



Pallet Tag Program Laboratory Report

Wienerberger Denmark Helsinge, Denmark



Project No. 1905-05 PTP

Prepared By:

J. Lucas Comadoll

J. Lucas Comadoll
Project Testing Technician
AMT Laboratories

July 2019



LABORATORY REPORT

AMT Laboratories • 3741 Greenway Circle • Lawrence, Kansas 66046 • (888) 376-3600

FOR: Bo Feldskov
cc: Matt Travis

SUBJECT: Wienerberger Denmark
Helsingør, Denmark

DATE: July 11, 2019

PROJECT: 1905-05 Wienerberger Denmark

New Construction Cleaning and Adverse Effects Evaluation

SAMPLES SUBMITTED: 36 types of clay brick and 3 types of mortar

Brick	Color	Size
(4) samples of "PT449"	Black/Dark Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "PT450"	Gray and Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "PT465"	Red	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W001"	Dark Gray and Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W103"	Yellow	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W105"	Yellow with a White Surface	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W108"	Dark Brown and Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W109"	Brown with a White Surface	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W110"	Dark Red	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W112"	Light Brown and Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W170"	Dark Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W193"	Orange	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W209"	Buff	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W212"	Buff	22.86 cm x 5.08 cm x 11.43 cm

SAMPLES SUBMITTED: (cont.)

Brick	Color	Size
(4) samples of "W309"	Red	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W409"	Dark Red	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W445"	Yellow with a White Surface	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W447"	Dark Brown with a White Surface	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W451"	Dark Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W452"	Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W453"	Light Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W454"	Black/Dark Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W466"	Red and Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W470"	Buff	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W479"	Buff	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W490"	Red	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W491"	Yellow and Brown	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W492"	Red and Orange	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W494"	Red and Yellow	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W495"	Yellow and Buff with Green Spots	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W496"	Brown and Yellow	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "W498"	Brown and Gray	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "Veldbrons"	Orange (Sandy Surface Finish)	20.96 cm x 5.08 cm x 10.16 cm
(4) samples of "Bronsdroen"	Red with White/Gray Surface	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "Blau Wrood"	Dark Red and Black	22.86 cm x 5.08 cm x 11.43 cm
(4) samples of "Vigo Rosa"	Dark Brown with White Surface	22.86 cm x 5.08 cm x 11.43 cm

SAMPLES SUBMITTED: (cont.)

Mortar	Mix
DAN-GRIT	35/65/650
DAN-GRIT	50/50/700
DAN-GRIT	M5

SUBMITTED BY: Bo Feldskov
Technical Manager
MV Produkter ApS
Snedkervej 19A
6740 Bramming
DENMARK

PURPOSE OF TEST:

- To determine the most appropriate new construction cleaner(s) for the submitted clay bricks.
- To determine if MV Mangan Fjerner, MV Rust Fjerner, or MV Salt Fjerner cause any adverse effects to the submitted clay bricks.

PRODUCTS EVALUATED:

New Construction Cleaning	Dilution:
MV Mangan Kontrol	1:6
MV Murvaerks Rens	1:1

Stain Removal (Adverse Effects)	Dilution:
MV Mangan Fjerner	1:3
MV Rust Fjerner	1:1
MV Salt Fjerner	1:1

TEST METHODS: Mortar Removal

MV Mangan Kontrol diluted with six parts water and MV Murvaerks Rens diluted with one part water were tested to determine the optimum cleaner/cure time combination for complete removal of laboratory applied mortar from the submitted samples while limiting surface alterations. Due to the large number of samples submitted, limited amount of mortar available, and limited surface area of each sample set, only one type of brick was tested for mortar removal.

To simulate new construction soiling, the samples were placed on a bench with finished surface facing upward. Hollow cylinders measuring 50 mm in diameter and 75 mm tall were positioned on top of the samples and filled with a wet mixture of cementitious mortar. The wet mortar-filled cylinder was allowed to remain in contact with the samples for 10 minutes before removal.

Heavy deposits of mortar were removed with dry scraping after 24 hours. Prepared cleaning solutions were then evaluated for their effectiveness in removing residual mortar after 7 days of curing. A visual examination was made to determine the percent removal of the applied mortar after the cleaning procedure below.

Cleaning Procedure:

1. Pre-wet the surface and apply diluted cleaning solution according to the Product Data Sheet instructions.
2. Allow for an appropriate dwell time:
MV Mangan Kontrol3 minutes
MV Murvaerks Rens.....3 minutes
3. Reapply cleaning solution; do not let cleaner dry into the brick.
4. Rinse thoroughly with plenty of fresh water.*
5. Allow the sample to dry for at least 18 hours and visually examine.
6. Compare the uncleaned surfaces to the cleaned surfaces for the best match.

***Rinsing Equipment** – Masonry washing equipment generating approximately 700-800 psi with a water flow rate of 8 gallons per minute delivered through a 45 degree fan spray tip was used for rinsing.

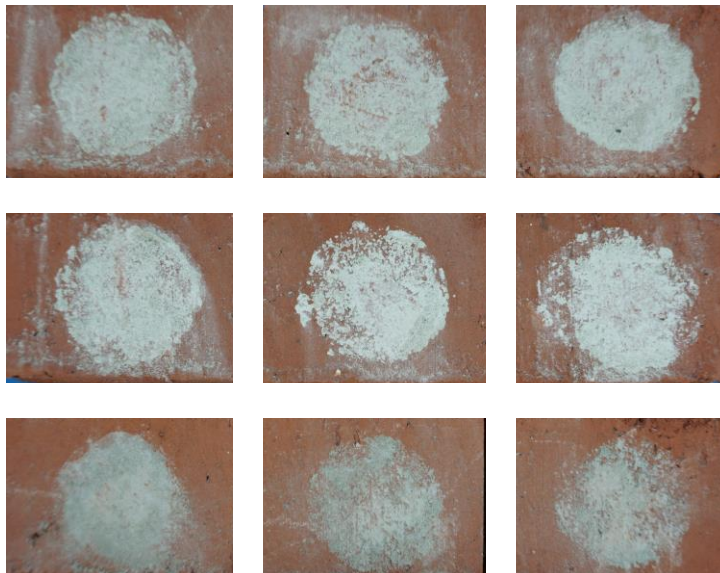
TEST RESULTS AND PHOTOGRAPHS: Mortar Removal

Mortar	Mix	Key
DAN-GRIT	35/65/650	1
DAN-GRIT	50/50/700	2
DAN-GRIT	M5	3

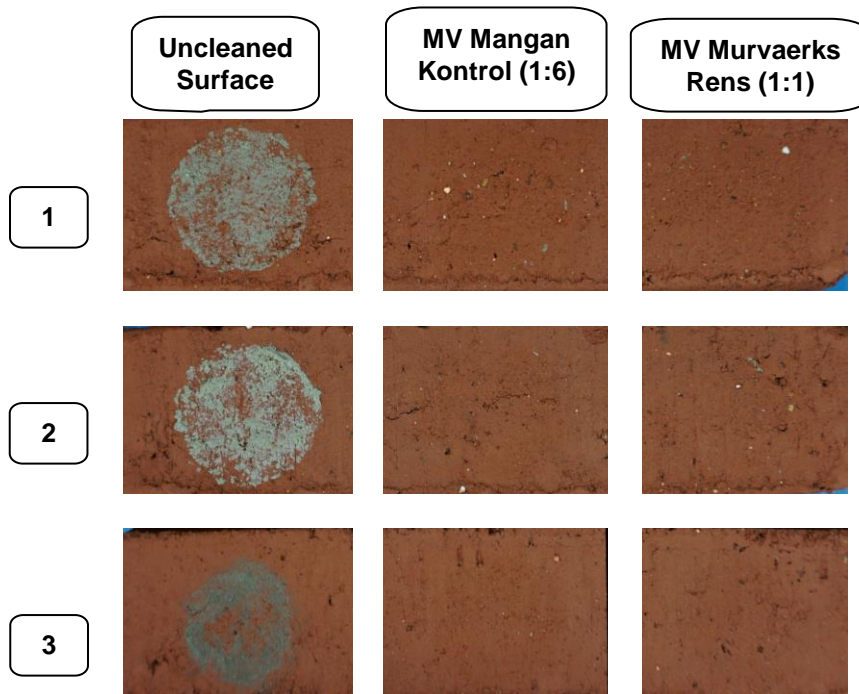
Name: "W309" Brick				
Product	Dilution	% Mortar Removal 1	% Mortar Removal 2	% Mortar Removal 3
MV Mangan Kontrol	1:6	98%	100%	100%
MV Murvaerks Rens	1:1	98%	98%	100%

TEST RESULTS AND PHOTOGRAPHS: Mortar Removal (cont.)

“W309” Brick Before Cleaning



“W309” Brick After Cleaning



Key	Mortar Mix
1	DAN-GRIT 35/65/650
2	DAN-GRIT 50/50/700
3	DAN-GRIT M5

CONCLUSIONS – Mortar Removal

In the mortar removal tests conducted, all of the cleaners removed at least 98% of each of the three types of applied mortar from the surface of the samples.

Information regarding surface alteration can be found under the “New Construction Cleaning” section of the report (pp. 8-27).

