = 40$ ksi, Normal Weight Concrete (145 pcf) $f'_c = 3$ ksi

OVERALL SLAB DEPTH ⁵ (inches)	STEEL DECK (GAGE)	DECK SPANS, CENTER TO CENTER OF SUPPORTS (ft)															
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
4	22	451	339	266	215	178	148	103	71								
	20	500	425	340	280	229	160	113	79	54							
	18	500	500	462	373	259	183	130	92	64							
	16	500	500	462	387	288	205	146	105	74	51						
4 1/2	22	500	390	305	347	204	172	148	111	78	64						
	20	500	489	391	322	272	233	168	120	86	60						
	18	500	500	500	445	371	265	192	140	101	72	50					
	16	500	500	500	445	382	294	214	157	114	83	59					
5	22	500	441	345	279	231	195	167	145	115	83	58					
	20	500	500	442	364	307	264	230	174	128	93	66					
	18	500	500	500	500	432	364	267	197	146	108	78	55				
	16	500	500	500	500	431	376	296	220	164	122	90	65				
5 1/2	22	500	491	385	311	257	217	186	162	142	120	87	62				
	20	500	500	493	406	342	294	256	226	176	131	96	70				
	18	500	500	500	500	481	420	360	269	202	152	114	84	60			
	16	500	500	500	500	481	420	371	298	225	171	129	96	71	50		
6	22	500	500	424	343	284	240	206	179	157	140	122	90	65			
	20	500	500	500	448	377	324	283	250	219	178	134	100	73	52		
	18	500	500	500	500	500	463	409	348	268	204	156	118	88	64		
	16	500	500	500	500	500	463	409	366	297	228	175	134	101	75	54	
6 1/2	22	500	500	464	375	310	262	225	195	172	153	136	114	92	67		
	20	500	500	500	490	413	355	309	273	243	204	172	137	103	76	54	
	18	500	500	500	500	500	500	448	387	325	266	205	158	121	91	67	
	16	500	500	500	500	500	500	448	400	362	296	230	179	138	106	79	
7	22	500	500	500	407	337	284	244	212	187	166	148	125	105	88	69	
	20	500	500	500	500	448	385	336	296	265	224	189	161	136	105	78	
	18	500	500	500	500	500	500	486	425	358	304	259	205	159	123	93	
	16	500	500	500	500	500	500	486	435	393	357	292	230	180	140	108	
7 1/2	22	500	500	500	439	363	307	263	229	201	179	160	136	114	96	80	
	20	500	500	500	500	483	415	362	320	285	244	206	175	149	127	106	
	18	500	500	500	500	500	500	500	464	391	332	283	243	204	160	125	
	16	500	500	500	500	500	500	500	469	423	386	353	289	229	181	142	
8	22	500	500	500	471	390	329	282	246	216	192	172	147	124	104	87	
	20	500	500	500	500	500	446	389	343	306	264	223	190	161	138	117	
	18	500	500	500	500	500	500	500	500	423	359	307	264	228	197	160	
	16	500	500	500	500	500	500	500	500	454	414	379	339	285	228	182	

For SI: 1 ksi = 6.89 MPa, 1 pcf = 16.0 kg/m³, 1 psf = 0.0479 kN/m², 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 in²/foot = 59.27 mm²/m

¹ The maximum unshored span for the panels is shown in Table 2.

² All loads are assumed to be statically applied.

³ Deflection limit of the composite slab is $1/360$ of span under total load, which includes live load (as shown in Table), and dead load (weight of reinforced concrete and weight of the steel deck).

⁴ Longitudinal and transverse reinforcement bars having a yield strength of at least 60 ksi or welded wire fabric must be provided. Area of this reinforcement must be equal to 0.00075 times the area of concrete above the steel deck but not less than 0.028 square inch per foot of width.

⁵ Overall slab depth refers to the nominal concrete depth measured from the top of the concrete to the bottom of the steel deck.

TABLE 4—EPICORE DESIGN UNFACTORED SUPERIMPOSED UNIFORM LIVE LOADS (psf)^{1,2,3,4,5}
FOR END SPANS OF CONTINUOUS SPAN CONDITION
 $f_y = 40$ ksi, Normal Weight Concrete (145 pcf) $f'_c = 3$ ksi

OVERALL SLAB DEPTH ⁶ (inches)	STEEL DECK (GAGE)	DECK SPANS, CENTER TO CENTER OF SUPPORTS (ft)													
		12	13	14	15	16	17	18	19	20	21	22	23	24	25
4	22	191	166	130	96	71	51								
	20	252	189	142	106	79	58								
	18	287	215	163	123	93	69	50							
	16	300	240	182	139	106	80	59							
4 1/2	22	220	190	167	145	110	83	61							
	20	290	255	208	159	121	92	69	50						
	18	347	309	236	181	140	107	82	61						
	16	346	316	263	203	157	122	94	71	53					
5	22	248	215	189	167	147	122	94	71	52					
	20	328	288	251	213	175	135	104	80	60					
	18	393	359	326	253	198	155	121	93	71	53				
	16	392	358	330	282	222	174	137	107	83	63				
5 1/2	22	277	240	210	186	166	142	121	104	80	60				
	20	365	321	285	242	207	177	148	116	89	68	51			
	18	439	401	369	320	270	214	169	134	105	82	62			
	16	438	401	368	340	300	239	190	152	120	94	73	56		
6	22	305	265	232	206	184	159	136	116	100	85	67	50		
	20	403	355	315	271	232	199	171	148	125	98	76	57		
	18	485	443	408	360	309	268	227	182	145	115	91	70	53	
	16	484	443	407	376	349	315	253	204	164	132	105	82	64	
6 1/2	22	334	289	254	225	201	176	150	129	110	95	81	69	56	
	20	441	388	345	300	257	220	190	165	143	124	106	83	63	
	18	500	485	446	399	344	297	259	226	193	155	125	99	77	59
	16	500	485	446	412	382	356	327	266	217	176	143	115	91	72
7	22	362	314	275	244	218	193	165	142	121	104	89	76	65	55
	20	479	421	374	329	281	242	209	181	157	136	118	103	89	70
	18	500	500	485	439	378	327	285	249	219	192	165	133	107	85
	16	500	500	484	448	416	387	361	318	278	228	187	153	124	100
7 1/2	22	391	339	297	263	235	210	180	154	132	114	97	83	71	60
	20	500	454	404	358	306	264	228	197	171	149	130	113	98	85
	18	500	500	500	479	412	357	311	272	239	210	185	164	141	114
	16	500	500	500	483	449	418	391	348	307	272	236	195	161	131
8	22	419	364	319	282	252	227	194	167	143	123	106	91	77	65
	20	500	487	433	387	331	85	246	214	185	161	140	122	106	92
	18	500	500	500	500	447	387	337	295	259	228	201	178	157	139
	16	500	500	500	500	482	449	420	378	334	296	263	234	204	169

For SI: 1 ksi = 6.89 MPa, 1 pcf = 16.0 kg/m³, 1 psf = 0.0479 kN/m², 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 in²/foot = 59.27 mm²/m

¹ The maximum unshored span for the deck is shown in Table 2.

² All loads are assumed to be statically applied.

³ Deflection limit of the composite slab is $1/360$ of span under total load, which includes live load (as shown in Table), and dead load (weight of reinforced concrete and weight of the steel deck).

⁴ Longitudinal and traverse reinforcement bars having a yield strength of at least 60 ksi or welded wire fabric shall be provided. Area of this reinforcement must be equal to 0.00075 times the area of concrete above the steel deck but not less than 0.028 square inch per foot of width.

⁵ The use of reinforcing bars over interior supports is required and they must be designed and placed in accordance with Chapter 19 of the IBC.

⁶ Overall slab depth refers to the nominal concrete depth measured from the top of the concrete to the bottom of the steel deck.

TABLE 5—EPICORE DESIGN UNFACTORED SUPERIMPOSED UNIFORM LIVE LOADS (psf)^{1,2,3,4,5}
FOR INTERIOR SPANS OF CONTINUOUS SPAN CONDITION
 $f_y = 40$ ksi, Normal Weight Concrete (145 pcf) $f'_c = 3$ ksi

OVERALL SLAB DEPTH ⁶ (inches)	STEEL DECK (GAGE)	DECK SPANS, CENTER TO CENTER OF SUPPORTS (ft)													
		12	13	14	15	16	17	18	19	20	21	22	23	24	25
4	22	234	174	130	96	71	51								
	20	254	189	142	106	79	58								
	18	287	215	163	123	93	69	50							
	16	300	240	182	139	106	80	59							
4 1/2	22	335	252	191	145	110	83	61							
	20	348	273	208	159	121	92	69	50						
	18	347	309	236	181	140	107	82	61						
	16	346	316	263	203	157	122	94	71	53					
5	22	395	349	267	206	159	122	94	71	52					
	20	394	360	291	225	175	135	104	80	60					
	18	393	359	326	253	198	155	121	93	71	53				
	16	392	358	330	282	222	174	137	107	83	63				
5 1/2	22	441	403	360	280	219	172	134	104	80	60				
	20	440	402	370	304	239	188	148	116	89	68	51			
	18	439	401	369	341	270	214	169	134	105	82	62			
	16	438	401	368	340	300	239	190	152	120	94	73	56		
6	22	487	445	403	344	291	231	183	145	114	88	67	50		
	20	486	444	409	378	315	250	199	159	125	98	76	57		
	18	485	443	408	377	350	283	227	182	145	115	91	70	53	
	16	484	443	407	376	349	315	253	204	164	132	105	82	64	
6 1/2	22	500	487	445	380	327	283	240	192	154	122	96	74	56	
	20	500	486	447	414	384	323	260	209	168	134	106	83	63	
	18	500	485	446	413	383	357	294	238	193	155	125	99	77	59
	16	500	485	446	412	382	356	328	266	217	176	143	115	91	72
7	22	500	500	487	416	358	310	269	235	200	161	129	102	80	61
	20	500	500	486	449	417	381	331	269	218	177	142	114	90	70
	18	500	500	485	448	416	388	363	304	248	203	165	133	107	85
	16	500	500	484	448	416	387	362	338	278	228	187	153	124	100
7 1/2	22	500	500	500	452	389	336	293	256	224	197	168	135	108	85
	20	500	500	500	485	451	415	363	318	275	225	184	149	120	96
	18	500	500	500	484	450	419	392	368	311	256	211	173	141	114
	16	500	500	500	483	449	418	391	367	345	286	236	195	161	131
8	22	500	500	500	487	420	363	316	276	242	213	187	165	141	114
	20	500	500	500	500	484	448	392	344	303	268	231	190	156	126
	18	500	500	500	500	483	450	421	395	371	317	263	218	180	148
	16	500	500	500	500	482	449	420	394	371	349	294	245	204	169

For SI: 1 ksi = 6.89 MPa, 1 pcf = 16.0 kg/m³, 1 psf = 0.0479 kN/m², 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 in²/foot = 59.27 mm²/m

¹ The maximum unshored span for the deck is shown in Table 2.

