

TECHNICAL NOTES on Brick Construction

12007 Sunrise Valley Drive, Suite 430, Reston, Virginia 20191 | www.gobrick.com | 703-620-0010

Index

September 2024

Subject Index

Technical Notes on Brick Construction is a series of bulletins that contain design, detailing and construction information based on the latest technical developments in brick masonry. Drawings, photographs, tables and charts illustrate appropriate topics. They are available individually or as a set. Registered purchasers of a complete set will receive notification of new or revised editions via email.

Technical Notes on Brick Construction are recommendations on the use of fired clay brick. They are explicitly written for fired clay brick manufactured:

- 1) from clay, shale or similar naturally occurring earthy substances; and
- 2) with a firing process that creates a fired bond between the particles of the brick.

The properties of fired clay brick and the clay brick masonry made from them were used to establish the recommendations in these *Technical Notes*. Using these recommendations with other products that are not manufactured as outlined above may not result in the same performance associated with fired clay brick masonry. Further, use of these *Technical Notes* for the design, installation and maintenance of construction built with other products may in fact be detrimental to those products and the building on which they are installed. Thus, BIA does not advise the use of these recommendations with other products including but not limited to those claiming to be similar to fired clay brick products such as "fly ash" brick, concrete brick and other unfired or non-clay brick.

NUMBER

Individual copies are available to view and download free of charge from BIA's website at www.gobrick.com.

SUBJECT

To view, download or order Technical Notes, go to the BIA website at www.gobrick.com and select Technical Notes.

SUBJECT	NUMBER
Α	
ADA	14E
Adhered Veneer	28C
Admixtures in Mortar	1,8
Air Barriers	
Air Space	7, 7B
Anchor Bolts	
Anchors	28D, 44B, 46
Arches	31–31C
Construction	31
Flashing	
Semi-Circular	31C
Structural Design	31A
ASTM International Standards	
Anchors and Ties	7A, 28B, 44B
Brick	9A
Mortar	
Pavers	9A, 14
В	
Barrier Walls	7
Bearing Walls	
Brick (see Engineered Brick	Masonry)
Brick and Concrete Masonry	(CMU)28D
Bonds and Patterns in Brickwo	rk 30
Paving Patterns	14, 29
Bond Breaks	18A
Bond – Mortar	8 Series
Brick Sizes	9B, 10
С	
•	40
Calculated Fire Resistance	
Caps	
Cavity Walls	
Chimneys	
Classification of Brick	9A

Cleaning	1. 20
Efflorescence	
Coatings for Brick	
Cold Weather Construction	
Guide Specifications	
Color – Brick	
Mortar	
Columns and Pilasters	
Compressive Strength	
Brick Masonry	3A 42
Brick Units	
Mortar	
Pavers	
Walls	
Condensation	
Control Joints (see Expansion Joints)	0_,
Copings	36
Corbels and Racking	36A
Corrosion	
Metal Ties	7A 44B
Shelf Angles	
Steel Lintels	
Coursing Tables for Brick	
Cracking	
· · · · · · · · · · · · · · · ·	
D	
Dampproofing	7, 46
Differential Movement	18, 18A
Bond Breaks	
Expansion Joints in Paving	14 Series
Expansion Joints in Walls	
Flexible Anchorage	18A
Material Properties	
Structures Without Shelf Angles	18A
Volume Changes and Effects	18
Dimensioning	10
•	

SUBJECT	NUMBER
Direct Gain, Passive Solar Heatin	na 13
Drainage Materials	-
Drainage Walls	
Drip Edge	
Drip Lage	, , , , , , , , ,
E	
Efflorescence	
Identification and Prevention	23
Causes and Prevention	
Removal	
Empirical Design of Brick Masonr	
Energy	,
Codes	4, 4A
Embodied	48
R-Values	4. 4A
Thermal Conductivity	
Thermal Conductance	
U-Factors	
Engineered Brick Masonry	,
Allowable Design Stresses	3A
Building Code Requirements	
Guide Specifications	
Material Properties	
Section Properties	
Wall Types and Properties	
Equivalent Thickness	16
Estimating Material Quantities	10
Expansion Joints	
Paving	14 Series
_	
F	
Face Grouting	
Fasteners for Brick Masonry	
Fences	
Field Panels	9R