It is recommended that the selected cleaners always be used in the lowest possible concentration.

RECOMMENDATIONS: Mortar Removal

Recommendations for mortar removal for each brick submitted by Wienerberger Denmark, Helsingør, Denmark are provided in the chart below. Recommendations are based on the cleaner and dilution that provided the best match to the uncleaned surface.

Sample	Mortar Removal
All Submitted Brick	MV Mangan Kontrol (1:6) OR MV Murvaerks Rens (1:1)

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.

TEST METHODS: New Construction Cleaning

MV Mangan Kontrol and MV Murvaerks Rens were evaluated to determine if any of the cleaners cause any adverse effects when used on the submitted samples. The samples were visually examined following the procedure below based on the following:

Surface Finish Removal is the visual examination of the sample comparing the surface finish of the uncleaned surface to the surface finish cleaned with selected product(s) at given dilutions.

Substrate Deterioration is the visual examination of the sample comparing the uncleaned surface to surfaces cleaned with selected product(s) at given dilutions looking for any potential erosion/digestion of the sample.

Color Change is the visual examination comparing the color of the uncleaned surface to the color of surfaces cleaned with selected products at given dilutions.

Staining is the visual examination for changes that are the result of a chemical reaction that leaves a staining precipitate.

The following is the scale used for reporting results of both categories:

- 0 – **No change** compared to uncleaned surface
- 1 – **Slight change** compared to uncleaned surface
- 2 – **Moderate change** compared to uncleaned surface
- 3 – **Significant change** compared to uncleaned surface

Cleaning Procedure:

1. Pre-wet the surface and apply diluted cleaning solution according to Product Data Sheet instructions.
2. Allow for an appropriate dwell time:
MV Mangan Kontrol3 minutes
MV Murvaerks Rens.....3 minutes
3. Reapply cleaning solution; do not let cleaner dry into the brick.
4. Rinse thoroughly with plenty of fresh water.*
5. Allow the sample to dry for at least 18 hours and visually examine.
6. Compare the uncleaned surfaces to the cleaned surfaces for the best match.

***Rinsing Equipment** – Masonry washing equipment generating approximately 700-800 psi with a water flow rate of 8 gallons per minute delivered through a 45 degree fan spray tip was used for rinsing.

TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning

Scale used for reporting results of both categories:
0 – No change compared to uncleaned surface
1 – Slight change compared to uncleaned surface
2 – Moderate change compared to uncleaned surface
3 – Significant change compared to uncleaned surface

Name: "PT449" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "PT450" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "PT465" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W001" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W103" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W105" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W108" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W109" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W110" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W112" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W170" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W193" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W209" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W212" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W309" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W409" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W445" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W447" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W451" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W452" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W453" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W454" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W466" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W470" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W479" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W490" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W491" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W492" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W494" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



Name: "W495" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "W496" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



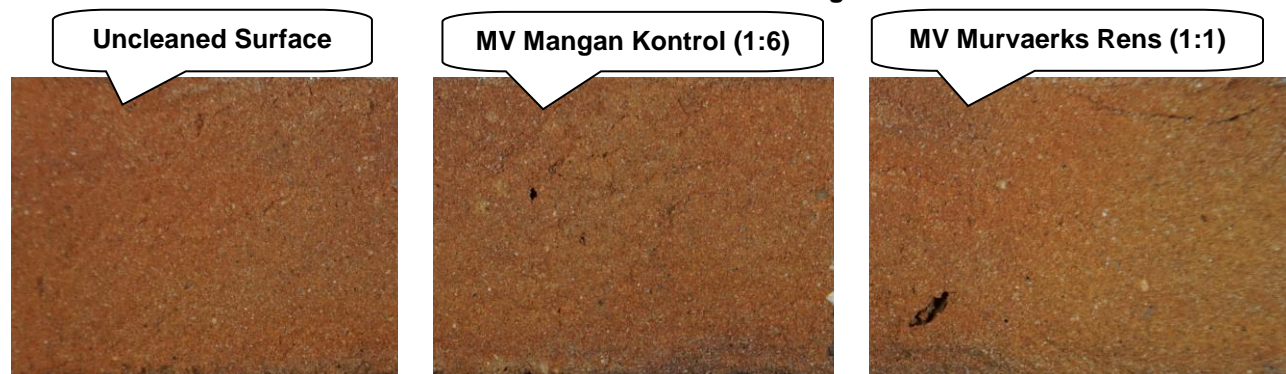
Name: "W498" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

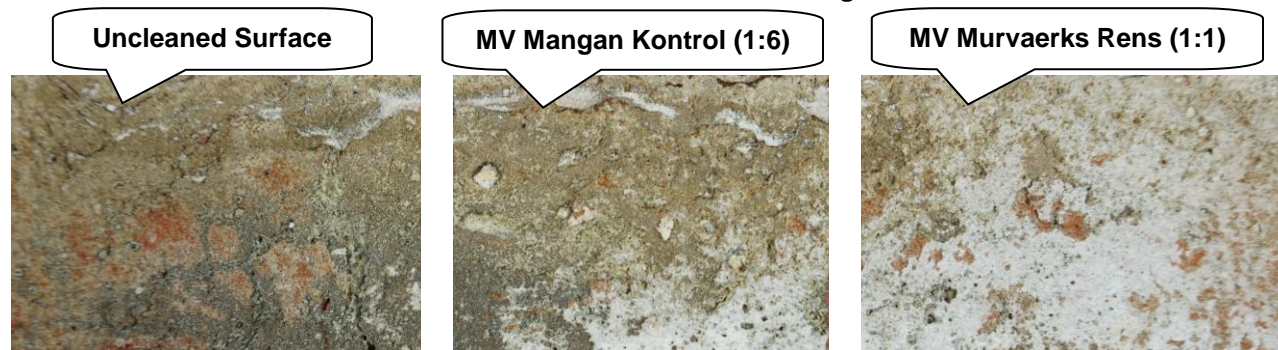
Name: "Veldbrons" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0

"Veldbrons" Brick After Cleaning



Name: "Bronsdroen" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0

"Bronsdroen" Brick After Cleaning



TEST RESULTS AND PHOTOGRAPHS: New Construction Cleaning (cont.)

Name: "Blau Wrood" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0

"Blau Wrood" Brick After Cleaning



Name: "Vigo Rosa" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Kontrol	1:6	0	0	0	0
MV Murvaerks Rens	1:1	0	0	0	0

"Vigo Rosa" Brick After Cleaning



CONCLUSIONS – New Construction Cleaning

In the cleaning tests conducted, neither MV Mangan Kontrol nor MV Murvaerks Rens caused any change to the appearance of the submitted samples.

It is recommended that the selected cleaners always be used in the lowest possible concentration.

RECOMMENDATIONS: New Construction Cleaning

Recommendations for cleaning for each brick submitted by Wienerberger Denmark, Helsingør, Denmark are provided in the chart below. Recommendations are based on the cleaner and dilution that provided the best match to the uncleaned surface.

Sample	New Construction Cleaning
All Submitted Brick	MV Mangan Kontrol (1:6) OR MV Murvaerks Rens (1:1)

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.

TEST METHODS: Stain Removal (Adverse Effects)

MV Mangan Fjerner, MV Rust Fjerner, and MV Salt Fjerner were evaluated to determine if any of the cleaners cause any adverse effects when used on the submitted samples. The samples were visually examined following the procedure below based on the following:

Surface Finish Removal is the visual examination of the sample comparing the surface finish of the uncleaned surface to the surface finish cleaned with selected product(s) at given dilutions.

Substrate Deterioration is the visual examination of the sample comparing the uncleaned surface to surfaces cleaned with selected product(s) at given dilutions looking for any potential erosion/digestion of the sample.

Color Change is the visual examination comparing the color of the uncleaned surface to the color of surfaces cleaned with selected products at given dilutions.

Staining is the visual examination for changes that are the result of a chemical reaction that leaves a staining precipitate.

The following is the scale used for reporting results of both categories:

- 0 – **No change** compared to uncleaned surface
- 1 – **Slight change** compared to uncleaned surface
- 2 – **Moderate change** compared to uncleaned surface
- 3 – **Significant change** compared to uncleaned surface

Procedure:

1. Prewet the brick surface.
2. Apply cleaners in accordance with the Product Data Sheet instructions.
3. Allow appropriate dwell time:
 - MV Mangan Fjerner 3 minutes
 - MV Rust Fjerner 3 minutes
 - MV Salt Fjerner 3 minutes
4. Pressure rinse thoroughly with plenty of fresh water.*
5. Allow 24 hours for the sample to dry. Then conduct a visual evaluation to determine if there is any change in appearance.

