

Robertson Long Span Roof Deck Simplicity . . . Flexibility

The essence of a designer's wish is expressed in Robertson LS Deck units . . . simplicity of design . . . flexibility of application. The deck unit is available in 4.5", 6.0" and 7.5" depths, in 20, 18, 16 and 14 gauges, permitting spans to 32' for certain roof loads. (See property tables on page 11.) Longer lengths, up to 50', can be obtained for overhangs.

Unique design, efficient use of metal, plus the Robertson "stiffened web", achieve an exceptional strength-weight ratio for maximum economy. Complete uniformity is insured by cold forming in a continuous rolling operation.

The architect may select almost any type of ceiling treatment. LS Deck can be left exposed for various ap-

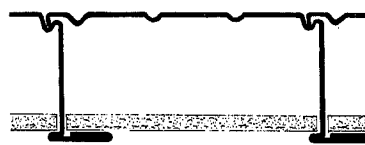
plications; canopies, loading docks or other similar uses. It can be finished at any time with recessed lights and acoustic tile for schools, offices and other similar structures.

LS Deck is designed in accordance with American Iron & Steel Institute's specifications for light gauge structural members. With its continuous top sheet, it is easily adapted for use as a roof diaphragm for the transmittal of lateral forces due to seismic action or wind. A series of seven full scale tests, conducted at Cornell University by an independent consulting structural engineer, substantiate the performance of LS Deck for this usage. Table on page 11 lists lateral diaphragm design shears for the various depths, type and gauge sections.

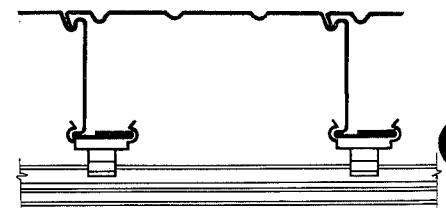
COMPLETE CEILING VERSATILITY

acoustical treatment

Acoustical tiles or pans offering a variety of aesthetic and color effects may be inserted on the integral shelf of the lower flanges of LS Deck for a finished acoustical ceiling. The resultant system, with standard acoustical units, produces a Noise Reduction Coefficient range of .70 to .80, based on tests conducted at Riverbank Acoustical Laboratories.



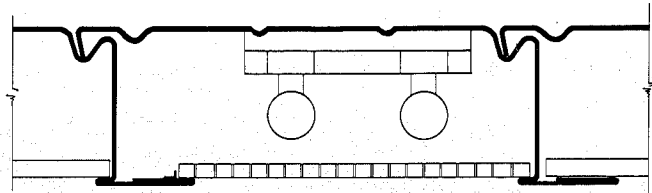
ACOUSTICAL TILE
OR BOARD



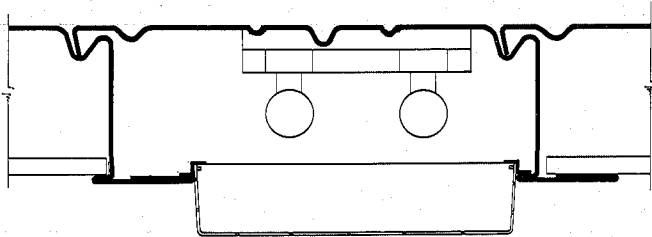
SUSPENDED METAL PAN

lighting

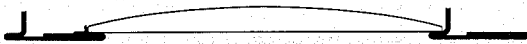
Various types of standard fluorescent fixtures can be readily installed in the space between webs of the deck units to provide a "recessed troffer" lighting effect. Interior surfaces of deck recess may be painted white to afford greater reflectivity. The integral lower flange shelves provide ready support for the diffuser which should be positively attached to prevent unintentional dislodgement, yet allow access for maintenance.



