DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON

Letter
Circular
LC 71

June 27, 1922

Tentative Classification of Building Construction with reference to Fire Resistance

The types of construction in use are divided into grades and classes, depending on the general design. Within each grade or class there will be a large range in fire resistance, depending on the details used and the properties of the materials employed, but each grade or class is so chosen that with the most suitable materials and details it will develop a higher degree of resistance than the succeeding grade or class.

By fire resistance is meant the ability to withstand fire exposure from without and fire within, with no collapse and minimum amount of damage, also such properties as tend to prevent starting and spread of fire within, and also such as will make the building a fire barrier in case of a general conflagration.

Grade A

This grade has solid, incombustible, fire resistive exterior, party, fire, and division walls, incombustible solid or hollow room and corridor partitions, and solid, incombustible, fire resistive floor and roof construction. Walls may be furred and ceilings may be suspended from the floor construction when desired, using incombustible materials

The floor loads may be supported on bearing walls or wall and floor loads may be supported by protected rolled steel, cast iron or reinforced concrete framing. The wall material may be brick, concrete, stone, or equivalent and the floor and roof material any incombustible material formed in solid units or slabs that has the necessary strength and fire resistance.

All vertical openings are to be suitably enclosed to prevent passage of fire.

Class 1. - Buildings in this class conform with the above requirements and have incombustible top or finish floors and roof, partition, supports, door and window frames and sash, with wired glass except where there is no exposure from adjacent buildings or occupancies where plain glass may be used. Doors and shutters may be metal, hollow or solid, or of wood metal covered. Where used in fire or division walls, or where severe exterior or interior exposure is to be provided against, they shall meet the requirements for fire doors and shutters. Minor interior trim may be of wood.

Class 2. - Buildings in this class conform with the general

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The types of construction in use are divided into grades and classes, depending on the general design. Within each grade or class there will be a large range in fire resistance, depending on the details used and the properties of the materials employed, but each grade or class is so chosen that with the most suitable materials fire will involve a higher degree of resistance than the succeeding grade or class.

By fire resistance is meant the ability to withstand fire and prevent fire within and fire without, with no collapse and minimum amount of injury, also such properties as tend to prevent spreading and control of fire within, and also such as will make the building a fire barrier in case of a general conflagration.

Grade A

This grade has walls, incombustible, fire resistive exterior, party, life, and division walls, incombustible walls or bolton type and construction partitions, and roofs, incombustible, fire resistive floor and roof construction. Walls may be furred and ceiling may be suspended from the floor construction when desired, using incombustible material.

The floor joists may be supported on bearing walls or wall and floor joists may be supported by protected rolled steel, cast iron or interior concrete furring. The wall material may be brick, concrete, stone, or equivalent and the floor and roof material may be incombustible material forming in solid units or slabs that has the necessary strength and fire resistance.

All vertical openings are to be suitably enclosed to prevent passage of fire.

Class 1. - Buildings in this class conform with the above requirements and have incombustible top or finish floors and roof, partitions, supports, door and window frames and sash, with metal glass except where there is no exposure fire although buildings of this class may be used. Doors and shutters may be metal, tolbon or solid, or of wood metal covered. Where used in fire or division walls, or where covers exterior or interior openings is to be provided against, they shall meet the requirements for fire doors and shutters. Minor interior trim may be of wood.

Class 2. - Buildings in this class conform with the general

requirements for Grade A, and have combustible top or finish floors, partition supports, door and window frames and sash, with plain glass, except where exposure from adjacent buildings or occupancies is to be provided for, when the minimum protection shall be metal door and window frames and sash with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters.

Grade B

Buildings in this grade have hollow, incombustible and fire resistive exterior walls and solid or hollow party, fire and division walls. Walls shall be of such thickness and design as will meet the requirements of the given use. They may be of brick, fire resistive hollow tile, concrete blocks or units, slabs cast in place with an air space, or equivalent. The floor and roof construction may be solid or hollow, cast in place or built of units. Other general features are the same as for Grade A.