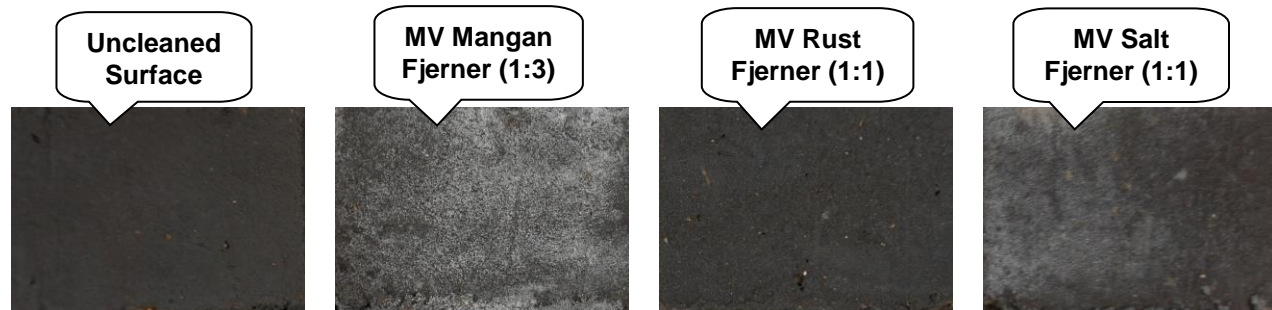
***Pressure Rinsing Equipment** – Masonry washing equipment generating approximately 700-800 psi with a water flow rate of 8 gallons per minute delivered through a 45 degree fan spray tip was used for rinsing.

TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects)

Scale used for reporting results of both categories:
0 – No change compared to uncleaned surface
1 – Slight change compared to uncleaned surface
2 – Moderate change compared to uncleaned surface
3 – Significant change compared to uncleaned surface

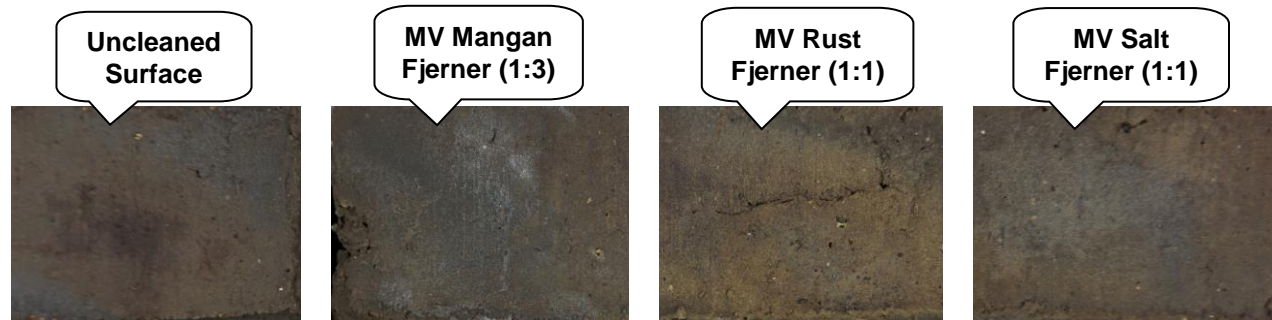
Name: "PT449" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	2
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	2

"PT449" Brick After Testing



Name: "PT450" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	1
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

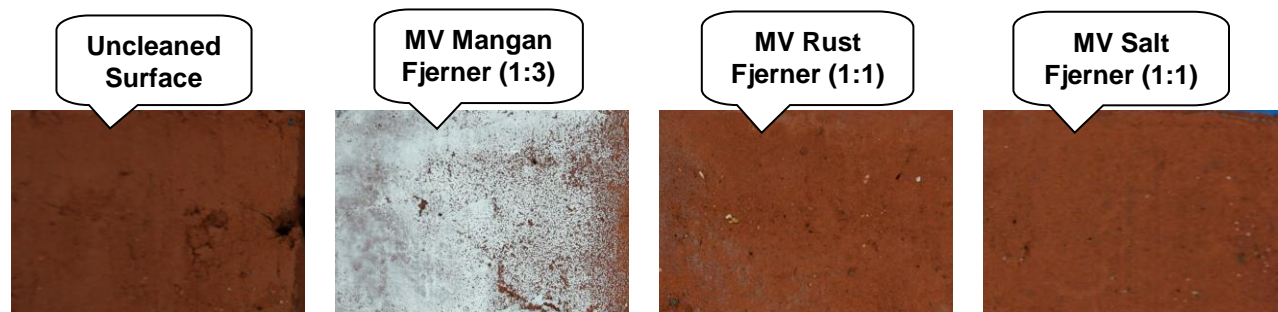
"PT450" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

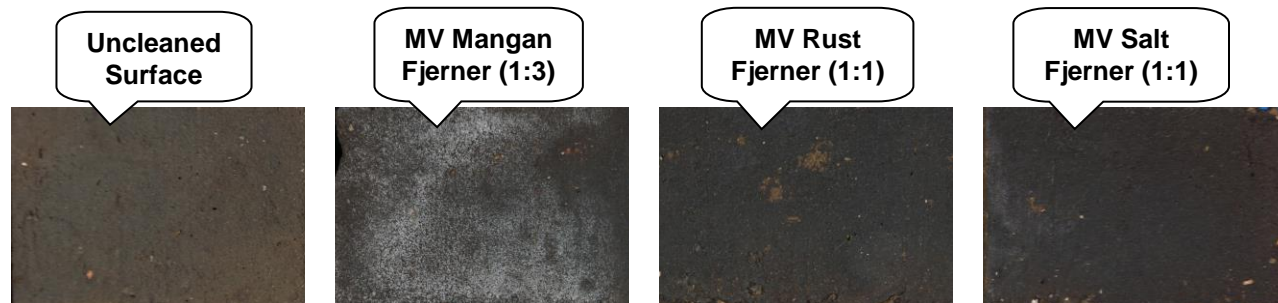
Name: "PT465" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"PT465" Brick After Testing



Name: "W001" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	2
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W001" Brick After Testing

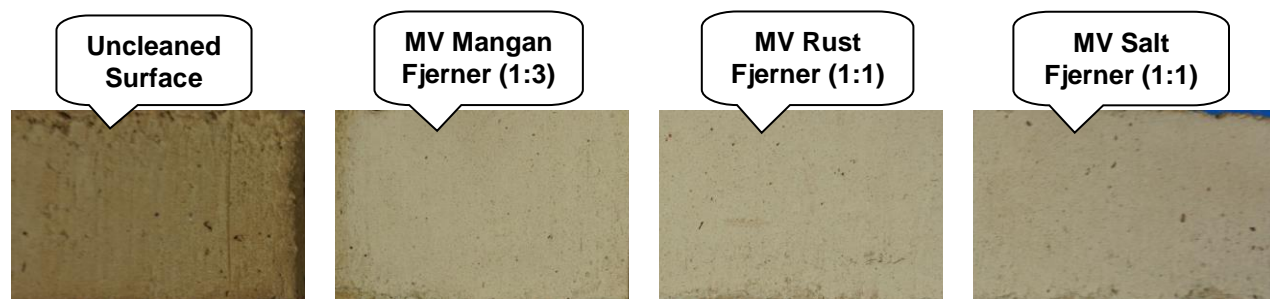


NOTE: The "W001" Brick as submitted displayed significant color variation prior to testing.

TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W103" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

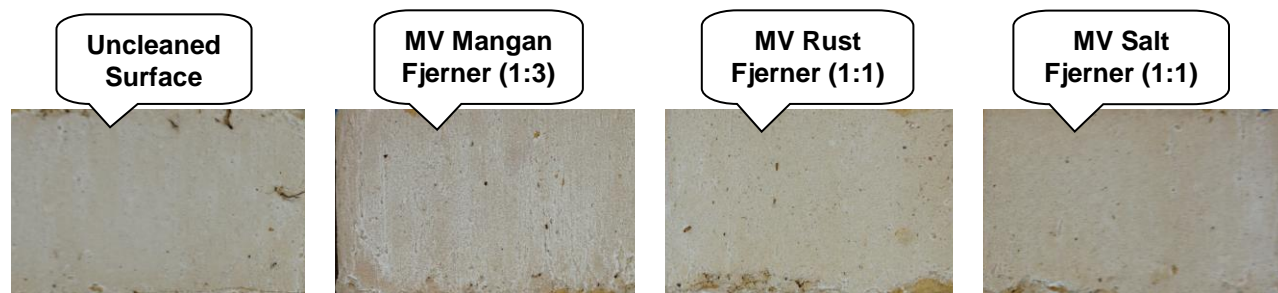
"W103" Brick After Testing



NOTE: The "W103" Brick as submitted displayed significant color variation prior to testing.

