

# Rely+On™ Virkon™

SARS-CoV-2,(Covid-19) is proven inactivated at a dilution of 1:600 in 10 minutes or 1 minute at a dilution of 1:100 (1%)

## Material Compatibility Test – 3<sup>rd</sup> Party.

To support earlier immersion tests for the product Rely-On™ Virkon™, which created an extreme environment to prepare operators for the potential of persistent applications in a 'worse case' synario a 12 week test was carried out by a 3<sup>rd</sup> Party, DuPont Brazil, to replicate current applications at a 1% Rely+On™ Virkon™ dilution, sprayed onto surfaces.

DuPont do Brasil S / A - DC&F Division, located in Barueri - SP, registered with CNPJ under number 61.064.929 / 0001-79.

Date: January 16, 2014.

Tests performed by: Aline Mora.

Laboratory Supervisor: Melina T Guedes

### Objective:

Analysis of the impact of using the Virkon™ product on sample surfaces made up of different types of materials, following the application procedure suggested, after 12 weeks of product application.

### SAMPLE DESCRIPTION

Plates made up of five different types of materials, namely:

- Stainless steel 316;
- Stainless steel 304;
- Carbon steel;
- Corian®;
- Vinyl floor (Polyurethane).

### PROCEDURE

Sample preparation:

- Four samples of each material were prepared in order to obtain suitable plates for the application of the product.
- The samples were then washed and dried and the mass was subsequently measured, before the test started.
- Preparation of the solution:

A 1: 100 concentration solution (part of product per part of water) of Virkon™ was prepared each test week and used during the week for application. Figure 1 shows an image of the product ready for application.



Figure 1: Virkon™ solution used in the test

Test procedure:

The Virkon™ solution was sprayed on the plates and spread over the entire surface with the help of a cleaning cloth. The removal of the product from the surface of the samples was then done with the help of a damp cloth and after a certain time, according to Table 1.

**The application was done 3 times a day for 12 weeks.**

Table 1: Sample identification and product action time before removal.

1: Identification of samples and product action time before removal.		
Material	Sample	Product action time before removal stainless steel
Stainless steel 316	1	10 minutes
	2	20 minutes
	3	30 minutes
	4	* without removal
carbon steel	5	10 minutes
	6	20 minutes
	7	30 minutes
	8	* without removal
Corian®	9	10 minutes
	10	20 minutes
	11	30 minutes
	12	* without removal
Vynil Floor	13	10 minutes
	14	20 minutes
	15	30 minutes
	16	* without removal
Stainless steel 304	17	10 minutes
	18	20 minutes
	19	30 minutes
	20	* without removal

\* The last sample from each group of plates (samples 4, 8, 12, 16 and 20) remained without removing the product for the entire test period.

## RESULTS

Evaluation of the mass variation of the samples:

Sample masses were measured before and after 12 weeks of testing. The masses and the variation obtained are found in Table 2.

Table 2: Record of sample masses during the test and total mass variation

Material	Sample	time	Mass before test (g)	Mass after test (g)	Variation (%)
Stainless steel 316	1	10 minutes	281.09	281.09	0.000%
	2	20 minutes	282.46	282.46	0.000%
	3	30 minutes	287.36	287.37	0.003%
	4	* without removal	283.52	283.54	0.007%
carbon steel	5	10 minutes	287.52	287.52	0.000%
	6	20 minutes	292.25	292.32	0.024%
	7	30 minutes	290.43	290.45	0.007%
	8	* without removal	287.5	287.46	-0.014%
Corian®	9	10 minutes	272.52	272.66	0.051%
	10	20 minutes	274.55	274.69	0.051%
	11	30 minutes	272.77	272.86	0.033%
	12	* without removal	273.61	273.75	0.051%
Vynil Floor	13	10 minutes	44.04	44.05	0.023%
	14	20 minutes	44.14	44.14	0.000%
	15	30 minutes	44.62	44.63	0.022%
	16	* without removal	42.9	42.92	0.047%
Stainless steel 304	17	10 minutes	282.77	282.77	0.000%
	18	20 minutes	284.36	284.37	0.004%
	19	30 minutes	281.86	281.86	0.000%
	20	* without removal	287.22	287.24	0.007%

**The mass variations obtained did not present significant results that result in impacts on the samples from the application of the product.**

Visual assessment of samples:

Images of the samples were recorded before the start of the test after the period of 12 weeks with 3 daily applications of the product. They can be seen in Figures 2 to 11.

