

TECHNICAL DATA SHEET

Interlox® 5707

Phosphorous-Free Paint Pretreatment for Multi-Metal Applications

Manufacturer	Atotech Deutschland GmbH
Document No.	8059
Version	08
Version date	22. Mar.2019
Doc.-No.	8059
SAP-No.	1679480
IMDS-No.	75925481
Products covered	INTERLOX 5707 M (1681844) INTERLOX 5707 R (1682845) INTERLOX REAGENT A (1687434) INTERLOX REAGENT B (1687435)

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1 PROCESS INFORMATION

Interlox® 5707 is a phosphorous-free system that deposits a zirconium oxide coating on steel, aluminum, zinc and magnesium substrates. Interlox® 5707 provides an excellent base for wet painting or powder coating and will significantly enhance adhesion and corrosion resistance. Interlox® 5707 is suitable for passivation of aluminum substrates and will provide corrosion protection without the use of paint or other organic topcoats.

NOTE: Interlox® 5707 is not recommended for passivation of steel or steel alloys without the use of paint or other organic topcoats.

Advantages of using Interlox® 5707 include:

- Phosphorus-free formulation
- Does not contain any heavy metals (Cr, Ni, Zn)

- Dip mode or spray applications
- May be used on steel, zinc, magnesium, aluminum surfaces prior to painting
- Provides excellent adhesion with paint (powder, wet and ecoat)
- Single components make up
- Separate replenishment product for improved process stability
- Ambient temperature operation

2 EQUIPMENT

Tank	Polypropylene, Koroseal, rubber lined steel or stainless steel
Heater (Optional)	Teflon coated heating elements
Filtration	Use 25 micron rated filter media (Recommended for most applications; strongly recommended for high volume steel lines)
Solution Agitation	Recommended for immersion application
pH controller (Recommended)	For auto dosing Interlox® 5707 R . Use fluoride resistant pH probe

3 MAKE-UP

Make-up of 100 l
(typical concentration)

	Liter	kg
Water	about 98	about 98
Interlox® 5707 M	2.0	2.15

1. Select a suitable clean tank*
2. Fill to 80 % of working volume with water**.
3. Add the required amount of **Interlox® 5707 M** and mix well.
4. Adjust solution level to final working volume with water.
5. Adjust solution temperature within the recommended operating range.
6. Verify total acid points and pH*** and adjust as needed.
7. The Interlox® 5707 solution is now ready for operation.

* If the tank previously contained a zinc or iron phosphate process, chemical descaling of the tank is recommended. Atotech recommends **UniDet AR 5** for this.

** **MAKE-UP WATER:** In most areas city water is suitable. However, in some regions, the hardness and / or alkalinity of the city water may cause precipitation of the active ingredients.
The suitability of the city water can be determined by preparing a small amount of Interlox® solution in an off-line container, using water from the process tank, and checking for precipitation and pH before proceeding with the tank make-up.
If precipitation occurs or if the pH of the Interlox® 5707 solution is greater than 5.0, the water used for make-up will require adjustment before addition of **Interlox® 5707 M**. In these instances, it is recommended to decrease the water pH to 5.5 – 6.0, using **Interlox® 5707 R** or dilute sulfuric acid, before adding Interlox® 5707 M. Deionized or RO treated water may also be used as make-up water.

*** Occasionally, a newly made up solution of **Interlox® 5707** may exhibit pH of < 3.5. Unless the line is processing primarily steel or highly polished aluminum, do not adjust the pH. The pH will increase naturally once production begins. In lines that are processing primarily steel or polished aluminum, the pH should be adjusted to 4.2 – 4.6 with dilute ammonium hydroxide solution before beginning operations.
Processing steel with a solution pH of less than 4.2 increases the potential for flash rusting.
If ammonium hydroxide is not available, very dilute (<5%) sodium or potassium hydroxide solution can be used. This must be added slowly to avoid localized precipitation.

