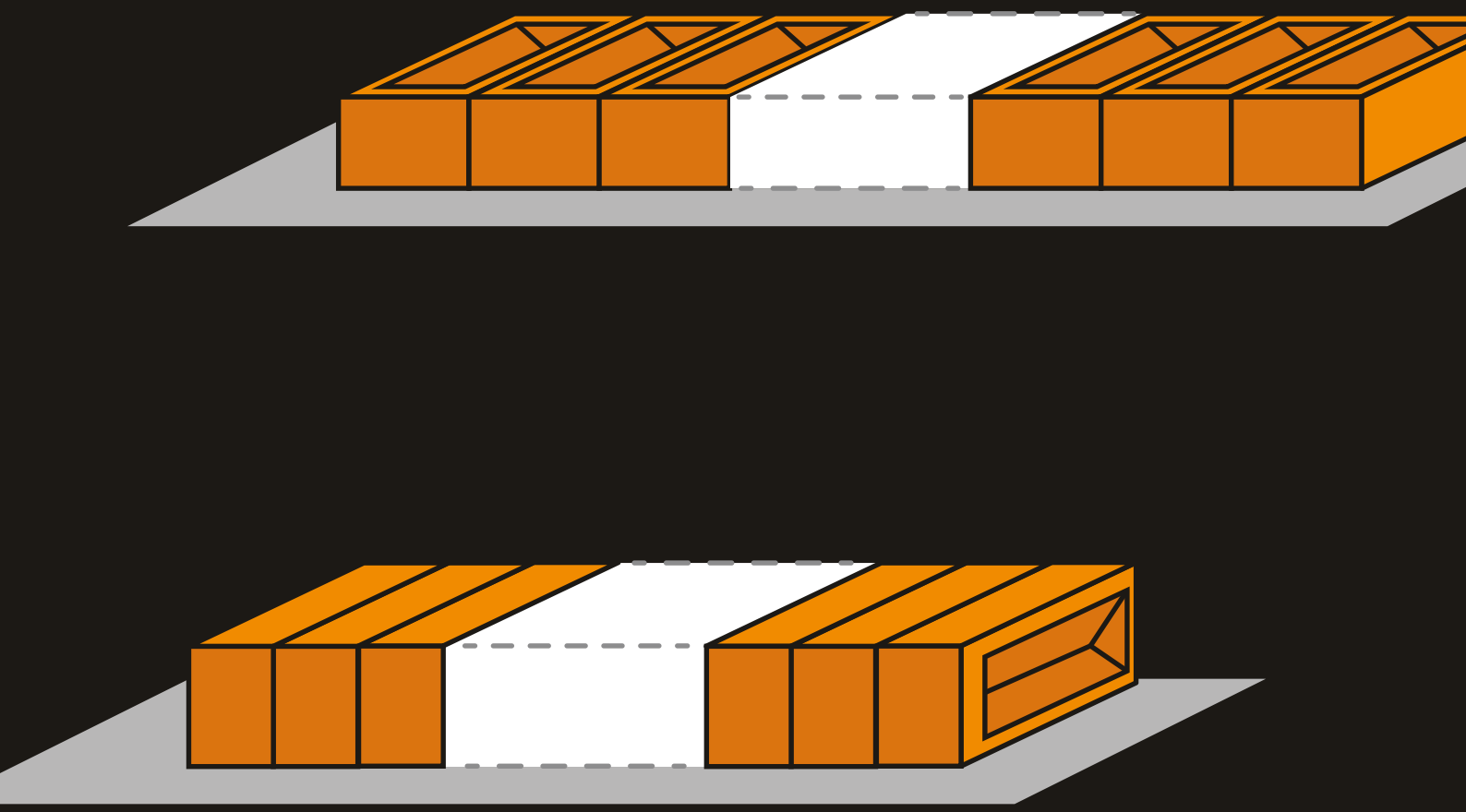

SITE PRACTICE

PAS70:2003
HD Clay Brick Guide to appearance and site practice

POWERED BY RIJSWAARD BAKSTEEN

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PAS 70 SITE PRACTICE

HD clay bricks guide to appearance and site measured dimensions and tolerance.