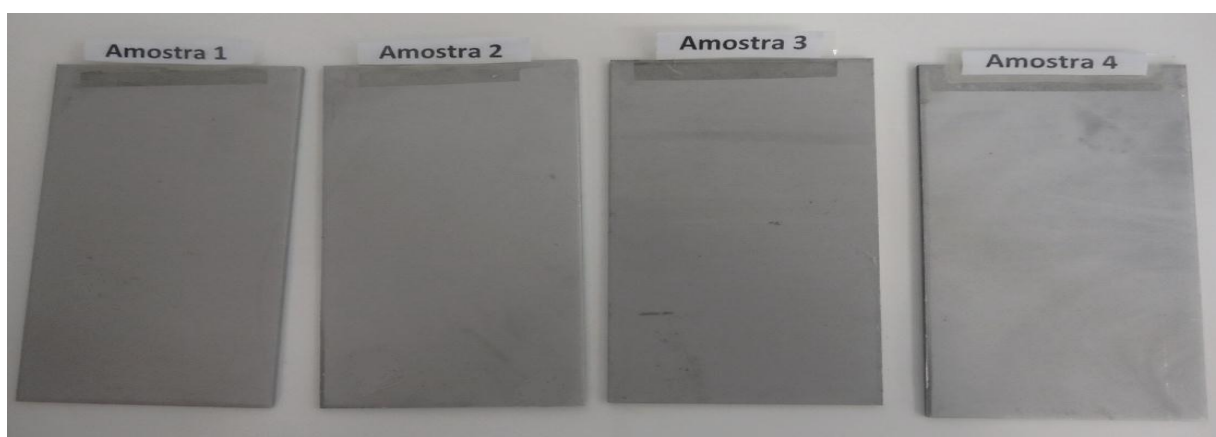


Figure 2: 316 stainless steel plates before the test starts. Sample 1: removal of the product after 10 minutes; Sample 2: removal of the product after 20 minutes; Sample 3: removal of the product after 30 minutes; Sample 4: without removing the product.

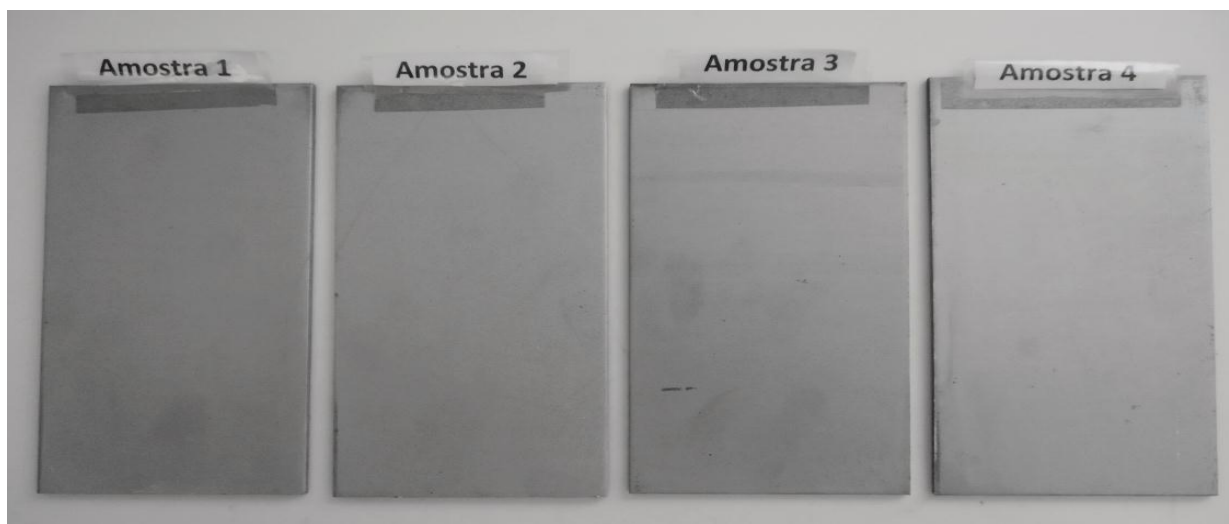


Figure 3: stainless steel 316 plates after 12 weeks of testing. Sample 1: removal of the product after 10 minutes; Sample 2: removal of the product after 20 minutes; Sample 3: removal of the product after 30 minutes; Sample 4: without removing the product.

