

PLAINTIFF'S EXHIBIT

KG-224

KAISER GYPSUM


NULL-A-FIRE

$\frac{5}{8}$ " GYPSUM WALLBOARD

ONE HOUR FIRE RESISTANCE

A TEST REPORT BY THE BUREAU OF STANDARDS, U.S. DEPT. OF COMMERCE
ASTM Designation: G-1.1-59

- ☐ NON-LOAD BEARING PARTITIONS
- ☐ LOAD BEARING PARTITIONS . . .
- ☐ CEILING CONSTRUCTION

A PRODUCT OF



KAISER GYPSUM
COMPANY, INC.
LOS ANGELES

NO. 2

BUILDING CODE ACCEPTANCE

ICBO Research Report No. 2075 covers Designs 23 - 1 hr. and Design 88 - 2 hr., for use of the lay-in panels with Kaiser Fire-Rated Grid.

MAINTENANCE

Kaiser Fire-Rated Acoustical Products may be easily cleaned with mild soap and water, wallpaper cleaner, or a vacuum cleaner. They also may be repainted a number of times using a brush, or spray gun, without loss of sound absorption, provided reasonable care is taken to keep the holes open.

LIMITATIONS

Kaiser Fire-Rated Acoustical Products are not recommended for use in areas where they will be subject to impact or abuse, or in areas of excessive or continuing high humidity.

SOUND ABSORPTION

High sound absorption values tested in accordance with ASTM Method of Test for Sound Absorption of Acoustical Materials in Reverberation Rooms Designation C 423-60T.

Pattern	Thick- ness	Mounting	Sound Absorption Coefficients						NRC Spec. Range
			125 cps	250 cps	500 cps	1000 cps	2000 cps	4000 cps	
Swirl Pin-Punched Lay-In	1/2"	7	.27	.32	.54	.78	.66	.49	.55 - .65
	5/8"	7	.33	.43	.66	.84	.68	.56	.65 - .75
Fissured Lay-In	1/2"	7	.23	.30	.51	.79	.78	.74	.55 - .65
	5/8"	7	.24	.34	.61	.87	.85	.82	.65 - .75
Non-directional Fissured Lay-In	5/8"	7	.24	.32	.53	.81	.84	.76	.65 - .75
Fissured Tile	5/8"	7	.35	.36	.63	.74	.64	.61	.50 - .60
Swirl Pin-Punched Tile	5/8"	7	.35	.36	.68	.67	.47	.32	.50 - .60
Mounting No. 7 - Mechanically mounted on metal supports - 16" air space.									

SOUND ATTENUATION

When used in suspended ceilings with ceiling-height partitions, Kaiser Fire-Rated Acoustical Products provide a high sound transmission loss value when tested in accordance with Acoustical Materials Association Tentative Method of Test AMA I-II "Ceiling Sound Transmission Test by the Two-Room Method."

Pattern	Thick- ness	Standard Mounting	Attenuation Factors - Decibels - AMA I-II - 1963											Ceiling STC
			125 cps	175 cps	250 cps	350 cps	500 cps	700 cps	1000 cps	1400 cps	2000 cps	2800 cps	4000 cps	
Fissured Tile	5/8"	CCF	32	36	35	38	40	42	49	55	57	53	48	40 - 44