Publicly Available Specification 70 (PAS) provides authoritative guidance, whilst removing reference to contractual arrangements and retaining a sample and reference panel approach to acceptability.

The PAS gives a simple test to resolve site disputes without the recourse to long jaw calipers and off-site measurement. The following groups contributed to the document.

- **Brick Development Association Ltd.**
- **Lucideon Ltd (formally Ceram)**
- **Kingston University National Building Specification**
- **National House Building Council**
- **Office of the Deputy Prime Minister**

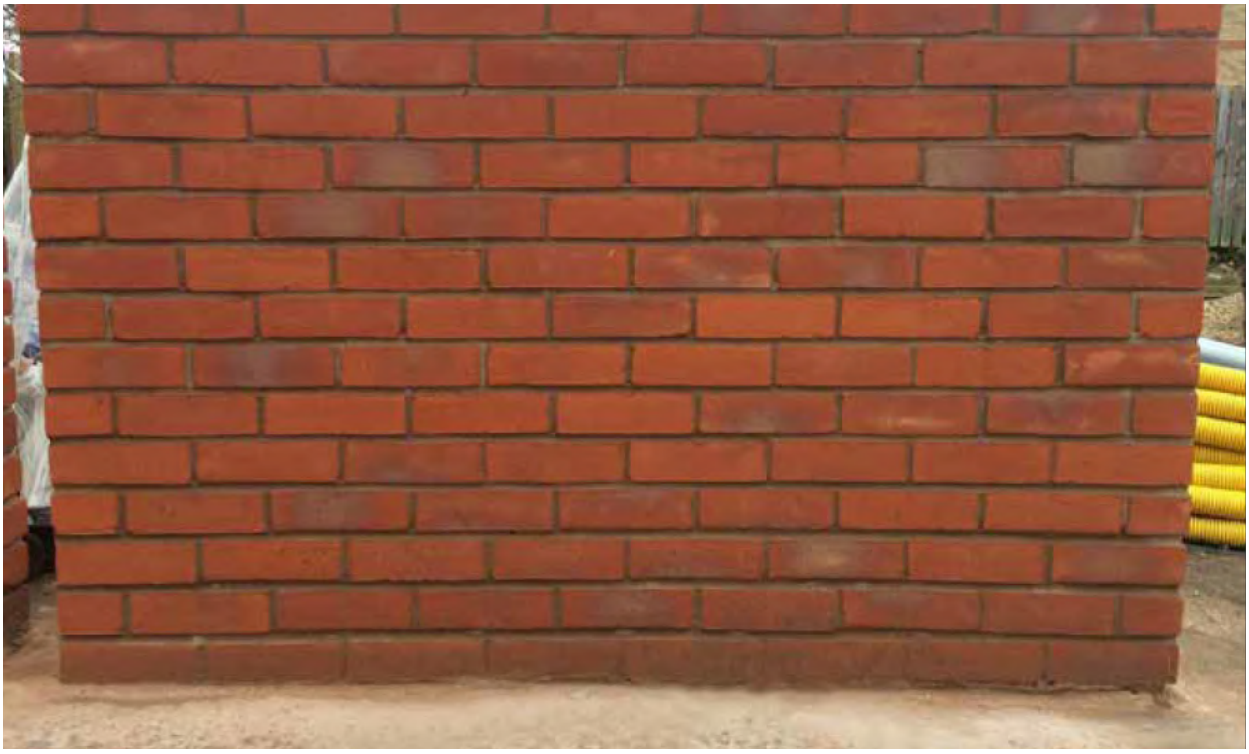
TRIAL PANEL

The key to agreeing quality and workmanship on site is to construct a sample panel. This should not be less than1m2. PAS 70 notes in clause 3.9:

"Trial panel built as brickwork and usually constructed at the start of a project for the purpose of establishing the visual characteristics of the brick, which is to be representative of the appearance of the brick to be used in the executed work."