SUBJECT	NUMBER	SUBJECT	NUMBER	SUBJECT
Fireplaces, Residential	19–19E	Moisture Control		Sand Setting Bed
Contemporary, Projected Co		Barrier Walls	7	Solar Reflectance.
Rumford, Multifaced		Caps and Copings		Tack Coat
Details and Construction		Condensation		Traffic
Finnish Style Masonry Heate		Corrosion		Permeance
Russian Style Masonry Heat		Drainage Walls		Piers and Pilasters
Fire Resistance		Flashing		Plant Removal
Flashing, Types and Selection		Glazed Brick Walls		Portland Cement/Lime
Arches		Maintenance		Prefabricated Brick M
Details		Mortar		Introduction
Installation		Rain Screen Wall		Thin Brick
Replacement		Repointing		Pressure-Equalized R
Flexible Paving Systems		Water Repellent Coatings		
Floor-Wall Connections, Bearing		Weeps		R
Freeze Thaw Durability		Moisture Expansion		Rain Penetration (see
Freezing, Protection From		Mortar-Collection Devices		Rain Screen Wall
		Mortars for Brickwork		Recycled Content
G		Cold Weather Construction		Reinforced Brick Mas
Garden Walls	29A	Efflorescence		Hollow Brick Maso
Glazed Brick		Estimating Quantities	,	Specifications
Specifications	9A	Guide Specifications		Replacement Brick
Walls		Joints		Repointing
Glossary		Materials		Retrofit
Green Building		Mixing		Rigid Paving Systems
Grout Properties		Paving Systems		Rumford Fireplaces
Guide Specifications		Quality Assurance		R-Values
•		Repointing		
Н		Selection		S
Heat Transmission, Coefficients	of4	Mortar Wash		Salvaged Brick
Hollow Brick Masonry	41	Movement (see Differential Mo		Sample Panels
Hot Weather Construction	1	`	,	Sealers (see Water R
_		P		Sealants
I		Paint	6	Section Properties
Inspection	46	Acrylic Latex	6	Selection of Brick
Initial Rate of Absorption7A		Mineral		Serpentine Walls
Insulation4	, 4A, 7, 7A, 28D	Semi-Opaque	6	Service Life
Ivy Removal	46	Parapets	7, 18 Series, 36A	Shelf Angles
_		Patterns		Typical Details
L		Paving Systems	14 Series	Corrosion Resistar
Landscape Architecture		Accessibility		Single-Wythe Bearing
Accessibility		Adhesives		Sills
Garden Walls		Bases	14	Sizes of Brick
Miscellaneous Applications		Bituminous Setting Bed	14B	Slip/Skid Resistance.
Paving		Clay Pavers		Soffits
Pedestrian Applications		Cleaning		Solar Energy (see Pa
Lateral Forces, Shear Wall Des	-	Coatings		Solar Reflectance
LEED	, -	Details	14 Series	Sound Barriers (see N
Limewash		Drainage	14 Series	Sound Insulation
Lintels		Edge Restraint	14 Series	Spalling
Loadbearing Brick Homes	26	Expansion Joints		Specifications, General
M		Ice and Snow Removal	14	TMS 602 Specifica
M Maintananaa	40	Infiltration Rate	14D	Brick
Maintenance		Installation	14 Series	Cold and Hot Wear
Cleaning		Interlock	14A	Mortars
Manufacturing Brick		Joint Sand	14A, 14B	Pavers
Material Properties		Maintenance	14 Series	Stains, Color Change
Masonry Heaters		Managing Rainwater	14D, 48	Masonry Stains
Mock-Ups		Mortar Setting Bed		Stains, Discoloration a
Modular Brick Masonry	10	Patterns		Identification and P
		Dormooble Dovements	14 140	Removal

SUBJECT	NUMBER
Sand Setting Bed	
Solar Reflectance	48
Tack Coat	
Traffic	
Permeance	
Piers and Pilasters	
Plant Removal Portland Cement/Lime Mortar	
Prefabricated Brick Masonry	8 Series
Introduction	40
Thin Brick	
Pressure-Equalized Rain Screen	
•	
R	
Rain Penetration (see Moisture C	
Rain Screen Wall	
Recycled Content	48
Reinforced Brick Masonry	00.44
Hollow Brick Masonry	
Specifications Replacement Brick	
Repointing	
Retrofit	
Rigid Paving Systems	
Rumford Fireplaces	
R-Values	
	, ,
S	
Salvaged Brick	
Sample Panels	7B, 9
Sealers (see Water Repellents)	
Sealants	
Section Properties	
Selection of Brick	
Serpentine Walls Service Life	
Shelf Angles	40
Typical Details	7 28B
Corrosion Resistance	
Single-Wythe Bearing Walls	
Sills	
Sizes of Brick	9B, 10
Slip/Skid Resistance	14, 14E
Soffits	36
Solar Energy (see Passive Solar	Systems)
Solar Reflectance	
Sound Barriers (see Noise Barrie	,
Sound Insulation	
Spalling	
Specifications, General TMS 602 Specification	
Brick	
Cold and Hot Weather Constru	
Mortars	
Pavers	,
Stains, Color Change	
Masonry Stains	6
Stains, Discoloration and Soiling	
Identification and Prevention	23
Removal	20
Steel Studs	28B
Steps and Ramps	29