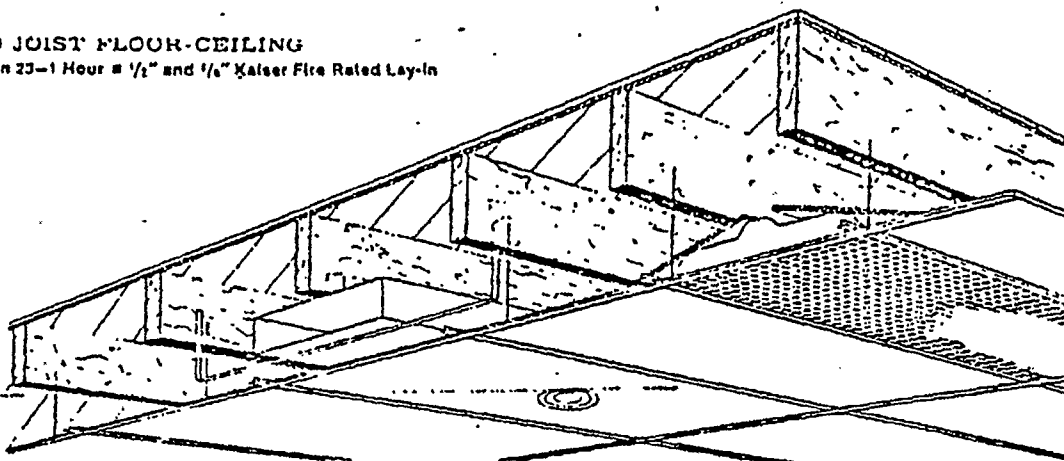
Pattern	Thick- ness	Standard Mounting	Attenuation Factors - Decibels - AMA I-II - 1967																Ceiling STC
			125 cps	160 cps	200 cps	250 cps	315 cps	400 cps	500 cps	630 cps	800 cps	1000 cps	1250 cps	1600 cps	2000 cps	2500 cps	3150 cps	4000 cps	
Swirl Pin- nched ay-In	1/2"	CE (H)	32	40	38	29	29	33	32	32	33	36	40	46	51	55	56	56	35 - 39
	5/8"	CE (H)	33	42	40	31	31	35	34	36	38	41	46	52	55	57	57	57	40 - 44
Fissured Lay-In	1/2"	CE (H)	29	38	37	29	28	31	31	33	33	36	39	43	47	51	54	56	35 - 39
	5/8"	CE (H)	31	40	37	30	30	33	33	35	36	39	43	47	51	53	53	52	35 - 39

APPLICATION RECOMMENDATIONS

Kaiser Fire-Rated Acoustical Products must be mechanically mounted on metal supports, as detailed in the following, to produce the listed fire ratings. Kaiser Fire-Rated Grid may be used with the lay-in panels in Designs 23 - 1 hour and 88 - 2 hours. See Technical Bulletin 273 for details of this grid.

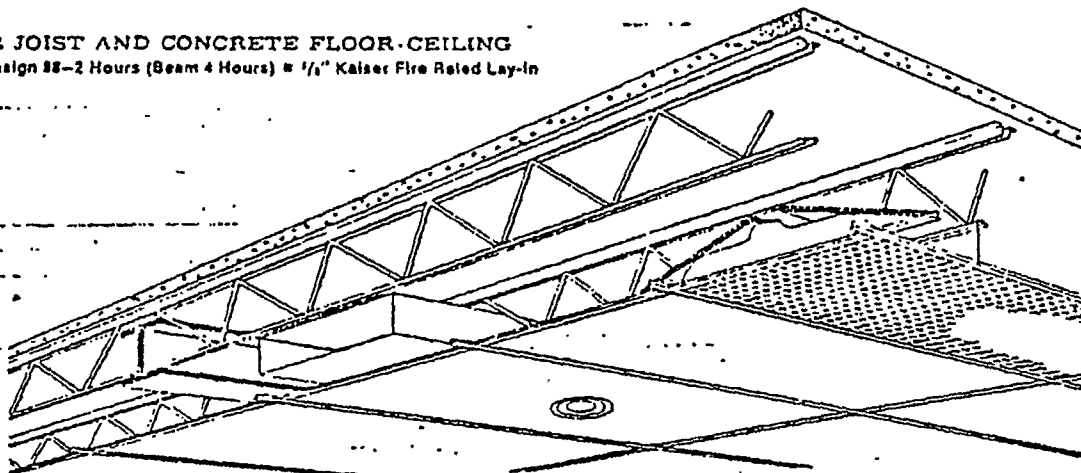
WOOD JOIST FLOOR-CEILING

UL Design 23-1 Hour = $\frac{1}{2}$ " and $\frac{1}{8}$ " Kaiser Fire Rated Lay-In



