

## A Resilient Channel Discussion

The use of Resilient Channel (RC) in acoustical partition construction has been a popular and cost-effective method to increase acoustical isolation for many years. I have put this page together in the hopes that it will help clarify the proper (and improper) uses of RC.

A must read is Section 7.4 of the *Noise Control Manual for Residential Buildings* by David A. Harris. David invented the Gold Bond resilient furring channel (commonly known as “hat” channel) back in the 1960s.

The following three JPGs are taken directly from the *Gypsum Construction Handbook* published by USG. They illustrate the proper installation of RC-1 channel (a) on the stud/joist/framing, (b) as part of a wall system and (c) as part of a ceiling system.

(a) Rc1\_1.jpg

(b) Rc1\_2.jpg

(c) Rc1\_3.jpg

Other recommendations made in the *Gypsum Construction Handbook*:

- Position RC-1 Resilient Channel at right angles to steel studs, space 24” o.c. and attach to stud flanges with 3/8” Type S pan head screws driven through holes in channel mounting flange.
- Use 1-1/4” Type W screws to mount the RC-1 to wood studs/joists/framing.
- Locate channels 2” from floor and within 6” of ceiling.
- Install channels with mounting flange down, except at floor to accommodate attachment. (See (a) above.)
- Splice channel by nesting (*not* butting) directly over stud. Screw-attach through *both* flanges.
- A 2-hr. floor/ceiling system with STC/MTC ratings as high as 60/54 is achievable with a ceiling of double-layer 5/8” Gypsum Board attached to RC-1 Channels across joists with 3” Mineral Fiber insulation in the joist cavities.

Note on MTC Rating System: Music and Mechanical Equipment Transmission Class is a single-number rating system developed by USG. It is designed for use in selecting or evaluating sound isolation construction when the sound source to be isolated contains considerable low frequency energy. Test values include data in 1/3 octave bands from 50 to 80 Hz in accordance with ASTM E413, but they do not qualify under that standard. I.e., significant error may exist in measurements below the 100 Hz 1/3 octave band.

RC Comparison Table.PDF contains a table of wall constructions with their 1/3 octave band Transmission Loss values, STCs and (when available) MTCs measured in accordance with ASTM E413. The table is intended for use in comparing wall systems before and after the addition of RC. It is not intended to be a complete partition STC/MTC resource. For information on other partitions, please see the source references in the document.

***For Walls: RC-8 should be installed at the top and bottom of the wall and every 24” in between.  
For Ceilings: RC-8 should be installed at each end of the ceiling and every 18” in between.***

**Resilient Channel Acoustical Performance Comparison Table**

Studs	Wall Board	Resilient Channel	Insulation	1/3 Octave Band Center Frequency																	STC	MTC	Source				
				50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000				2500	3150	4000	
1	2x4W	1/2" GB, both sides	None	None				17	17	15	20	31	28	27	33	37	33	40	38	41	38	34	34	36	33	28	USG
2	2x4W	1/2" GB, both sides	RC-1, one side	None				17	21	19	24	33	33	35	37	42	47	48	53	54	53	48	40	43	40	32	USG
3	2x4W	1/2" GB, both sides	RC-1, one side	3" Mineral Fiber				20	25	26	34	40	43	45	48	52	54	57	59	61	59	52	48	50	47	39	USG
4	2x4W	5/8" GB, both sides	None	3" Mineral Fiber				19	18	18	29	39	31	31	39	42	42	46	47	46	38	35	40	43	37	31	USG
5	2x4W	5/8" GB, both sides	RC-1, one side	3" Mineral Fiber				27	33	38	45	49	52	55	58	59	60	61	63	57	53	56	60	51	43	USG	
6	3.5"M	2 layers 5/8" GB, both sides	None	None				35	30	35	44	45	47	49	51	52	54	55	54	46	44	49	52	48	43	USG	
7	3.5"M	2 layers 5/8" GB, both sides	None	3" Mineral Fiber				38	36	37	47	50	52	53	54	55	57	56	56	48	47	52	55	51	49	USG	
8	3.5"M	2 layers 5/8" GB, both sides	RC-1, one side	None				26	29	30	38	43	45	52	55	55	57	56	58	60	52	48	52	56	50	43	USG
9	3.5"M	2 layers 5/8" GB, both sides	RC-1, one side	3" Mineral Fiber	18	14	21	33	41	45	50	52	57	60	62	62	64	64	66	66	62	59	63	68	61	57	USG
10	2x4W	2 layers 1/2" GB, one side; 1/2" GB other side	None	None				16	17	25	26	29	31	36	37	40	42	42	43	45	44	44	48	37	N/A	NRCC	
11	2x4W	2 layers 1/2" GB, both sides	RC-1, one side	None				38	31	38	45	49	53	52	54	56	57	58	59	53	55	58	62	52	N/A	USG	
12	2x4W	2 layers 1/2" GB, both sides	RC-1, one side	3" Mineral Fiber				35	41	47	53	56	57	59	60	61	63	64	65	65	64	59	61	59	N/A	RAL	
13	3.5"M	2 layers 1/2" GB, both sides	None	5/8" Mineral Fiber				31	34	36	46	47	51	55	56	56	60	61	60	63	59	52	54	57	55	N/A	USG
14	3.5"M	2 layers 1/2" GB, both sides	RC-1, one side	3" Mineral Fiber	20	27	33	38	42	48	53	54	59	61	61	60	60	62	64	65	62	59	63	60	N/A	RAL	

Notes:

2x4W = 2"x4" wood studs, 16" o.c.