PLASTIC LOUVER



SNAP-IN PLEXIGLAS



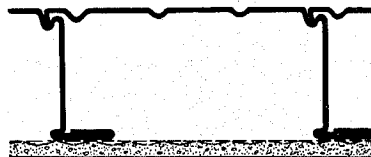
HOLOPHANE LENS



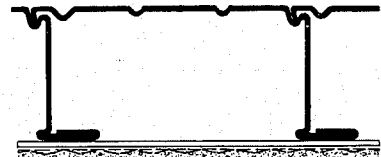
PRISMATIC PLASTIC LENS

fireproofing

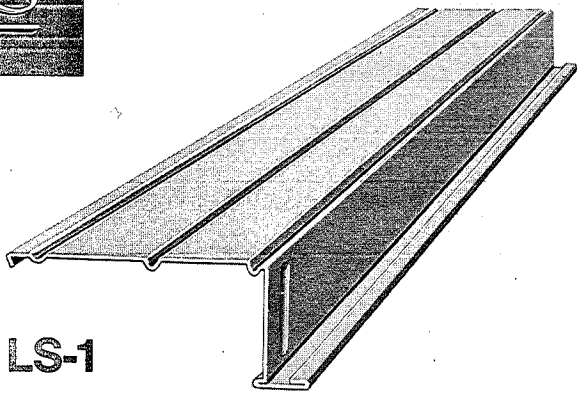
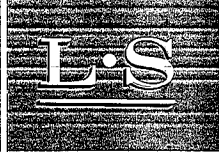
Where areas require fire-rated construction, sprayed on ceiling protection provides a simple economical method of acquiring the necessary hourly rating.



SPRAYED-ON
ACOUSTIC
FIREPROOFING

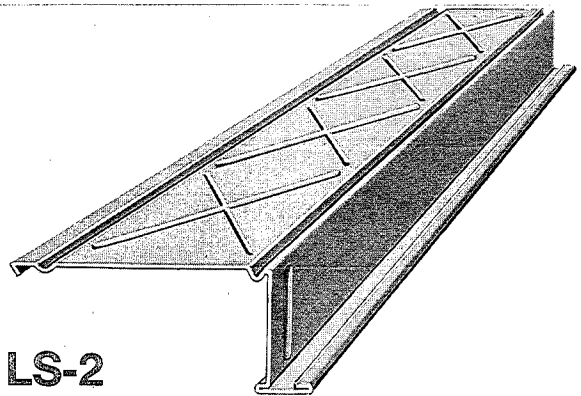


1/4" DIA. WELDED RODS
WITH SPRAYED-ON
ACOUSTIC FIREPROOFING



LS-1

LS-1 and LS-2 differ in their distribution of metal and the method of top (compression) flange stiffening to achieve a maximum strength property range with a minimum number of sections. LS-1 is designed for HEAVIER than normal roof loads or where MODERATE seismic or wind shear forces must be handled with nominal horizontal deflection.



LS-2

LS-2 is recommended for NORMAL roof loads or where HIGH seismic or wind shear forces must be handled with minimum horizontal deflections. The "X" pattern of the stiffening embossments acts similar to structural "X" bracing, resulting in higher load carrying ability and lower horizontal deflection under seismic or wind loading.

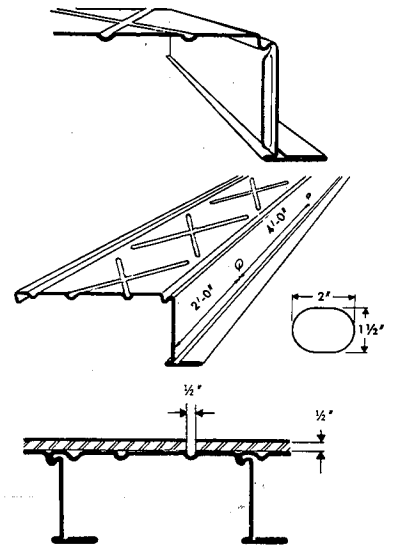
features

INTEGRAL WEB STIFFENER—In balanced design, Robertson's LS web element is sufficient for shear transfer. The exclusive "web stiffener," formed as an integral part of the section, provides web strength exceeding that of two unstiffened webs of equal gauge, as determined by witnessed tests, results of which are available upon request.

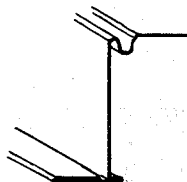
ACCESS HOLES—Electrical wiring perpendicular to the span of LS Deck is usually accomplished at butt joints. However, when specified, Robertson supplies LS Deck with two access holes near one end of the unit. These afford additional access for cross-wiring and connections without extending above or below the deck structure.

FLAT TOP PLATE—The top plate opening of only 5/8" permitting the use of a minimum 1/2" thickness of roof insulation, presents a supporting area of nearly 100% for the insulation and a ready, flat working surface.

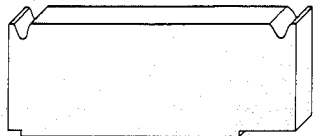
VAPOR PERMEABILITY—Recent tests run by the engineering department of a leading University using the desiccant method of ASTM C 355-59T for the rate of water vapor transmission of LS Deck, established an average of only .25 perm. This eliminates the necessity of vapor barriers on LS Deck.