- The trail panel should be mixed taken from 3 packs.
- If this is not practical take bricks from separate levels and sides from what is available.
- The trail panel should be laid on flat level ground and be retained for the duration of the project.
- The trail panel should be able to be viewed in natural daylight.
- Agreement from all parties including the Client and Designers should be obtained.
- The panel should be of representative workmanship.

AAB in line with industry guidance recommend that the sample panel should include all the bond types and design features as proposed for the project. The panel must be laid in mortar in the intended mortar colour, and intended joint profile. When required,multiple sample panels can be constructed in order to experiment with finishing detail, to establish an approved sample panel.

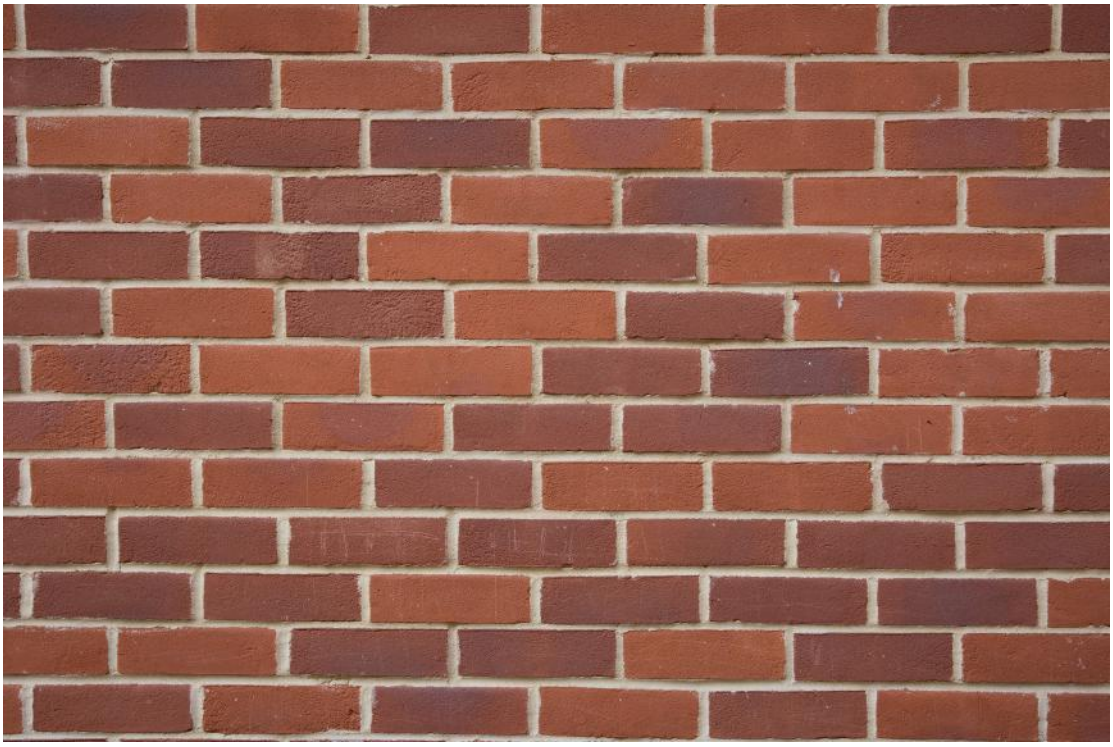


The contract & associated brick work aesthetic standard is based on the approved sample panel which is retained on site. This sample panel is the used to construct the first area of brickwork,this first area of brickwork becomes the reference panel.

REFERENCE PANEL

Having constructed and agreed the trial panel the first brickwork constructed on the project is normally the reference panel. This should be inspected and signed off by all parties.

The standard for the project is thus established and enables site teams to ensure subsequent brickwork is constructed in a manner which meets the agreed reference panel.



