

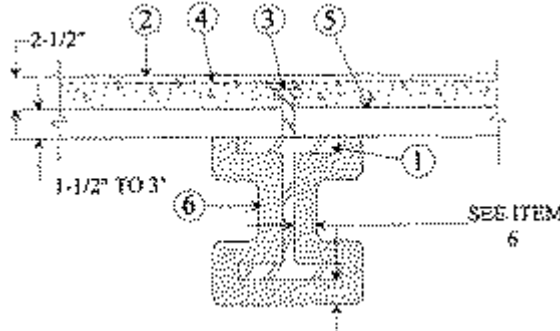
**Design No. N852**

Restrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr

Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr

Loading Determined by Allowable Stress Design Method or Load and Resistance Factor Design Method published by the American Institute of Steel Construction, or in accordance with the relevant Limit State Design provisions of Part 4 of the National Building Code of Canada

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



1. **Steel Beam** — W8x28 min size.
2. **Normal Weight Concrete** — Compressive strength, 4000 psi. Either carbonate or siliceous aggregate may be used. Unit weight, 145 +/- 3 pcf.
- 2A. **Light Weight Concrete** — Compressive strength, 3000 psi. Either expanded shale, clay or slate aggregate by rotary-kiln method. Unit weight, 110 +/- 3 pcf.
3. **Shear Connector** — (Optional) — Studs, 3/4 in. diam headed type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units.
4. **Welded Wire Fabric** — (Optional) — 6x6-10/10 SWG.
5. **Steel Floor and Form Units\*** — 1-1/2 to 3 in. deep fluted units welded to beam.
6. **Spray-Applied Fire Resistive Materials\*** — Applied by mixing with water and spraying in more than one coat to the beam to the final thicknesses shown below. Crest areas shall be filled with Spray-Applied Fire Resistive Materials above the beam. Beam surfaces must be clean and free of dirt, loose scale and oil. Min average and min ind. density of 15/14 pcf respectively. Min avg and min ind density of 22/19 pcf respectively for Types Z-106, Z-106/HY, Z-106/G. Min avg and min ind density of 40/36 pcf respectively for Types AV650, Z-146, Z-146PC and Z-146T cementitious mixture. Min avg and min ind density of 50/45 pcf respectively for Types AV800, Z-156, Z-156T and Z-156PC. For method of density determination, see Design Information Section. The thickness of Spray-Applied Fire Resistive Materials shown in the table below are only applicable when the beams are supporting floor assemblies containing only fluted floor and form units, topped with normal weight concrete (Item 2).

Rating Hr	Min Thkns In.	
	Restrained Beam	Unrestrained Beam
1	5/16	5/16
1-1/2	7/16	9/16
2	11/16	13/16
2(+)	9/16	3/4
3	1-3/16	1-5/16
4	1-11/16	1-7/8

(+) Rating applicable only when a minimum of 4-1/2 in. of normal weight concrete provided over deck crests.

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the thickness applied to the beams' lower flange edges is reduced by one-half and the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with normal weight concrete (Item 2).

Rating Hr	Min Thkns In.	
	Restrained Beam	Unrestrained Beam
1	3/8	3/8
1-1/2	7/16	5/8
2	11/16	7/8
2(+)	9/16	13/16
3	1-3/16	1-7/16
4	1-11/16	1-15/16

(+) Rating applicable only when a minimum of 4-1/2 in. of normal weight concrete provided over deck crests.

The thickness of Spray-Applied Fire Resistive Materials shown in the table below are only applicable when the beams are supporting floor assemblies containing only fluted floor and form units, topped with light weight concrete (Item 2A).

Rating Hr	Min Thkns In.	
	Restrained Beam	Unrestrained Beam
1	3/8	3/8
1-1/2	8/16	5/8
2	13/16	15/16
3	1-5/16	1-9/16
4	1-7/8	2-1/8

**ARABIAN VERMICULITE INDUSTRIES** —Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set, Z-106, Z-106/G, Z-146 investigated for exterior use. Types AV650 and AV800 investigated for exterior use.

**GRACE KOREA INC** —Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set, Z-106, Z-106/G, Z-106/HY, Z-146 investigated for exterior use.

**W R GRACE & CO - CONN** —Types MK-6/HY, MK-6/HY Extended Set, MK-10 HB, MK-10 HB Extended Set, MK-6/HB, MK-6s, MK-6 GF, MK-6 GF Extended Set, MK-1000/HB, MK-1000/HB Extended Set, RG, Z-106, Z-106/G, Z-106/HY, Z-146,

## FIRE RESISTANCE DIRECTORY W R GRACE DESIGNS

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Z-146T, Z146PC, Z-156, Z-156T and Z-156PC investigated for exterior use.

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