



*Technische Kennwerte von
Romanzementmorteln gegenüber anderen
hydraulischen Bindemitteln*

Technical parameters of Roman cement mortars
vs. other binders

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Aim of study

- 1. To compare ROCARE cements with existing products in cast and render mortars.**

Rofix NHL 5, Vicat Fix-Zement, Portland cement, ROCARE cements (Gartenau and W&P), Rofix Gussmortel and Feinschlamme

- 2. To produce data to guide development of new European Norme.**



Mortars for comparison

Cast mortars –

Proportions:	0.5 and 1:1 by volume
Flow:	19.5 cm
Workable life:	15 – 30 minutes
Retarder:	Citric acid

Render mortars –

Proportions:	1:1.5 and 1:2.5 by volume
Flow:	15.5 cm
Workable life:	1 – 2 hours
Retarder:	Citric acid (Fix) Deactivation process (ROCARE cements)



The programme

Test
Consistency
Workable Life
Air content
Strength
Young's modulus
Bulk density
Water absorption coefficient
Water vapour permeability
Adhesive strength
Shrinkage
Salt crystallisation resistance
Sulfate resistance
Frost resistance
Pore structure

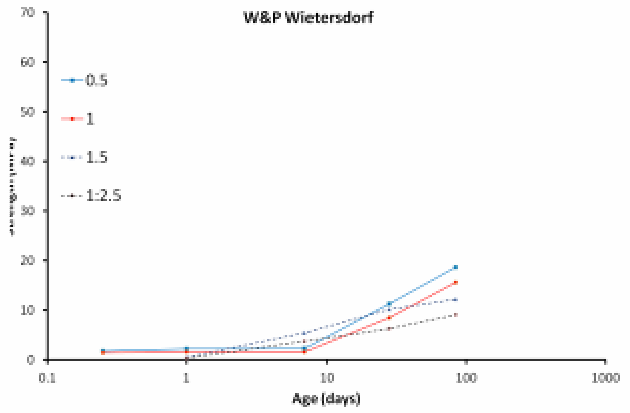
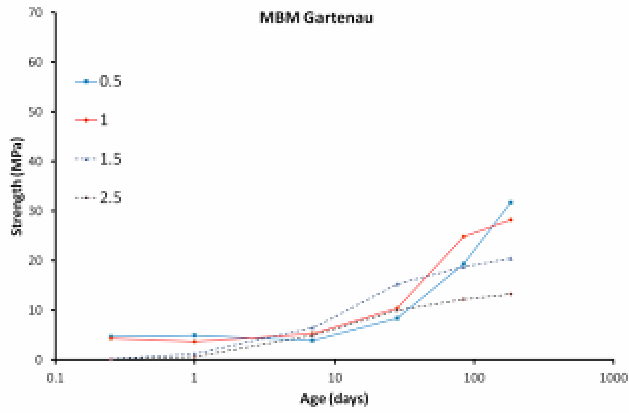
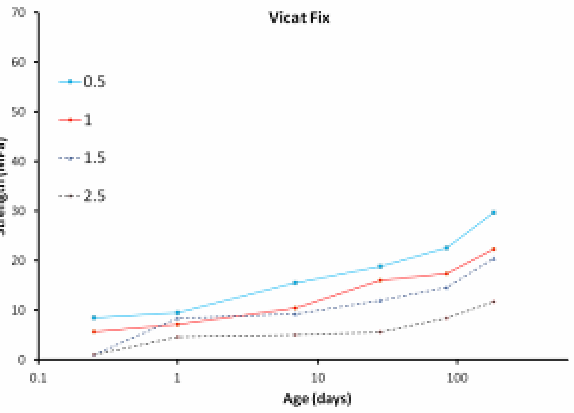
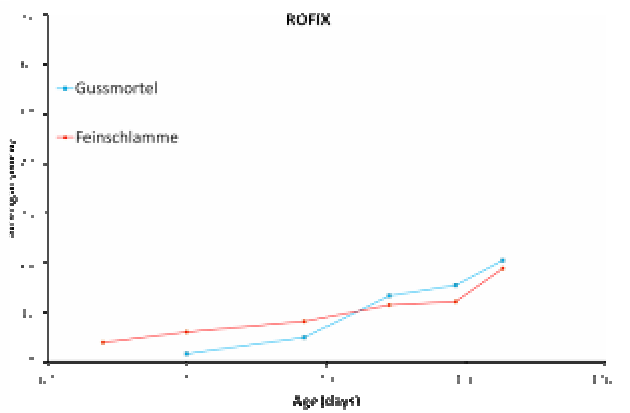
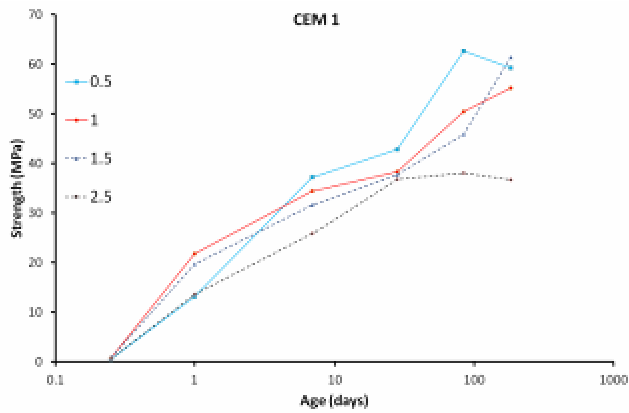
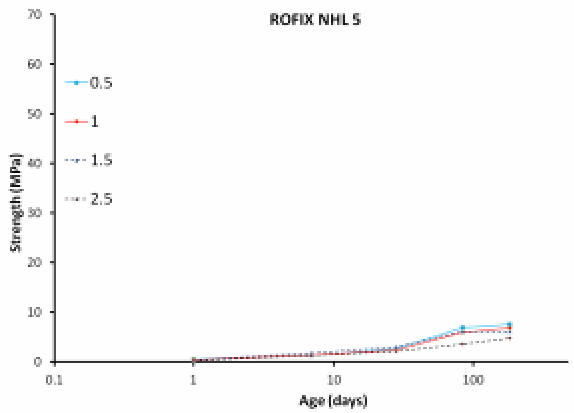
Involves collaboration between 6 partners. Data will be used by other partners to promote ROCARE mortars.