SAMPLE PANEL

The PAS notes in clause 3.10 that:

"Panel of brickwork or mortarless laid bricks erected adjoining the reference panel during the ongoing project works for the purpose of assessing the visual characteristics of bricks taken from subsequent project deliveries,to ensure a consistency of appearance in the executed work."

PAS 70 in clause 4.5 Assessment:

"Inspection of the sample panel should be carried out at any time prior to subsequent handling on site. When the sample panel is viewed at the same distance as the reference panel which is normally 3m and without individual scrutiny of individual bricks, the two panels should not differ significantly."

- The sample panel(s) should be constructed in bricks, blended from three packs.
- Where possible, they should reflect the bond of the reference panel.
- Visual adjustments should be allowed, for moisture ingress to the reference panel/weathering and the absence of mortar.

DIMENSIONS AND TOLERANCES

BSEN771-1 requires manufacturers to declare the dimensions of clay masonry units in millimeters for Length, Width and Height. The manufacturer must also declare the category the mean product performance fulfills, T2 (The lowest tolerance), T1 or TM (Manufacturers declared deviation).

Declared Size mm	TI Lower & Upper Limits	Tolerances mm	T2 Lower & Upper Limits	Tolerances mm
40	37-43	±3	38-42	±2
50	47-53	±3	48-52	±2
65	62-68	±3	63-67	±2
68	65-71	±3	66-70	±2
73	70-76	±3	71-75	±2
80	76-84	±4	78-82	±2
90	86-94	±4	88-92	±2
102	98-106	±4	99-105	±3
190	184-196	±6	186-194	±4
215	209-221	±6	211-219	±4
225	219-231	±6	221-229	±4
227	221-233	±6	223-231	±4
290	283-297	±7	286-294	±4

Range

Dimensions Tolerance			
Tolerance	**Length (mm)**	**Width (mm)**	**Height (mm)**
R1	8	5	4
R2	3	2	1

Testing on site to establish the product's mean performance and how it compares to the declared category maybe necessary.

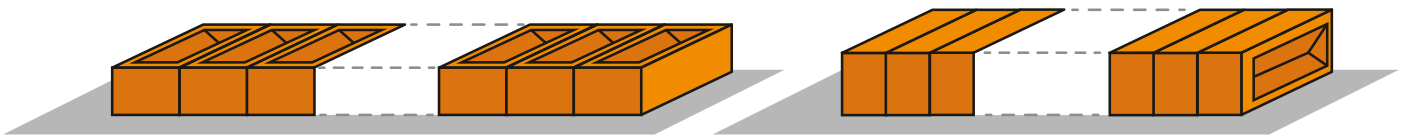
BS EN 771-1 has a more complex method of determining dimensions which are carried out at a test center using long jawed calipers. This is normally impractical for site work so PAS 70 has a more acceptable, more easily replicated site test to swiftly confirm the dimensions of clay bricks. The procedures are listed below;

TOLERANCE – T1, T2 OR TM

- Use a retractable steel rule conforming to BS 4035.
- Sample ten clay bricks taken from three packs to replicate site blending.
- Remove any superfluous material stuck to the brick.
- Place the 10 clay bricks in contact with each other in a straight line along a flat hard level surface using the appropriate arrangement as shown below.
- Measure the overall dimension as shown below to the nearest mm.
- Divide each respective overall measurement by 10 to obtain an average value to the nearest mm.
- Compare the measurement to the above table to establish the tolerance category.

Imagery of a PAS 70 Test conducted for length category.