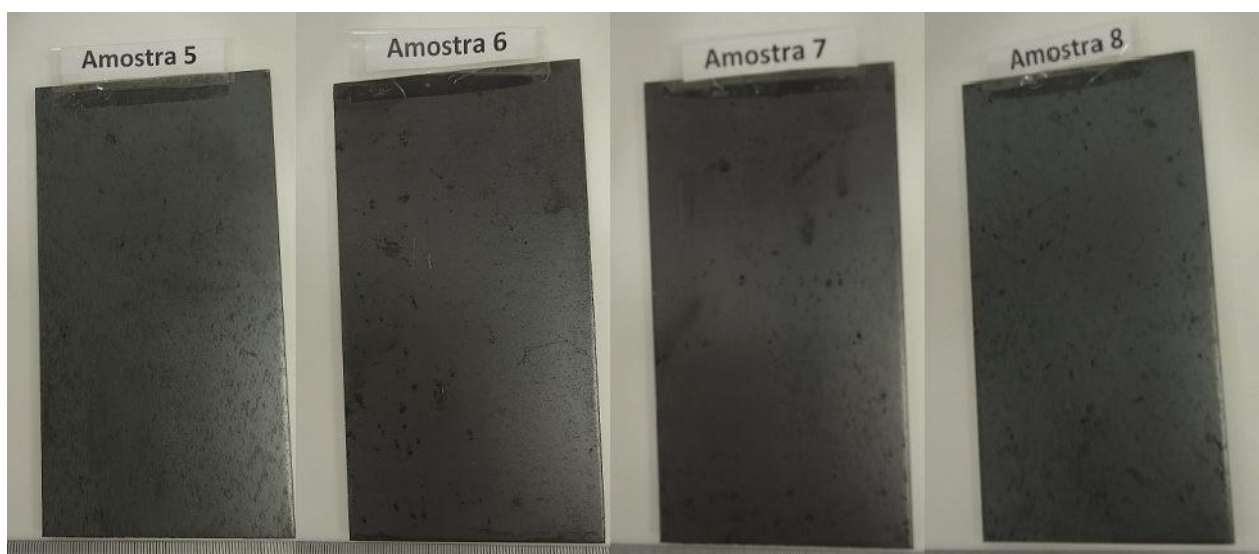


Figure 4: Carbon steel plates before the test starts. Sample 5: removal of the product after 10 minutes; Sample 6: removal of the product after 20 minutes; Sample 7: removal of the product after 30 minutes; Sample 8: without removal of the product.

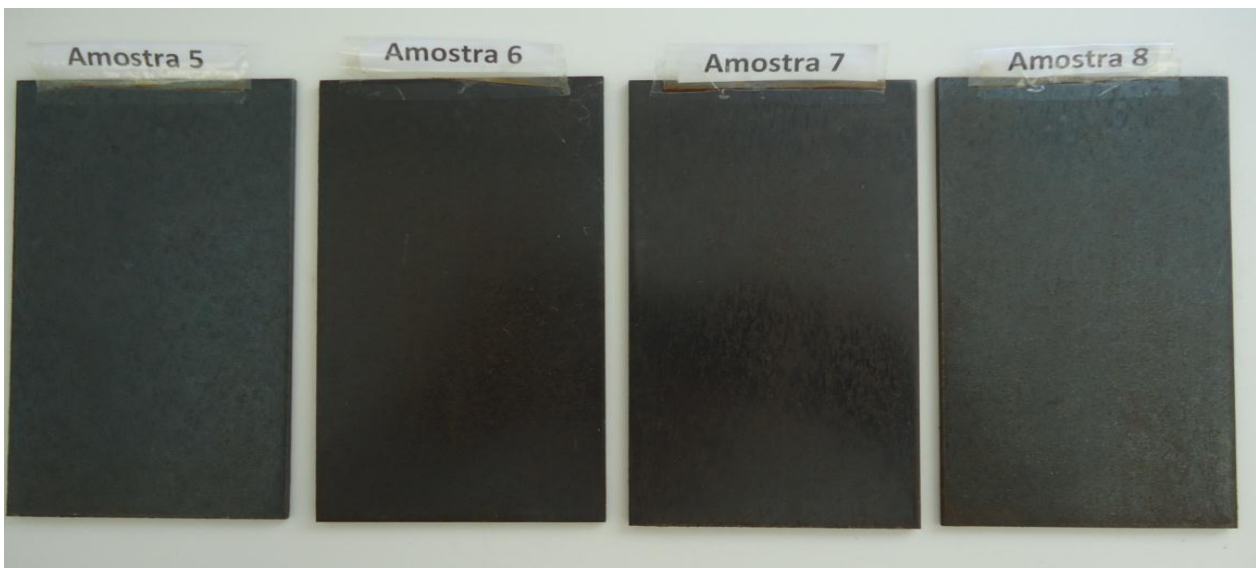


Figure 5: Carbon steel plates after 12 weeks of testing. Sample 5: removal of the product after 10 minutes; Sample 6: removal of the product after 20 minutes; Sample 7: removal of the product after 30 minutes; Sample 8: without removal of the product.