Air Content

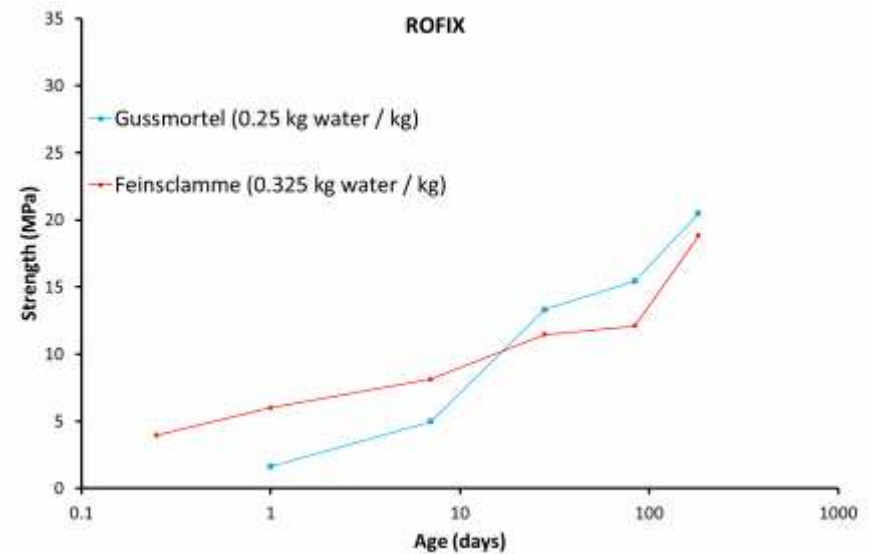
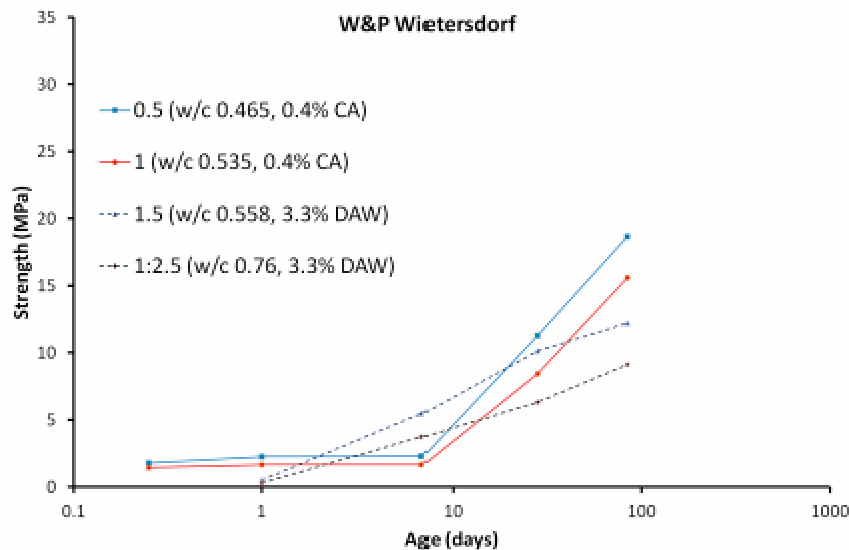
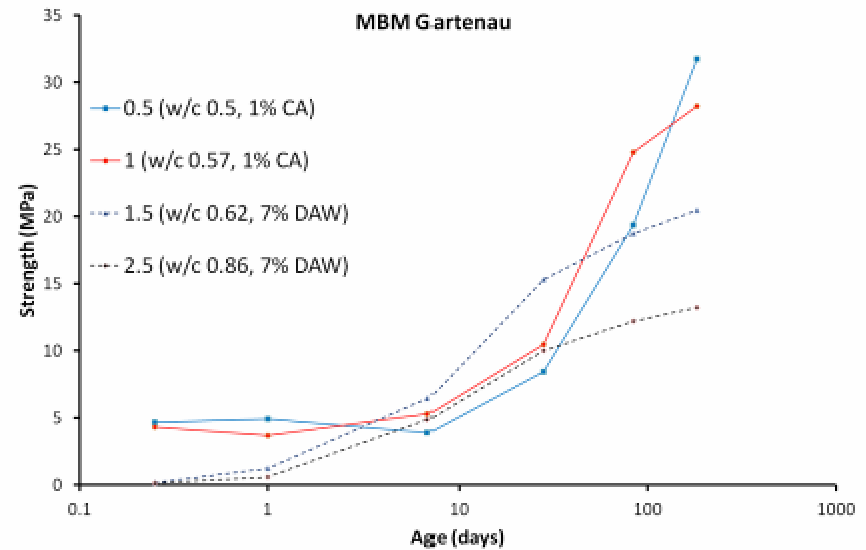
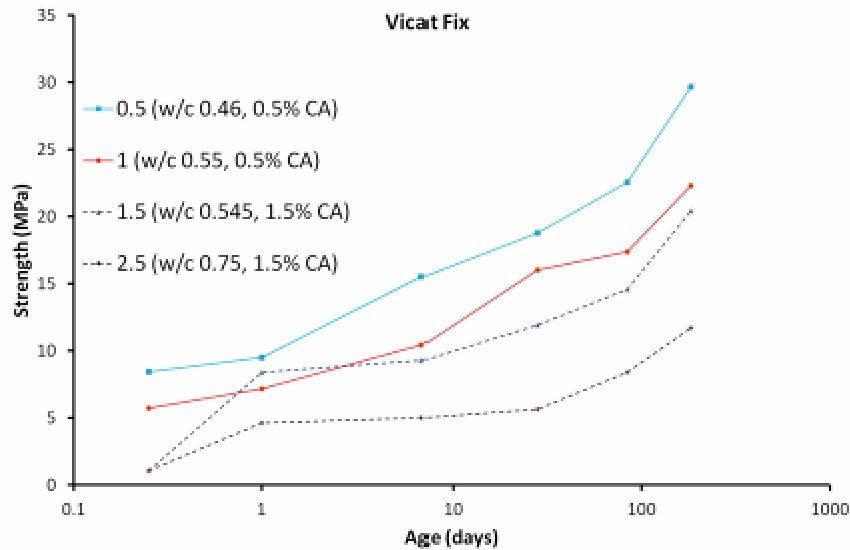
Cement	Cement/Sand	Retarder	Water/Cement	Air Content (%)
MBM Gartenau	1:0.5	1% CA	0.5	2.2
MBM Gartenau	1:1	1% CA	0.57	2.1
MBM Gartenau	1:1.5	DARC	0.62	4.5
MBM Gartenau	1:2.5	DARC	0.86	5.5
W&P	1:0.5	0.4% CA	0.465	4.8
W&P	1:1	0.4% CA	0.535	5.1
W&P	1:1.5	DARC	0.558	6.5
W&P	1:2.5	DARC	0.76	6.6
CEM1	1:0.5	-	0.4	1.9
CEM1	1:1	-	0.444	2.9
CEM1	1:1.5	-	0.417	4.6
CEM1	1:2.5	-	0.585	5.3
Vicat FIX	1:0.5	0.5% CA	0.46	2.2
Vicat FIX	1:1	0.5% CA	0.55	2.2
Vicat FIX	1:1.5	1.5% CA	0.545	4.5
Vicat FIX	1:2.5	1.5% CA	0.75	5.4
ROFIX NHL5	1:0.5	-	0.705	2.3
ROFIX NHL5	1:1	-	0.849	1.8
ROFIX NHL5	1:1.5	-	0.831	4.4
ROFIX NHL5	1:2.5	-	1.166	5.4
Rofix Feinschlamme	-	-	-	2.5
Rofix Gussmortel	-	-	-	1.8