SUBJECT NUMBER Sustainability......48 Sustainable Development29 Т Terminology......2 Terraces 29 Thermal Bridge4 Thermal Expansion of Walls18 Series Thermal Mass.....4 Thermal Resistance _____4 Thin Brick28C Modular Panel......28C Precast Concrete28C Prefabricated Panel28C Thick Set......28C Thin Set28C Ties and Reinforcement Adjustable44B Corrosion Resistance......7A, 44B Joint Reinforcement......44B Specifications11A TMS 402 Building Code3 Tuckpointing (see Repointing) Used Brick......15 U-Factors......4, 4A, 4B Vapor Diffusion.....7 Vapor Retarders7A Concrete Masonry (CMU)28D Hollow Brick......41 Thin Brick Veneer28C Water Penetration (see Moisture Control) Water-Repellent Coatings6, 6A, 46 Pigmented6 Silicone Emulsion Coatings6 Weeps7, 46 Whitewash.....6 Winter Construction (see Cold Weather Construction) Workmanship......7B Specifications11 Series

REVISED TECHNICAL NOTES

(since December 2005)

1	June 2018
3A	
4	January 2016
4A	
6	August 2024
6A	August 2008
7	
7A	November 2017
7B	November 2017
8	March 2020
8B	March 2020
9	
9A	October 2007
10 (replaces 10, 10A & 10B)	
13	
14	
14A	,
14B	,
14C	
14D	,
14E	
16 (replaces 16 & 16B)	
18	
18A	,
20	
23	
23A	
28	
28A	
28B	
28C	
28D (replaces 21, 21A, 21B &21C)	•
41	
46 (replaces 7F)	
47 (replaces 7C & 7D)	
47 (replaces 70 & 7D)	November 2015

Numerical Index

Technical Notes on Brick Construction are recommendations explicitly written for the design, installation and maintenance of masonry using fired clay brick. BIA does not advise the use of these recommendations with other products, including but not limited to those claiming to be similar to fired clay brick products.

Technical Notes are revised to include new technical information. The issue date of a current Technical Note is shown between brackets []. Current editions supersede earlier editions. The designation Reissued indicates that the edition of the Technical Note shown in brackets [] has been thoroughly reviewed and found to be technically accurate. The reissued date appears in parentheses (). Missing numbers have been discontinued.

- 1 [June 2018] Hot and Cold Weather Construction
- 2 [Jan./Feb. 1975] (Reissued March 1999) Glossary of Terms Relating to Brick Masonry
- 3 [July 2002] Overview of Building Code Requirements for Masonry Structures ACI 530-02/ASCE 5-02/TMS 402-02 and Specifications for Masonry Structures ACI 530.1-02/ASCE 6-02/TMS 602-02
- 3A [June 2024] Brick Masonry Material Properties
- 3B [May 1993] Brick Masonry Section Properties
- 4 [Jan. 2016] Introduction to Energy Performance of Brick Masonry
- 4A [June 2016] Residential Energy Code Compliance
- 4B [Feb. 2002] Energy Code Compliance of Brick Masonry Walls
- 5A [June 1970] (Reissued Aug. 2000) Sound Insulation Clay Masonry Walls
- 6 [Aug. 2024] Changing the Appearance of Brick Masonry
- 6A [Aug. 2008] Colorless Coatings for Brick Masonry
- 7 [Nov. 2017] Water Penetration Resistance Design and Detailing
- 7A [Nov. 2017] Water Penetration Resistance Materials
- **7B** [Nov. 2017] Water Penetration Resistance Construction and Workmanship
- 8 [March 2020] Mortars for Brickwork
- 8B [March 2020] Mortars for Brickwork Selection and Quality Assurance
- 9 [Dec. 2006] Manufacturing of Brick
- 9A [Oct. 2007] Specifications for and Classification of Brick
- 9B [Dec. 2003] Manufacturing, Classification and Selection of Brick Selection, Part III
- 10 [Feb. 2009] Dimensioning and Estimating Brick Masonry
- 11 [Dec. 1971] (Reissued Aug. 2001) Guide Specifications for Brick Masonry, Part I
- 11A [June 1978] (Reissued Sept. 1988) Guide Specifications for Brick Masonry, Part II
- 11B [Feb. 1972] (Reissued Sept. 1988) Guide Specifications for Brick Masonry, Part III
- **11C** [July 1972] (Reissued May 1998) Guide Specifications for Brick Masonry, Part IV
- 11D [Aug. 1972] (Reissued Sept. 1988) Guide Specifications for Brick Masonry, Part IV Continued
- 11E [Sept. 1991] Guide Specifications for Brick Masonry, Part V, Mortar and Grout
- 13 [June 2017] Ceramic Glazed Brick Exterior Walls
- 14 [May 2017] Paving Systems Using Clay Pavers
- **14A** [May 2017] Paving Systems Using Clay Pavers on a Sand Setting Bed
- **14B** [June 2010] Paving Systems Using Clay Pavers on a Bituminous Setting Bed
- 14C [July 2011] Paving Systems Using Clay Pavers in a Mortar Setting Bed
- 14D [Feb. 2012] Permeable Clay Brick Pavements
- 14E [July 2012] Accessible Clay Brick Pavements
- 15 [May 1988] Salvaged Brick
- 16 [March 2008] Fire Resistance of Brick Masonry