Figure 6: Corian® steel plates before starting the test. Sample 9: removal of the product after 10 minutes; Sample 10: removal of the product after 20 minutes; Sample 11: removal of the product after 30 minutes; Sample 12: without removal of the product.

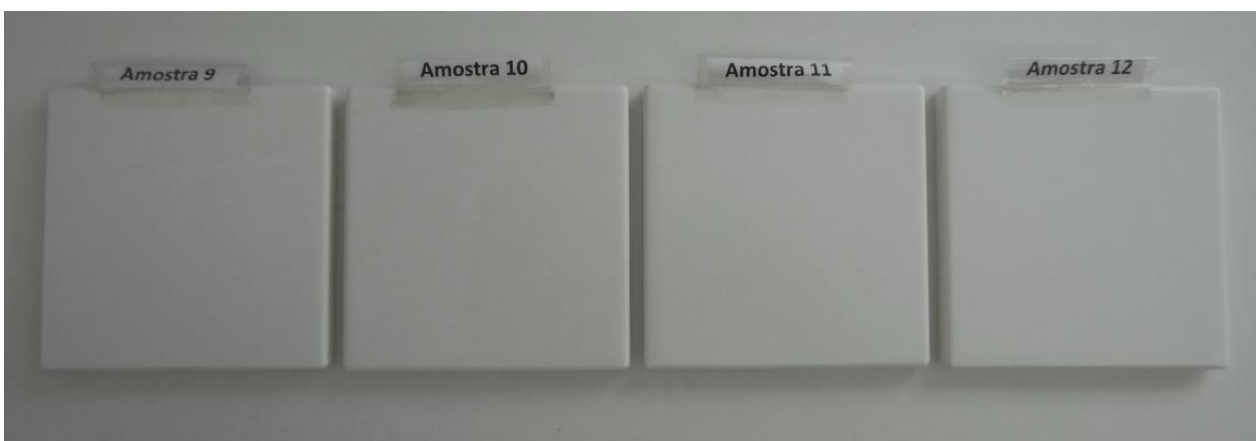


Figure 7: Corian® steel plates after 12 weeks of testing. Sample 9: removal of the product after 10 minutes; Sample 10: removal of the product after 20 minutes; Sample 11: removal of the product after 30 minutes; Sample 12: without removal of the product.