Strengths



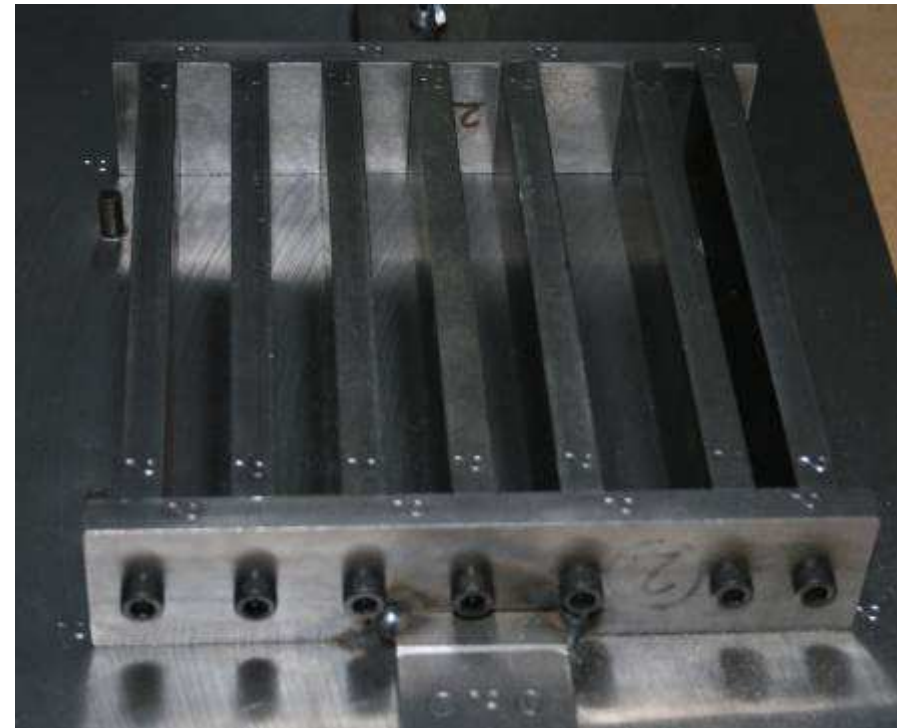
Strengths



Mortars in the laboratory and on the wall

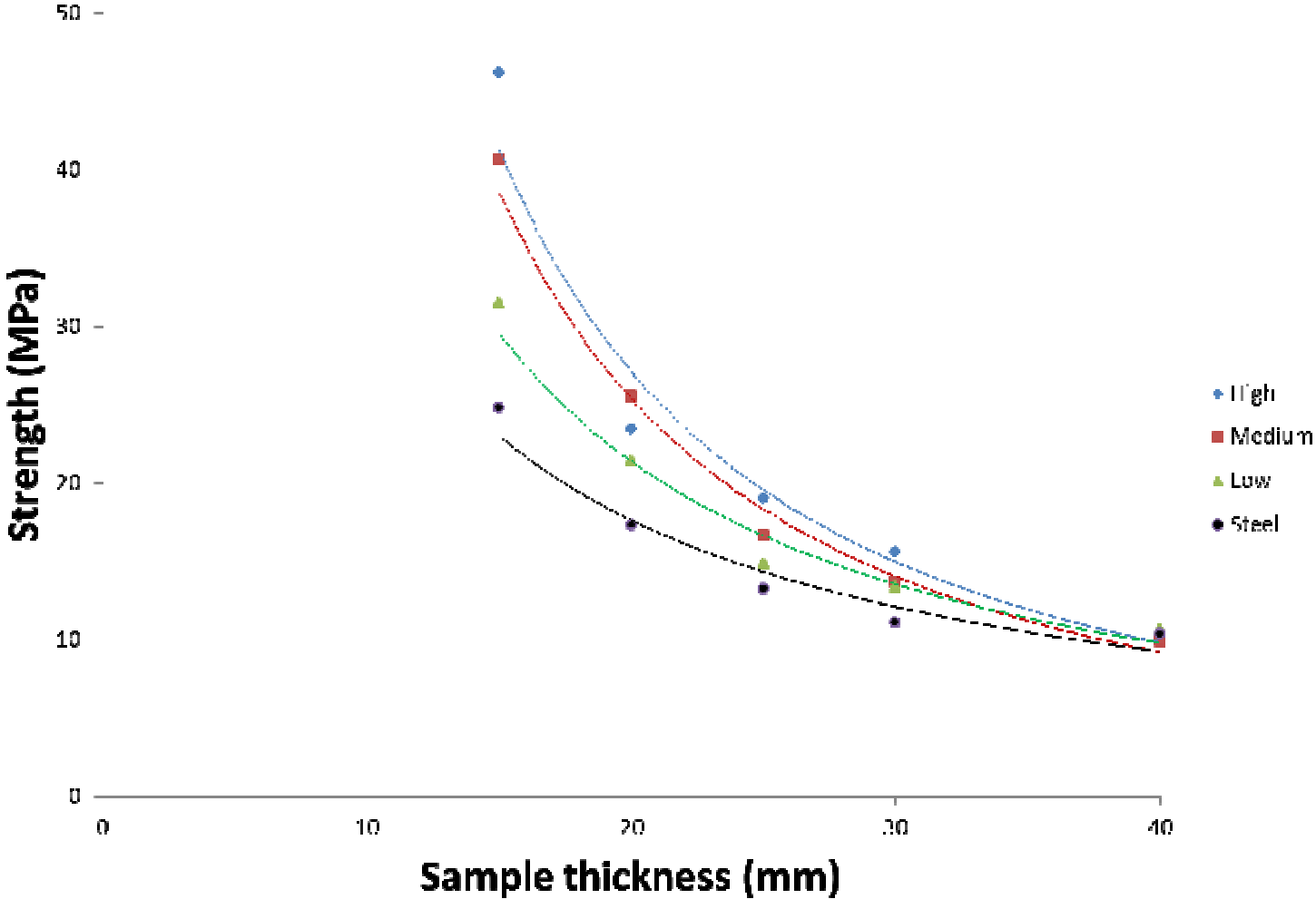