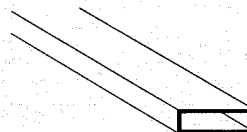
accessories



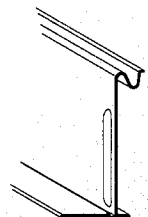
REINFORCING WEB



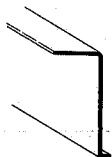
NEOPRENE PROFILE CLOSURE
For sound and sight



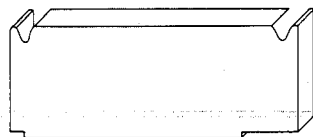
HOLE REINFORCING TUBE
3 1/2" x 1" x 14 GA.



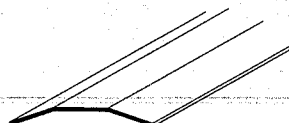
STARTING CHANNEL



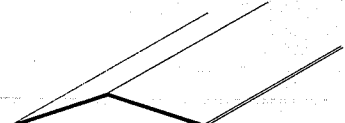
"Z" PLATE



14 GAUGE PROFILE PLATE



BUTT JOINT SHEAR AND COVER PLATE



RIDGE PLATE

SEISMIC SHEAR TRANSFER ELEMENTS

properties

Section & Gauge	Wt./Sq. Ft. Lbs.	Overall Depth	I In. ⁴	S.M. In. ³	Coeff. Of Strength In Bending	Coeff. Of Deflection		Web Strength* Value 2" Min. Bearing/End/Ft. of Width
						L/360	L/240	
7.5 LS2-18	4.3	7.548	9.10	2.03	27070	397710	596560	1260
7.5 LS2-16	5.5	7.560	13.00	2.98	39730	568150	852230	2110
7.5 LS1-18	4.5	7.548	11.73	2.46	32800	512650	768970	1260
7.5 LS1-16	5.6	7.560	15.30	3.11	41470	668670	1003010	2110
7.5 LS1-14	6.9	7.575	19.72	3.92	52270	861840	1292760	2110
6.0 LS2-20	3.1	6.036	3.95	1.14	15200	172630	258950	580
6.0 LS2-18	4.0	6.048	5.55	1.53	20400	242560	363840	1290
6.0 LS1-18	4.3	6.048	7.21	1.87	24930	315110	472660	1290
6.0 LS1-16	5.2	6.060	9.40	2.36	31470	410820	616230	2050
4.5 LS2-20	2.8	4.536	2.05	0.77	10230	89580	134390	380
4.5 LS2-18	3.7	4.548	2.88	1.03	13730	125870	188800	950
4.5 LS1-18	4.0	4.548	3.87	1.32	17600	169130	253700	950
4.5 LS1-16	5.0	4.560	5.03	1.66	22130	219830	329750	1530

design shears

Depth	Deck Type	Gauge	Design Shear (#/LF)*
4.5	LS2	20	510
4.5	LS2	18	860
4.5	LS1	18	790
4.5	LS1	16	890
6.0	LS2	20	510
6.0	LS2	18	860
6.0	LS1	18	575
6.0	LS1	16	650
7.5	LS2	18	860
7.5	LS2	16	970
7.5	LS1	18	575
7.5	LS1	16	650
7.5	LS1	14	720

NOTES:

- Web strength values for LS deck derived from test data.
- All tabulation has been computed in accordance with the A.I.S.I. "Standard Specifications for Design of Light Gauge Steel." Values given are for 12" width.
- Coefficients of Strength and Deflection given are for simple spans. To obtain the uniformly distributed load in pounds per square foot, which any section will carry on a simple span at stress not to exceed 20,000 p.s.i., divide coefficient of strength of that section by span in feet squared. To find the uniformly distributed live load permissible for a deflection not to exceed L/240 or L/360 of a span (as required) divide coefficient of deflection by the span in feet cubed.
- Properties apply to simple span condition only. For multiple span and cantilever conditions consult H. H. R. Co. District Office.
- When specifying LS deck units, designate by depth, type and gauge. As an example, 7.5 LS-2-18 would indicate 7.5" depth LS-2 type in 18 gauge material.

*All recommended design shear values in the above table are based on a safety factor of 3 applied to the failure shear values from tests. This is the generally accepted safety factor for use in designing light gauge steel diaphragms to resist seismic action or wind. The above design shear values are applicable for all deck spans up to the maximum span for each deck unit under vertical loading.

selection table Total Load (dead + live) shown in pounds per square ft.

