TECHNICAL BULLETIN No. 8

SEVENTH REVISION • JUNE 1958

FIRE RESISTIVE RATINGS

Metal Lath and Plaster

TECHNICAL BULLETIN BINDER

TO BE INSERTED IN

		CONSTRUCTION	Fire Resistance	AUTHORITY
COLUMNS	STEEL COLUMNS	1¾" gypsum-vermiculite or gypsum-perlite plaster[1], [11], over self-furring metal lath wrapped around column.	4-hours	Underwriters' Laboratories Retardant 2851-5, 6, dated 5/15/56 and 3187-4, 5, 7
		1½" gypsum-vermiculite or perlite plaster[1], [11], over metal lath. Metal lath furred out 1¼" from column flanges with space between column flanges and lath filled with plaster.	4-hours	Underwriters' Laboratories Retardants 2851-2, dated 5/10/49 and 3187-3, dated 4/24/50
		1½" gypsum-perlite plaster[1], [11], over metal lath. Metal lath furred 7/16" from column with ¾" channel brackets at approximately 2' vertical spacings.	4-hours	Underwriters' Laboratories Retardant 3187-6
		1" gypsum-vermiculite or perlite plaster[1], [11], over metal lath. Metal lath furred out 1¼" from column flanges with space between column flanges and lath filled with plaster.	3-hours	Underwriters' Laboratories Retardants 2851-1, dated 5/10/49, and 3187-1, dated 1/24/50
		1⅜" gypsum-vermiculite or gypsum-perlite plaster[1], [11], over self-furring metal lath wrapped around column.	3-hours	Underwriters' Laboratories Retardant 2851-5, 6, dated 5/15/56 and 3187-4, 5, 7
		1" gypsum-perlite plaster[1], [11], over metal lath. Metal lath furred out 1¼" from column flanges.	2-hours	Underwriters' Laboratories Retardant 3187-2, dated 1/24/50
		1" gypsum-perlite plaster[1], [11], over self-furring metal lath wrapped around column.	2-hours	Underwriters' Laboratories Retardant 3187-4, 5, 7
		¾" gypsum-sanded plaster[12], 1:3 mix on metal lath.	1-hour	BMS-92, Table 40
		1" portland-cement plaster[12], 1:2½ mix on metal lath.	1-hour	
	CAST IRON COLUMNS	1½" portland cement plaster[12], 1:1/10:2½ cement, lime and sand mix (by volume) on ¾" rib metal lath with ½" broken air space.	3-hours	BMS-92, Table 38
	TIMBER COLUMNS	1" portland-cement plaster[12], on metal lath, applied over column and over steel or cast iron cap, ¾" air space.	2-hours	
STEEL BEAMS, GIRDERS & TRUSSES	Protected with Suspended Ceilings	1" gypsum-vermiculite plaster[1], [11], over metal lath with at least a 2½" air space between lath and protected structural members.	4-hours	Underwriters' Laboratories Retardant 2773, dated 1/20/47
		1" gypsum-perlite plaster[3], [11], over metal lath, with at least a 3" air space between lath and structural members. Plaster on back of lath 1" minimum on ceiling, 1½" to 3" at beam.	4-hours	Underwriters' Laboratories Retardant 2993 (Supplement), dated 11/18/49
		⅞" gypsum-perlite plaster[1], [11], over metal lath with at least 3½" air space between lath and structural member.[7]	4-hours	Underwriters' Laboratories Retardant 3355, dated 4/30/51
		⅝" gypsum-vermiculite plaster[1], [11], plus ½" vermiculite acoustical plastic over metal lath with at least a 2½" air space between lath and structural members.	4-hours	Underwriters' Laboratories Retardant 2773, dated 11/29/50
		1" sprayed asbestos fiber[8], [11], over metal lath with at least a 2" air space between lath and protected structural member. If beam extends below general ceiling level, rating is reduced to 2-hours.	3-hours	Underwriters' Laboratories, Retardant 2923, dated 6/15/50
	Protected with Ceilings Furred or in Contact with Structural Steel	1" gypsum-vermiculite plaster[1], [12], on metal lath.[9]	4-hours	BMS-92, Table 43
		1" neat wood-fibered gypsum[12], or ¾" gypsum-vermiculite plaster[1], [12], on metal lath.[9]	3-hours	
		¾" gypsum-sanded plaster[12], 1:2, 1:3 mix on metal lath.[9]	2-hours	
		¾" portland cement or gypsum-sanded plaster[12], 1:2, 1:3 mix on metal lath.[9] Three lbs. asbestos fiber and 15 lbs. of lime added to each bag of portland cement.	1½-hours	

