

This series of Technical Notes covers issues which manufacturers, users and specifiers may wish to consider in their approach to the application of manufactured GRC elements for façade cladding

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GRC TECHNICAL NOTE 3

COMPARRISON OF GRC MANUFACTURING AND INSTALLATION TOLERANCES

There are no specific BS or EN standards currently published that are applicable for the dimensional tolerances of manufactured or installed GRC cladding elements. Often references may be made to industry publications or those which cover architectural precast.

The tables below provide comparative dimensional tolerances for the various standards and publications that are in common use.

Please note that none of the tolerances allow for both the reversible and irreversible shrinkage and subsequent expansion that the GRC product will experience both post manufacture and in service. To determine such dimensional changes reference should be made to test results obtained by mix proof testing to BS EN 1170-7¹

MANUFACTURING TOLERANCES

Requirement	GRCA Technote 13 ²	PCI MNL 130-09 ³	BS 8297: 2017 ⁴	BS EN 14992: 2007 ⁵
Length and height < 3000mm	+/- 3	+/- 3	+3	+/- 5 ^{8 9}
Length and height > 3000mm	+/- 6	+/- 3/3000	+/- 5 ⁶	+/- 6 ^{8 9}
Edge Returns	+12 – 0	+13- 0	N/A	N/A
Angular variation of moulded returns <75	+/-1	+/- 1	N/A	N/A
Angular variation of moulded returns >75	+/- 1.5	+/- 2		
Thickness - facing coat	+2 – 0	+3 – 0	N/A	N/A
Thickness - structural material	+5 – 0	+6 -0	+/- 3	+/- 3 ⁸
Depth of stiffening ribs	+10 - 5	N/A	N/A	N/A
Vertical and horizontal alignment of stud frame members	6/3000	6/3000	N/A	N/A
Spacing of stud frame cross members	+/- 10	+/- 10	N/A	N/A
Squareness of stud frame	10	10	N/A	N/A
Overall size of frame	+/- 10	+/- 10	N/A	N/A
Variation from squareness – different in length of diagonals < 2000mm	3	3/2000	3	N/A
Variation from squareness – different in length of diagonals > 2000mm	6	Max 6	3/2000 ⁷	
Bowing <3000	L/250	L240	6	N/A
Bowing 3000-6000	L/250	L240	9	N/A
Bowing 6000-12000	L/250	L240	12	N/A
Openings within panel face	+/- 5	+/-6	N/A	N/A
Location of openings within panel face	+/- 3	+/-6	+/-6	+/- 10 ⁸
Position of cast in anchors etc.	N/A	+/-12	+/-6	+/-10 ⁸

INSTALLATION TOLERANCES

Requirement	GRCA Technote ²	PCI MNL 130-09 ³	BS 8297: 2017 ⁴	BS EN 14992 2007 ⁵
Joint width	N/A	+/- 6	+/- 6	N/A
Panel edges out of parallel	N/A	6	5	N/A
Alignment of panel edge	N/A	6	6	N/A
Offset in plane – vertical faces	N/A	6	6	N/A

Please note the information provided is on a general and advisory basis only. Reference should be made to the appropriate standard as indicated and below. A more detailed explanation of the permitted tolerances may be provided. Specifiers and users should always consider acceptable dimensional deviances as appropriate to project specific applications.

References

1. BS EN 1170-7 1998: Precast Concrete Products – test method for glass-fibre reinforced cement. Measurement of extremes of dimensional variations due to moisture content. Published March 1998
2. GRCA Technote 13 GRC Tolerances. Published November 2020
3. PCI Manual for Quality Control for Plants and production of Glass Fiber Reinforced Concrete Products. Second Edition. Published 2009
4. EN 14992 Precast concrete products wall elements. Published September 2007
5. BS 8297 Design, manufacture and installation of architectural precast concrete – Code of practice. Published October 2017
6. 6000mm-9000mm +/- 8mm, 9000mm-12000mm +/- 10mm
7. Up to a maximum of 9
8. All quoted dimensions based on Class A.
9. Up to 500mm = +/-3mm, 6000mm-10000mm = +/-8mm, Above 10000mm +/- 10mm