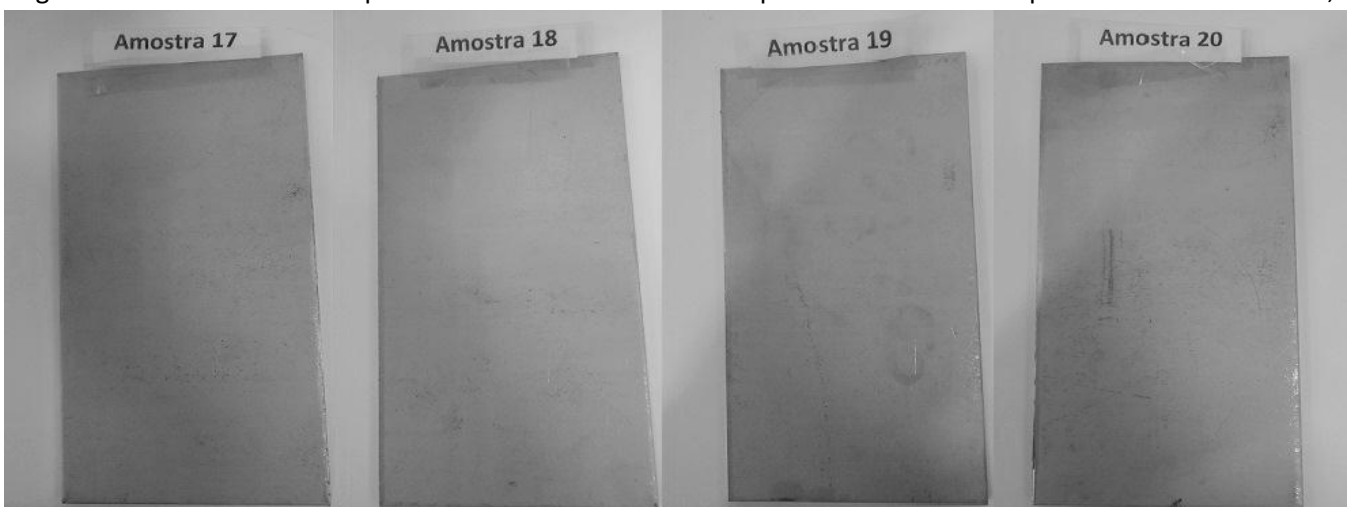


Figure 8: Vinyl floor tiles before the test starts. Sample 13: removal of the product after 10 minutes; Sample 14: removal of the product after 20 minutes; Sample 15: removal of the product after 30 minutes; Sample 16: without product removal



Figure 9: Vinyl floor tiles after 12 weeks of testing. Sample 13: removal of the product after 10 minutes; Sample 14: removal of the product after 20 minutes; Sample 15: removal of the product after 30 minutes; Sample 16: without removal of the product.

Figure 10: 304 stainless steel plates before the test starts. Sample 17: removal of the product after 10 minutes;



Sample 18: removal of the product after 20 minutes; Sample 19: removal of the product after 30 minutes; Sample 20: without product removal.

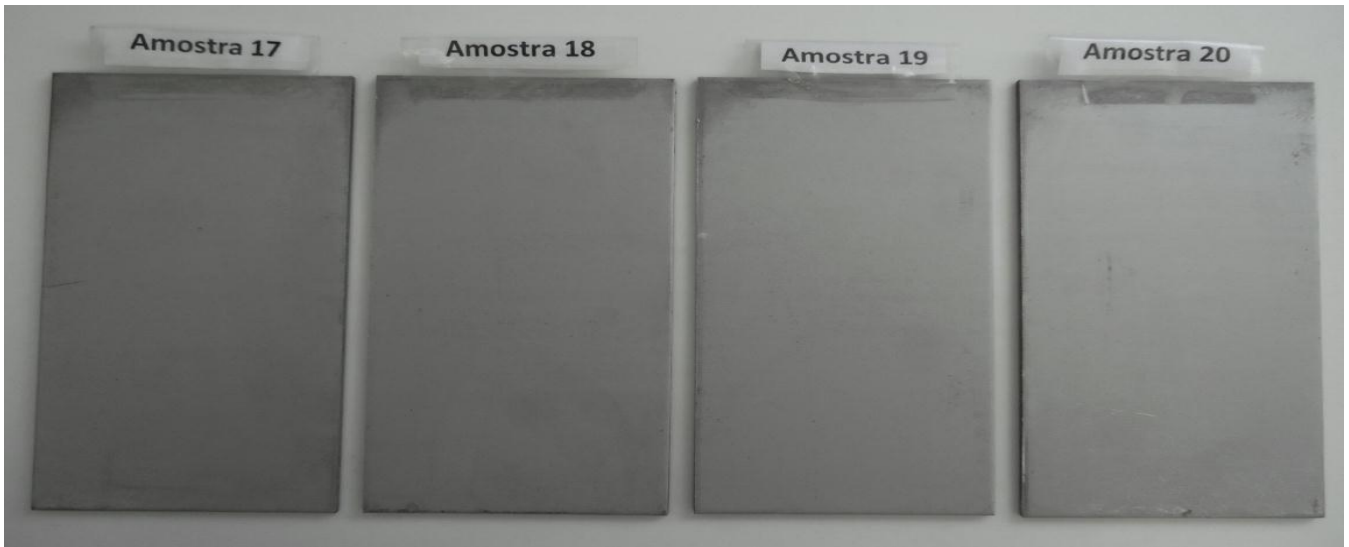


Figure 11: 304 stainless steel plates after 12 weeks of testing. Sample 17: removal of the product after 10 minutes; Sample 18: removal of the product after 20 minutes; Sample 19: removal of the product after 30 minutes; Sample 20: without product removal.