PLAINTIFF'S EXHIBIT

GP-1029

AIA FILE 20-B-1

SGP 0003520

METAL LATH MANUFACTURERS ASSOCIATION

ENGINEERS BUILDING • CLEVELAND 14, OHIO

		CONSTRUCTION	Fire Resistance	AUTHORITY
FLOORS	STEEL JOIST FLOORS (Using Contact, Furred or Suspended Ceilings)	Floor: 2½" concrete on metal lath. Ceiling: 1" gypsum-vermiculite plaster[1], [12], on metal lath.	4-hours	TRBM-44, Table 18
		Floor: Same as above. Ceiling: ¾" gypsum-vermiculite plaster[1], [12], or 1" neat wood-fibered gypsum plaster on metal lath.	3-hours	
		Floor: 2½" perlite concrete. Ceiling: ¾" gypsum-perlite plaster[1], [11], over metal lath.	3-hours	Underwriters' Laboratories Retardant 3454-2
		Floor: 2" concrete on metal lath. Ceiling: ¾" gypsum-vermiculite plaster[1], [12], or 1" neat wood-fibered gypsum plaster, on metal lath.	2½-hours	TRBM-44, Table 18
		Floor: 2½" concrete on metal lath. Ceiling: 1" sprayed asbestos fiber[12], on metal lath.[8]	2½-hours	
		Floor: 2¼" concrete on metal lath. Ceiling: ¾" gypsum-sanded plaster[12], 1:2, 1:3 mix on metal lath.	2-hours	
		Floor: 2½" concrete on metal lath. Ceiling: ¾" sprayed asbestos fiber[12], on metal lath.[8]	2-hours	
		Floor: 2" concrete on metal lath. Ceiling: ⅝" sprayed asbestos fiber[12], on metal lath.[8]	1½-hours	
		Floor: 2" concrete on metal lath. Ceiling: ¾" gypsum-sanded plaster[12], 1:2, 1:3 mix, or ¾" portland cement plaster[12], 1:2, 1:3 mix with 15 lbs. hydrated lime and 3 lbs. asbestos fiber per bag of cement, on metal lath.	1½-hours	
FLOORS	CELLULAR STEEL FLOORS	Floor: 2½" concrete (minimum thickness over cells). Ceiling: 1 1/32" gypsum-vermiculite plaster [1], [11], over metal lath. Metal lath required to be at least 3¾" from underside of cellular steel panel. Metal lath furred around beams and plastered 1 5/16" thick with same mix.	4-hours	Tested by the National Bureau of Standards
		Floor: 3¼" concrete (minimum thickness over cells). Ceiling: 1" gypsum-perlite plaster[2], [11], over metal lath. Metal lath attached directly to underside of floor panel. Beams plastered 1½" thick over face of lath with same mix.	4-hours	Underwriters' Laboratories Retardant 3789-1, dated 10/3/56
		Floor: 2" concrete (minimum thickness over cells). Ceiling: ⅞" gypsum-vermiculite plaster[2], [11], over metal lath. Metal lath required to be at least 2¼" from underside of cellular steel panel.	4-hours	Underwriters' Laboratories Retardant 2689, dated 12/18/39
		Floor: 2" perlite concrete (minimum thickness over cells). Ceiling: 1" gypsum-perlite plaster[3], [11], over metal lath. Metal lath required to be at least 3" from underside of floor panel and steel beams.	4-hours	Underwriters' Laboratories Retardant 2993, dated 12/9/48
		Floor: 2" concrete (minimum thickness over cells). Ceiling: 1" gypsum-vermiculite plaster[1], [12], on metal lath. Metal lath required to be at least 2" from underside of floor panel.	4-hours	BMS-92, Table 45
		Floor: 2½" concrete (minimum thickness over cells). Ceiling: ⅝" gypsum-vermiculite plaster[1], [11], plus ½" vermiculite acoustic plastic over metal lath. Metal lath required to be at least 7¼" from underside of floor panel.	4-hours	Underwriters' Laboratories Retardant 2773, dated 11/29/50
		Floor: 2½" concrete (minimum thickness over cells). Ceiling: ¾" gypsum-perlite plaster[1], [12], plus ½" acoustical plaster on metal lath. Metal lath required to be at least 7¼" from underside of floor panel and 2" from steel beams.	4-hours	Tested by the National Bureau of Standards
		Floor: 2" concrete (minimum thickness over cells). Ceiling: 1" neat wood-fibered gypsum plaster[12], on metal lath. Metal lath to be at least 9" from underside of floor panel. With lath not closer than 2", rating is 3-hours.	4-hours	BMS-92, Table 45
		Floor: 2" concrete (minimum thickness over cells). Ceiling: 1⅛" sprayed fiber[8], [11], over metal lath. Metal lath required to be at least 4½" from underside of panel.	4-hours	Underwriters' Laboratories Retardant 3431-1, dated 9/14/51
		Floor: 2" concrete (minimum thickness over cells). Ceiling: ⅞" gypsum-perlite plaster[1], [11], over metal lath. Space from lath to floor at least 15½", and from lath to beams 3½". (See [7])	4-hours	Underwriters' Laboratories Retardant 3355, dated 4/30/51
		Floor: 2" concrete (minimum thickness over cells). Ceiling: ¾" gypsum-perlite mill-mixed plaster [11], over metal lath. Metal lath required to be at least 15⅜" from the underside of cellular steel panel and 3⅜" from steel beam. Beam rated 4 hours. (See[13])	3-hours	Underwriters' Laboratories Retardants 3574-6, 3789, dated 7/25/57
		Floor: 2" concrete (minimum thickness over cells). Ceiling: ⅞" gypsum-vermiculite plaster[1], [11], over metal lath. Space from lath to floor at least 15⅝", and from lath to beams 3½". (See [6])	3-hours	Underwriters' Laboratories Retardant 2689, dated 12/13/49