² All loads are assumed to be statically applied.

³ Deflection limit of the composite slab is $1/360$ of span under total load, which includes live load (as shown in table), and dead load (weight of reinforced concrete and weight of the steel deck).

⁴ Longitudinal and traverse reinforcement bars having a yield strength of at least 60 ksi or welded wire fabric shall be provided. Area of this reinforcement must be equal to 0.00075 times the area of concrete above the steel deck but not less than 0.028 square inch per foot of width.

⁵ The use of reinforcing bars over interior supports is required and they must be designed and placed in accordance with Chapter 19 of the IBC.

⁶ Overall slab depth refers to the nominal concrete depth measured from the top of the concrete to the bottom of the steel deck.

TABLE 6—ALLOWABLE UNIFORM TOTAL LOADS (DEAD PLUS LIVE), psf¹⁻⁵

ER2R

No. Spans	Gage	Design Thick. (in)	Span Length Center to Center of Supports (ft.)														
			6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"
1	22	0.0295	120/116	102/91	88/73	77/59	68/49	60/41	53/34	48/29	-	-	-	-	-	-	-
	20	0.0358	151/143	129/112	111/90	97/73	85/60	75/50	67/42	60/36	54/31	-	-	-	-	-	-
	18	0.0474	209/192	178/151	153/121	134/98	118/81	104/67	93/57	83/48	75/41	68/36	62/31	-	-	-	-
	16	0.0600	262/240	223/189	193/151	168/123	148/101	131/84	117/71	105/61	94/52	86/45	78/39	66/30	-	-	-
2	22	0.0295	111/278	95/219	82/175	71/142	63/117	55/98	49/82	44/70	40/60	36/52	33/45	28/35	-	-	-
	20	0.0358	138/344	117/271	101/217	88/176	78/145	69/121	61/102	55/87	50/74	45/64	41/56	34/43	29/34	-	-
	18	0.0474	191/461	163/363	140/290	122/236	108/195	95/162	85/137	76/116	69/100	62/86	57/75	48/58	41/45	35/36	31/30
	16	0.0600	253/500	216/455	186/364	162/296	143/244	126/203	113/171	101/146	91/125	83/108	75/94	63/72	54/57	47/46	41/37
3+	22	0.0295	139/218	118/171	102/137	89/111	78/92	69/77	62/64	55/55	50/47	45/41	41/35	35/27	-	-	-
	20	0.0358	172/269	147/212	127/170	110/138	97/114	86/95	77/80	69/68	62/58	56/50	51/44	43/34	37/26	-	-
	18	0.0474	239/361	204/284	176/227	153/185	134/152	119/127	106/107	95/91	86/78	78/67	71/59	60/45	51/35	44/28	-
	16	0.0600	317/452	270/356	233/285	203/232	178/191	158/159	141/134	126/114	114/98	103/84	94/73	79/57	67/44	58/36	51/29

ER2RA

No. Spans	Gage	Design Thick. (in)	Span Length Center to Center of Supports (ft.)														
			6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"
1	22	0.0295	116/109	98/86	85/69	74/56	65/46	58/38	51/32	46/28	-	-	-	-	-	-	-
	20	0.0358	147/134	125/105	108/84	94/68	83/56	73/47	65/40	59/34	53/29	-	-	-	-	-	-
	18	0.0474	204/179	174/141	150/113	131/92	115/76	102/63	91/53	82/45	74/39	67/33	61/29	-	-	-	-
	16	0.0600	258/225	220/177	189/142	165/115	145/95	128/79	115/67	103/57	93/49	84/42	77/37	64/28	-	-	-
2	22	0.0295	107/263	91/207	78/166	68/135	60/111	53/93	47/78	43/66	38/57	35/49	32/43	27/33	-	-	-
	20	0.0358	129/322	110/253	95/203	82/165	73/136	64/113	57/95	51/81	46/70	42/60	38/52	32/40	27/32	-	-
	18	0.0474	178/432	151/340	131/272	114/221	100/182	89/152	79/128	71/109	64/93	58/81	53/70	44/54	38/42	33/34	28/28
	16	0.0600	240/500	204/426	176/341	154/277	135/228	120/190	107/160	96/136	86/117	78/101	71/88	60/68	51/53	44/43	38/35
3+	22	0.0295	133/206	114/162	98/130	85/106	75/87	66/73	59/61	53/52	48/45	44/38	40/33	-	-	-	-
	20	0.0358	161/252	137/198	118/159	103/129	91/106	80/89	72/75	64/63	58/54	53/47	48/41	40/31	-	-	-
	18	0.0474	222/338	189/266	163/213	142/173	125/143	111/119	99/100	89/85	80/73	73/63	66/55	56/42	47/33	-	-
	16	0.0600	300/424	256/333	220/267	192/217	169/179	149/149	133/126	120/107	108/92	98/79	89/69	75/53	64/42	55/33	48/27

(continued)

TABLE 6—ALLOWABLE UNIFORM TOTAL LOADS (DEAD PLUS LIVE), psf¹⁻⁵

ER3.5

No. Spans	Gage	Design Thick. (in)	Span Length Center to Center of Supports (ft.)													
			12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	23'-0"	24'-0"	25'-0"
1	20	0.0358	77/70	65/55	56/44	49/36	43/29	-	-	-	-	-	-	-	-	-
	19	0.0418	96/82	81/65	70/52	61/42	54/35	48/29	-	-	-	-	-	-	-	-
	18	0.0474	112/95	96/74	82/60	72/48	63/40	56/33	50/28	-	-	-	-	-	-	-
	16	0.0600	151/121	129/95	111/76	97/62	85/51	75/42	67/36	60/30	54/26	-	-	-	-	-
2	20	0.0358	90/167	77/132	66/105	58/86	51/71	45/59	40/50	36/42	32/36	29/30	-	-	-	-
	19	0.0418	107/199	91/156	78/125	68/102	60/84	53/70	47/59	43/50	38/43	35/35	32/29	-	-	-
	18	0.0474	122/228	104/179	90/143	78/117	69/96	61/80	54/67	49/57	44/49	40/40	36/34	33/28	-	-
	16	0.0600	157/291	133/229	115/183	100/149	88/123	78/102	70/86	62/73	56/63	51/52	47/43	43/36	39/30	36/26
3+	20	0.0358	113/131	96/103	83/83	72/67	63/55									
	19	0.0418	133/155	114/122	98/98	85/80	75/66									
	18	0.0474	153/178	130/140	112/112	98/91	86/75									
	16	0.0600	196/228	167/179	144/143	125/117	110/96									

ER3.5A

No. Spans	Gage	Design Thick. (in)	Span Length Center to Center of Supports (ft.)													
			12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	23'-0"	24'-0"	25'-0"
1	20	0.0358	76/65	64/51	56/41	48/33	43/28	-	-	-	-	-	-	-	-	-
	19	0.0418	93/78	80/61	69/49	60/40	53/33	47/27	-	-	-	-	-	-	-	-
	18	0.0474	110/89	94/70	81/56	70/46	62/38	55/31	49/26	-	-	-	-	-	-	-
	16	0.0600	148/114	126/89	109/72	95/58	83/48	74/40	66/34	59/29	53/25	-	-	-	-	-
2	20	0.0358	84/157	72/124	62/99	54/81	48/66	42/55	38/47	34/40	30/34	28/28	-	-	-	-
	19	0.0418	100/187	85/147	73/118	64/96	56/79	50/66	44/55	40/47	36/40	33/33	30/28	-	-	-
	18	0.0474	114/214	98/168	84/135	73/110	64/90	57/75	51/63	46/54	41/46	37/38	34/32	31/26	-	-
	16	0.0600	148/274	126/215	109/172	95/140	83/115	74/96	66/81	59/69	53/59	48/49	44/40	40/34	37/28	34/24
3+	20	0.0358	106/123	90/97	78/78	68/63	59/52									
	19	0.0418	125/146	107/115	92/92	80/75	70/62									
	18	0.0474	143/168	122/132	105/105	92/86	80/71									
	16	0.0600	185/214	157/168	136/135	118/110	104/90									

¹Loads are based on ASD Design.²Uniform load values listed on the left side of the box are governed by stress or web crippling and the values listed on the right side of the box are governed by deflection.³The deflection criteria used for generating the tables above are L/240 or 1" maximum.⁴Stress governed values assume a maximum allowable stress of 24 ksi.⁵Minimum end and interior support bearing lengths are 2" and 4", respectively.

