



## Mortar References

1. ASTM C 10, "Standard Specification for Natural Cement," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01 Cement; Lime; Gypsum; ASTM Committee C01 on Cement, 2017.
2. ASTM C 91, "Standard Specification for Masonry Cement," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01 Cement; Lime; Gypsum; ASTM Committee C01 on Cement, 2017.
3. ASTM C 144, "Standard Specification for Aggregate for Masonry Mortar," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.05 Chemical-Resistant Nonmetallic Materials; Vitrified Clay Pipe; Concrete Pipe; Fiber-Reinforced Cement Products; Mortars or mortars and Grouts; Masonry; Precast Concrete; ASTM Committee C12 on Mortars or mortars for Unit Masonry, 2017.
4. ASTM C 1324, "Standard Test Method for Examination and Analysis of Hardened Masonry Mortar," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.05 Chemical-Resistant Nonmetallic Materials; Vitrified Clay Pipe; Concrete Pipe; Fiber-Reinforced Cement Products; Mortars or mortars and Grouts; Masonry; Precast Concrete; ASTM Committee C12 on Mortars or mortars for Unit Masonry, 2017.
5. ASTM C 270, "Standard Specification for Mortar for Unit Masonry," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.05 Chemical-Resistant Nonmetallic Materials; Vitrified Clay Pipe; Concrete Pipe; Fiber-Reinforced Cement Products; Mortars or mortars and Grouts; Masonry; Precast Concrete; ASTM Committee C12 on Mortars or mortars and Grouts for Unit Masonry, 2017.
6. ASTM C 1713, "Standard Specification for Mortars or mortars for the Repair of Historic Masonry," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.05 Chemical-Resistant Nonmetallic Materials; Vitrified Clay Pipe; Concrete Pipe; Fiber-Reinforced Cement Products; Mortars or mortars and Grouts; Masonry; Precast Concrete; ASTM Committee C12 on Mortars or mortars and Grouts for Unit Masonry, 2017.
7. ASTM C 51, "Standard Terminology Relating to Lime and Limestone (as used by the Industry)" In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01 Cement; Lime; Gypsum; ASTM Committee C07 on Lime, 2017.
8. ASTM C 856, "Standard Practice for Petrographic Examination of Hardened Concrete," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.02; ASTM Subcommittee C 9.65, 2017.
9. ASTM C 1723, "Standard Guide for Examination of Hardened Concrete Using Scanning Electron Microscopy," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.02; ASTM Subcommittee C 9.65, 2017.
10. ASTM C 1329, "Standard Specification for Mortar Cement," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01; ASTM Subcommittee C01.11, 2016.
11. ASTM C 150, "Standard Specification for Portland Cement," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01; ASTM Subcommittee C01.10, 2018.
12. ASTM C 1489, "Standard Specification for Lime Putty for Structural Purposes," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01; ASTM Subcommittee C07.02, 2015.
13. ASTM C 207, "Standard Specification for Hydrated Lime for Masonry Purposes," In Annual Book of ASTM Standards, Section Four Construction, Vol. 04.01; ASTM Subcommittee C07.02, 2011.
14. Bartos, P. Groot, C., and Hughes, J.J. (eds.), "Historic Mortars or mortars: Characteristics and Tests", Proceedings PRO12, RILEM Publications, France, 2000.
15. Boynton, R., *Chemistry and Technology of Lime and Limestone, 2<sup>nd</sup> edition*, John Wiley & Sons, Inc. 1980.
16. Brosnan, Denis, A., Characterization of Rosendale Mortars or mortars For Fort Sumter National Monument and Degradation of Mortars or mortars by Sea Water and Frost Action, Final Report, April 19, 2012.

17. Callebaut, K., Elsen, J., Van Balen, K., and Viaene, W., "Nineteenth century hydraulic restoration mortars or mortars in the Saint Michael's Church (Leuven, Belgium) Natural hydraulic lime or cement?" *Cement and Concrete Research*, V 31, pp 397-403, 2001.
18. Callebaut, K., Elsen, J., Van Balen, K., and Viaene, W., Historical and scientific study of hydraulic mortars or mortars from the 19<sup>th</sup> century. In International RILEM workshop on historic mortars or mortars: Characterization and Tests; Paisley, Scotland, 12<sup>th</sup> to 14<sup>th</sup> May 1999, Edited by Barton, P., Groot, C., and Hughes, J.J., Cachan, France, RILEM Publications, 2000.
