Acoustic *doors* and how to read an Rw rating

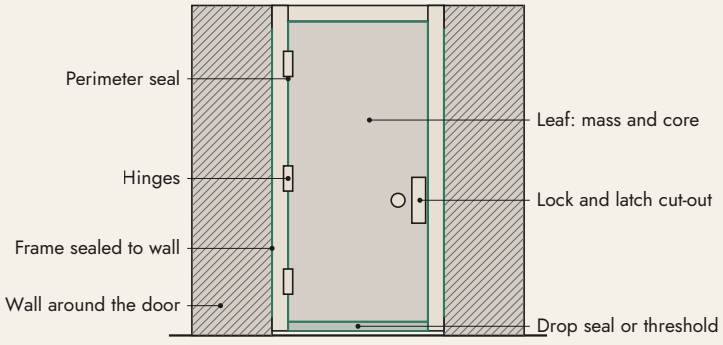
What Rw means on a door, why a laboratory figure is not a site figure, the weakest-link sum and the evidence to ask for. No dB requirement is given for any project.

Compliance guidance. Figures are from the editions named and apply to England (Wales has the same sentences; Scotland and Northern Ireland were not read). Approved Document E gives an example of construction, not an operator's standard or an acoustic consultant's brief. This is guidance, not acoustic, legal or building control advice: confirm each door's requirement with the project acoustic consultant and building control.

AT A GLANCE

Quantity	What it is	Where it comes from	On a door schedule
Rw	One number for the airborne sound insulation of a door, measured in a laboratory and calculated from the band-by-band results.	BS EN ISO 10140-2 (test), BS EN ISO 717-1 (rating)	Write the doorset requirement as Rw [x] dB for the whole doorset, not the leaf.
R	The sound reduction index in decibels, band by band across frequency: what the one number comes from.	ISO 10140-1:2021 Annex B (doors)	Ask for the band-by-band table, not the headline figure alone.
C and Ctr	Adaptation terms written after Rw, as in Rw (C; Ctr). They adjust the number for the kind of noise.	BS EN ISO 717-1; Approved Document E uses Ctr	Say whether the requirement is Rw alone or Rw + Ctr.
R′ and DnT,w	Site figures. R′ counts sound that goes round the door as well as through it; DnT,w is the room-to-room level difference.	ISO 16283-1; Approved Document E Table 0.1b	Not a door rating. For one door, R′ is not expected to beat the laboratory R.
Mass per unit area	Kilograms per square metre of the leaf.	Approved Document E 6.6	The Document's other route for a hotel-room corridor door: at least 25 kg/m² with good perimeter sealing.

Descriptions come from Approved Document E, BSI scope text and free previews; the full texts of BS EN ISO 10140-2 and 717-1 were not read.



An acoustic doorset in elevation, with the parts that decide its result labelled. Schematic: not a product. Original drawing by Make Bespoke Studio.

THE WEAKEST-LINK SUM

An open gap of share f of the leaf area limits the door: combined R = -10 log10 [(1 - f) x $10^{-R/10}$ + f] (our simplified sum; a consultant works band by band). On an example 926 x 2,040 mm leaf, 10 mm under it is 0.49% of the area; 3 mm all round is 0.94%.

Example leaf	No gap	0.05%	0.1%	0.25%	0.5%	1.0%
35 dB	35 dB	31 dB	29 dB	26 dB	23 dB	20 dB
40 dB	40 dB	32 dB	30 dB	26 dB	23 dB	20 dB
45 dB	45 dB	33 dB	30 dB	26 dB	23 dB	20 dB

SPECIFICATION WORDING

ACOUSTIC DOORSET

Doorset to achieve a weighted sound reduction index of Rw [x] dB (C [ ]; Ctr [ ]), as tested in accordance with BS EN ISO 10140-2 [2021] and rated to BS EN ISO 717-1 [2020], for the complete doorset: leaf, frame, perimeter seals, [drop seal / threshold], [glazing] and ironmongery cut-outs as supplied. Test report from [a named laboratory] to be submitted before manufacture, with the tested construction drawn and the band-by-band results given. Any difference between the tested construction and the doorset supplied to be approved in writing by [acoustic consultant].

FIRE-RATED ACOUSTIC DOORSET

Doorset to achieve [FD30S / E30 Sa] and Rw [x] dB. The fire test or assessment evidence and the acoustic test report to describe the same doorset, including the acoustic seals and [drop seal / threshold] as fitted. Certificate, field of application and installation instructions to be submitted before manufacture.

INSTALLATION, SEALING AND FIRST-ROOM ACCEPTANCE

Frame sealed to the surrounding wall on both faces with [sealant and backing as the doorset maker's instructions] before architraves are fixed. Perimeter seals to bed evenly on all four edges; foot gap closed by [drop seal / threshold] with the door latched. No cut-out or penetration other than those in the tested construction. Before the run, [one] doorset to be installed and checked by [acoustic consultant / project manager] against the test report (seal contact, drop seal, latch pull-in) and approved in writing. [Site sound test to BS EN ISO 16283-1 if required.]

TERMS USED

Rw

A single-number quantity that characterises the airborne sound insulation of a building element in the laboratory (Approved Document E, Annex C). Higher means more insulation.

Apparent sound reduction index (R')

The field version of the sound reduction index, which counts sound radiated by flanking elements as well as by the test element (ISO 16283-1).

Drop seal

A seal fitted in the bottom edge of a door leaf that drops to meet the floor or threshold when the door closes and lifts when it opens, closing the foot gap without a raised sill.

STANDARDS AND SOURCES

- Approved Document E (England), 2003 edition incorporating amendments to 2015: paras 6.5 to 6.7, 1.8, 0.8, Annex C read.
- BS EN ISO 10140-2:2021: current at BSI; scope read. Approved Document E names BS EN ISO 140-3:1995, withdrawn 2011.
- ISO 10140-1:2021, Annex B (doors): free preview read.
- BS EN ISO 717-1:2020; BS EN ISO 16283-1:2014+A1:2017: both current at BSI; 717-1 not read (ADE names the 1997 edition), 16283-1 free sample read.
- Approved Document B Vol 2 App C (C2, C4); Approved Document M Vol 2 (2.7(e)): read.

Full guide: https://makebespoke.com/trade/technical/acoustic-doors-and-rw-ratings. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.