		CONSTRUCTION	Fire Resistance	AUTHORITY
FLOORS	CONCRETE JOISTS	Floor: 3″ concrete slab[10]. Ceiling: 1″ gypsum-vermiculite plaster[1, 11], over metal lath. Metal lath required to be at least 8¼″ from underside of floor joists.	4-hours	Underwriters' Laboratories Retardant 3390-13, dated 11/12/54
		Floor: 2″ concrete slab[10]. Ceiling: ¾″ gypsum-vermiculite plaster[1, 11], over metal lath. Metal lath required to be at least 8¼″ from underside of floor joists.	3-hours	Underwriters' Laboratories Retardant 3390-11, dated 1/19/54
FLOORS	CORRUGATED STEEL FORMS	Floor: 3¼″ reinforced sand-gravel concrete over top of corrugations. Ceiling: 1″ gypsum-vermiculite plaster[1, 11], over metal lath. Ceiling suspended at least 14½″ below steel forms and 2½″ below steel beams.	4-hours	Underwriters' Laboratories Retardant 3413-1, dated 3/7/52
		Floor: 3¼″ reinforced expanded-slag concrete over top of corrugations. Ceiling: Metal lath attached directly to bottom of corrugated form. Self-furring metal lath wrapped around steel beams. Gypsum-perlite plaster, 100 lbs.: 2 cu. ft. mix, applied so as to fill corrugation above lath and ⅜″ below face of lath. Beams plastered 1½″ thick over face of lath with same mix.	4-hours	Underwriters' Laboratories Retardant 3413-4