Name: "W105" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	1	0	0	0

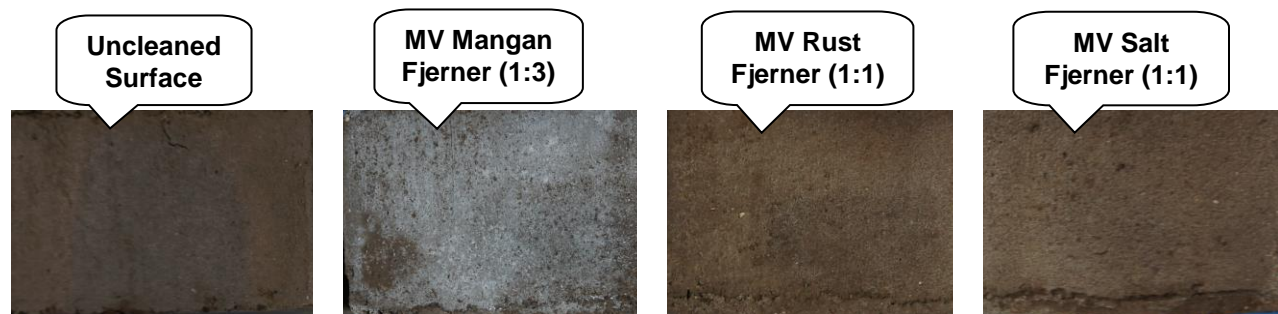
"W105" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

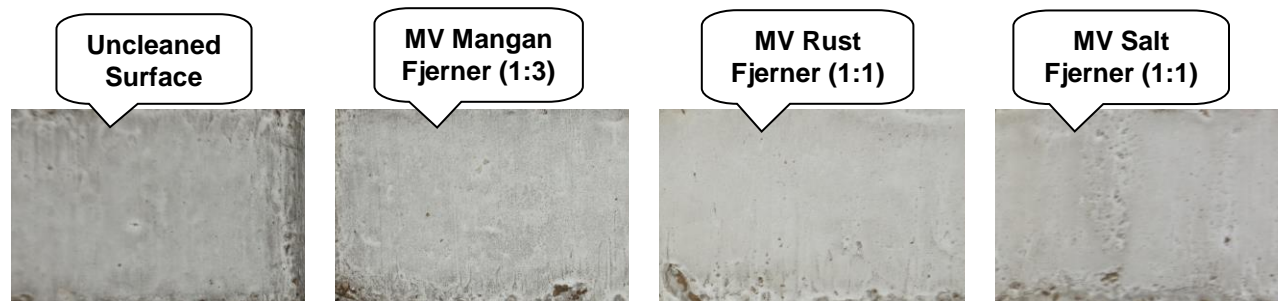
Name: "W108" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	2
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	1	0	0	0

"W108" Brick After Testing



Name: "W109" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

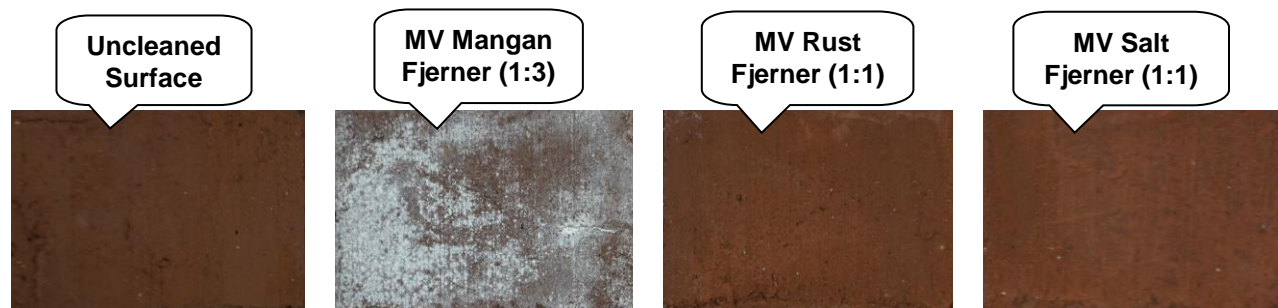
"W109" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

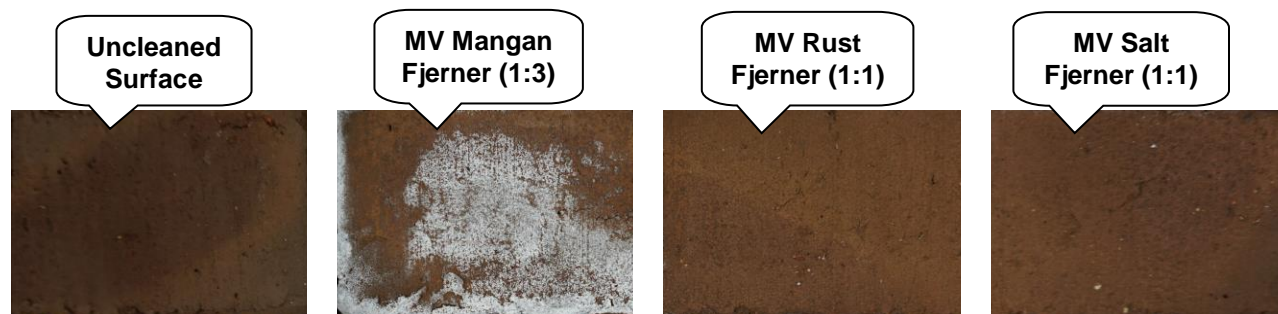
Name: "W110" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W110" Brick After Testing



Name: "W112" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	2
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	1	0	0	0

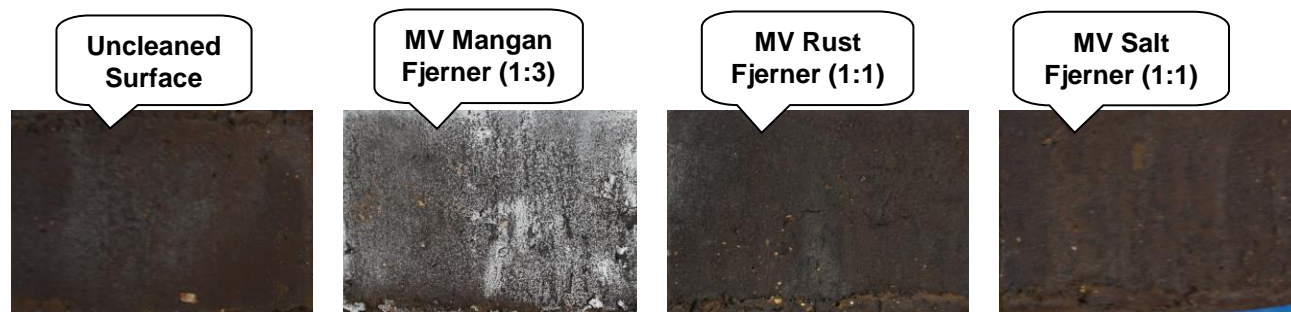
"W112" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

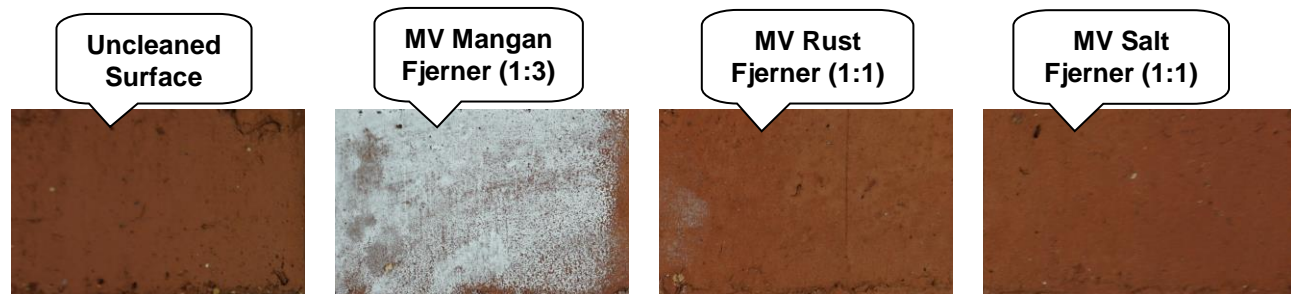
Name: "W170" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W170" Brick After Testing



Name: "W193" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

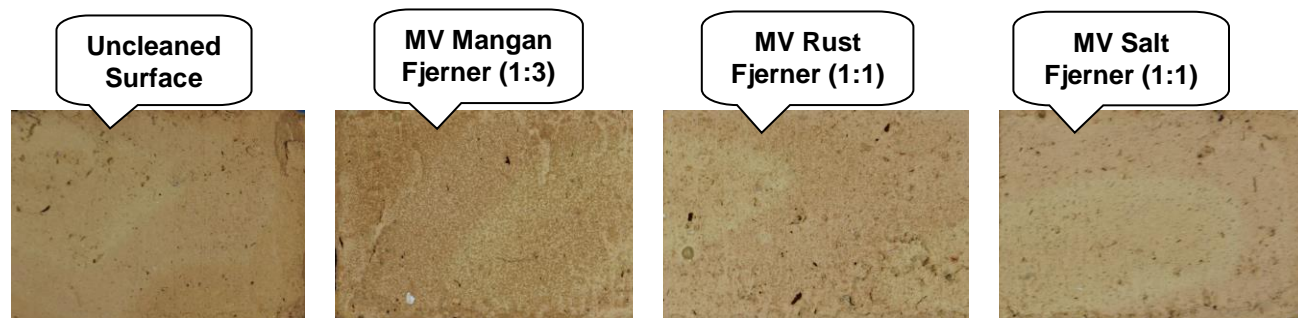
"W193" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W209" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	2	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

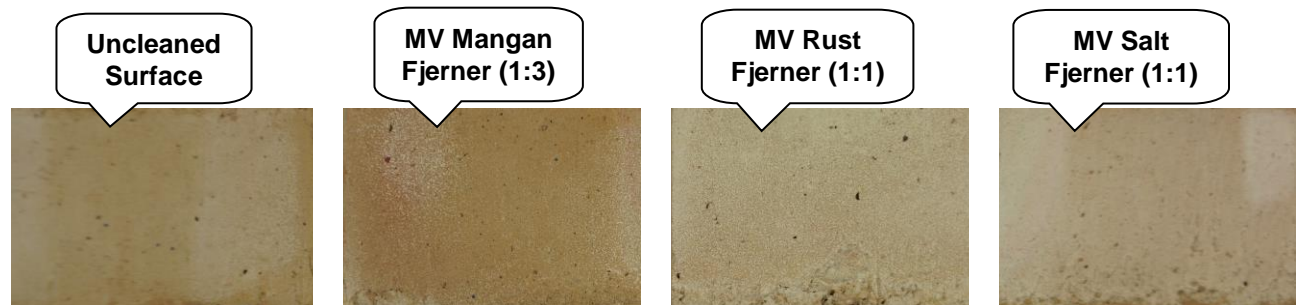
"W209" Brick After Testing



Name: "W212" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	2	0
MV Rust Fjerner	1:1	1*	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

*NOTE: Very slight change compared to uncleaned surface.