3.5"M = 3.5" metal studs, 24" o.c.

STC = Sound Transmission Class

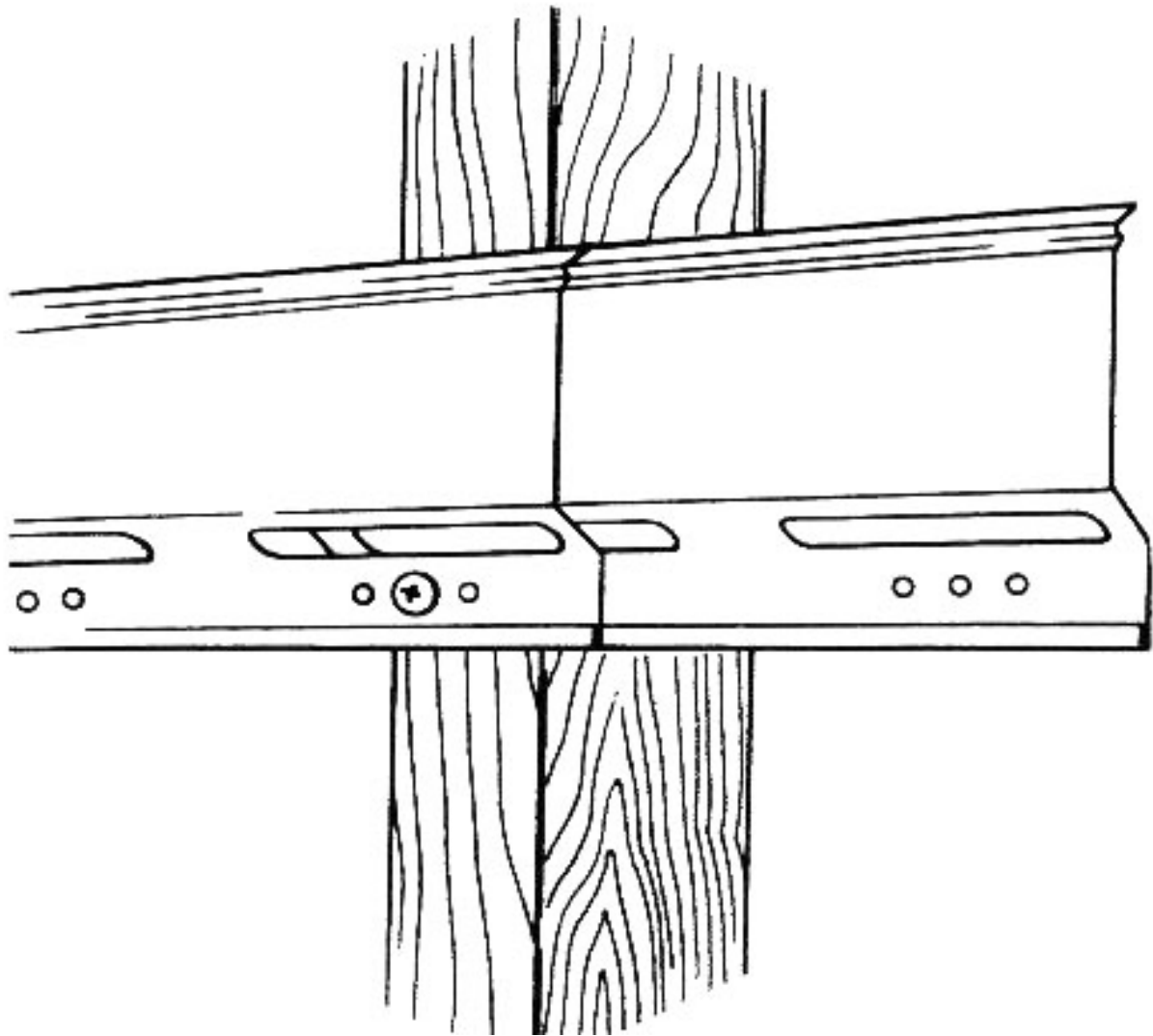
MTC = Music/Mechanical Transmission Class

Sources:

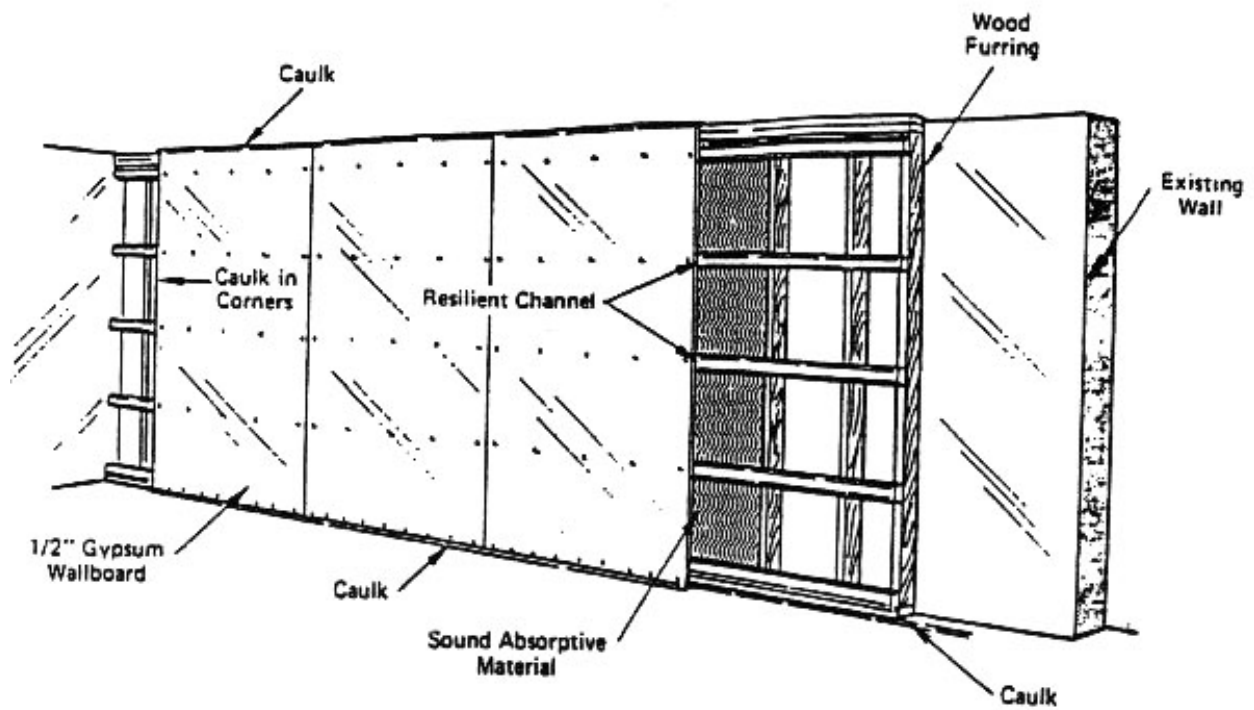
NRCC = National Research Council Canada

RAL = Riverbank Acoustical Laboratories

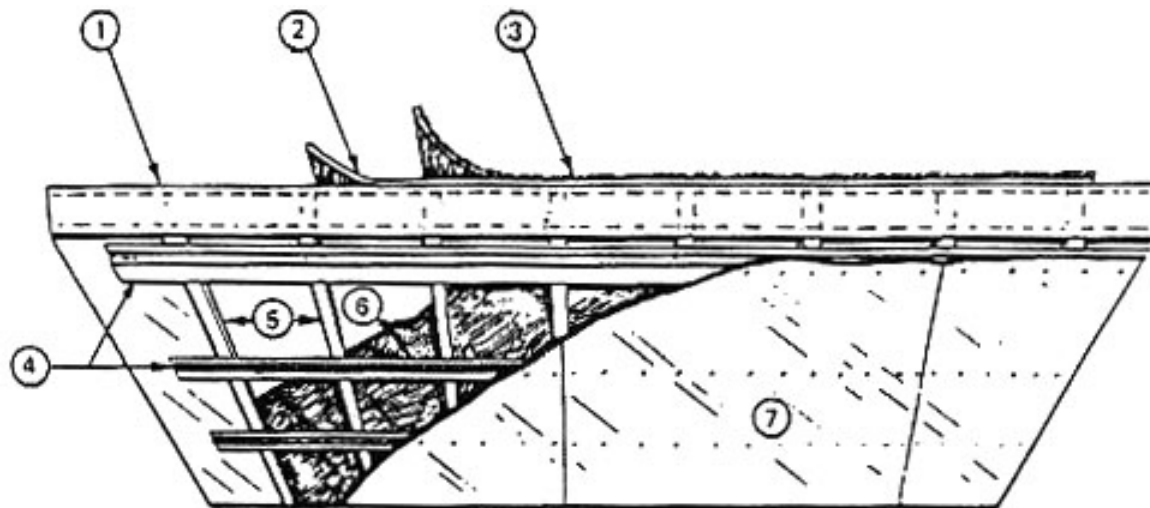
USG = United States Gypsum Company Literature



Rc1\_1



## Rc1\_2



- |                                     |                         |
|-------------------------------------|-------------------------|
| 1. Existing floor-ceiling structure | 5. Wood furring         |
| 2. Pad                              | 6. Glass fiber pad      |
| 3. Carpet                           | 7. Gypsum ceiling board |
| 4. Resilient metal channels         |                         |

## Rc1\_3