LS 7.5	Type of Span	Rib Depth	Unit Type & Gauge	Purlin Spacing												
				20'-0"	21'-0"	22'-0"	23'-0"	24'-0"	25'-0"	26'-0"	27'-0"	28'-0"	29'-0"	30'-0"	31'-0"	32'-0"
MAX. LENGTH 50'-0"	Simple Span	7.5"	LS2-18	68	61	56	51	47	43	40	37	35	32	30	28	26
			LS1-18	82	74	68	62	57	52	49	45	42	39	36	34	32
			LS2-16	99	90	82	75	69	64	59	55	51	47	44	41	39
			LS1-16	104	94	86	78	72	66	61	57	53	49	46	43	40
			LS1-14	131	119	108	99	91	84	77	72	67	62	58	54	51
LS 6.0	Type of Span	Rib Depth	Unit Type & Gauge	Purlin Spacing												
				16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	23'-0"	24'-0"	25'-0"	26'-0"	27'-0"	28'-0"
MAX. LENGTH 50'-0"	Simple Span	6.0"	LS2-20	59	53	47	42	38	34	31	29	26	24	22	21	19
			LS2-18	80	71	63	57	51	46	42	39	35	33	30	28	26
			LS1-18	97	86	77	69	62	57	52	47	43	40	37	34	32
			LS1-16	123	109	97	87	79	71	65	59	55	50	47	43	40
LS 4.5	Type of Span	Rib Depth	Unit Type & Gauge	Purlin Spacing												
				10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"
MAX. LENGTH 50'-0"	Simple Span	4.5"	LS2-20	75*	69*	63*	58*	52	45	40	35	32	28	26	23	21
			LS2-18	137	113	95	81	70	61	54	48	42	38	34	30	28
			LS1-18	176	145	122	104	90	78	69	61	54	48	43	38	35
			LS1-16	221	183	154	131	113	98	86	77	68	60	53	48	43

- NOTES: 1. *Indicates end bearing governs. 2. For multiple span and cantilever conditions consult H.H.R. Company District Office. 3. In this table the dead load was assumed to be the weight of the deck and 7 p.s.f. for insulation and built-up roofing.

SPECIFICATION LS DECK

1. **GENERAL**—All roof areas noted on the plans shall be covered with LS deck as manufactured by H. H. Robertson Company.

2. **MATERIAL**—LS deck and flashing shall be formed from steel sheets conforming to ASTM A-245-64. The steel shall have received before being formed, a metal protective coating of zinc conforming to ASTM A525-65T wiped coating and to Federal Specification QQ-S-775 c Type 1, class e. Units shall be (select depth, type and gauge in accordance with the following nomenclature): Examples: 4.5 LS1-16, 7.5 LS2-18, etc.

3. **CONSTRUCTION**—LS deck shall consist of a one piece, single web section, having integral stiffening ribs formed in the top flange. Deck units shall have a lower flange $2\frac{7}{8}$ " wide to provide maximum lateral stability and an integral shelf on each side of the web for support of acoustical or light diffusing elements. At the ends of deck units, vertical stiffening ribs shall be impressed as an integral part of the webs to provide a web strength equal to or exceeding that of two unstiffened webs. The webs (shall) (shall not) (select one) have shop-punched electrical access holes for transverse passage of wiring. Side joints shall be interlocking (male-female) and continuous for the length of the section. LS deck shall have a coverage width of 12". The sections shall be formed in 4.5", 6" and 7.5" depth, of 20, 18, 16 and 14 USS gauge steel and of types LS1 and LS2 as designated in "Material" above.


4. **SHOP FINISH**—LS deck shall have the standard metal coated finish without any additional shop treatment.

5. **DESIGN**—LS deck shall be capable of carrying the specified total loads with a maximum fiber stress not to exceed 20,000 psi on the actual thickness of metal. Maximum allowable deflection under roof live load shall not exceed $(L/240)$ $(L/360)$ of the span length. Design load (dead load + live load) shall be taken from the contract drawings without allowance for impact. Deck design is to be in accordance with the American Iron and Steel Institute's "Specification for the Design of Light Gage Cold-Formed Steel Structural Members, 1962."