**The visual analysis of the samples did not indicate differences between the four specimens used in the sample groups of stainless steel 304, stainless steel 316, Corian® and vinyl flooring. That is, both the samples submitted to the procedure of application and removal of the product after 10 minutes, and the samples where the product was only applied, without removal, presented the same visual aspect after 12 weeks of testing. Annex I displays the images that show a comparison between the first and the last sample of each group.**

The visual evaluation indicated a difference only in the group of carbon steel samples, where it is possible to notice the difference in the oxidation of the material, when comparing the sample where the product was removed with the sample without removal. The first signs of oxidation of carbon steel samples were noted in the fourth week of testing. Figure 12 shows an image of the first and last sample of this group, where it is possible to observe the significant difference between the procedure where there is no removal of the product after application and where the product is removed after 10 minutes.

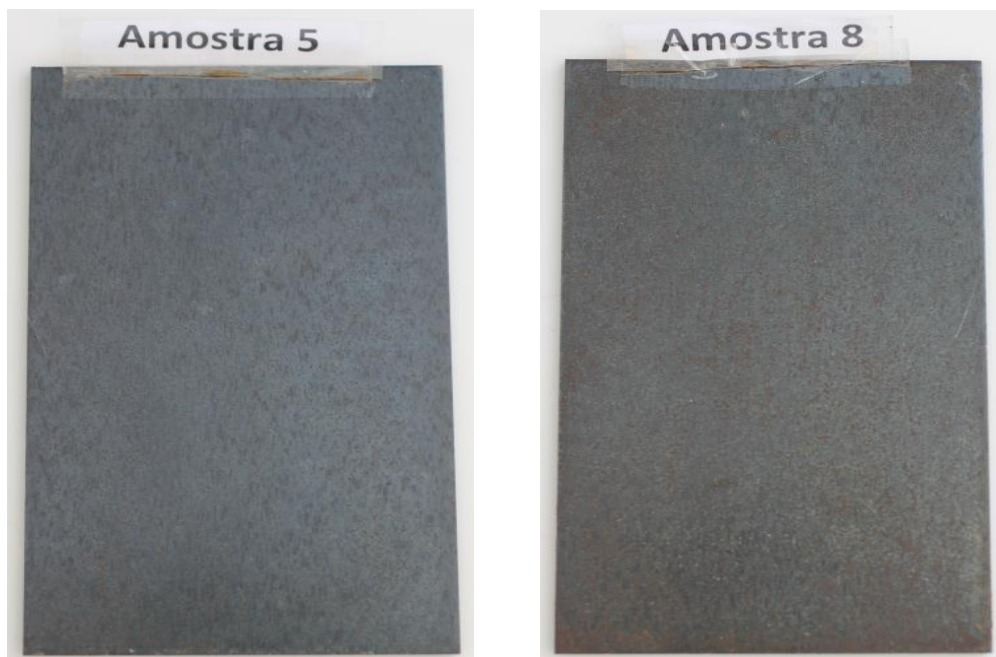
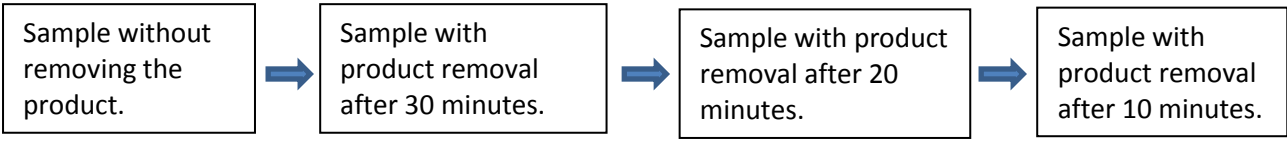


Figure 12: Carbon steel plates after 12 weeks of testing. Sample 5: removal after 10 minutes; Sample 8: without removal of the product.

It is also possible to note the observed impact was proportional to the time of exposure of the sample to the product, thus being the order of impact:



Figures 13 to 16 show in detail the surface of these samples, where it is possible to see the impact caused by oxidation:



Figure 13: Sample 5 - removal after 10 minutes    Figure 14: Sample 6 - removal after 20 minutes



Figure 15: Sample 7 - removal after 30 minutes.    Figure 16: Sample 8 - without removing the product.

## **CONCLUSION**

From the analysis of the results obtained after the application of the Virkon® product on the sample surfaces, it is possible to observe that:

### Oxidation

-Only samples made of carbon steel showed signs of oxidation, and visually, the sample that was not subjected to product removal had a significantly higher degree of oxidation than the sample where the product was removed after 10 minutes;

-The first signs of oxidation in the carbon steel samples were noticed in the fourth week of testing, in the sample without removal of the applied product;

- Both 316 stainless steel samples and 304 stainless steel samples did not show signs of oxidation after 12 weeks of product application.