**TABLE 7—EPICORE, ER2R, ER2RA, ER3.5, AND ER3.5A
ASD LOADS BASED ON WEB CRIPPLING**

DECK TYPE	BASE METAL THICKNESS (inch)	ALLOWABLE LOADS (plf)					
		End Bearing Length			Interior Bearing Length		
		1 1/2 inches	2 inches	3 inches	3 inches	4 inches	5 inches
Epicore-22, ER2R-22, ER2RA-22	0.0295	668	735	846	1383	1518	1638
Epicore-20, ER2R-20, ER2RA-20	0.0358	951	1042	1195	1952	2136	2298
Epicore-18, ER2R-18, ER2RA-18	0.0474	1585	1729	1969	3218	3504	3757
Epicore-16, ER2R-16, ER2RA-16	0.0600	2430	2639	2989	4896	5310	5674
ER3.5-20, ER3.5A-20	0.0358	644	706	809	1386	1517	1632
ER3.5-19, ER3.5A-19	0.0418	862	942	1076	1835	2003	2151
ER3.5-18, ER3.5A-18	0.0474	1091	1189	1355	2305	2510	2690
ER3.5-16, ER3.5A-16	0.0600	1693	1838	2082	3533	3831	4094

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m

FOOTNOTES FOR TABLES 8a through 8d—ALLOWABLE DIAPHRAGM SHEAR AND FLEXIBILITY NOTES

¹F = Flexibility factor is the distance measured in average micro-inches a diaphragm web will deflect in a span of 1 foot under a shear of 1 pound per foot.

q_D = Allowable diaphragm shear, in pounds per linear foot.

R = Ratio of vertical load span of the deck to length of each deck sheet.

² Arc Seam or spot (puddle) weld end-weld patterns are shown in Figures 3 and 4.

³ The one-third stress increase must not be permitted for resistance to horizontal forces due to earthquake or wind.

⁴ See Table 9 for diaphragm flexibility limitations and the footnotes to Table 9 for guidance on diaphragm deflection computations.

⁵ Arc seam or spot (puddle) welds must have an effective fusion area to supporting members at least equivalent to a $\frac{3}{8}$ " x 1" long (arc seam welds) or $\frac{1}{2}$ " diameter (spot-puddle weld), respectively.

⁷ Spacing of marginal welds to members parallel to flutes:

a. Arc seam or spot (puddle) welds to members such as chords and to collector elements such as struts or ties must have a spacing in feet equal to $32,000 (t) / v$:

where:

t = Uncoated base-metal thickness of fluted deck, in inches.

v = Actual diaphragm shear at marginal supports parallel to flutes or actual shear to be transferred to collector elements (at struts or ties), in pounds per foot

b. The spacing of welds parallel to flutes must not exceed the deck span divided by three.

⁸ Attachments at interior lines of shear transfer perpendicular to deck corrugation:

▪ The shear transfer from a diaphragm to interior tie or strut lines perpendicular to deck corrugations must not exceed the shear values indicated in the tables.

▪ Two lines of puddle welds may be used to develop the actual shear transfer of these collector elements.

⁹ Where individual panels are cut, the partial panel must be fastened to ensure complete transfer of design shear forces at the point of the diaphragm to adjacent full panels to attain the values specified in the tables.

TABLE 8a—ALLOWABLE DIAPHRAGM SHEAR (qD) AND FLEXIBILITY FACTOR (F)

PRODUCT:		ER2R^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		½" DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/4 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		6		7		8		9		10		11		12		13		14	
		q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F
22	12	476	10.2+66.3R	458	9.5+56.8R	444	8.9+49.7R	433	8.4+44.2R	424	8+39.8R	417	7.6+36.2R	411	7.3+33.1R	406	7.1+30.6R	402	6.8+28.4R
	18	359	12.6+66.3R	340	11.8+56.8R	326	11+49.7R	315	10.5+44.2R	307	9.9+39.8R	300	9.5+36.2R	294	9.1+33.1R	289	8.8+30.6R	285	8.5+28.4R
	24	300	14.5+66.3R	281	13.6+56.8R	267	12.9+49.7R	257	12.2+44.2R	248	11.6+39.8R	241	11.1+36.2R	235	10.7+33.1R	230	10.3+30.6R	226	10+28.4R
	36	241	17.4+66.3R	223	16.5+56.8R	209	15.7+49.7R	198	15+44.2R	189	14.4+39.8R	182	13.8+36.2R	176	13.3+33.1R	171	12.9+30.6R	167	12.5+28.4R
20	12	745	8.3+37.1R	711	7.8+31.8R	685	7.3+27.8R	665	6.9+24.7R	649	6.6+22.3R	636	6.4+20.2R	626	6.1+18.5R	616	5.9+17.1R	609	5.7+15.9R
	18	572	10.1+37.1R	538	9.5+31.8R	512	9+27.8R	492	8.6+24.7R	476	8.2+22.3R	463	7.9+20.2R	452	7.6+18.5R	443	7.3+17.1R	436	7.1+15.9R
	24	486	11.5+37.1R	451	10.9+31.8R	426	10.4+27.8R	406	9.9+24.7R	390	9.5+22.3R	377	9.1+20.2R	366	8.8+18.5R	357	8.5+17.1R	349	8.3+15.9R
	36	399	13.5+37.1R	365	12.9+31.8R	339	12.4+27.8R	319	11.9+24.7R	303	11.5+22.3R	290	11.2+20.2R	279	10.8+18.5R	270	10.5+17.1R	263	10.2+15.9R
18	12	1418	6+16R	1339	5.6+13.7R	1281	5.3+12R	1235	5.1+10.7R	1199	4.9+9.6R	1170	4.7+8.7R	1145	4.6+8R	1124	4.4+7.4R	1107	4.3+6.8R
	18	1114	7.1+16R	1036	6.7+13.7R	977	6.4+12R	932	6.2+10.7R	896	6+9.6R	866	5.8+8.7R	842	5.6+8R	821	5.4+7.4R	804	5.3+6.8R
	24	963	7.9+16R	884	7.6+13.7R	826	7.3+12R	780	7+10.7R	744	6.8+9.6R	715	6.6+8.7R	690	6.4+8R	669	6.2+7.4R	652	6.1+6.8R
	36	811	9.1+16R	733	8.8+13.7R	674	8.6+12R	629	8.3+10.7R	592	8.1+9.6R	563	7.9+8.7R	538	7.7+8R	518	7.6+7.4R	500	7.4+6.8R
16	12	2138	4.4+7.9R	2039	4.2+6.8R	1970	4+5.9R	1921	3.8+5.3R	1886	3.7+4.7R	1860	3.6+4.3R	1842	3.5+3.9R	1757	3.4+3.6R	1515	3.3+3.4R
	18	1706	5.2+7.9R	1600	4.9+6.8R	1524	4.8+5.9R	1468	4.6+5.3R	1425	4.5+4.7R	1393	4.3+4.3R	1368	4.2+3.9R	1349	4.1+3.6R	1332	4+3.4R
	24	1490	5.7+7.9R	1380	5.5+6.8R	1301	5.3+5.9R	1241	5.2+5.3R	1195	5+4.7R	1159	4.9+4.3R	1131	4.8+3.9R	1109	4.7+3.6R	1089	4.6+3.4R
	36	1273	6.4+7.9R	1160	6.3+6.8R	1077	6.2+5.9R	1014	6+5.3R	965	5.9+4.7R	926	5.8+4.3R	894	5.7+3.9R	868	5.6+3.6R	846	5.5+3.4R
PRODUCT:		ER2RA^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		½" DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/4 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		6		7		8		9		10		11		12		13		14	
		q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F	q _D	F
22	12	450	9+66.3R	435	8.3+56.8R	424	7.8+49.7R	416	7.4+44.2R	409	7+39.8R	403	6.7+36.2R	399	6.5+33.1R	395	6.3+30.6R	391	6.1+28.4R
	18	332	11.1+66.3R	318	10.4+56.8R	307	9.7+49.7R	298	9.2+44.2R	291	8.7+39.8R	286	8.3+36.2R	281	8+33.1R	277	7.7+30.6R	274	7.5+28.4R
	24	274	12.9+66.3R	259	12.1+56.8R	248	11.3+49.7R	240	10.7+44.2R	233	10.2+39.8R	227	9.8+36.2R	222	9.4+33.1R	219	9+30.6R	215	8.7+28.4R
	36	215	15.7+66.3R	200	14.8+56.8R	189	14+49.7R	181	13.3+44.2R	174	12.7+39.8R	168	12.2+36.2R	164	11.7+33.1R	160	11.3+30.6R	157	10.9+28.4R
20	12	697	7.4+37.1R	670	6.9+31.8R	650	6.5+27.8R	634	6.1+24.7R	622	5.9+22.3R	611	5.6+20.2R	603	5.4+18.5R	596	5.2+17.1R	590	5.1+15.9R
	18	524	9+37.1R	497	8.5+31.8R	477	8+27.8R	461	7.6+24.7R	449	7.2+22.3R	438	6.9+20.2R	430	6.7+18.5R	423	6.4+17.1R	417	6.2+15.9R
	24	438	10.4+37.1R	411	9.7+31.8R	390	9.2+27.8R	375	8.8+24.7R	362	8.4+22.3R	352	8.1+20.2R	343	7.8+18.5R	336	7.5+17.1R	330	7.3+15.9R
	36	351	12.3+37.1R	324	11.7+31.8R	304	11.2+27.8R	288	10.7+24.7R	276	10.3+22.3R	265	9.9+20.2R	257	9.6+18.5R	250	9.3+17.1R	244	9+15.9R
18	12	1211	5.3+16R	1170	5+13.7R	1142	4.8+12R	1122	4.5+10.7R	1109	4.4+9.6R	1100	4.2+8.7R	1094	4.1+8R	1079	3.9+7.4R	1065	3.8+6.8R
	18	931	6.4+16R	886	6.1+13.7R	854	5.8+12R	830	5.5+10.7R	813	5.3+9.6R	800	5.1+8.7R	791	5+8R	776	4.8+7.4R	762	4.7+6.8R
	24	791	7.2+16R	743	6.9+13.7R	710	6.6+12R	684	6.3+10.7R	665	6.1+9.6R	651	5.9+8.7R	639	5.7+8R	624	5.5+7.4R	610	5.4+6.8R
	36	650	8.4+16R	601	8.1+13.7R	565	7.8+12R	538	7.6+10.7R	517	7.3+9.6R	501	7.1+8.7R	488	6.9+8R	472	6.8+7.4R	458	6.6+6.8R
16	12	1543	4+7.9R	1485	3.8+6.8R	1446	3.6+5.9R	1419	3.4+5.3R	1400	3.3+4.7R	1388	3.2+4.3R	1380	3.1+3.9R	1375	3+3.6R	1373	3+3.4R
	18	1202	4.7+7.9R	1139	4.5+6.8R	1094	4.3+5.9R	1062	4.1+5.3R	1038	4+4.7R	1020	3.9+4.3R	1007	3.8+3.9R	997	3.7+3.6R	990	3.6+3.4R
	24	1032	5.2+7.9R	966	5+6.8R	919	4.9+5.9R	883	4.7+5.3R	857	4.6+4.7R	836	4.4+4.3R	820	4.3+3.9R	808	4.2+3.6R	798	4.1+3.4R
	36	862	6+7.9R	793	5.8+6.8R	743	5.7+5.9R	705	5.5+5.3R	675	5.4+4.7R	652	5.3+4.3R	634	5.2+3.9R	619	5.1+3.6R	607	5+3.4R