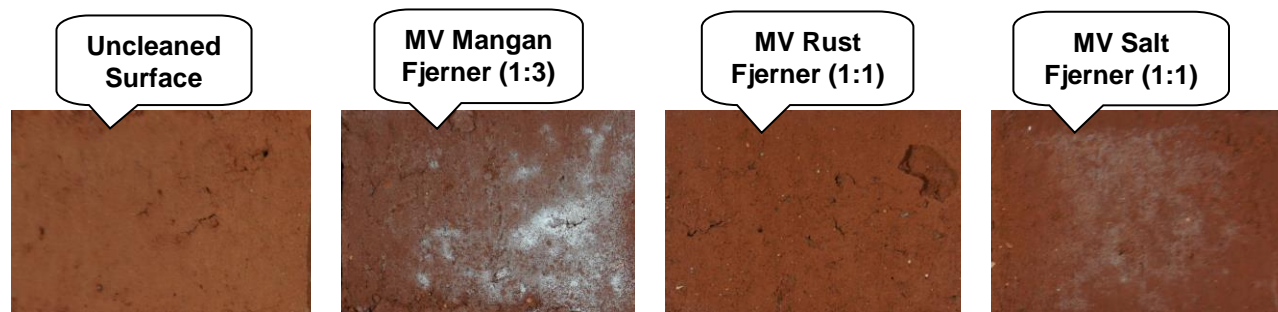
"W212" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

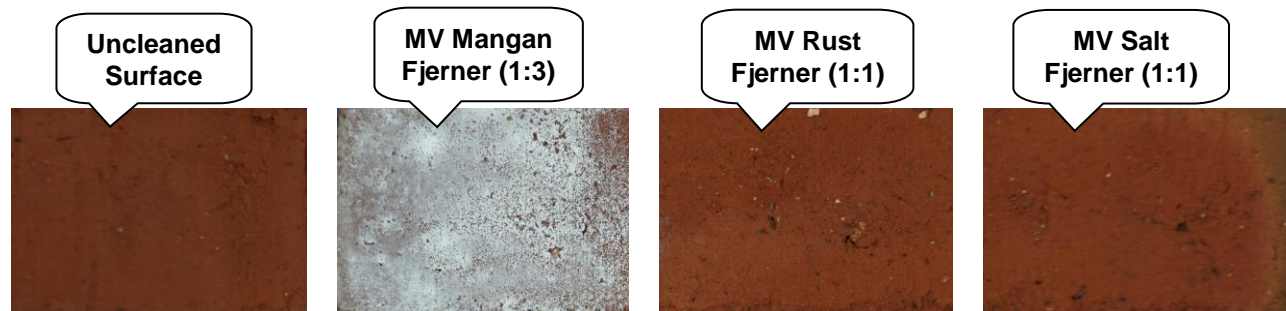
Name: "W309" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	2
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	1

"W309" Brick After Testing



Name: "W409" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

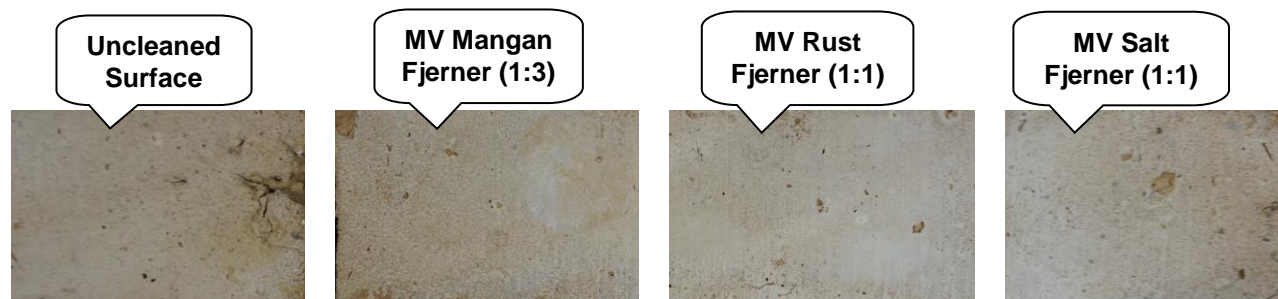
"W409" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

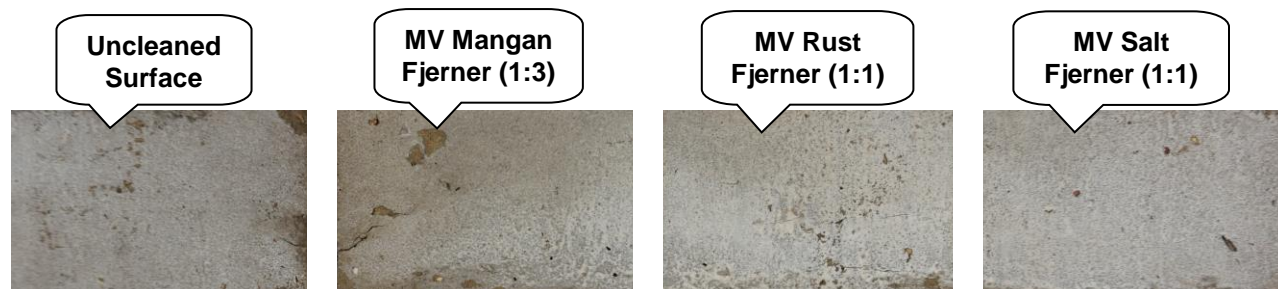
Name: "W445" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W445" Brick After Testing



Name: "W447" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W447" Brick After Testing

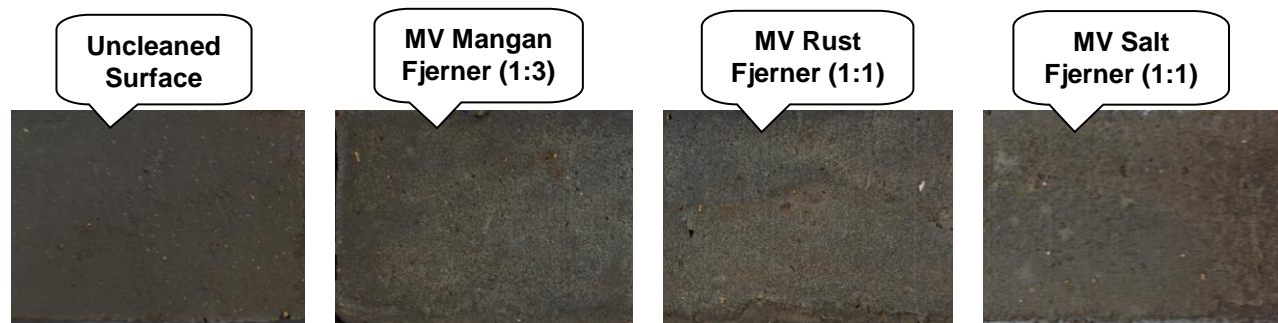


TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W451" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	1*
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	1*

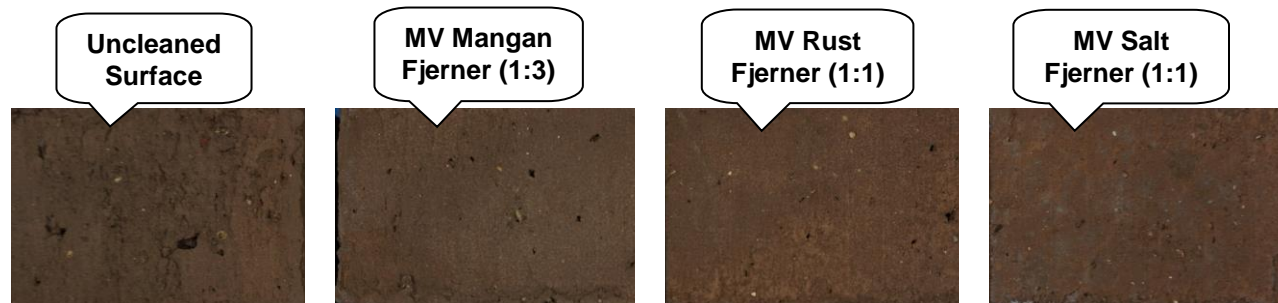
*NOTE: Very slight change compared to uncleaned surface.