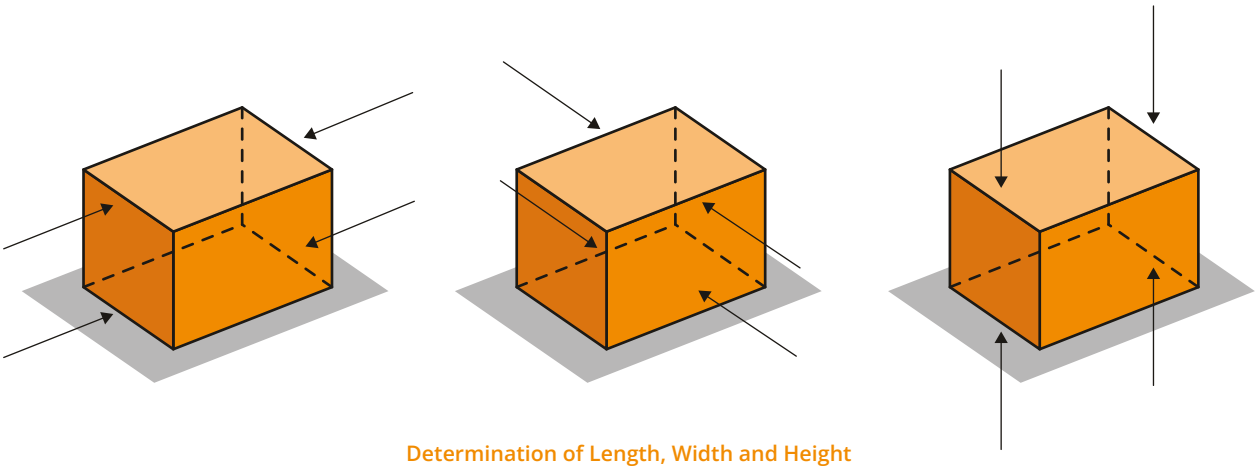
Summary of correct arrangements for width and height.



RANGE – R1, R2 AND RM

Contrary to the tolerance test, the range test measures the brick individually to establish a range of size. The range test should not be confused for tolerance and comparison of results should only be compared to the Range table above.

- Using either the same bricks as the tolerance test, or 10 bricks sampled from three packs to replicate site blending.
- Measure the length, width and height of each brick, across the brick's top and bed as illustrated below.
- The average of the two measurements = The brick's result for that dimension.
- Record the dimensions of each brick individually.
- Calculate the difference between the largest and smallest result for the chosen dimension.
- Compare the result to the above range table to establish the range category.



Determination of Length, Width and Height

Table extract from PAS 70

Name of construction site							**Date**						
							Product name						
Name of manufacturer							**Batch reference no.**						
Manufacturers declared work size dimensions (length x width x height) mm							**215 mm x 102.5 mm x 65 mm**						
Measured data													
Length mm	1st												
	2nd												
	Mean												
Width mm	1st												
	2nd												
	Mean												
Height mm	1st												
	2nd												
	Mean												
NOTE All numbers should be in whole mm													

RELEVANT BRITISH STANDARDS

1. BS EN 771-1:2011 Specification for masonry units part 1: Clay Masonry Units
2. PD 6697:2010 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2
3. BS 8221-1:2012 Code of practice for cleaning and surface repair of buildings
4. BS 7533-9:2010 Pavements constructed with Clay natural stone or concrete pavers
5. PAS 70:2003 HD clay bricks guide to appearance and site measured dimensions and tolerance
6. BS EN 15804:2012 Sustainability of construction works
7. BS 8103-2:2012 Structural design of low rise buildings
8. BS 8000-3:2008 Workmanship on building sites
9. BS EN 1344:2003 Clay pavers – requirements and test methods
10. National Federation of Demolition Contractors: (NFDC). Demolition of refurbishment information data sheet 13. Nfdc-drids.com/sheet 13
11. BS EN 772-3:1998 Methods of test for masonry units determination of net volume
12. BS EN 772-1:2011 Methods of test determination of compressive strength
13. BS EN 1998-1.1:2005 and A1 2012: Design of masonry structures
14. BS EN 998-2:2010 Specification for mortar and masonry
15. BS EN 772-5:2001 Methods of test for masonry units' determination of the active soluble salts
16. BS EN 772-7:1998 Methods of test of masonry units. Determination of water absorption of clay masonry damp proof courses

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