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lb/ft = 14.6 N/m

TABLE 8b—ALLOWABLE DIAPHRAGM SHEAR (q_d) AND FLEXIBILITY FACTOR (F)

PRODUCT:		ER2R ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		$\frac{1}{2}$ " DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/8 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		6		7		8		9		10		11		12		13		14	
		q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F
22	12	521	9.2+66.3R	495	8.6+56.8R	476	8.2+49.7R	461	7.8+44.2R	449	7.5+39.8R	439	7.2+36.2R	431	7+33.1R	424	6.8+30.6R	418	6.6+28.4R
	18	404	11+66.3R	378	10.5+56.8R	359	10+49.7R	343	9.5+44.2R	331	9.1+39.8R	322	8.8+36.2R	313	8.5+33.1R	307	8.3+30.6R	301	8+28.4R
	24	345	12.4+66.3R	319	11.9+56.8R	300	11.4+49.7R	285	10.9+44.2R	273	10.5+39.8R	263	10.2+36.2R	255	9.8+33.1R	248	9.6+30.6R	242	9.3+28.4R
	36	287	14.4+66.3R	260	13.9+56.8R	241	13.4+49.7R	226	13+44.2R	214	12.6+39.8R	204	12.3+36.2R	196	11.9+33.1R	189	11.6+30.6R	183	11.4+28.4R
20	12	832	7.5+37.1R	783	7.1+31.8R	746	6.8+27.8R	718	6.5+24.7R	696	6.3+22.3R	678	6.1+20.2R	663	5.9+18.5R	650	5.7+17.1R	639	5.6+15.9R
	18	659	8.9+37.1R	610	8.5+31.8R	573	8.1+27.8R	545	7.8+24.7R	523	7.6+22.3R	505	7.3+20.2R	489	7.1+18.5R	477	6.9+17.1R	466	6.8+15.9R
	24	572	9.9+37.1R	523	9.5+31.8R	487	9.2+27.8R	459	8.9+24.7R	436	8.6+22.3R	418	8.4+20.2R	403	8.2+18.5R	390	8+17.1R	379	7.8+15.9R
	36	485	11.2+37.1R	437	10.9+31.8R	400	10.6+27.8R	372	10.4+24.7R	350	10.2+22.3R	332	10+20.2R	316	9.7+18.5R	304	9.6+17.1R	293	9.4+15.9R
18	12	1625	5.4+16R	1511	5.2+13.7R	1427	5+12R	1361	4.8+10.7R	1309	4.7+9.6R	1267	4.6+8.7R	1232	4.4+8R	1203	4.3+7.4R	1178	4.2+6.8R
	18	1322	6.3+16R	1208	6.1+13.7R	1123	5.9+12R	1058	5.7+10.7R	1006	5.6+9.6R	964	5.4+8.7R	929	5.3+8R	899	5.2+7.4R	874	5.1+6.8R
	24	1170	6.9+16R	1056	6.7+13.7R	972	6.5+12R	906	6.4+10.7R	854	6.3+9.6R	812	6.1+8.7R	777	6+8R	748	5.9+7.4R	723	5.8+6.8R
	36	1018	7.6+16R	905	7.5+13.7R	820	7.4+12R	755	7.3+10.7R	703	7.2+9.6R	660	7.1+8.7R	625	7.1+8R	596	7+7.4R	571	6.9+6.8R
16	12	2573	4+7.9R	2427	3.9+6.8R	2324	3.8+5.9R	2251	3.7+5.3R	2197	3.6+4.7R	2120	3.5+4.3R	2054	3.4+3.9R	1757	3.4+3.6R	1515	3.3+3.4R
	18	2127	4.6+7.9R	1971	4.5+6.8R	1858	4.4+5.9R	1775	4.3+5.3R	1712	4.2+4.7R	1634	4.1+4.3R	1568	4.1+3.9R	1512	4+3.6R	1465	3.9+3.4R
	24	1904	5+7.9R	1743	4.9+6.8R	1625	4.8+5.9R	1537	4.8+5.3R	1469	4.7+4.7R	1391	4.6+4.3R	1325	4.6+3.9R	1269	4.5+3.6R	1222	4.4+3.4R
	36	1681	5.5+7.9R	1515	5.4+6.8R	1392	5.4+5.9R	1299	5.4+5.3R	1226	5.3+4.7R	1148	5.3+4.3R	1082	5.3+3.9R	1026	5.2+3.6R	979	5.2+3.4R
PRODUCT:		ER2RA ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		$\frac{1}{2}$ " DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/8 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		6		7		8		9		10		11		12		13		14	
		q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F	q_d	F
22	12	486	8.2+66.3R	465	7.7+56.8R	450	7.3+49.7R	438	7+44.2R	428	6.7+39.8R	421	6.4+36.2R	414	6.2+33.1R	409	6+30.6R	404	5.9+28.4R
	18	368	9.9+66.3R	348	9.4+56.8R	332	8.9+49.7R	320	8.5+44.2R	311	8.1+39.8R	303	7.8+36.2R	297	7.6+33.1R	291	7.3+30.6R	287	7.1+28.4R
	24	309	11.3+66.3R	289	10.7+56.8R	274	10.2+49.7R	262	9.7+44.2R	252	9.4+39.8R	244	9+36.2R	238	8.7+33.1R	233	8.5+30.6R	228	8.2+28.4R
	36	251	13.3+66.3R	230	12.7+56.8R	215	12.2+49.7R	203	11.8+44.2R	193	11.4+39.8R	186	11+36.2R	179	10.7+33.1R	174	10.4+30.6R	169	10.1+28.4R
20	12	765	6.8+37.1R	727	6.4+31.8R	698	6.1+27.8R	676	5.8+24.7R	658	5.6+22.3R	644	5.4+20.2R	632	5.3+18.5R	622	5.1+17.1R	613	5+15.9R
	18	592	8.1+37.1R	554	7.7+31.8R	525	7.3+27.8R	503	7+24.7R	485	6.8+22.3R	471	6.6+20.2R	459	6.4+18.5R	449	6.2+17.1R	440	6+15.9R
	24	506	9+37.1R	467	8.7+31.8R	439	8.3+27.8R	416	8+24.7R	399	7.7+22.3R	384	7.5+20.2R	372	7.3+18.5R	362	7.1+17.1R	354	6.9+15.9R
	36	419	10.4+37.1R	381	10.1+31.8R	352	9.8+27.8R	330	9.5+24.7R	312	9.2+22.3R	298	9+20.2R	286	8.8+18.5R	276	8.6+17.1R	267	8.4+15.9R
18	12	1367	4.9+16R	1308	4.7+13.7R	1268	4.5+12R	1240	4.4+10.7R	1221	4.2+9.6R	1191	4.1+8.7R	1164	4+8R	1140	3.9+7.4R	1121	3.8+6.8R
	18	1085	5.8+16R	1021	5.6+13.7R	976	5.4+12R	943	5.2+10.7R	918	5+9.6R	888	4.9+8.7R	860	4.8+8R	837	4.7+7.4R	817	4.6+6.8R
	24	945	6.4+16R	878	6.2+13.7R	830	6+12R	794	5.8+10.7R	767	5.7+9.6R	736	5.6+8.7R	709	5.4+8R	685	5.3+7.4R	666	5.2+6.8R
	36	804	7.2+16R	735	7+13.7R	684	6.9+12R	646	6.8+10.7R	616	6.7+9.6R	584	6.6+8.7R	557	6.4+8R	534	6.3+7.4R	514	6.2+6.8R
16	12	1819	3.7+7.9R	1734	3.6+6.8R	1675	3.5+5.9R	1634	3.4+5.3R	1606	3.3+4.7R	1586	3.2+4.3R	1573	3.1+3.9R	1565	3+3.6R	1515	3+3.4R
	18	1468	4.3+7.9R	1375	4.2+6.8R	1308	4+5.9R	1260	3.9+5.3R	1224	3.8+4.7R	1197	3.8+4.3R	1176	3.7+3.9R	1161	3.6+3.6R	1150	3.6+3.4R
	24	1292	4.7+7.9R	1195	4.6+6.8R	1125	4.5+5.9R	1072	4.4+5.3R	1033	4.3+4.7R	1002	4.2+4.3R	978	4.2+3.9R	959	4.1+3.6R	944	4+3.4R
	36	1117	5.2+7.9R	1015	5.1+6.8R	941	5.1+5.9R	885	5+5.3R	842	5+4.7R	807	4.9+4.3R	780	4.9+3.9R	757	4.8+3.6R	739	4.8+3.4R