"W451" Brick After Testing



Name: "W452" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

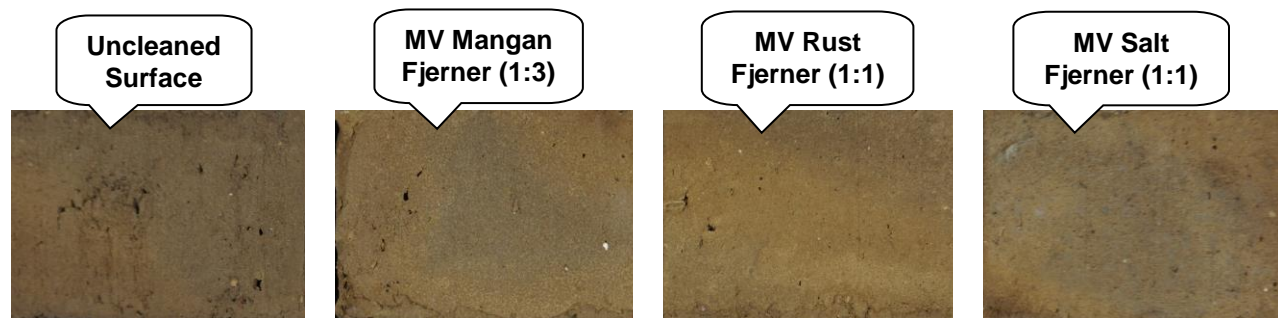
"W452" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W453" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	1	0	0	0

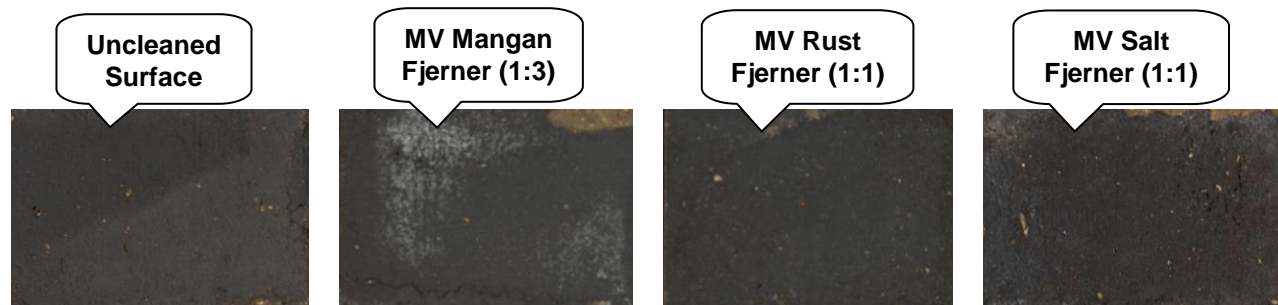
"W453" Brick After Testing



Name: "W454" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	1*
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	1*

***NOTE:** Very slight change compared to uncleaned surface.

"W454" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

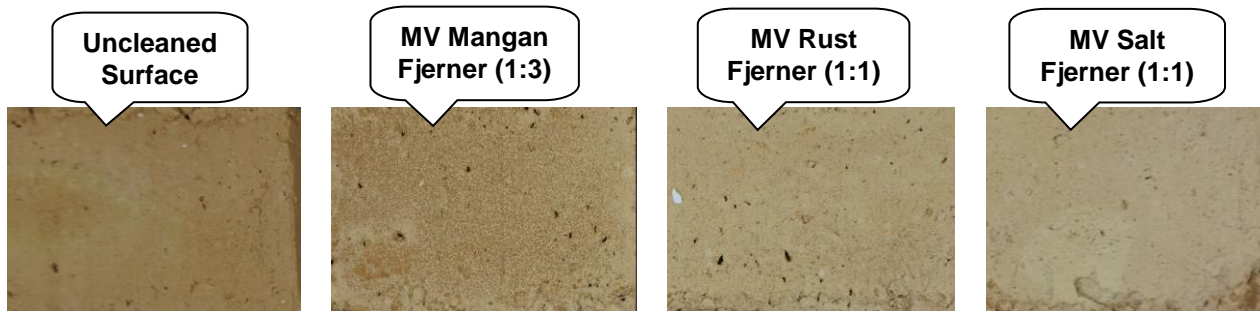
Name: "W466" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	3
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W466" Brick After Testing



Name: "W470" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	2	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

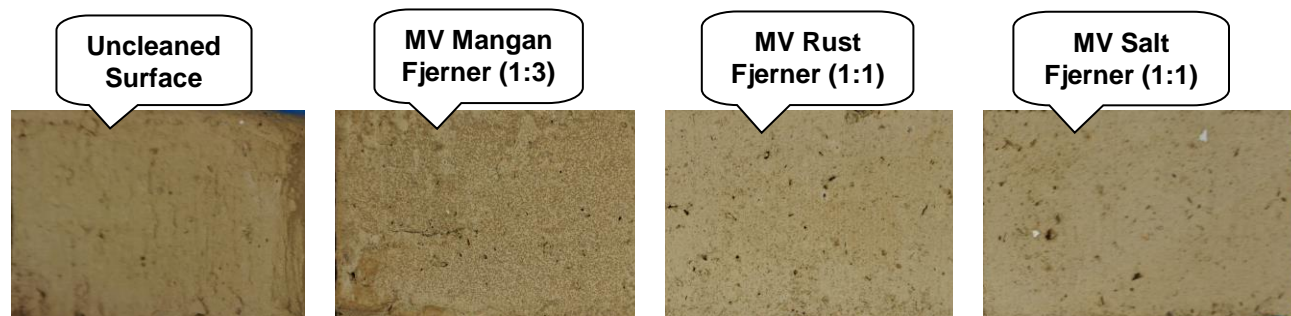
"W470" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W479" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	3	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

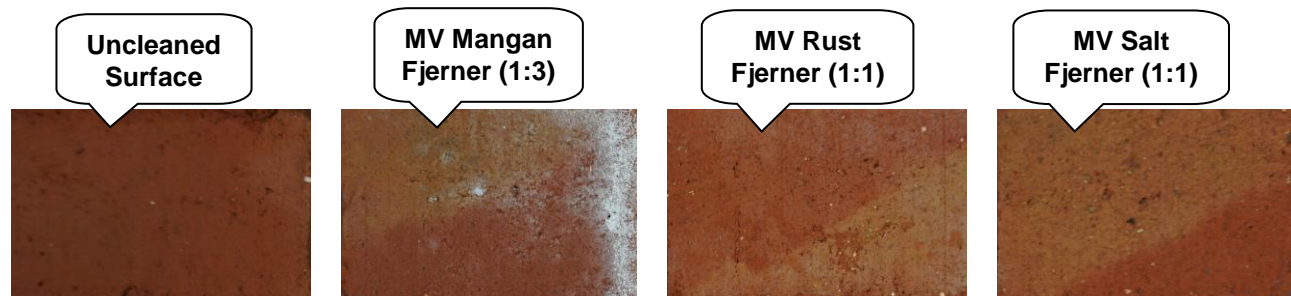
"W479" Brick After Testing



Name: "W490" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	2
MV Rust Fjerner	1:1	0	0	0	1*
MV Salt Fjerner	1:1	0	0	0	0

***NOTE: Very slight change compared to uncleaned surface.**

"W490" Brick After Testing

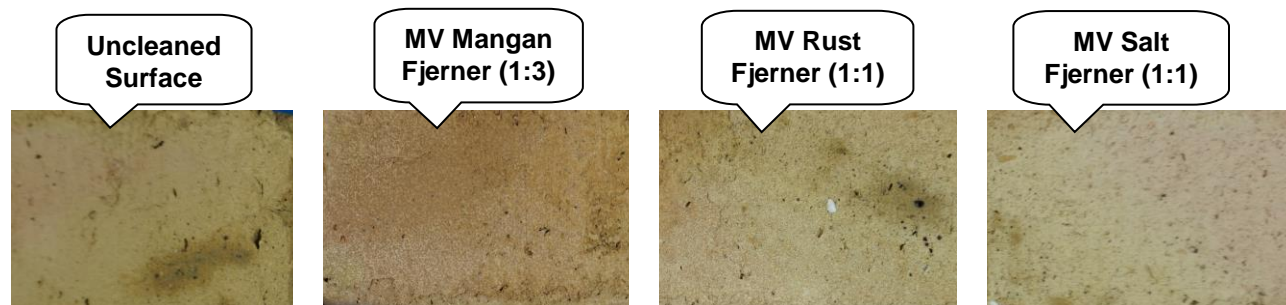


TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W491" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	3	0	2	0
MV Rust Fjerner	1:1	1*	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