Mortars in the laboratory and on the wall

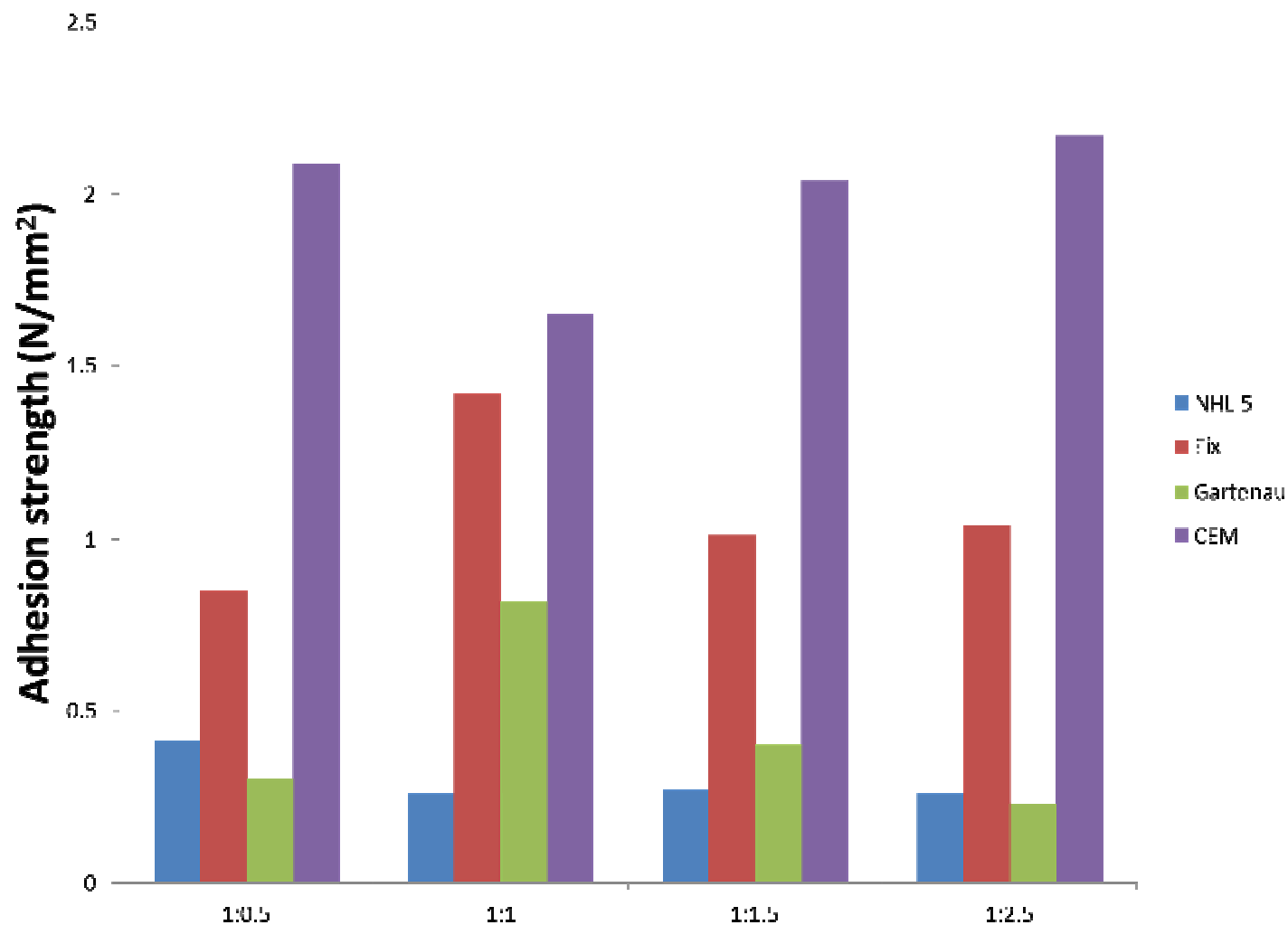




Mortar between bricks



Adhesive strength



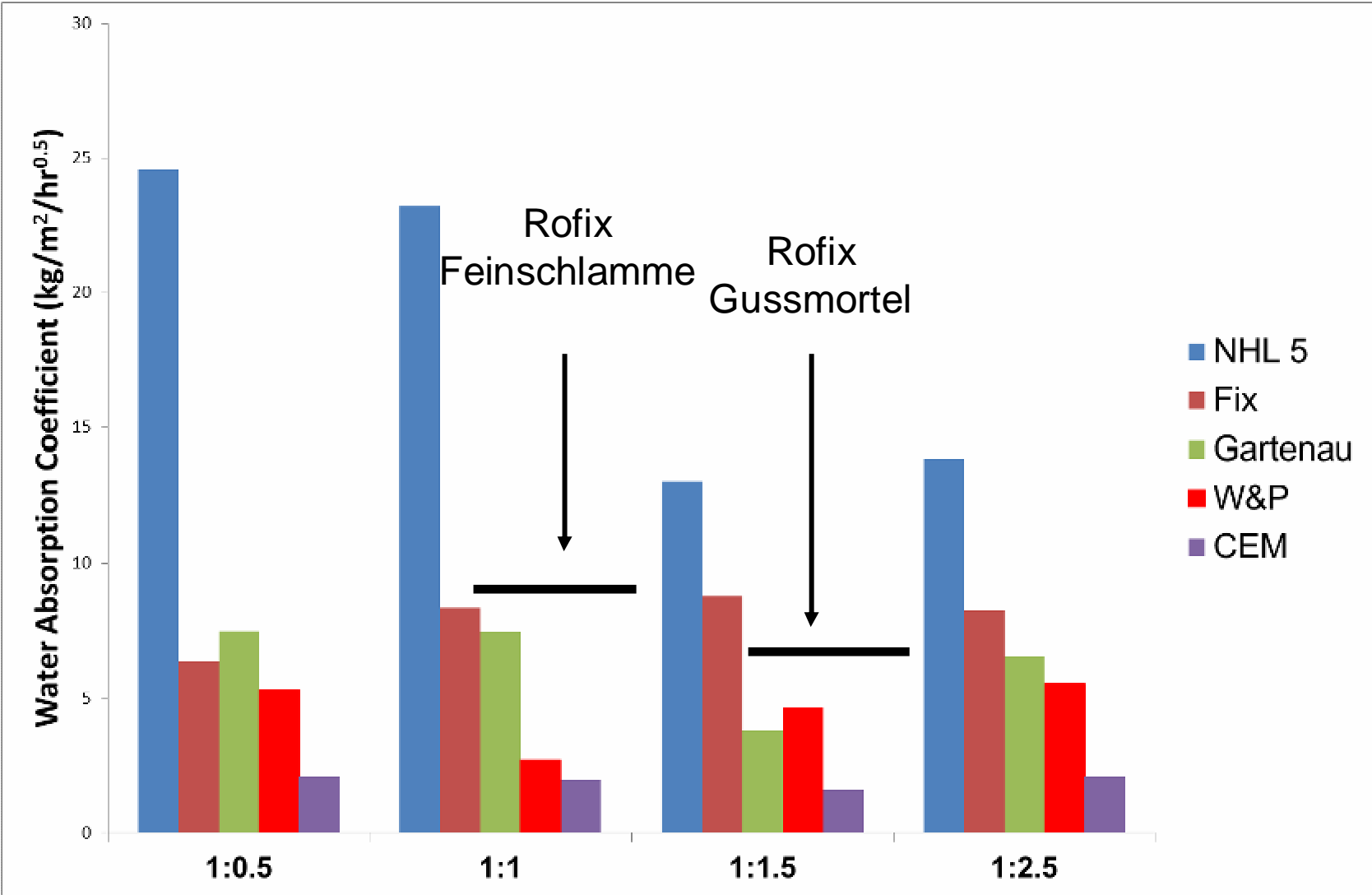


Porosity

Mortar	NHL 5	Gartenau	W&P	Vicat Fix	CEM1
1:0.5	36	26	32	23	14
1:1	32	22	26	22	12
1:1.5	23	19	21	22	10
1:2.5	21	18	21	20	12
Rofix Gussmortel			29		
Rofix Feinschlaamme			35		