4 OPERATING PARAMETERS

Parts should be suitably cleaned (water break free and rust free condition) prior to treating with Interlox® 5707. Process cycles required to achieve the necessary cleanliness will vary depending on substrate, surface condition and application method. Contact your local Atotech representative for assistance.

Solution Composition

Concentration	Optimum	Range
Interlox® 5707 M	2 % by vol. (20 ml/l) 4 – 5 TA points	1 – 3% by vol. (10 – 30 ml/l) 2 – 7 TA points

Operating Conditions

	Optimum	Range
Temperature	20 – 30 °C (68 – 86 °F)	15 – 50 °C (59 – 120 °F)
Treatment time (spray application)	1 min	30 sec – 2 min
Treatment time (immersion application)	2 min	1 – 3 min
pH (steel)	4.6 – 4.9	4.2 – 5.0
pH (Al, Zn, Mg)	4.0 – 4.9	3.5 – 5.0
Agitation (immersion application)	Mild mechanical or solution agitation is beneficial when a uniform coating appearance is desired.	
Filtration	Recommended, especially for lines processing steel. 25 micron polypropylene bag filtration can be used to remove the small amount of precipitant that forms.	

5 MAINTENANCE

The Interlox® 5707 working solution will be consumed based on the treatment load. If the coating produced is not acceptable, check all control parameters, ensure that the parameters are within the recommendations, and make all necessary adjustments.

Mild mechanical or solution agitation is beneficial when uniform coating appearance is desired.

For proper operation, it is necessary to monitor and control both the pH and the Total Acid Points (TA points) of the working Interlox® 5707 solution. **Interlox® 5707 R** was designed to maintain the pH of the Interlox® 5707 solution while replenishing the active components Interlox® 5707. **Measurement of the pH, using a fluoride resistant pH probe, should be the main control method.**

The concentration of Interlox® 5707 solution is verified by titration for total acidity, expressed TA points, using the analytical method given in section 9. The TA points can vary depending on the water composition used to make the working solution. Normal range for a 2% solution is 4.0 to 5.0 TA points. Upon solution make up, the total acid points should be determined and set as the standard. Concentration can also be determined using one of photometric methods described in section 9.

Solution control can be done by various methods as explained in the following:

5.1 Automated control using pH controller and dosing pump – best practice

In this method:

- A pH controller and dosing pump provide fully automated pH control of the Interlox® 5707 solution by on-demand addition of **Interlox® 5707 R**;
- The pH controller continuously measures the pH value of the Interlox® 5707 solution and automatically adds **Interlox® 5707 R** to maintains the pH within its optimum operating range (see "operating conditions" in section 3)
- The pH probe should be a fluoride resistant.
- The **pH probe should be calibrated regularly as per supplier's manual**;

- The **concentration of the Interlox® 5707 solution should be routinely monitored** (1/hour, 1/shift or 1/day depending of production throughput), the total acidity being the preferred method:
- If the total acidity decreases more than 0.5 TA points from standard, **Interlox® 5707 M should be added** to increase the Total Acid points without significant change of pH. An addition of 3.1 ml/l of **Interlox® 5707 M** will increase the TA points by approximately 0.5 points. If regular adds of Interlox® 5707 M are needed to maintain the total acidity, the usage of a dosing pump for continuous add is recommended.

5.2 Manual control

In this method:

- The pH is manually monitored 2 to 8 times per shift or per day;
- A fluoride resistant probe is recommended; The **pH probe should be calibrated regularly as per supplier's manual**.
- The following should be done if:
 - pH increases above its optimum value (see "operating conditions" in section 3) or the value determined as the upper limit:
 - Add small amount of **Interlox® 5707 R**
 - Let the tank mix for 10-15 min or 1-2 tank turnovers
 - Measure pH;
 - Repeat until pH reaches its optimum value.
- **Note: Amount of Interlox® required varies based on water composition and Interlox® 5707 solution contamination levels. Best practice is to adjust with several small additions rather than one large addition.**
- pH decreases below its optimum value (see "operating conditions" in section 3) or the value determined as the lower limit:
 - Increase the pH with a 10% solution of ammonium hydroxide (preferred) or very dilute sodium hydroxide.
- The concentration of the Interlox® 5707 solution should be verified in a regular manner (1/hour, 1/shift or 1/day depending of production throughput) **after pH has been adjusted to its optimum value**. The total acidity measurement is the preferred method:
 - If the total acidity decreases more than 0.5 TA points from standard, and pH is within the optimum range, **Interlox® 5707 M should be added** to increase the TA points without significant change of pH.