Class 1. - The details are the same as for Class 1, Grade A.

Class 2. - The details are the same as for Class 2, Grade A.

Grade C

Exterior walls are hollow or solid and consist of incombustible framing on which incombustible lath and plaster, sheet metal, or other incombustible sheathing is applied. Party, division and fire walls may be solid or hollow walls of the types described under Grades A and B, or of the same type as the exterior walls, provided they are made adequate for the given use.

The floor and roof construction has incombustible framing, the structural portions being of incombustible material, and may be built hollow or solid.

Class 1. - All metal framing, sheathing, and structural members have protection equivalent to not less than one-inch plaster on metal lath. Other details same as for Class 1 of Grade A.

Class 2. - All metal framing, sheathing, and structural members have protection equivalent to not less than one-inch plaster on metal lath. Other details same as for Class 2 of Grade A.

Class 3. - Metal framing, sheathing and structural members are unprotected. Other details same as for Class 1 of Grade A.

Class 4. - Metal framing, sheathing and structural members are unprotected. Other details are the same as for Class 2 of Grade A.

requirements for Grade A, and have combustible top or finish floors, partition supports, door and window frames and sash, with plain glass, except where exposure from adjacent buildings or occupancies is to be provided for, when the minimum protection shall be metal door and window frames and sash with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters.

Grade B

Buildings in this grade have hollow, incombustible and fire resistive exterior walls and solid or hollow party, fire and division walls. Walls shall be of such thickness and design as will meet the requirements of the given use. They may be of brick, fire resistive hollow tile, concrete blocks or units, slabs cast in place with an air space, or equivalent. The floor and roof construction may be solid or hollow, cast in place or built of units. Other general features are the same as for Grade A.

Class 1. - The details are the same as for Class 1, Grade A.

Class 2. - The details are the same as for Class 2, Grade A.

Grade C

Exterior walls are hollow or solid and consist of incombustible framing on which incombustible lath and plaster, sheet metal, or other incombustible sheathing is applied. Party, division and fire walls may be solid or hollow walls of the types described under Grades A and B, or of the same type as the exterior walls, provided they are made adequate for the given use.

The floor and roof construction may incombustible framing, the structural portions being of incombustible material, and may be built hollow or solid.

Class 1. - All metal framing, sheathing, and structural members have protection equivalent to not less than one-inch plaster on metal lath. Other details same as for Class 1 of Grade A.

Class 2. - All metal framing, sheathing, and structural members have protection equivalent to not less than one-inch plaster on metal lath. Other details same as for Class 2 of Grade A.

Class 3. - Metal framing, sheathing and structural members are unprotected. Other details same as for Class 1 of Grade A.

Class 4. - Metal framing, sheathing and structural members are unprotected. Other details are the same as for Class 2 of Grade A.

Grade D

Buildings in this grade have solid or hollow exterior, division, party and fire walls of incombustible and fire resistive ma material. Walls must be of design and thickness to meet the requirements of the intended use, and may be of brick, hollow tile, concrete block, or equivalent. The floor and interior construction consists of solid, heavy timber framing, supporting solid heavy wooden floor and roof built without concealed air spaces. Metal framing where used shall be properly protected. Layers of asbestos or other incombustible felt are to be placed between the finish and structural floor. The roofing is to be of incombustible or fire retardant type. Partitions may be of solid timber, plaster on incombustible lath and studs, or equivalent. Door and window frames and sash may be of wood with plain glass, except where exposure from adjacent buildings or occupancies is to be provided for, when the minimum protection shall be metal door and window frames and sash with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters. Doors may be of wood except where used in fire or division walls, or where severe exterior or interior exposure is to be provided for, when they shall meet the requirements for fire doors or shutters.

All vertical openings are to be properly enclosed to prevent passage of fire.