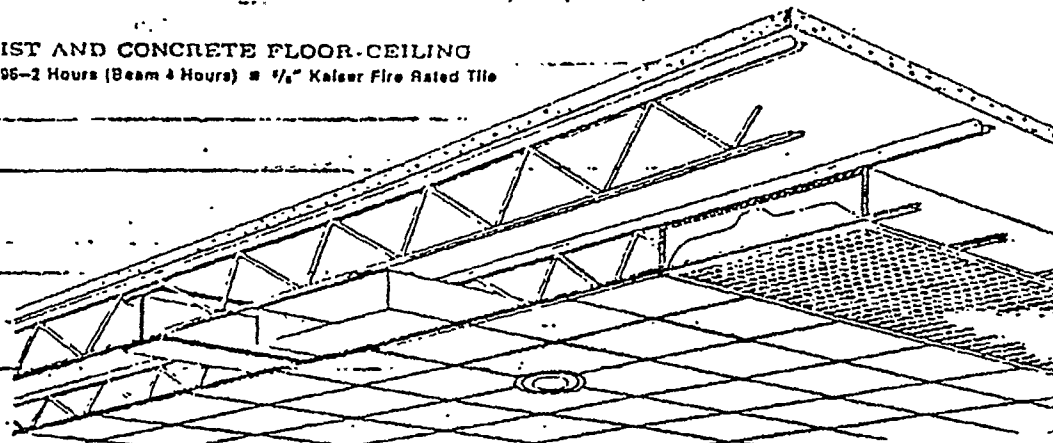
BAR JOIST AND CONCRETE FLOOR-CEILING

UL Design 88-2 Hours (Beam 4 Hours) = $\frac{1}{8}$ " Kaiser Fire Rated Lay-In



BAR JOIST AND CONCRETE FLOOR-CEILING

UL Design 96-2 Hours (Beam 4 Hours) = $\frac{1}{8}$ " Kaiser Fire Rated Tile



WOOD JOIST FLOOR-CEILING ASSEMBLY

Underwriters' Laboratories, Inc., Design 23-1 Hour, $\frac{1}{2}$ " or $\frac{1}{4}$ " Kaiser Fire Rated Acoustical Lay-In Board.

ELEMENTS OF THE CONSTRUCTION:

1. FINISH FLOOR—1" x 4" T&G.
2. BUILDING PAPER—Commercial red rosin, 0010 thick
3. SUB-FLOOR—1" x 6" T&G laid diagonally.
4. BRIDGING—1" x 3" wood.
5. WOOD JOISTS—2" x 10" Douglas Fir, Standard grade (1200 psi) at 16" o.c.
6. HANGER WIRE—No. 12 galvanized steel wire gauge attached to wood joists or supplemental 2" x 4" hanger wire supports. Wire spaced 48" o.c. for main beams and 24" o.c. for cross tees
7. STEEL SUSPENSION SYSTEM—Listed by Underwriters' Laboratories, Inc. in the Building Materials List, Guide No. 40 U18 18. Main runners, 12 ft long, spaced 48" o.c. Cross tees, 4 ft long, spaced 24" o.c., and 2 ft long spaced parallel to main beams.

8. ACOUSTICAL LAY-IN BOARD— $\frac{1}{2}$ " or $\frac{1}{4}$ " by 24" x 48" (nominal) Kaiser Fire Rated Acoustical Lay-In Panels

Border units supported by No. 24 gauge painted steel border angles, 1" x $\frac{1}{4}$ ".

9. HOLD-DOWN CLIPS— $\frac{1}{2}$ " x $\frac{1}{4}$ " deep; .023" electrogalvanized steel. Two clips uniformly spaced (one per 24" length of panel) on each cross tee

10. PENETRATIONS—

(a) Recessed-Type Electric Fixture—Listed by Underwriters' Laboratories, Inc. in the Electrical Construction Materials List, Guide No. 120 12.18. 2 ft wide by 4 ft long. Fixture housing to be of steel. Spacing not to exceed 16 sq ft per 100 sq ft. of ceiling area.

(b) Mineral Wool Belt Light Fixture Cover—Listed by Underwriters' Laboratories, Inc. in the Building Materials List, Guide No. 40 U18 2. Two 2" x 48" x $\frac{1}{4}$ " pieces, cut from 21" x 48" x $\frac{1}{4}$ " batts, laid along the long dimensions of the fixture and against the suspension member supporting the fixture. Two 17" x 48" x $\frac{1}{4}$ " pieces, cut from 21" x

48" x $\frac{1}{4}$ " batts, slit for the hanger wires at the midspan of the fixture, placed to rest on each side of the fixture and the adjacent tile, and wire-tied to the hanger wires at the corners of the fixture. Two 4 $\frac{1}{2}$ " x 24" x $\frac{1}{4}$ " pieces, cut from 21" x 48" x $\frac{1}{4}$ " batts placed on top of the tile at each end of the fixture and wire-tied to the hanger wires at the corners of the fixtures

(c) Air Duct—Duct opening not over 111 sq. in. per 100 sq ft. of ceiling area. Outside surface of duct throat protected with $\frac{1}{4}$ " inch of asbestos paper. Duct supported by $\frac{1}{2}$ " inch No. 16 gauge steel channels bolted to $\frac{1}{2}$ " inch wide No. 21 gauge steel straps which are secured to wood joists with two 16d nails at each side at least 4 inches above lower chords of joists. Duct supports spaced 40 inches o.c. installed so that return air blower system shuts down automatically in fire.