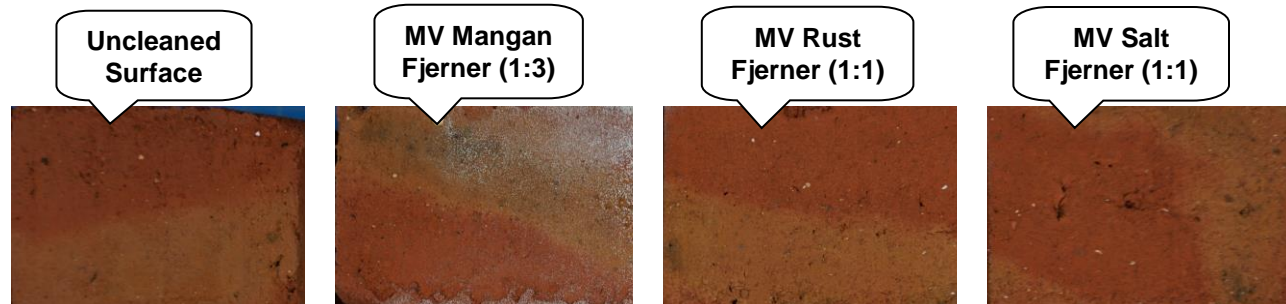
***NOTE: Very slight change compared to uncleaned surface.**

"W491" Brick After Testing



Name: "W492" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	2
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

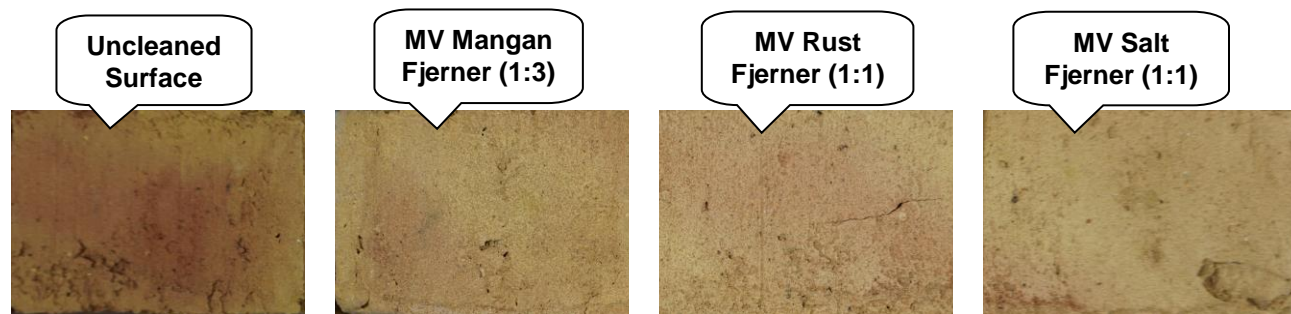
"W492" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

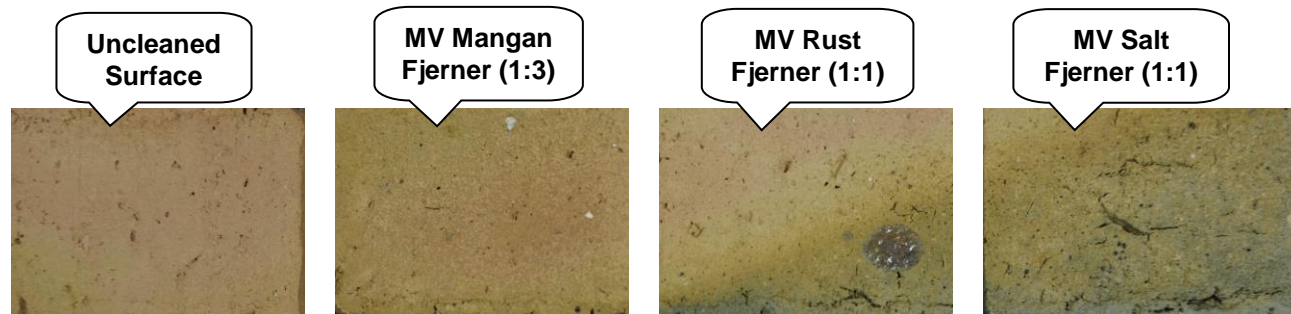
Name: "W494" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W494" Brick After Testing



Name: "W495" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"W495" Brick After Testing



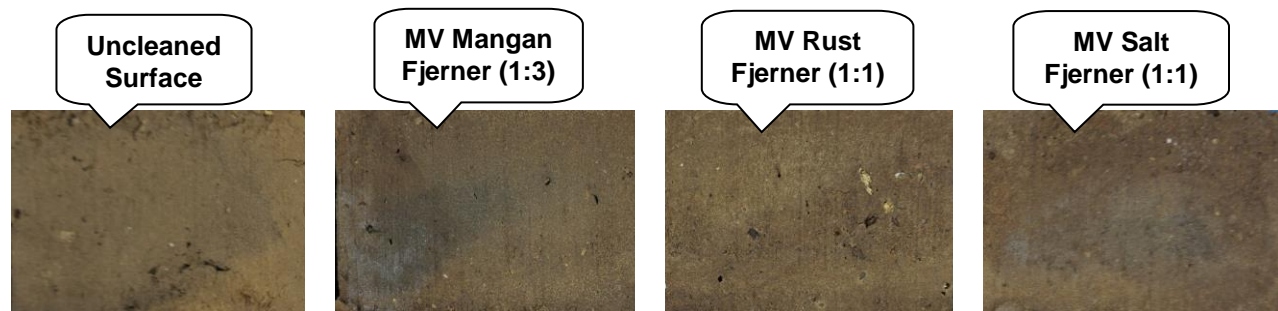
NOTE: The brick as submitted displayed significant color variation prior to testing.

TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

Name: "W496" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	1*
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

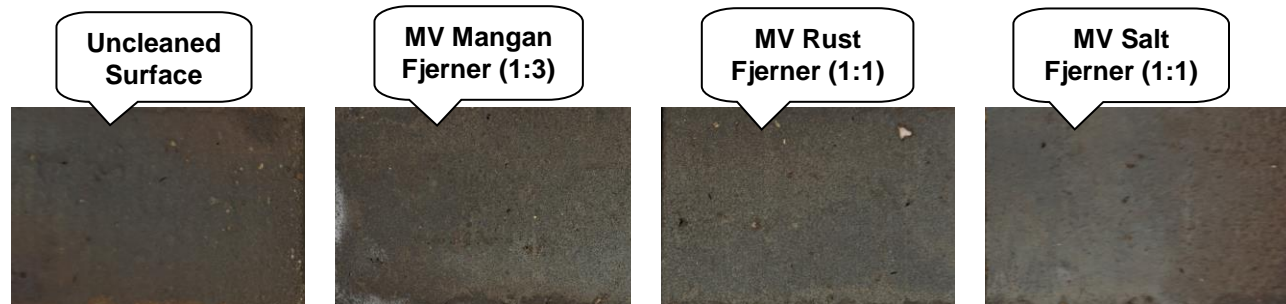
***NOTE: Very slight change compared to untested surface.**

"W496" Brick After Testing



Name: "W498" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	1	0	0	0
MV Rust Fjerner	1:1	1	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

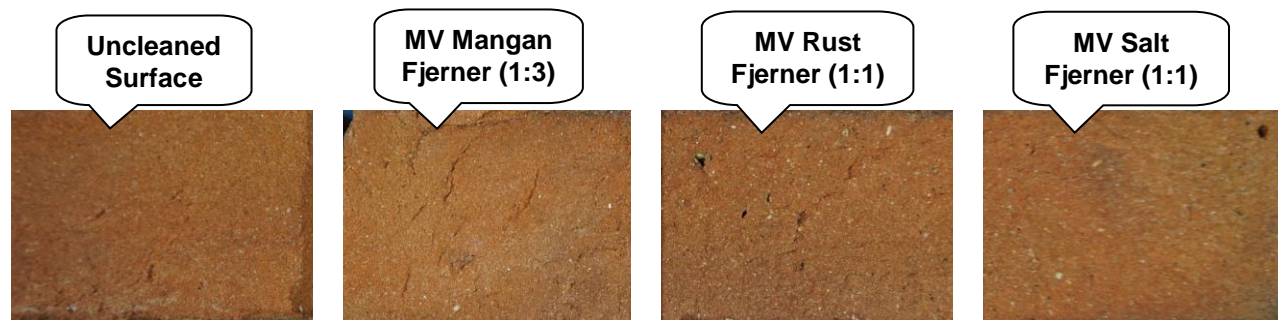
"W498" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

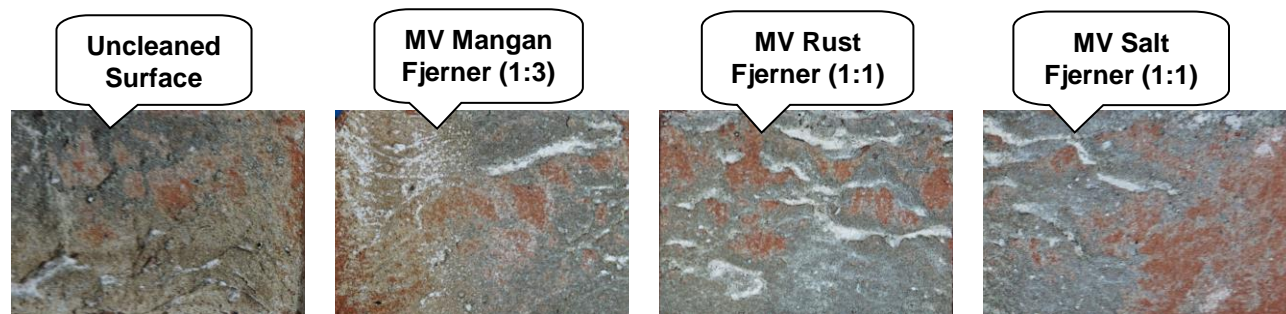
Name: "Veldbrons" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"Veldbrons" Brick After Testing