Class 1. - Buildings in this class conform with the general requirements of Grade D, and have all metal connections between columns, girders, beams and walls properly protected or made of incombustible fire resistive material.

Class 2. - The buildings conform with the general requirements and have exposed metal connections between columns, girders, beams, and walls.

Grade E

Buildings in this grade have solid or hollow exterior, division, party, and fire walls of incombustible and fire resistive material. Walls must be of design and thickness to meet the requirements of the intended use, and may be of brick, hollow tile, concrete block, or equivalent. The floor and interior construction consists of light wooden framing with facings forming an air space between them. Suitable protection must be applied over and around heating plants, rooms used for fuel storage, or similar occupancy, and separations provided between chimneys and the wooden construction. Door and window frames and sash may be of wood with plain glass except where exposure from adjacent buildings or occupancies is to be provided for, when door and window frames and sash shall be of metal with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters. Doors may be of wood except where used in fire or division walls, or where severe

Grade D

Buildings in this grade have solid or hollow exterior, division, party and fire walls of incombustible and fire resistive or masonry. Walls must be of design and thickness to meet the requirements of the intended use, and may be of brick, hollow tile, concrete block, or equivalent. The floor and interior construction consists of solid, heavy timber framing, supporting solid heavy wooden floor and roof built without concealed air spaces. Metal framing where used shall be properly protected. Layers of tarpaper or other incombustible felt are to be placed between the finish and structural floor. The roofing is to be of incombustible or fire retardant type. Partitions may be of solid timber, plaster on incombustible lath and studs, or equivalent. Door and window frames and sash may be of wood with plain glass, except where exposure from adjacent buildings or occupancies is to be provided for, when the minimum protection shall be metal door and window frames and sash with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters. Doors may be of wood except where used in fire or division walls, or where severe exterior or interior exposure is to be provided for, when they shall meet the requirements for fire doors or shutters.

All vertical openings are to be properly enclosed to prevent passage of fire.

Class J. - Buildings in this class conform with the general requirements of Grade D, and have all metal connections between columns, girders, beams and walls properly protected or made of incombustible fire resistive material.

Class S. - The buildings conform with the general requirements and have exposed metal connections between columns, girders, beams, and walls.

Grade E

Buildings in this grade have solid or hollow exterior, division, party, and fire walls of incombustible and fire resistive material. Walls must be of design and thickness to meet the requirements of the intended use, and may be of brick, hollow tile, concrete block, or equivalent. The floor and interior construction consists of light wooden framing with facings forming an air space between them suitable protection must be applied over and around framing placed rooms used for fuel storage, or similar occupancy, and exposures provided between chimneys and the wooden construction. Door and window frames and sash may be of wood with plain glass except where exposure from adjacent buildings or occupancies is to be provided for, when door and window frames and sash shall be of metal with wired glass, where glass is used, or the openings may be completely protected by automatically operated shutters. Doors may be of wood except where used in fire or division walls, or where severe

exterior or interior exposure is to be provided for, when they shall meet the requirements for fire doors.

Class 1. - Conforms with the general requirements of Grade E and has interior finish of plaster on incombustible lath or equivalent, and incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 2. - Conforms with the general requirements of Grade E and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and has incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 3. - Conforms with the general requirements of Grade E and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and combustible roof covering, all hollow spaces being fire stopped at floor and roof lines with 2-inch plank or equivalent.

Class 4. - Conforms with the general requirements of Grade E and has interior finish of wood, pulp board, or similar combustible material, and combustible roof covering.

Grade F

Buildings in this grade have exterior wall framing of wood faced on the outside with masonry veneer, stucco or similar incombustible material. Party, division, and fire walls are to be of solid or hollow masonry or equivalent incombustible and fire resistive construction of design and thickness to meet the required use, except that for double residences party or division walls may be of wood or metal studs with metal lath and plaster. Doors, frames and sash may be of wood with plain glass, except as used in party, division, and fire walls, when they shall be of design and material to properly protect the opening.