(d) Damper—15 inch square. No. 14 gauge protected with $\frac{1}{4}$ " inch of asbestos paper on both faces. Held open with fusible link, listed by U.L., Inc., Guide No. 120 UQ.

BAR JOIST AND CONCRETE FLOOR-CEILING ASSEMBLY

Underwriters' Laboratories, Inc., Design 88-2 Hours (Beam 4 Hours), $\frac{1}{4}$ " Kaiser Fire Rated Acoustical Lay-In Board.

ELEMENTS OF THE CONSTRUCTION:

1. SAND AND GRAVEL CONCRETE—1:2 $\frac{1}{2}$:3 mix, 3400 psi strength.
2. WIRE FABRIC—No. 10 steel wire gauge, 6" x 6" mesh
3. METAL LATH—Expanded, $\frac{1}{4}$ " ribbed, 3.4 lb. attached to joists with No. 18 gauge S.W.G. galvanized wire, spaced 9" o.c. and at edge overlap between joists.
4. BRIDGING— $\frac{1}{2}$ " diameter steel bridging bars.
5. STEEL JOISTS—8" Type BJ2, spaced 24" o.c. and welded to supports.
6. STEEL BEAMS—8" Type 8WF31.
7. HANGER WIRE—No. 12 galvanized steel wire gauge attached to steel joists or supplemental $\frac{1}{2}$ " cold rolled channel, spaced 48" o.c. on main beams.
8. STEEL SUSPENSION SYSTEM—Listed by U.L., Inc. in the Building Materials List,

Guide No. 40 U18 18. Main runners, 8 ft long spaced 24" o.c., cross tees 2 ft long spaced 48" o.c.

9. ACOUSTICAL LAY-IN BOARD— $\frac{1}{4}$ " x 24" x 48" or 24" x 24" (nominal) Kaiser Fire Rated Acoustical Lay-In Panels

Border units supported by No. 24 gauge painted steel border angles, 1" x $\frac{1}{4}$ ".

10. HOLD-DOWN CLIPS— $\frac{1}{2}$ " x $\frac{1}{4}$ " x $\frac{1}{2}$ ", 27 gauge electrogalvanized steel. Two clips uniformly spaced (one per 24" length of panel) on each cross tee.

11. PENETRATIONS—

(a) Recessed-Type Electric Fixture—Listed by Underwriters' Laboratories, Inc. in the Electrical Construction Materials List, Guide No. 120 12.18. 2 ft wide by 4 ft long. Fixture housing to be of steel. Spacing not to exceed 24 sq ft. per 100 sq ft. of ceiling area.

(b) Mineral Wool Belt Light Fixture Cover—Listed by Underwriters' Laboratories, Inc. in the Building Materials List, Guide No. 40

U18 2. Two 2" x 48" x $\frac{1}{4}$ " pieces, cut from 21" x 48" x $\frac{1}{4}$ " batts, laid along the long dimensions of the fixture and against the suspension member supporting the fixture. Two 17" x 48" x $\frac{1}{4}$ " pieces, cut from 21" x 48" x $\frac{1}{4}$ " batts, slit for the hanger wires at the midspan of the fixture, placed to rest on each side of the fixture and the adjacent tile, and wire-tied to the hanger wires at the corners of the fixture. Two 4 $\frac{1}{2}$ " x 24" x $\frac{1}{4}$ " pieces, cut from 21" x 48" x $\frac{1}{4}$ " batts placed on top of the tile at each end of the fixture and wire-tied to the hanger wires at the corners of the fixtures.

(c) Air Duct—Duct opening not over 70 sq. in. per 100 sq ft. of ceiling area. Outside surface of duct throat protected with $\frac{1}{4}$ " inch of asbestos paper. Duct supported by $\frac{1}{2}$ " inch No. 16 gauge steel channels, installed sq that return air blower systems shut down automatically in fire.

(d) Damper—15 inch square. No. 14 gauge protected with $\frac{1}{4}$ " inch of asbestos paper on both faces. Held open with fusible link, listed by U.L., Inc., Guide No. 120 UQ.

BAR JOIST AND CONCRETE-CEILING ASSEMBLY

Underwriters' Laboratories, Inc., Design 95-2 Hours (Beam 4 Hours), $\frac{1}{4}$ " Kaiser Fire Rated Acoustical Tile.