### Color

- There was no change in color or the appearance of stains in any of the samples with the procedures used after 12 weeks of testing.

**Elaborado por:** Aline Mora

**Química Responsável:** Aline Mora

**CRQ:** 124.253

The test align to earlier data to assist operators and practioners be aware and confident of the Rely+On™ Virkon disinfectant application applied to these various surfaces and their chosen protocols as outlined in the Rely+On™ Virkon™ literature and instructions for use.

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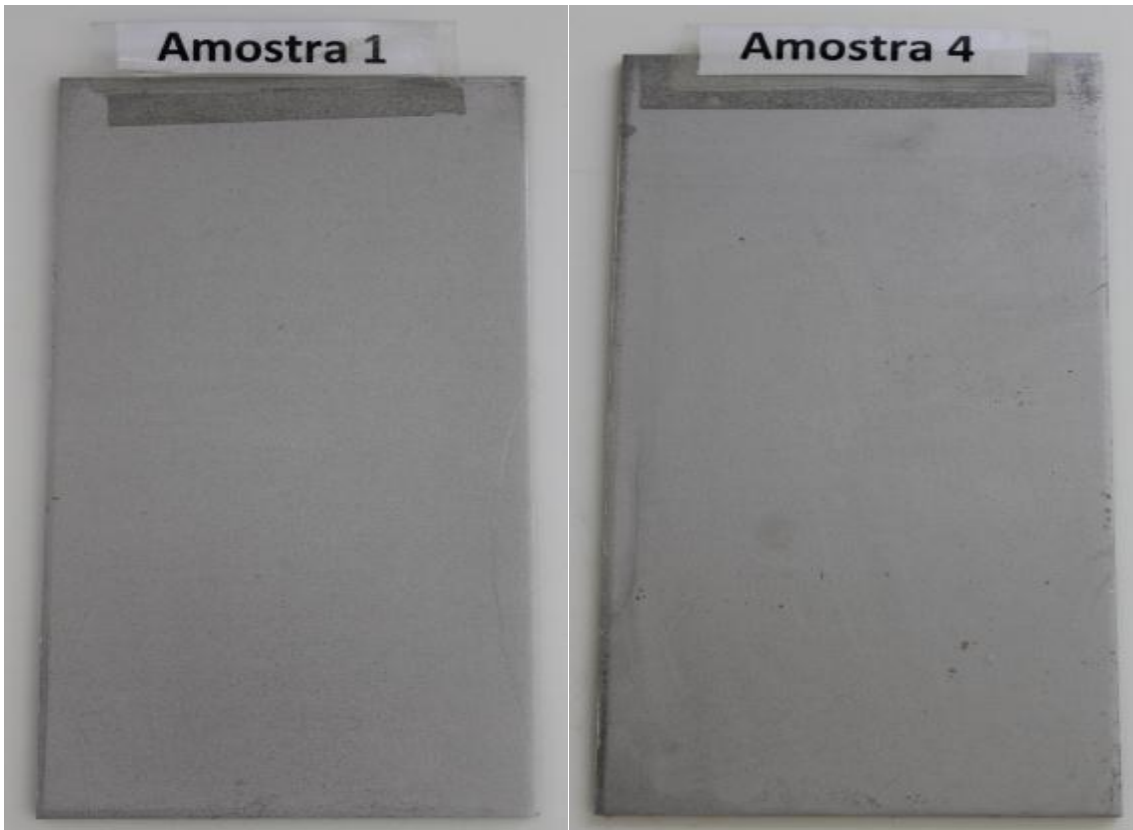
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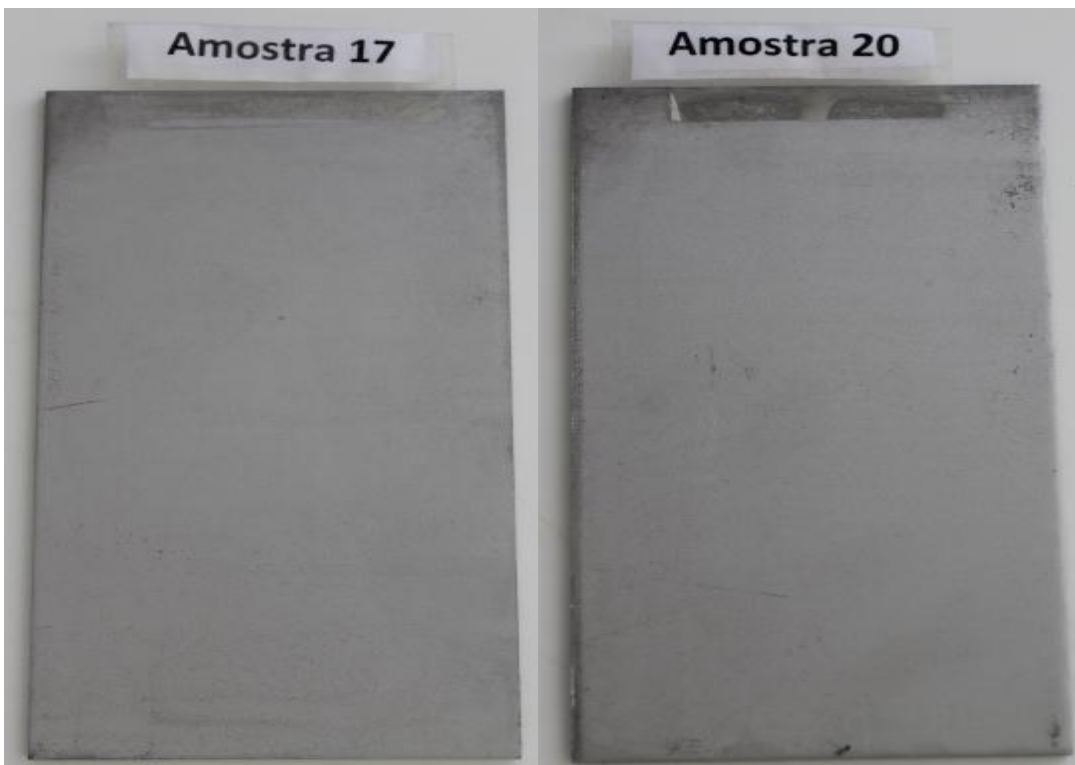
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**Annex I**