		Floor Assembly	Ceiling Assembly of Metal Lath and Plaster	Fire Resistance	Authority
FLOORS	WOOD JOIST FLOORS	Double wood floor (¾″ sheathing, T. & G. finish, with asbestos paper between) supported on 2″ x 10″ joists. Ordinary building paper can be used with T. & G. subflooring.	¾″ gypsum-sanded plaster[12], 1:2, 1:3 mix. Metal lath attached with 1½″, 11-gage, 7/16″ head, barbed roofing nails, at 6″ c/c.	1-hour Combustible	BMS-92, Table 42
			¾″ portland cement plaster[12], 1:2, 1:3 mix with 15 lbs. hydrated lime and 3 lbs. asbestos fiber per bag of cement. Metal lath attached with 1½″, 11-gauge, 7/16″ head, barbed roofing nails, at 6″ c/c.	1-hour Combustible	
			Either of above 1-hour assemblies with additional supports for lath placed 27″ c/c attached to alternate joists, consisting of 1 loop of No. 18 wire slipped over each of 2 nails driven in 1¼″, 2″ above bottom on each side of joists, and ends of this loop tied below lath.	1¼-hours Combustible	
			¾″ gypsum-vermiculite plaster[1, 12], on metal lath attached with 1½″, 11-gauge, 7/16″ head, barbed roofing nails, at 5″ c/c.	1¾-hours Combustible	Tested by the National Bureau of Standards
			¾″ gypsum-perlite plaster[1, 12], on metal lath attached with 1½″, 11-gauge, 7/16″ head, barbed roofing nails, at 5″ c/c.	1½-hours Combustible	

		Studs	Total Thickness	Plaster Both Sides on Metal Lath	Fire Resistance	Authority
PARTITIONS	WOOD STUD HOLLOW PARTITIONS	2″ x 4″ Non-load bearing	5⅝″	1″ neat wood-fibered gypsum[12]	2-hours Combustible	BMS-92, Table 30
		2″ x 4″ Load Bearing	5⅛″	¾″ gypsum-sanded[12], 1:2, 1:2 mix with mineral wool fill	1½-hours Combustible	
			5⅜″	⅞″ gypsum-sanded[12], 1:2, 1:3 mix	1-hour Combustible	
			5⅜″	⅞″ portland cement and sand[12], 1:2, 1:3 mix. Add 3 lbs. asbestos fiber per bag of cement.	1-hour Combustible	
			5⅛″	¾″ gypsum-sanded [12], 1:2, 1:2 mix	1-hour Combustible	
			5⅛″	¾″ gypsum-vermiculite[1, 11]	1-hour Combustible	Underwriters' Laboratories Retardant 2773, dated 8/31/44
			5⅛″	¾″ gypsum-sanded[11], 1:1½, 1:3 mix	1-hour Combustible	Underwriters' Laboratories Retardant 1355, dated 8/10/22
		2″ x 2″ Non-load bearing	3⅛″	¾″ gypsum-sanded[11], 1:1½, 1:3 mix	1-hour Combustible	

PARTITIONS

STEEL STUD HOLLOW PARTITIONS

Studs	Total Thickness	Plaster Both Sides on Metal Lath	Fire Resistance	Authority
¾" channels or Prefabricated Steel Studs (non-load bearing)	May vary, but minimum air space of 2" is required between interior faces of metal lath	1" gypsum-perlite plaster [1], [11], over metal lath attached to ¼" pencil rods on metal clips.	3½-hours	Ohio State University Test No. T-799
		1" neat wood-fibered gypsum[12]	2½-hours	BMS-92, Table 31
		1" gypsum-perlite[1], [11]	2-hours	University of California Laboratory Tests of 1-48 and 4-51
		⅞" neat wood-fibered gypsum[12]	2-hours	BMS-92, Table 31
		¾" neat wood-fibered gypsum[12]	1½-hours	
		⅞" gypsum-sanded[12], 1:2, 1:3 mix	1-hour	
		⅞" portland cement[12], 1:2, 1:3 with 3 lbs. of asbestos fiber per bag of cement	1-hour	
		¾" gypsum-sanded[12], 1:2, 1:2 mix	1-hour	
Prefabricated Load Bearing Steel Studs		1" neat wood-fibered gypsum[12]	2-hours[5]	BMS-92, Table 27
		¾" neat wood-fibered gypsum[12]	1½-hours	
		¾" gypsum-sanded[12], 1:2, 1:2 mix	1-hour	
		⅞" gypsum-sanded[12], 1:2, 1:3 mix	1-hour	

PARTITIONS

SOLID PARTITIONS (Non-load bearing)