ELEMENTS OF THE CONSTRUCTION:

1. SAND AND GRAVEL CONCRETE—1:2 $\frac{1}{2}$:3 $\frac{1}{2}$ mix, 3500 psi strength.
2. WIRE FABRIC—No. 10 steel wire gauge, 8" x 6" mesh
3. METAL LATH—Expanded, $\frac{1}{4}$ " ribbed, 3.4 lb. attached to joists with No. 18 gauge S.W.G. galvanized wire, spaced 9" o.c. and at edge overlap between joists
4. BRIDGING— $\frac{1}{2}$ " diameter steel bridging bars
5. STEEL JOISTS—8" Type BJ2 spaced 24" o.c. and welded to supports
6. STEEL BEAMS—8" Type 8WF31.
7. HANGER WIRE—No. 12 S.W.G. galvanized wire, wire-tied to lower chord of joists, spaced not over 48" o.c. on cold-rolled channels and at all four corners of light fixtures.

8. COLD-ROLLED CHANNELS—No. 16 gauge cold-rolled steel, $\frac{1}{2}$ " deep channels spaced not over 48" o.c. and along the long sides of each light fixture. Additional channels arranged to form a frame around air-duct outlets

9. Z RUNNERS—No. 26 gauge steel, $\frac{1}{2}$ " deep with $\frac{1}{4}$ " and $\frac{1}{8}$ " flanges spaced 12"

o.c. Attached to cold-rolled channels with "Z" runner clips. Where runners are interrupted at lights their ends are attached to cold-rolled channels with "Z" runner clips, and with the upper flanges and upper half of webs at the ends cut back $\frac{1}{4}$ " with the lower portion of web and entire lower flange remaining. "Z" runner splices made of No. 26 gauge electrogalvanized steel, 5" long, $\frac{1}{2}$ " high, and $\frac{1}{4}$ " deep. End clearances $\frac{1}{4}$ " at splices and $\frac{1}{4}$ " at walls. Short pieces of "Z" runners are placed in lateral joints at ends of light-fixture boxes and air-duct outlet, secured with "Z" runner clips

10. Z RUNNER CLIPS—No. 12 S.W.G. galvanized wire, placed over cold-rolled channels and fastened to "Z" runners. Maximum spacing 48" o.c.

11. ACOUSTICAL TILE— $\frac{1}{2}$ " x 12" x 12" T&G Kaiser Fire Rated Acoustical Tile

Border tile supported by No. 24 gauge painted-steel wall channel, $\frac{1}{2}$ " deep with $\frac{1}{4}$ " legs, along with one spring clip between tile and border channel, made of: No. 26 gauge spring steel, $\frac{1}{4}$ " deep, $\frac{1}{2}$ " wide, and 4" long. One spring clip must be used with each border tile

12. PENETRATIONS—

(a) Recessed-Type Electric Fixture—

Materials List, Guide No. 120 12.18. Fixtures of 2' x 4' size with steel housing or enclosure and hardware, with spacing not to exceed 16 sq. ft. per 100 sq. ft. of ceiling area.

(b) Light-Fixture Yoke—Two per light fixture assembly, spaced 36" o.c. No. 16 gauge steel channel each supplied with two steel studs 4" long to hold light-fixture protection boxes and light fixtures. Attached to cold-rolled channels with No. 16 gauge steel clamps bolted to brackets

(c) Light-Fixture Protection Boxes—Made of $\frac{1}{2}$ " thick Kaiser Fire Rated Accessory Board. Each box consists of two side pieces, 4 $\frac{1}{4}$ " by 50 $\frac{1}{4}$ ", two end pieces 4 $\frac{1}{4}$ " by 23 $\frac{1}{4}$ ", and one top piece 25 $\frac{1}{4}$ " x 50 $\frac{1}{4}$ ". Assembled with 8d common nails spaced 6" o.c. on top of the box and 3" o.c. at the sides

(d) Air Duct—Duct opening not over 55 sq. in. per 100 sq ft. of ceiling area. Outside surface of duct throat protected with $\frac{1}{4}$ " thick asbestos paper. Duct supported by $\frac{1}{2}$ " cold-rolled channels bolted to No. 20 gauge galvanized-steel duct hangers bent over lower chord of joists and bolted, spacing not over 36" o.c.

(e) Damper—15" square. No. 12 gauge steel protected with $\frac{1}{4}$ " thick asbestos paper on both surfaces