5.3 Semi-automatic control

In this method:

- Follow previous method – Manual control.
- Record how much **Interlox® 5707 R** is consumed every shift or day and calculate its consumption rate (ml/h or L/h or...);
- Once the consumption rate of **Interlox® 5707 R** has been accurately determined, use a calibrated dosing pump to continuously add Interlox® 5707 R at the previously determined consumption rate.
- pH should be frequently monitored.
- Dosing pump may need periodic adjustment to maintain the pH in its optimum range.
- If regular adjustments are required to maintain the total acidity of the solution, the same methodology can be used to continuously dose **Interlox® 5707 M**.

5.4 Conductivity

The conductivity is not a good method to control the concentration of the Interlox® 5707 solution. However, it can be a good indicator of depletion of the Interlox® 5707 solution. At constant concentration of the Interlox® 5707 solution, the conductivity should stay constant or increase depending of drag-ins and drag-outs. A decrease of conductivity is a clear indicator that the solution of Interlox® 5707 is being depleted. We recommend checking the conductivity at make-up and making sure it never fails below this initial value.

5.5 Contamination

Installations processing a high percentage of aluminum may experience an accumulation of aluminum in the Interlox® 5707 process solution. Analyze for aluminum concentration by Atomic Absorption. Concentrations above 0.5 g/l can detrimentally affect coating performance. If the Al concentration exceeds 0.5 g/l, the working solution should be disposed of and a new make-up done.

5.6 Chemical consumption

Typical replenishment rate of **Interlox® 5707 R** is: 3.5 ml/m² (0.33 ml/ft²). Factors affecting drag out rates (part configuration, dwell time, line speed,...) as well as factors such as rinse water quality, line maintenance and washer design can increase or decrease consumption rates. Experience has shown that under various conditions the consumption can vary from 1.5 to 5.0 ml/m² (0.14-0.46 ml/ft²).

6 GENERAL SAFETY PRECAUTIONS

Avoid direct contact with this material. Do not inhale associated mist or vapors. Wash contaminated clothing before reuse. Refer to Safety Data Sheet (SDS) for specific precautions before handling this material and for first aid recommendations. As applicable, keep exposure below the limits recommended by the appropriate regional regulatory agencies.

For further information on product safety refer to the corresponding SDS. The SDS is enclosed at the first delivery of a product. Otherwise, a SDS for a product is available on request from the appropriate regional Atotech office.

7 MATERIAL NO. FOR MAKE-UP AND MAINTENANCE PRODUCTS

PRODUCT	MATERIAL NO.
INTERLOX 5707 M	1681844
INTERLOX 5707 R	1682845

For Analytical Purposes Only (available from Neuruppin)

INTERLOX REAGENT A	1687434
INTERLOX REAGENT B	1687435

8 DOCUMENT HISTORY

Current revision status	Date	Change against last version:
01	15. Mar.2013	NEW
02	14. Jan.2014	QDS to Sales
03	16. Jan.2014	Change of the working conditions, whole document
04	05. Nov.2014	New Analyse 2325
05	12. Mar.2015	Analyse update, New Analyse 2428
06	19. July.2016	Updated the operating conditions and process control
07	20. Jan.2017	Analyse 2428 deleted
08	04. Jan.2018	Update Analyse 1984

Literal transcription of the manufacturer's original document (Atotech Deutschland GmbH · Doc. 8059 · v08). Content verified automatically against the original — text, values, formulas and highlighted warnings — on 03.09.2026. Approved on 03.09.2026.

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