Studs	Total Thickness	Thickness and Type of Plaster on Metal Lath	Fire Resistance	Authority
¾" channels	2½"	2½" neat wood-fibered gypsum	2½-hours	BMS-92, Table 32
	2½"	2½" gypsum-perlite[1]	2-hours	Underwriters' Laboratories Retardant 3453, dated 2/13/52
	2½"	2½" gypsum-vermiculite[1]	2-hours	National Bureau of Standards
	2"	2" neat wood-fibered gypsum	2-hours	National Bureau of Standards
	2"	2" gypsum-sanded 1:2, 1:2 mix	1-hour	Ohio State University, Test No. 129
	1½"	1½" gypsum-perlite[3]	1-hour	Ohio State University, Test No. 147
Studless	2"	2" gypsum-sanded, 1:2, 1:2 mix	1-hour	Ohio State University, Test No. 162

ROOFS

STEEL ROOF DECK ASSEMBLIES

Roof[4]	Suspended Ceilings of Metal Lath and Plaster	Fire Resistance	Authority
2" vermiculite concrete	1" gypsum-vermiculite plaster[2], [12]	4-hours	Tested by the National Bureau of Standards
1" insulation board of shredded wood bonded with portland cement.	1" gypsum-vermiculite plaster[2], [12]	3-hours	
1" insulation board of felted glass fiber.	1" gypsum-vermiculite plaster[2], [12]	2-hours	
1½" wood fiberboard insulation.	1" gypsum-sanded plaster[12], 1:2 mix	2-hours	
1½" wood fiber and cement binder.	⅞" gypsum-sanded plaster[12], 1:2 mix	2-hours	
1" wood fiberboard insulation.	¾" gypsum-sanded plaster[12], 1:2, 1:3 mix	1½-hours	

SGP 0003523

NOTE:

Many of these fire resistive ratings, especially those for cellular steel floors, actually exceeded the fire-resistive period shown. They are listed as 1, 1½, 2, 2½, 3, and 4 hour assemblies to facilitate use of the data in conjunction with building code regulations.

Gypsum-sanded or portland cement plaster mixed 1:2, 1:2 means 1 part neat to 2 parts sand aggregate by weight for both scratch and brown coats.

1. Scratch coat: 100 lbs. gypsum to 2 cu. ft. of aggregate. Brown coat: 100 lbs. gypsum to 3 cu. ft. of aggregate.
2. 100 lbs. gypsum to 2½ cu. ft. of aggregate for both scratch and brown coats.
3. 100 lbs. gypsum to 3 cu. ft. of aggregate for both scratch and brown coats.
4. Equivalent insulation permissible.
5. 2½ hr. rating if load does not exceed 5120 psi of stud area.
6. Tested with openings for noncombustible ducts, electrical outlets, and pipes. Their permissible combined area did not exceed 100 sq. in. per 100 sq. ft. of ceiling area. No failure, but test arbitrarily discontinued at 3 hours.
7. Tested with openings for noncombustible ducts, electrical outlets, etc. Their permissible combined area did not exceed 100 sq. in. per 100 sq. ft. of ceiling area. No failure; test arbitrarily discontinued after 4 hours.
8. Sprayed fiber is a proprietary product, usually applied by contractor licensed by the manufacturer.
9. These ratings are based on tests in which light-rolled sections and open-web joists were protected with metal lath and plaster ceilings attached directly to the bottom flanges.
10. Add 2" to overall floor slab thickness where electricel raceways and junction boxes are used.
11. Plaster thickness is measured from face of metal lath to finished plaster surface.
12. Plaster thickness is measured from back plane of metal lath, exclusive of ribs to finished plaster surface.
13. Tested with openings for noncombustible ducts not exceeding 113 sq. in. per 100 sq. ft., and one electrical outlet not exceeding each 90 sq. ft., of ceiling area.

Authorities cited are:

BMS-92: National Bureau of Standards, Building Materials and Structures Report No. 92.

TRBM-44: National Bureau of Standards, Technical Report on Building Materials No. 44.

Values attributed to NBS are derived from unpublished NBS test reports.

Additional information or details of construction available upon request.

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9. FIRE RESISTANCE