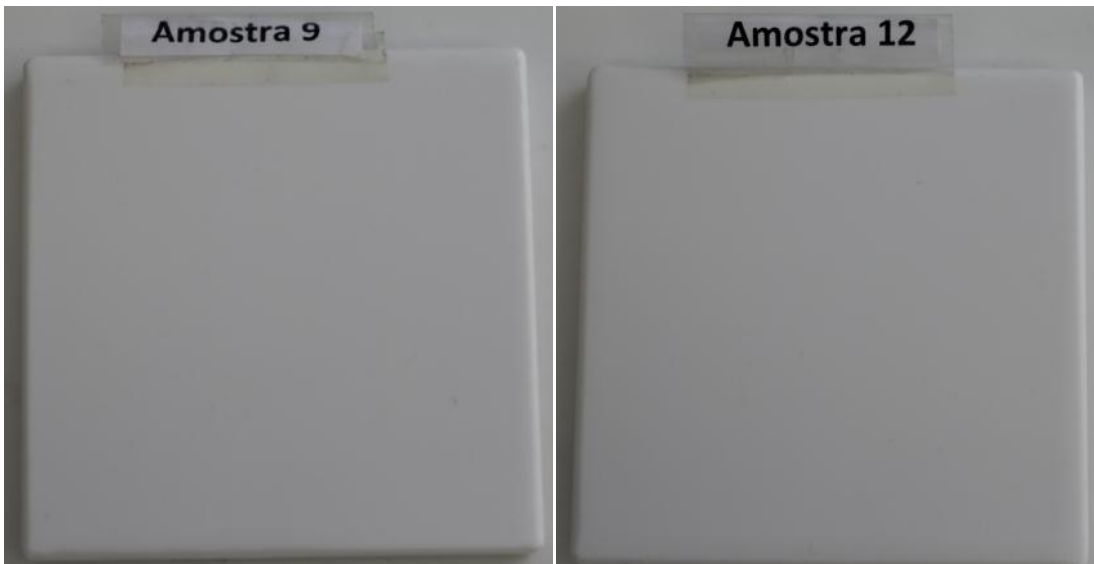
Images of the first and last sample of each material group after the 12 weeks of testing.



316 stainless steel plates after 12 weeks of testing. Sample 1: removal after 10 minutes; Sample 4: without removing the product.



304 stainless steel plates after 12 weeks of testing. Sample 17: removal after 10 minutes; Sample 20: without product removal.



Corian® plates after 12 weeks of testing. Sample 9: removal after 10 minutes; Sample 12: without removal of the product.



Vinyl floor boards after 12 weeks of testing. Sample 13: removal after 10 minutes; Sample 16: without removal of the product.