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf / ft = 14.6 N/m

TABLE 8c—ALLOWABLE DIAPHRAGM SHEAR (q_D) AND FLEXIBILITY FACTOR (F)

PRODUCT:		ER3.5 ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		1/2" DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/3 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		12		13		14		15		16		17		18		20		22	
		q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F
20	12	583	6.4+56.5R	577	6.1+52.2R	573	5.9+48.4R	569	5.7+45.2R	566	5.5+42.4R	563	5.3+39.9R	560	5.2+37.7R	556	5+33.9R	552	4.8+30.8R
	18	410	8.1+56.5R	404	7.7+52.2R	400	7.4+48.4R	396	7.1+45.2R	393	6.9+42.4R	390	6.7+39.9R	387	6.5+37.7R	383	6.1+33.9R	379	5.9+30.8R
	24	323	9.6+56.5R	318	9.2+52.2R	313	8.8+48.4R	310	8.5+45.2R	306	8.2+42.4R	303	7.9+39.9R	301	7.7+37.7R	296	7.3+33.9R	293	6.9+30.8R
	36	237	12.3+56.5R	231	11.7+52.2R	227	11.3+48.4R	223	10.9+45.2R	220	10.5+42.4R	217	10.1+39.9R	214	9.8+37.7R	210	9.3+33.9R	206	8.8+30.8R
19	12	810	5.5+35.5R	801	5.3+32.8R	794	5.1+30.4R	788	4.9+28.4R	783	4.8+26.6R	778	4.6+25.1R	774	4.5+23.7R	766	4.3+21.3R	761	4.1+19.4R
	18	574	6.9+35.5R	565	6.6+32.8R	558	6.4+30.4R	552	6.1+28.4R	547	5.9+26.6R	542	5.8+25.1R	538	5.6+23.7R	531	5.3+21.3R	525	5.1+19.4R
	24	456	8.2+35.5R	448	7.8+32.8R	440	7.5+30.4R	434	7.3+28.4R	429	7+26.6R	424	6.8+25.1R	420	6.6+23.7R	413	6.3+21.3R	407	6+19.4R
	36	338	10.3+35.5R	330	9.9+32.8R	322	9.6+30.4R	316	9.2+28.4R	311	8.9+26.6R	306	8.7+25.1R	302	8.4+23.7R	295	8+21.3R	289	7.6+19.4R
18	12	1057	4.8+24.3R	1045	4.6+22.5R	1035	4.5+20.9R	1026	4.3+19.5R	1018	4.2+18.3R	1011	4.1+17.2R	1005	4+16.2R	994	3.8+14.6R	986	3.6+13.3R
	18	754	6+24.3R	742	5.8+22.5R	731	5.6+20.9R	722	5.4+19.5R	714	5.2+18.3R	708	5.1+17.2R	701	4.9+16.2R	691	4.7+14.6R	683	4.5+13.3R
	24	602	7.1+24.3R	590	6.8+22.5R	580	6.6+20.9R	571	6.3+19.5R	563	6.1+18.3R	556	6+17.2R	550	5.8+16.2R	539	5.5+14.6R	531	5.3+13.3R
	36	450	8.9+24.3R	438	8.6+22.5R	428	8.3+20.9R	419	8+19.5R	411	7.8+18.3R	404	7.5+17.2R	398	7.3+16.2R	388	7+14.6R	379	6.6+13.3R
16	12	1681	3.7+12R	1671	3.5+11.1R	1663	3.4+10.3R	1657	3.3+9.6R	1653	3.2+9R	1649	3.1+8.5R	1637	3.1+8R	1617	2.9+7.2R	1601	2.8+6.5R
	18	1211	4.6+12R	1197	4.4+11.1R	1186	4.2+10.3R	1177	4.1+9.6R	1170	4+9R	1163	3.9+8.5R	1151	3.8+8R	1131	3.6+7.2R	1115	3.5+6.5R
	24	976	5.3+12R	960	5.1+11.1R	948	5+10.3R	937	4.8+9.6R	928	4.7+9R	920	4.5+8.5R	908	4.4+8R	888	4.2+7.2R	872	4+6.5R
	36	741	6.6+12R	724	6.4+11.1R	709	6.2+10.3R	697	6+9.6R	687	5.8+9R	677	5.7+8.5R	665	5.5+8R	645	5.3+7.2R	629	5.1+6.5R
PRODUCT:		ER3.5A ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		1/2" DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/3 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		12		13		14		15		16		17		18		20		22	
		q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F
20	12	569	5.6+56.5R	565	5.4+52.2R	562	5.2+48.4R	559	5+45.2R	556	4.9+42.4R	554	4.7+39.9R	552	4.6+37.7R	548	4.4+33.9R	545	4.3+30.8R
	18	396	7+56.5R	392	6.7+52.2R	389	6.4+48.4R	386	6.2+45.2R	383	6+42.4R	381	5.8+39.9R	379	5.7+37.7R	375	5.4+33.9R	372	5.2+30.8R
	24	310	8.3+56.5R	305	7.9+52.2R	302	7.6+48.4R	299	7.3+45.2R	296	7.1+42.4R	294	6.9+39.9R	292	6.7+37.7R	289	6.3+33.9R	286	6+30.8R
	36	223	10.6+56.5R	219	10.2+52.2R	216	9.8+48.4R	212	9.4+45.2R	210	9.1+42.4R	208	8.8+39.9R	205	8.5+37.7R	202	8+33.9R	199	7.6+30.8R
19	12	788	4.8+35.5R	781	4.6+32.8R	776	4.5+30.4R	771	4.3+28.4R	767	4.2+26.6R	763	4.1+25.1R	760	4+23.7R	754	3.8+21.3R	749	3.7+19.4R
	18	552	6+35.5R	546	5.8+32.8R	540	5.6+30.4R	535	5.4+28.4R	531	5.2+26.6R	527	5+25.1R	524	4.9+23.7R	518	4.7+21.3R	513	4.5+19.4R
	24	434	7.1+35.5R	428	6.8+32.8R	422	6.6+30.4R	417	6.3+28.4R	413	6.1+26.6R	409	5.9+25.1R	406	5.8+23.7R	400	5.5+21.3R	395	5.2+19.4R
	36	316	9+35.5R	310	8.6+32.8R	304	8.3+30.4R	299	8+28.4R	295	7.8+26.6R	291	7.5+25.1R	288	7.3+23.7R	282	6.9+21.3R	278	6.6+19.4R
18	12	1015	4.2+24.3R	1011	4.1+22.5R	1008	3.9+20.9R	1001	3.8+19.5R	995	3.7+18.3R	989	3.6+17.2R	985	3.5+16.2R	976	3.4+14.6R	970	3.3+13.3R
	18	715	5.3+24.3R	710	5.1+22.5R	705	4.9+20.9R	698	4.7+19.5R	692	4.6+18.3R	686	4.4+17.2R	681	4.3+16.2R	673	4.1+14.6R	666	3.9+13.3R
	24	565	6.2+24.3R	559	5.9+22.5R	553	5.7+20.9R	546	5.5+19.5R	540	5.4+18.3R	534	5.2+17.2R	530	5.1+16.2R	521	4.8+14.6R	515	4.6+13.3R
	36	415	7.8+24.3R	408	7.5+22.5R	401	7.2+20.9R	394	7+19.5R	388	6.8+18.3R	383	6.6+17.2R	378	6.4+16.2R	370	6.1+14.6R	363	5.8+13.3R
16	12	1279	3.2+12R	1274	3.1+11.1R	1270	3+10.3R	1269	3+9.6R	1268	2.9+9R	1268	2.8+8.5R	1268	2.7+8R	1268	2.6+7.2R	1268	2.5+6.5R
	18	908	4+12R	901	3.9+11.1R	895	3.7+10.3R	890	3.6+9.6R	887	3.5+9R	885	3.4+8.5R	883	3.3+8R	882	3.2+7.2R	882	3.1+6.5R
	24	723	4.7+12R	714	4.5+11.1R	707	4.4+10.3R	701	4.2+9.6R	697	4.1+9R	693	4+8.5R	691	3.9+8R	687	3.7+7.2R	685	3.6+6.5R
	36	538	5.8+12R	528	5.6+11.1R	519	5.4+10.3R	512	5.3+9.6R	507	5.1+9R	502	5+8.5R	498	4.8+8R	492	4.6+7.2R	487	4.4+6.5R

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf/ft = 14.6 N/m

TABLE 8d—ALLOWABLE DIAPHRAGM SHEAR (q_D) AND FLEXIBILITY FACTOR (F)