Name: "Bronsdroen" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	2	0	0	0
MV Rust Fjerner	1:1	2	0	0	0
MV Salt Fjerner	1:1	1	0	0	0

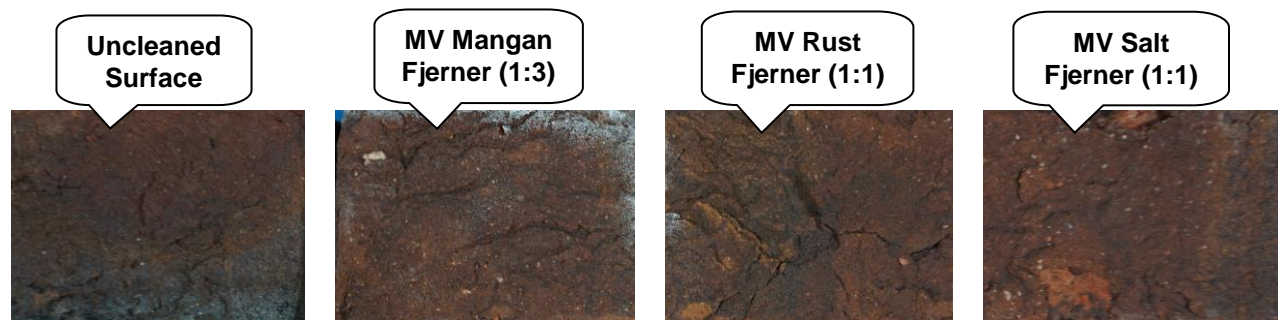
"Bronsdroen" Brick After Testing



TEST RESULTS AND PHOTOGRAPHS: Stain Removal (Adverse Effects) (cont.)

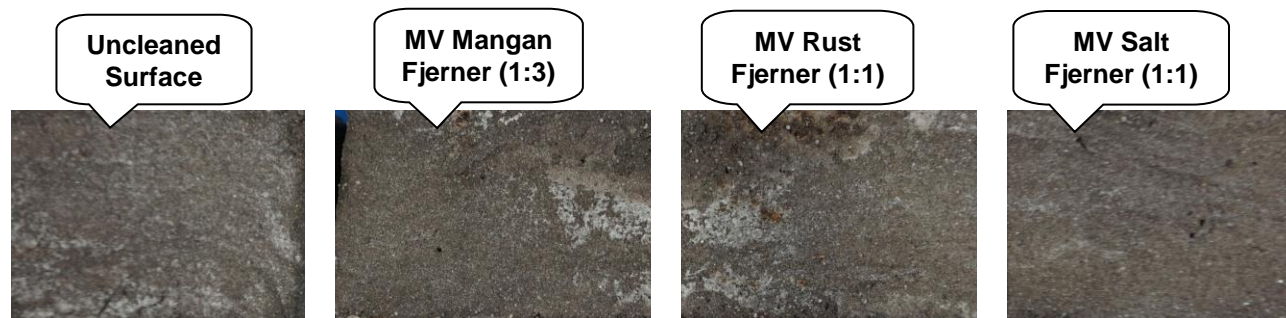
Name: "Blau Wrood" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	1
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"Blau Wrood" Brick After Testing



Name: "Vigo Rosa" Brick					
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
MV Mangan Fjerner	1:3	0	0	0	0
MV Rust Fjerner	1:1	0	0	0	0
MV Salt Fjerner	1:1	0	0	0	0

"Vigo Rosa" Brick After Testing



CONCLUSIONS – Stain Removal (Adverse Effects)

In most of the stain removal tests conducted, neither MV Rust Fjerner nor MV Salt Fjerner caused any moderate or significant changes to the appearance of the submitted samples with the following exceptions:

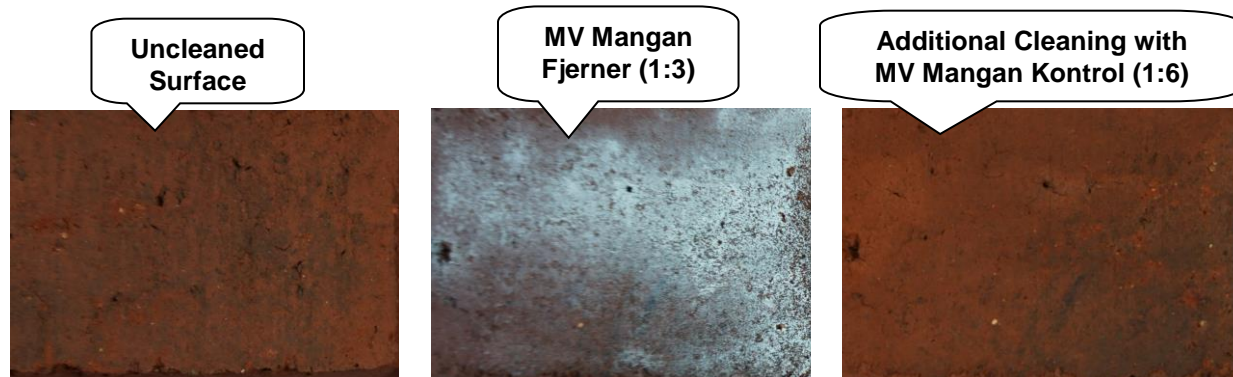
- MV Salt Fjerner resulted in moderate staining on the “PT449” brick.
- MV Salt Fjerner resulted in moderate surface finish removal of the “Bronsdroen” brick.

In most of the stain removal tests conducted, MV Mangan Fjerner resulted in very slight to significant staining (in the form of a white haze) with the following exceptions:

- MV Mangan Fjerner caused no change to the appearance of the “W103”, “W109”, “W445”, “W447”, “W452”, “W453”, “W454”, “W494”, “W495”, “Veldbrons”, and “Vigo Rosa” bricks.

As noted previously, MV Mangan Fjerner often resulted in a white haze forming on the surface of some of the samples. MV Mangan Kontrol diluted with six parts water was tested in order to determine if it would remove this white haze. MV Mangan Kontrol was successful in removing the white haze completely as seen in the photograph below.

“W466” Brick After Additional Cleaning



It is recommended that the selected cleaner always be used in the lowest possible concentration.

RECOMMENDATIONS: Stain Removal (Adverse Effects)

Recommendations for cleaning for each brick submitted by Wienerberger Denmark, Helsingør, Denmark are provided in the chart below. Recommendations are based on the cleaner and dilution that provided the best match to the uncleaned surface.

Sample	Stain Removal (Adverse Effects)
"PT449" Brick	MV Rust Fjerner (1:1)
"PT450" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"PT465" Brick	
"W001" Brick	
"W103" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W105" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W108" Brick	
"W109" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W110" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W112" Brick	
"W170" Brick	
"W193" Brick	
"W209" Brick	
"W212" Brick	

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.

RECOMMENDATIONS: Stain Removal (Adverse Effects) (cont.)

Sample	Stain Removal (Adverse Effects)
"W309" Brick	MV Rust Fjerner (1:1)
"W409" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W445" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W447" Brick	
"W451" Brick	MV Rust Fjerner (1:1)
"W452" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W453" Brick	
"W454" Brick	
"W466" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W470" Brick	
"W479" Brick	
"W490" Brick	
"W491" Brick	
"W492" Brick	
"W494" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W495" Brick	

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.

RECOMMENDATIONS: Stain Removal (Adverse Effects) (cont.)

Sample	Stain Removal (Adverse Effects)
"W496" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"W498" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"Veldbrons" Brick	
"Bronsdroen" Brick	MV Salt Fjerner (1:1)
"Blau Wrood" Brick	MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)
"Vigo Rosa" Brick	MV Mangan Fjerner (1:3) OR MV Rust Fjerner (1:1) OR MV Salt Fjerner (1:1)

The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate cleaning product and procedures for a particular project. See product literature for additional application and product information.



J. Lucas Comadoll
Project Testing Technician

ALL SAMPLES SUPPLIED FOR THE ABOVE EVALUATION WILL BE DISPOSED OF THIRTY (30) DAYS AFTER THE ISSUE DATE OF THIS REPORT. IF SAMPLES ARE TO BE RETAINED FOR ADDITIONAL TESTING OR RETURNED TO THE SENDER, PROVIDE WRITTEN INSTRUCTIONS TO THE LABORATORY WITHIN THIRTY (30) DAYS OF THE ISSUE DATE OF THIS REPORT.

Recommendations made within this report are based on laboratory test applications and observations. Final determination of the suitability of a product and/or procedure should be made only after thorough job testing on actual surfaces.