LS Deck shall be capable of providing continuous bracing for the compression flange of all horizontal roof supporting members such as beams, girders, arches and trusses so that the compression flange can carry the full design stress. Welding of the deck shall be proportioned to the bracing force required. (Design specifications to state the minimum horizontal shear values to be provided by the deck).

6. **ERECTION**—LS deck, as manufactured by H. H. Robertson Company, is to be installed by qualified deck erector. All LS deck shall be laid in strict accordance with the manufacturer's instructions below and as shown on the layout prepared for erector's use.

1. Inaccuracies in alignment or level of supporting members shall be brought to the attention of the proper parties in writing and corrected by others before the deck is placed to insure compliance of supporting steel, plates or walls with the design drawings and deck manufacturer's layout details.

2. Starting Point—all starting points are shown on the LS Deck layout thus; 

3. Weld starting web to supports with fillet welds centered at the base of bottom flange. Hold 90° angle between web and support.

4. Place succeeding units, performing each of the following 3 operations, in order, before proceeding to the next unit.

A. Place next unit.

Locate the leading edge of bottom flange and weld to supports with welds centered at base of bottom flanges.

B. Check and hold 90° angle between web and support.

C. Weld top longitudinal joints at each end of deck unit.
Note: Side of $\frac{1}{2}$ " lip not necessarily in contact with side

of female joint, since holding coverage at bottom flange and 90° angle of webs to support governs.

5. Proceed with remaining longitudinal joint, welding 2'-6" on centers, or as otherwise specified in detail.

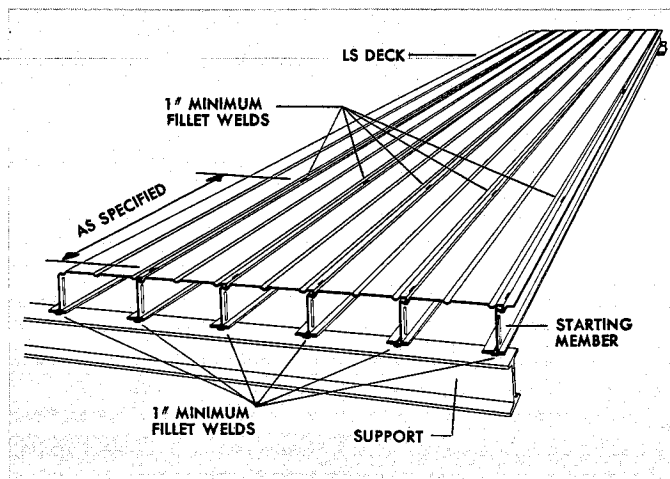
6. Place succeeding sheet in the initial bay in the same manner, making certain that units are welded as they are placed. Longitudinal joint welding can be done as each sheet is laid or after the entire deck is in place, depending on size of the job. The erector shall decide which procedure is most economical in each case.

7. LS Deck installed in adjoining bays in the same manner must be aligned, web for web, and immediately welded.

8. After welds have cooled, apply a touch-up coat of a suitable aluminum colored metal primer.

9. The treatment of end joints will vary with job requirements. The proper details for a given job will be indicated on the LS Deck layout.

10. Insert rubber void closures, where required.



7. WORK TO BE INCLUDED IN OTHER CONTRACTS

(a) **Painting**—The field preparation and painting of the exposed surface of the metal coated steel deck shall be covered under the General Painting Specifications.

(b) **Acoustic Treatment**—Furnishing and application of the acoustic treatment shall be covered under the Acoustic Specifications.

(c) **Lighting**—Furnishing and installation of lighting shall be covered under the Electrical, Wiring and Lighting Specifications. The electrical contractor shall inspect all LS Deck installations to determine that opening width and height dimensions are acceptable for fixture installation and diffuser attachment.

(d) **Steel Framing**—All structural steel and structural steel attachments required to adequately support the deck shall be furnished by others. All steel framing shall be erected in conformance with the tolerances set forth in the AISC Standard Code of Practice.

(e) **Miscellaneous**—All trades whose work involves the cutting of holes, reinforcing or drilling of deck, shall furnish all work and labor necessary and at the cost of those trades. All such work done shall be in strict accordance with the deck manufacturer's instructions and in a neat, workmanlike manner, without damage to roof deck units or accessories.

(f) **Built-up Roofing**—(1) Insulation shall be as required (minimum $\frac{1}{2}$ " thick) and shall be applied according to manufacturer's recommendation. (2) Roofing shall be mopped to the insulation according to the manufacturer's recommendations (to be furnished and installed by the built-up roofing contractor).