PRODUCT:		ER3.5A ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		$\frac{1}{2}$ " DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/6 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		12		13		14		15		16		17		18		20		22	
		q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F
20	12	628	5.4+56.5R	618	5.3+52.2R	610	5.1+48.4R	603	5+45.2R	598	4.9+42.4R	592	4.8+39.9R	588	4.7+37.7R	580	4.5+33.9R	573	4.4+30.8R
	18	454	6.6+56.5R	445	6.4+52.2R	437	6.2+48.4R	430	6.1+45.2R	424	5.9+42.4R	419	5.8+39.9R	415	5.6+37.7R	407	5.4+33.9R	400	5.2+30.8R
	24	368	7.6+56.5R	359	7.4+52.2R	351	7.2+48.4R	344	7+45.2R	338	6.8+42.4R	333	6.7+39.9R	328	6.5+37.7R	320	6.3+33.9R	314	6+30.8R
	36	281	9.3+56.5R	272	9+52.2R	264	8.8+48.4R	257	8.6+45.2R	251	8.4+42.4R	246	8.2+39.9R	242	8+37.7R	234	7.7+33.9R	227	7.4+30.8R
19	12	883	4.7+35.5R	868	4.6+32.8R	855	4.5+30.4R	844	4.4+28.4R	834	4.3+26.6R	826	4.2+25.1R	818	4.1+23.7R	805	3.9+21.3R	795	3.8+19.4R
	18	648	5.7+35.5R	632	5.6+32.8R	619	5.4+30.4R	608	5.3+28.4R	598	5.1+26.6R	590	5+25.1R	582	4.9+23.7R	569	4.7+21.3R	559	4.6+19.4R
	24	530	6.6+35.5R	514	6.4+32.8R	501	6.2+30.4R	490	6.1+28.4R	480	5.9+26.6R	472	5.8+25.1R	464	5.7+23.7R	451	5.5+21.3R	441	5.3+19.4R
	36	412	7.9+35.5R	396	7.7+32.8R	383	7.5+30.4R	372	7.3+28.4R	362	7.2+26.6R	354	7.1+25.1R	346	6.9+23.7R	333	6.7+21.3R	323	6.5+19.4R
18	12	1166	4.2+24.3R	1143	4.1+22.5R	1124	4+20.9R	1108	3.9+19.5R	1093	3.8+18.3R	1081	3.7+17.2R	1070	3.6+16.2R	1051	3.5+14.6R	1036	3.4+13.3R
	18	862	5+24.3R	840	4.9+22.5R	821	4.8+20.9R	805	4.7+19.5R	790	4.6+18.3R	778	4.5+17.2R	766	4.4+16.2R	748	4.2+14.6R	732	4.1+13.3R
	24	711	5.7+24.3R	688	5.6+22.5R	669	5.5+20.9R	653	5.3+19.5R	639	5.2+18.3R	626	5.1+17.2R	615	5+16.2R	596	4.9+14.6R	581	4.7+13.3R
	36	559	6.8+24.3R	537	6.7+22.5R	518	6.5+20.9R	501	6.4+19.5R	487	6.3+18.3R	474	6.2+17.2R	463	6.1+16.2R	444	5.9+14.6R	429	5.7+13.3R
16	12	1741	3.3+12R	1724	3.2+11.1R	1713	3.1+10.3R	1705	3+9.6R	1700	3+9R	1697	2.9+8.5R	1696	2.9+8R	1696	2.8+7.2R	1696	2.7+6.5R
	18	1307	3.9+12R	1285	3.8+11.1R	1268	3.7+10.3R	1254	3.6+9.6R	1243	3.6+9R	1235	3.5+8.5R	1229	3.4+8R	1221	3.3+7.2R	1211	3.2+6.5R
	24	1090	4.4+12R	1065	4.3+11.1R	1045	4.2+10.3R	1029	4.1+9.6R	1015	4.1+9R	1004	4+8.5R	995	3.9+8R	982	3.8+7.2R	968	3.7+6.5R
	36	874	5.1+12R	846	5+11.1R	823	5+10.3R	803	4.9+9.6R	787	4.8+9R	773	4.8+8.5R	761	4.7+8R	743	4.6+7.2R	725	4.5+6.5R
PRODUCT:		ER3.5A ^{1,2,3,4,5,6,7,8,9}																	
SUPPORT CONNECTIONS/LAYOUT:		$\frac{1}{2}$ " DIAMETER (EFFECTIVE) ARC SPOT WELDS, 24/6 PATTERN																	
SIDE LAP CONNECTIONS:		1.5" LONG ARC SEAM WELDS OR 2.0" LONG FILLET WELDS																	
GAGE	SIDE LAP CONN. SPACING (in)	LENGTH OF SPAN, CENTER-TO-CENTER DISTANCE BETWEEN SUPPORTS (ft)																	
		12		13		14		15		16		17		18		20		22	
		q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F	q_D	F
20	12	604	4.9+56.5R	597	4.7+52.2R	591	4.6+48.4R	586	4.5+45.2R	581	4.4+42.4R	577	4.3+39.9R	573	4.2+37.7R	567	4.1+33.9R	562	4+30.8R
	18	431	5.9+56.5R	424	5.7+52.2R	418	5.5+48.4R	413	5.4+45.2R	408	5.3+42.4R	404	5.1+39.9R	400	5+37.7R	394	4.8+33.9R	389	4.7+30.8R
	24	345	6.8+56.5R	338	6.6+52.2R	331	6.4+48.4R	326	6.2+45.2R	321	6.1+42.4R	317	5.9+39.9R	314	5.8+37.7R	307	5.6+33.9R	302	5.4+30.8R
	36	258	8.3+56.5R	251	8+52.2R	245	7.8+48.4R	239	7.6+45.2R	235	7.4+42.4R	231	7.3+39.9R	227	7.1+37.7R	221	6.8+33.9R	216	6.6+30.8R
19	12	809	4.2+35.5R	806	4.1+32.8R	804	4+30.4R	803	3.9+28.4R	803	3.8+26.6R	801	3.8+25.1R	795	3.7+23.7R	784	3.6+21.3R	776	3.5+19.4R
	18	583	5.1+35.5R	578	5+32.8R	574	4.8+30.4R	571	4.7+28.4R	569	4.6+26.6R	565	4.5+25.1R	559	4.4+23.7R	549	4.2+21.3R	540	4.1+19.4R
	24	471	5.9+35.5R	464	5.7+32.8R	459	5.5+30.4R	455	5.4+28.4R	451	5.3+26.6R	447	5.2+25.1R	441	5+23.7R	431	4.9+21.3R	422	4.7+19.4R
	36	358	7.1+35.5R	350	6.9+32.8R	344	6.7+30.4R	338	6.6+28.4R	334	6.4+26.6R	329	6.3+25.1R	323	6.2+23.7R	313	5.9+21.3R	304	5.7+19.4R
18	12	967	3.8+24.3R	962	3.7+22.5R	960	3.6+20.9R	959	3.5+19.5R	959	3.4+18.3R	959	3.3+17.2R	959	3.3+16.2R	959	3.2+14.6R	959	3.1+13.3R
	18	703	4.5+24.3R	696	4.4+22.5R	690	4.3+20.9R	686	4.2+19.5R	683	4.1+18.3R	681	4+17.2R	680	3.9+16.2R	680	3.8+14.6R	680	3.7+13.3R
	24	571	5.1+24.3R	562	5+22.5R	555	4.9+20.9R	549	4.8+19.5R	545	4.7+18.3R	542	4.6+17.2R	539	4.5+16.2R	536	4.3+14.6R	535	4.2+13.3R
	36	439	6.2+24.3R	429	6+22.5R	420	5.9+20.9R	413	5.8+19.5R	407	5.7+18.3R	402	5.5+17.2R	398	5.4+16.2R	392	5.3+14.6R	388	5.1+13.3R
16	12	1297	2.9+12R	1290	2.9+11.1R	1285	2.8+10.3R	1283	2.8+9.6R	1283	2.7+9R	1283	2.7+8.5R	1283	2.6+8R	1283	2.5+7.2R	1283	2.5+6.5R
	18	956	3.5+12R	944	3.4+11.1R	935	3.3+10.3R	928	3.3+9.6R	924	3.2+9R	920	3.2+8.5R	918	3.1+8R	917	3+7.2R	917	2.9+6.5R
	24	785	4+12R	771	3.9+11.1R	760	3.8+10.3R	751	3.7+9.6R	744	3.7+9R	739	3.6+8.5R	734	3.5+8R	729	3.4+7.2R	727	3.3+6.5R
	36	614	4.7+12R	598	4.6+11.1R	585	4.5+10.3R	573	4.4+9.6R	564	4.4+9R	557	4.3+8.5R	550	4.2+8R	541	4.1+7.2R	534	4+6.5R

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf / ft = 14.6 N/m

TABLE 9—DIAPHRAGM FLEXIBILITY LIMITATIONS^{1,2,3,4,5}

FLEXIBILITY FACTOR, F ³	MAXIMUM SPAN FOR MASONRY OR CONCRETE WALLS (feet)	SPAN / DEPTH LIMITATION			
		Rotation Not Considered in Diaphragm		Rotation Considered in Diaphragm	
		Masonry or Concrete Walls	Flexible Walls ⁴	Masonry or Concrete Walls	Flexible Walls ⁴
Over 150	Not used	Not used	2 : 1	Not used	1 1/2 : 1
70 - 150	200	2:1, or as required for deflection	3 : 1	Not used	2 : 1
10 - 70	400	2 1/2:1, or as required for deflection	4 : 1	As required for deflection	2 1/2 : 1
1 - 10	No limitation	3:1, or as required for deflection	5 : 1	As required for deflection	3 : 1
Less than 1	No limitation	As required for deflection	No limitation	As required for deflection	3 1/2 : 1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psi = 6.89 kPA, 1 psf = 4.88 kg/m², 1 plf = 14.6 N/m

¹ Diaphragms are to be investigated regarding their flexibility and recommended span-depth limitations. Refer to Table 8 for determination of the value F.

² Diaphragms supporting masonry or concrete walls are to have their deflections limited to the following amount:

$$\Delta_{\text{wall}} = (H^2 / 0.01E_c) f_c$$

where:

E = Modulus of elasticity of wall material for deflection determination, in pounds per square inch.

f_c = Allowable compressive strength of wall material in flexure, in pounds per square inch.