- 18 [May 2019] Volume Changes Analysis and Effects of Movement
- 18A [May 2019] Accommodating Expansion of Brickwork
- 19 [Jan. 1993] Residential Fireplace Design
- 19A [May 1980] (Reissued Aug. 2000) Residential Fireplaces, Details and Construction
- **19B** [June 1980] (Reissued April 1998) Residential Chimneys Design and Construction
- 19C [Oct. 2001] Contemporary Brick Masonry Fireplaces
- **19D** [Jan. 1983] (Reissued June 1987) Brick Masonry Fireplaces, Part I, Russian-Style Heaters
- 19E [1983] (Reissued Feb. 1998) Brick Masonry Fireplaces, Part II Fountain and Contemporary Style Heaters
- 20 [Aug. 2018] Cleaning Brickwork
- 23 [June 2019] Stains Identification and Prevention
- 23A [June 2019] Efflorescence Causes and Prevention
- 26 [Sept. 1994] Single Wythe Bearing Walls
- 27 [Aug. 1994] Brick Masonry Rain Screen Walls
- 28 [Nov. 2012] Anchored Brick Veneer/Wood Stud Walls
- 28A [March 2020] Adding Brick Veneer to Existing Construction
- 28B [Dec. 2005] Brick Veneer / Steel Stud Walls
- 28C [April 2014] Thin Brick Veneer
- 28D [June 2018] Brick Veneer/Concrete Masonry Walls
- 29 [July 1994] Brick in Landscape Architecture Pedestrian Applications
- 29A [Nov. 1968] (Reissued Jan. 1999) Brick in Landscape Architecture – Garden Walls
- 29B [April 1967] (Reissued May 1988) Brick in Landscape Architecture – Miscellaneous Applications
- 30 [March 1999] Bonds and Patterns in Brickwork
- 31 [Jan. 1995] Brick Masonry Arches
- 31A [Oct. 1967] (Reissued July 1986) Structural Design of Brick Masonry Arches
- 31B [Nov./Dec. 1981] (Reissued May 1987) Structural Steel Lintels
- **31C** [Feb. 1971] (Reissued Aug. 1986) Structural Design of Semicircular Brick Masonry Arches
- 36 [July/Aug. 1981] (Reissued Jan. 1988) Brick Masonry Details, Sills and Soffit
- 36A [Sept./Oct. 1981] (Reissued Feb. 2001) Brick Masonry Details, Caps and Copings, Corbels and Racking
- 40 [Aug. 2001] Prefabricated Brick Masonry Introduction
- 41 [Jan. 2008] Hollow Brick Masonry
- 42 [Nov. 1991] Empirical Design of Brick Masonry
- 44 [April 1986] Anchor Bolts for Brick Masonry
- 44B [May 2003] Wall Ties for Brick Masonry
- 46 [Dec. 2017] Maintenance of Brick Masonry
- 47 [June 2006] Condensation Prevention and Control
- 48 [Nov. 2015] Sustainability and Brick