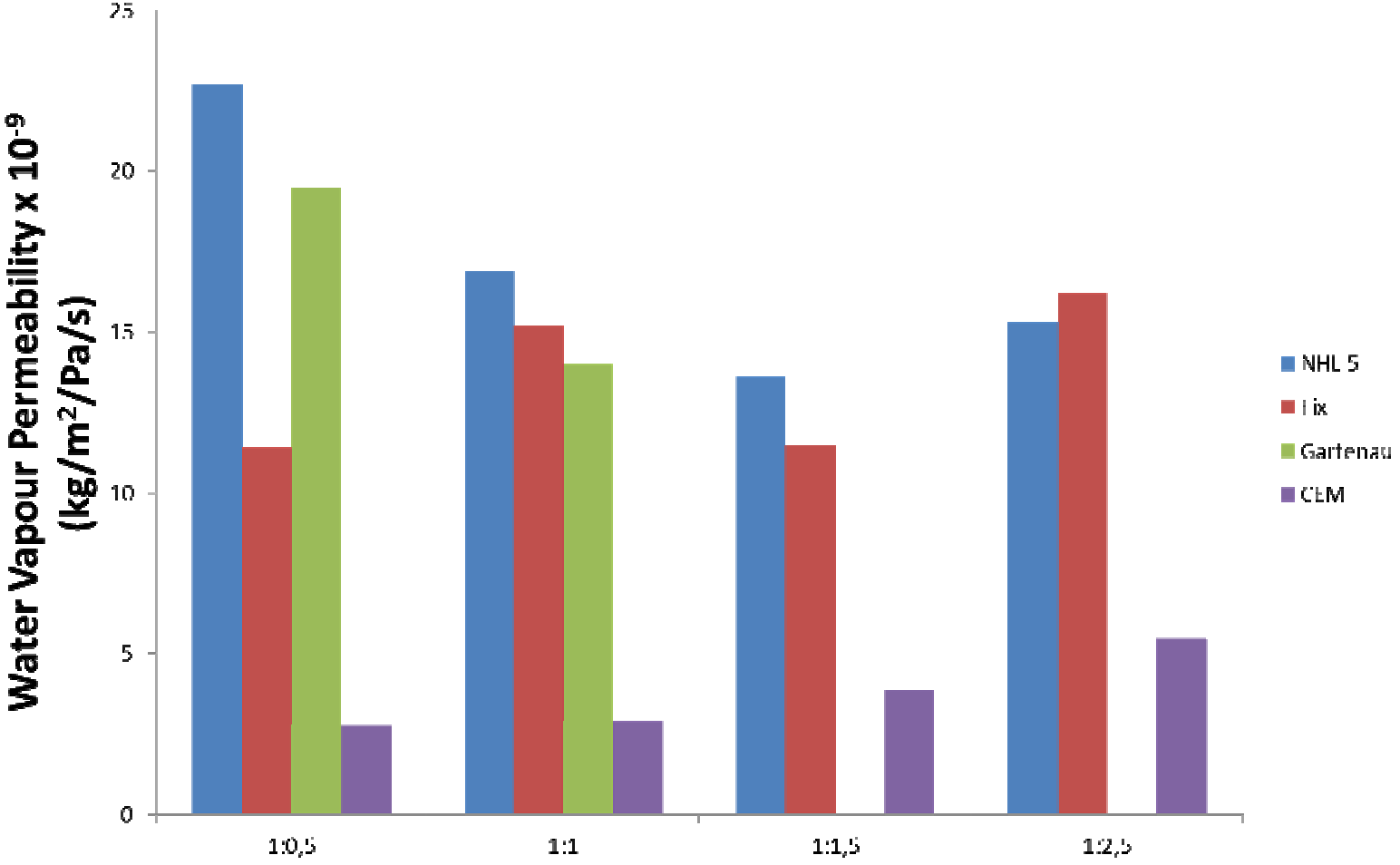


Water Absorption Coefficient





Water Vapour Permeability





Conclusions

Roman cements form a distinct group of binders.

Roman cement mortars combine excellent “breathability” properties with substantial mechanical strength.