For concrete, f_c = 0.45 f'_c

For masonry, f_c = F_b = 0.33 f'_m

H = Unsupported height of wall, in feet.

t = Thickness of wall, in inches.

³ The total deflection, Δ, of the diaphragm may be computed from the equation:

$$\Delta = \Delta_f + \Delta_w$$

where:

Δ_f = Flexural deflection of the diaphragm determined in the same manner as the deflection of beams.

Δ_w = Web deflection determined by the equation:

$$\Delta_w = (q_{\text{avg}} L_1 F) / 10^6$$

where:

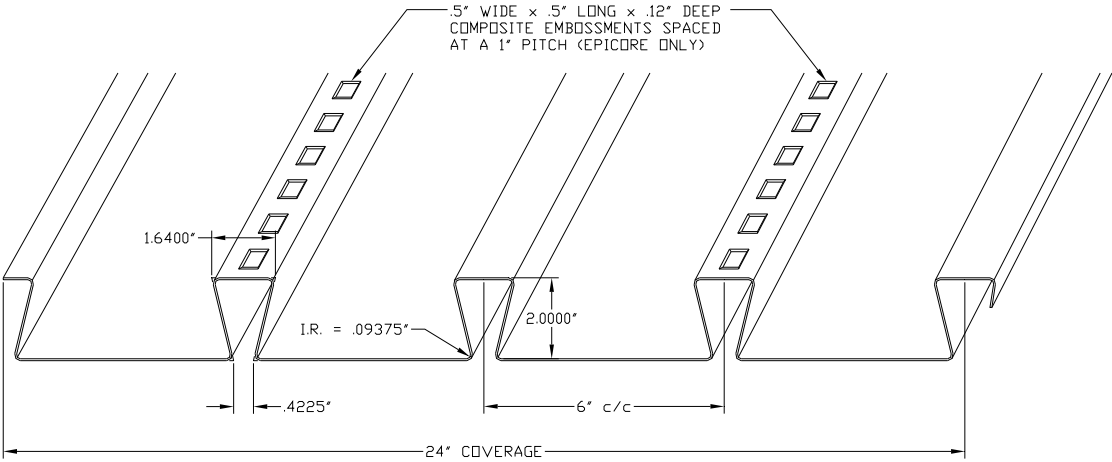
F = Flexibility factor (the average micro-inches a diaphragm web will deflect in a span of 1 foot under a shear of 1 pound per foot).

L₁ = Distance between vertical resisting element (such as shear wall) and the point to which the deflection is to be determined, in feet.

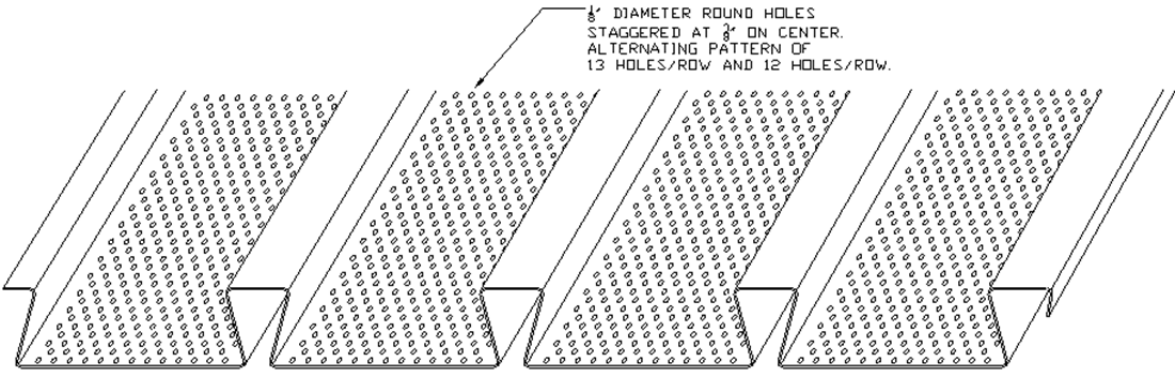
q_{avg} = Average shear in diaphragm, in pounds per square foot, over length L₁.

⁴ When applying these limitations to cantilevered diaphragms, the allowable span-depth ratio will be half that shown.

⁵ Diaphragm classification (flexible or rigid) and deflection limits must comply with Section 4.3.2 of the report.

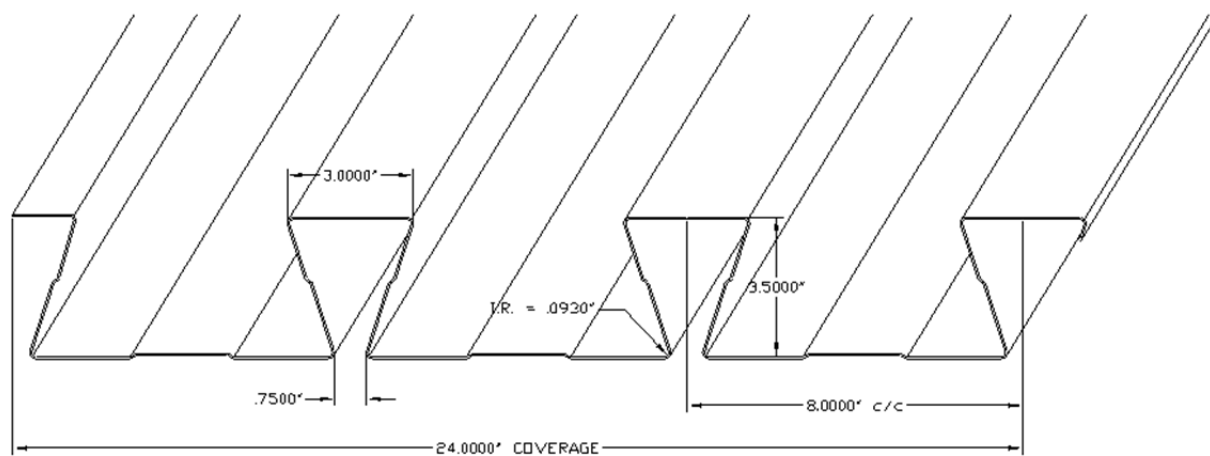


(a)—PROFILE DIMENSIONS FOR EPICORE, ER2R AND ER2RA

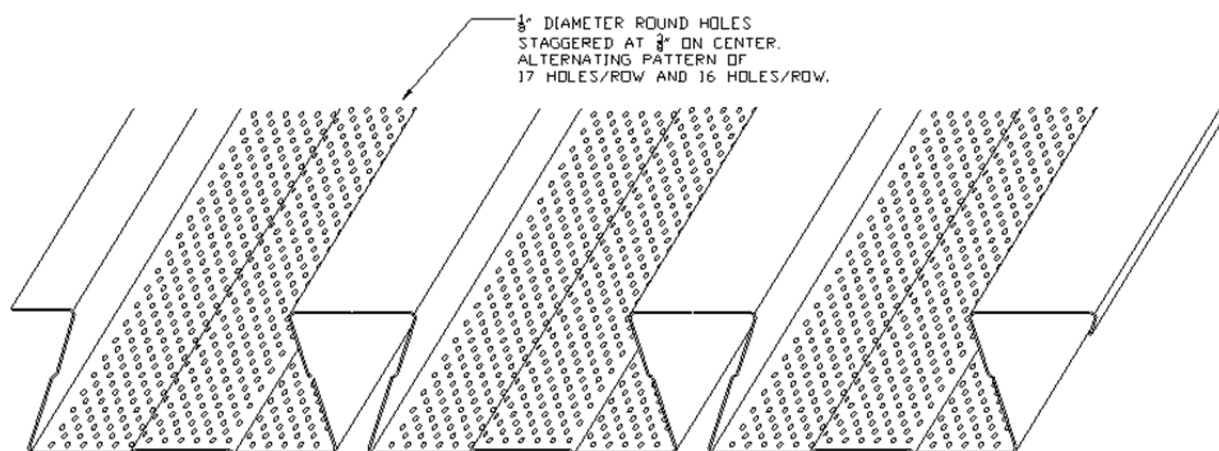


(b)—PERFORATION PATTERN FOR ER2RA

FIGURE 1—PROFILE FOR EPICORE, ER2R, AND ER2RA



(a)—PROFILE DIMENSIONS FOR ER3.5 AND ER3.5A



(b)—PERFORATION PATTERN FOR ER3.5A

FIGURE 2— PROFILE FOR ER3.5 AND ER3.5A

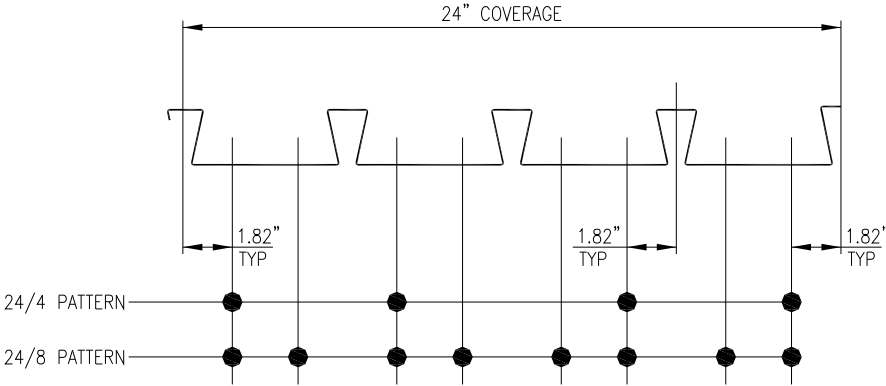


FIGURE 3—END WELD PATTERNS FOR EPICORE, ER2R AND ER2RA:
 $\frac{1}{2}$ "-INCH-DIAMETER EFFECTIVE ARC SPOT WELD PATTERNS FOR CONNECTIONS TO SUPPORTING MEMBER