The interior construction is of wood stud and joists with hollow spaces between facings. Suitable protection must be applied over and around heating plants, rooms used for fuel storage, or similar occupancy, and separation provided between chimneys and the wooden construction.

Class 1. - Conforms with the general requirements of Grade F and has interior finish of plaster on incombustible lath or equivalent, and incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.
Stucco, if used, is to be on incombustible lath.

Class 2. - Conforms with the general requirements of Grade F and has interior finish of plaster on wood lath, gypsum wall board, or

exterior or interior exposure is to be provided for, when they shall meet the requirements for fire doors.

Class 1. - Conforms with the general requirements of Grade E and has interior finish of plaster on incombustible lath or equivalent, and incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 2. - Conforms with the general requirements of Grade E and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and has incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 3. - Conforms with the general requirements of Grade E and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and combustible roof covering, all hollow spaces being fire stopped at floor and roof lines with 3-inch plank or equivalent.

Class 4. - Conforms with the general requirements of Grade E and has interior finish of wood, pulp board, or similar combustible material, and combustible roof covering.

Grade F

Buildings in this grade have exterior wall framing of wood faced on the outside with masonry veneer, stucco or similar incombustible material. Party, division, and fire walls are to be of solid or hollow masonry or equivalent incombustible and fire resistive construction of design and thickness to meet the required use, except that for double residences party or division walls may be of wood or metal studs with metal lath and plaster. Doors, frames and sash may be of wood with plain glass, except as used in party, division, and fire walls, when they shall be of design and material to properly protect the opening.

The interior construction is of wood stud and joists with hollow spaces between facings. Suitable protection must be applied over and around heating plants, ovens used for fuel storage, or similar occupancy, and communication provided between chimneys and the wooden construction.

Class 1. - Conforms with the general requirements of Grade F and has interior finish of plaster on incombustible lath or equivalent, and incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Stucco, if used, is to be on incombustible lath.

Class 2. - Conforms with the general requirements of Grade F and has interior finish of plaster on wood lath, gypsum wall board, or

equivalent, and has incombustible or fire retadrant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Stucco, if used, is to be on incombustible lath.

Class 3. - Conforms with the general requirements of Grade F and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and combustible roof covering, all hollow spaces being fire stopped at floor and roof lines with 2-inch plank or equivalent.

Stucco, if used, may be on wood lath.

Class 4. - Conforms with the general requirements of Grade F and has interior finish of wood, pulp board, or similar combustible material, and combustible roof covering.

Stucco, if used, may be on wood lath.

Grade G

Buildings of this grade have exterior wall framing of wood faced on the outside with boards or other combustible finish. Party, division, and fire walls are to be of solid or hollow masonry or equivalent incombustible and fire resistive construction of design and thickness to meet the required use, except that for double residences party or division walls may be of wood or metal studs with metal lath and plaster. Doors, frames, and sash may be of wood with plain glass, except as used in party, division, and fire walls, when they shall be of design and material to properly protect the openings.

The interior construction is of wood stud and joists with the hollow space between facings. Suitable protection must be applied over and around heating plants, rooms used for storage of fuel, or similar occupancy, and separation provided between chimneys and the wooden construction.

Class 1. - Conforms with the general requirements of Grade G and has interior finish of plaster on incombustible lath or equivalent, and incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 2. - Conforms with the general requirements of Grade G and has interior finish of plaster on wood lath, gypsum wall board, or equivalent, and has incombustible or fire retardant roof covering, all hollow spaces being fire stopped at floor and roof lines with incombustible material.

Class 3. - Conforms with the general requirements of Grade G and has interior finish of plaster on wood lath, gypsum wall board or equivalent, and combustible roof covering, all hollow spaces being fire stopped at floor and roof lines with 2-inch plank or equivalent.

Class 4. - Conforms with the general requirements of Grade G and has interior finish of wood, pulp board, or similar combustible material, and combustible roof covering.