19. Charloa, A.E., "Mortar analysis: A comparison of European procedures." *US/ICOMOS Scientific Journal: Historic Mortars or mortars & Acidic Deposition on Stone*, 3 (1), pp. 2-5, 2001.
20. Charola, A.E., and Lazzarin, L., Deterioration of Brick Masonry Caused by Acid Rain, ACS Symposium Series, Vol. 318, pp. 250-258, 2009.
21. Chiari, G., Torraca, G., and Santarelli, M.L., "Recommendations for Systematic Instrumental Analysis of Ancient Mortars or mortars: The Italian Experience", *Standards for Preservation and Rehabilitation*, ASTM STP 1258, S.J. Kelley, ed., American Society for Testing and Materials, pp. 275-284, 1996.
22. Doebley, C.E., and Spitzer, D., "Guidelines and Standards for Testing Historic Mortars or mortars", *Standards for Preservation and Rehabilitation*, ASTM STP 1258, S.J. Kelley, ed., American Society for Testing and Materials, pp. 285-293, 1996.
23. Eckel, Edwin, C., *Cements, Limes, and Plasters*, John Wiley & Sons, Inc. 655pp, 1922.
24. Edison, M.P. (Editor), *Natural Cement*, ASTM STP 1494, American Society for Testing and Materials, 2008.
25. Elsen, J., "Microscopy of Historic Mortars or mortars – A Review", *Cement and Concrete Research* 36, 1416-1424, 2006.
26. Elsen, J., Mertens, G., and Van Balen, K., Raw materials used in ancient mortars or mortars from the Cathedral of Notre-Dame in Tournai (Belgium), *Eur. J. Mineral.*, Vol. 23, pp. 871-882, 2011.
27. Elsen, J., Van Balen, K., and Mertens, G., Hydraulicity in Historic Lime Mortars or mortars: A Review, In, Valek, J, Hughes, J.J., and Groot, W.P. (Eds.), *Historic Mortars or mortars Characterization, Assessment and Repair*, RILEM Book series, Volume 7, pp. 125-139, Springer, 2012.
28. Erlin, B., and Hime, W.G., "Evaluating Mortar Deterioration", *APT Bulletin*, Vol. 19, No. 4, pp. 8-10+54, 1987.
29. Goins E.S., "Standard Practice for Determining the Components of Historic Cementitious Materials," National Center for Preservation Technology and Training, Materials Research Series, NCPTT 2004.
30. Goins, E.S., "A standard method for the characterization of historic cementitious materials." *US/ICOMOS Scientific Journal: Historic Mortars or mortars & Acidic Deposition on Stone*, # (1), pp. 6-7, 2001.
31. Groot, C., Ashall, G., and Hughes, J., Characterization of Old Mortars or mortars with Respect to their Repair, State-of-the-art Report of RILEM Technical Committee 167-COM, 2004.
32. Hughes, D.C., Jaglin, D., Kozlowski, R., Mayr, N., Mucha, D., and Weber, J., "Calcination of Marls to Produce Roman Cement", pp. 84-95, In, Edison, M.P. (Editor), *Natural Cement*, ASTM STP 1494, American Society for Testing and Materials, 2007.
33. Hughes, J.J., Cuthbert, S., and Bartos, P., "Alteration Textures in Historic Scottish Lime Mortars or mortars and the Implications for Practical Mortar Analysis", *Proceedings of the 7<sup>th</sup> Euroseminar on Microscopy Applied to Building Materials*, Delft, pp. 417-426, 1999.
34. Hughes, R.E., and Bargh, B.L., The weathering of brick: Causes, Assessment and Measurement, A Report of the Joint Agreement between the U.S. Geological Survey and the Illinois State Geological Survey, 1982.
35. Jana, D., "Application of Petrography In Restoration of Historic Masonry Structures", In: Hughes, J.J., Leslie, A.B. and Walsh, J.A., eds. *Proceedings of 10<sup>th</sup> Euroseminar on Microscopy Applied to Building Materials*, Paisley, 2005.
36. Jana, D., "Sample Preparation Techniques in Petrographic Examinations of Construction Materials: A State-of-the-art Review", *Proceedings of the 28<sup>th</sup> Conference on Cement Microscopy*, International Cement Microcopy Association, Denver, Colorado, pp. 23-70, 2006.
37. Jędrzejewska, H., Old mortars or mortars in Poland: a new method of investigation, *Studies in Conservation* 5, pp. 132-138, 1960.
38. Leslie, A.B., and Hughes, J.J., "Binder Microstructure in Lime Mortars or mortars: Implications for the Interpretation of Analysis Results", *Quarterly Journal of Engineering Geology & Hydrogeology*, V. 35, No. 3, pp. 257-263, 2001.