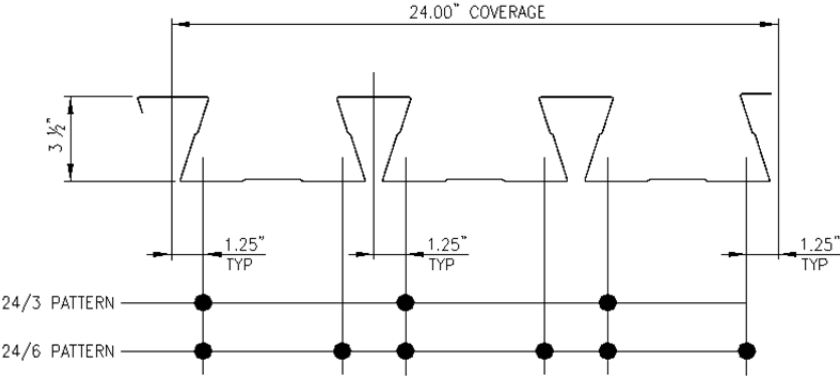
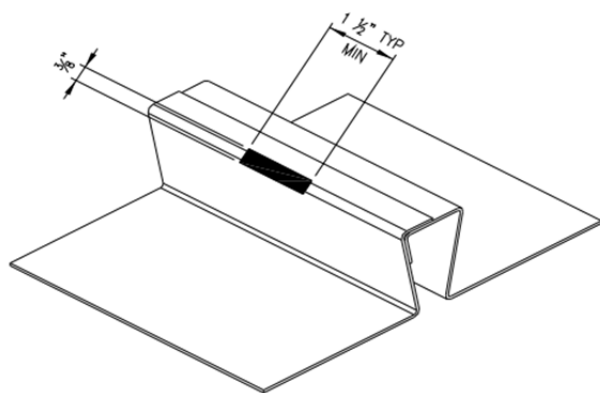
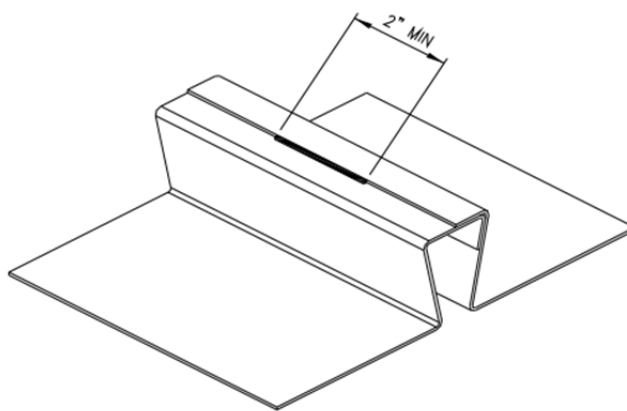


FIGURE 4—END WELD PATTERNS FOR ER3.5 AND ER3.5A:
 $\frac{1}{2}$ "-INCH-DIAMETER EFFECTIVE ARC SPOT WELD PATTERNS FOR CONNECTIONS TO SUPPORTING MEMBER



(a) CTYPICAL ARC SEAM WELDS AT SIDE LAP



(b) CALTERNATE FILLET WELD AT SIDE LAP EDGE

FIGURE 5—WELDS FOR EPICORE, ER2R, ER2RA, ER3.5 AND ER3.5A

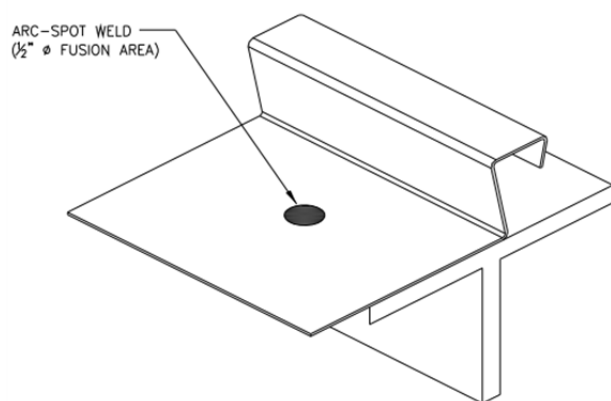
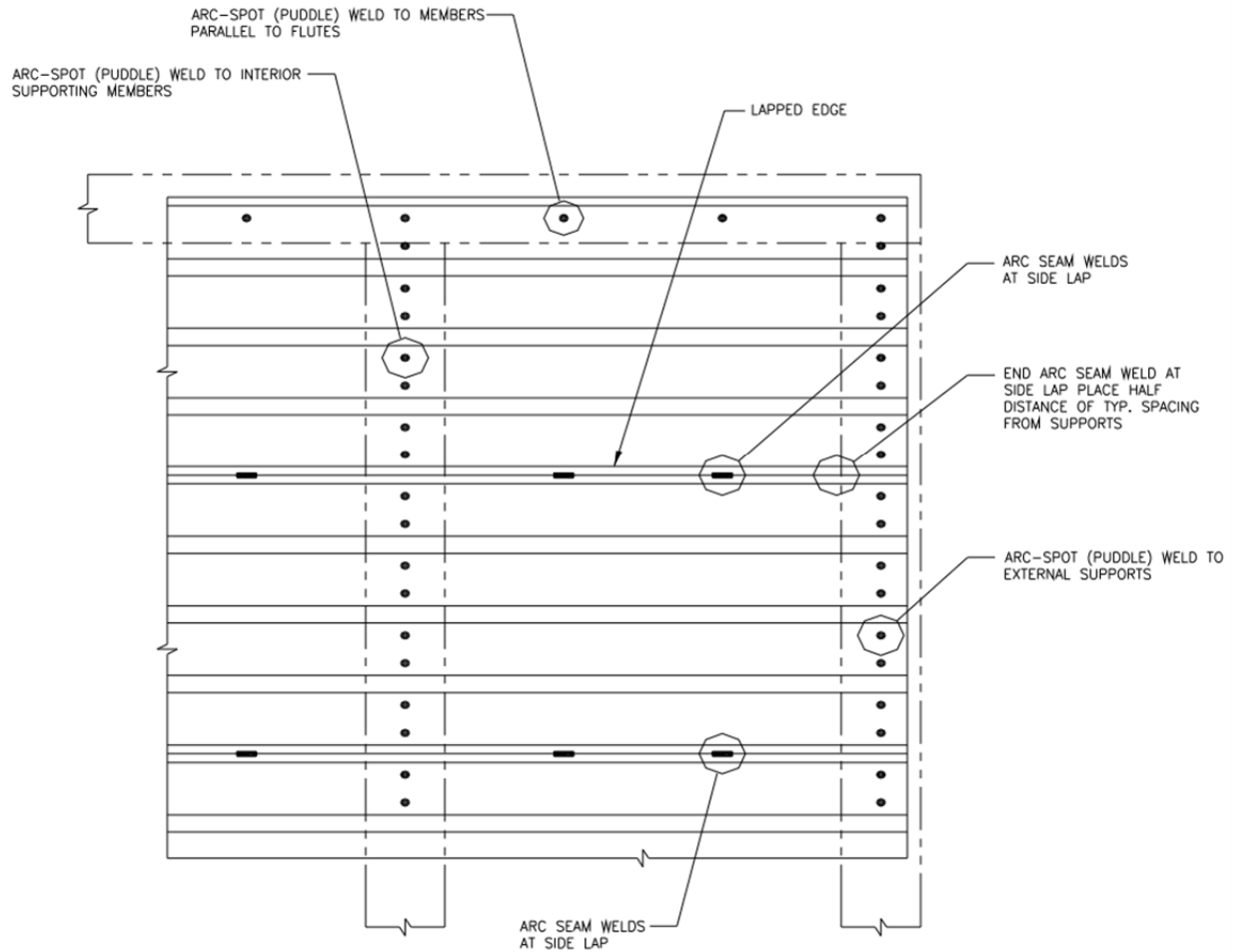


FIGURE 6—TYPICAL ARC SPOT WELD AT
SUPPORTING MEMBER PARALLEL TO FLUTE
FOR ALL DECK PROFILES
(ALTERNATELY, $\frac{3}{8}$ -INCH-BY-1-INCH ARC SEAM WELDS SHALL
BE USED)



1. WHEN THE ATTACHMENTS TO SUPPORTS PARALLEL TO FLUTES CANNOT BE MADE TO LOWER FLUTE OF THE DECK SECTION, SPECIAL MEMBERS SHALL BE ADDED AS NECESSARY TO DEVELOP THE REQUIRED CAPACITY OF THE DIAPHRAGM.
2. SEAM ATTACHMENTS MUST BE TOP SEAM WELD.

FIGURE 7—TYPICAL STEEL DECK DIAPHRAGM LAYOUT FOR EPICORE, ER2R, ER2RA, ER3.5, AND ER3.5A

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EVALUATION SUBJECT:**EPICORE, ER2R, ER2RA, ER3.5 AND ER3.5A STEEL DECK PANELS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that EPICORE, ER2R, ER2RA, ER3.5 and ER3.5A steel deck panels, recognized in ICC-ES master evaluation report ESR-2047, have also been evaluated for compliance with Chapters 22 and 22A of the code noted below.

Applicable code edition:

2013 *California Building Code* (CBC)

2.0 CONCLUSIONS

The EPICORE, ER2R, ER2RA, ER3.5 and ER3.5A steel deck panels, described in Sections 2.0 through 7.0 of the master evaluation report ESR-2047, comply with CBC Chapters 22 and 22A, provided the design and installation are in accordance with the 2012 *International Building Code*® (IBC) provisions noted in the master report and the additional requirements of the CBC Chapters 16, 16A, 17, 17A, 22 and 22A, as applicable.

This supplement expires concurrently with the master report, reissued July 2015.