39. Lubell, B., van Hees, Rob. P.J., and Groot, Casper J.W.P., The role of sea salts in the occurrence of different damage mechanisms and decay on brick masonry, *Construction and Building Materials*, Vol. 18, pp. 119-124, 2004.

40. Martinet, G., Quenee, B., Proposal for a useful methodology for the study of ancient mortars or mortars, Proceedings of the International RILEM workshop "Historic Mortars or mortars: Characteristics and tests," Paisley, pp. 81-91, 2000.
41. Mack, Robert, and Speweik, John P., *Preservation Briefs 2*, U.S. Department of the Interior, National Park Service Cultural Resources, Heritage Preservation Services, pp. 1-16, 1998.
42. Middendorf, B., Baronio, G., Callebaut, K, and Hughes, J.J., "Chemical-mineralogical and physical-mechanical investigation of old mortars or mortars, Proceedings of the International RILEM workshop "Historic Mortars or mortars: Characteristics and tests," Paisley, pp. 53-61, 2000.
43. Middendorf, B., Hughes, J.J., Callebaut, K., Baronio, G., and Papayanni, I., Mineralogical characterization of historic mortars or mortars, In. Groot, C., et al. (eds), *Characterization of Old Mortars or mortars with Respect to their Repair, State-of-the-art Report of RILEM Technical Committee 167-COM*, pp. 21-36, 2004a.
44. Middendorf, B., Hughes, J.J., Callebaut, K., Baronio, G., and Papayanni, I., Chemical characterization of historic mortars or mortars, In. Groot, C., et al. (eds), *Characterization of Old Mortars or mortars with Respect to their Repair, State-of-the-art Report of RILEM Technical Committee 167-COM*, pp. 37-53, 2004b.
45. Middendorf, B., Hughes, J.J., Callebaut, K., Baronio, G., and Papayanni, I., "Investigative Methods for the Characterization of Historic Mortars or mortars – Part 1: Mineralogical Characterization," *Materials and Structures*, Vol. 38, 2005a.
46. Middendorf, B., Hughes, J.J., Callebaut, K., Baronio, G., and Papayanni, I., "Investigative Methods for the Characterization of Historic Mortars or mortars – Part 2: Chemical Characterization," *Materials and Structures*, Vol. 38, pp 771-780, 2005b.
47. Sarkar, S.L., Aimin, Xu, and Jana, Dipayan, Scanning electron microscopy and X-ray microanalysis of Concretes, pp. 231-274, In, Ramachandran, V.S. and Beaudoin, J.J. *Handbook of Analytical Techniques in Concrete Science and Technology*, Noyes Publications, Park Ridge, New Jersey, 2000.
48. Speweik, J.P., *The History of Masonry Mortar in America 1720-1995*, 2010.
49. Stewart, J., and Moore, J., Chemical techniques of historic mortar analysis, Proceedings of the ICCROM Symposium "Mortars or mortars, Cements, and Grouts used in the Conservation of Historic Buildings," Rome, ICCROM, Rome, pp. 297-310, 1981.
50. Valek, J., Hughes, J.J., and Groot, C. (eds.), *Historic Mortars or mortars: Characterization, Assessment and Repair*, Springer, RILEM Book series Vol. 7, p. 464, 2012.
51. Valek, J., Hughes, J.J., and Groot, C. (eds.), *Historic Mortars or mortars: Characterization, Assessment and Repair*, Springer, RILEM Book series Vol. 7, 2012.
52. Van Balen, K., Toumbakari, E.E., Blanco, M.T., Aguilera, J., Puertas, F., Sabbioni, C., Zappia, G., Riontino, C., and Gobbi, G., "Procedures for mortar type identification: A proposal." In International RILEM workshop on historic mortars or mortars: Characteristics and Tests; Paisley, Scotland, 13<sup>th</sup> to 14<sup>th</sup> May 1999, edited by Barton, P., Groot, C., and Hughes, J.J., Cachan, France: RILEM Publications, 2000.
53. Vyskocilova, R., W. Schwarz, D. Mucha, D. Hughes, R. Kozlowski, and J. Weber, "Hydration processes in pastes of roman and American natural cements," *ASTM STP*, vol. 4, no. 2, 2007.
54. Weber, J., Gadermayr, N., Kozlowski, R., Mucha, D., Hughes, D., Jaglin, D., and Schwarz, W., Microstructure and mineral composition of Roman cements produced at defined calcination conditions, *Materials Characterization*, Vol. 58, pp. 1217-1228, 2007.