

**PRETREATMENT TECHNICAL DATA SHEET****IRON PHOSPHATE  
CLEANER COATER / CONVERSION COATING****PRODUCT DESCRIPTION**

**CHEMFOS 51HD** is a heavy duty dual action chemical cleaner-coater designed to remove soils and deposit a phosphate coating on steel surfaces in a single processing step. Ideally suited for pretreatment systems where heavily soiled parts are processed.

**TECHNICAL PROPERTIES**

Composition:	Liquid
Recommended Concentration:	3% by volume
Recommended Temperatures:	135 – 150°F (57 – 65°C)
pH Concentrate:	3.1
pH Working Solution:	4.5 - 5.8

**PRODUCT ADVANTAGES**

- Concentrated material that simultaneously removes soils and coats steel surfaces with an iron phosphate coating to improve paint adhesion and provide additional corrosion resistance.
- Offers simplicity of operation, competitive operational costs and extended bath life.
- Removes the most difficult soils while depositing the highest quality phosphate coating.

## PRETREATMENT TECHNICAL DATA SHEET

### USE & CONTROL INSTRUCTIONS:

#### Operating Properties (Typical):

- |  |                                      |
|--|--------------------------------------|
| • Application                                | Normally used in a spray application |
| • Operating concentration                    | 1.5 to 4% by volume                  |
| • Operating pH                               | 4.5 to 5.8                           |
| • Acid consumed (alternative for pH control) | 0.1 to 0.6                           |
| • Operating temperature                      | 135 – 150°F (57 – 65°C)              |
| • Dwell time                                 | 60 to 90 seconds                     |

Specific process conditions may warrant operating the above parameters outside of the typical ranges. Please consult your PPG representative.

#### Charge Instructions:

##### **Charge Details:**

- 1) Fill the clean tank to approximately  $\frac{3}{4}$  of the operating level with fresh water.
- 2) Start circulating pump.
- 3) Slowly add 3.0 gallons (11.3 liters or 29 pounds) of **CHEMFOS<sup>®</sup> 51HD** for every 100 gallons (378 liters) of bath volume.
- 4) Add approximately 16 ounces (0.5 Liters or 1.25 pounds) of CHEMFIL BUFFER for every 100 gallons (378 liters) of bath volume.
- 5) Slowly add the CHEMFIL BUFFER solution to the tank, ensuring good circulation.
- 6) Mix well and adjust the final volume to the operating level with additional water as needed. This should produce a bath having a pH of 4.8 and a Total Acid of at least 5.8 points. It is important that the pH be above 4.5 before operating. Most baths will require some additional adjustment before reaching this exact specification. Use **CHEMFOS<sup>®</sup> 51HD** to decrease the pH and CHEMFIL BUFFER to increase the pH.
  - a) Approximately 5 fluid ounces (150 ml) of **CHEMFOS<sup>®</sup> 51HD** per 100 gallons will decrease the pH by 0.1 pH units.
  - b) Approximately 1.0 fluid ounce (30 ml) of CHEMFIL BUFFER per 100 gallons will increase the pH by approximately 0.1 pH units.
- 7) Heat bath to operating temperature.

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### Analysis Procedures:

**CAUTION: DO NOT PIPETTE BY MOUTH!**

### Total Acid (and optional Acid Consumed titration):

#### Equipment needed:

- Burette Assembly (add a second one if Acid consumed is tested in place of pH)
- 10-ml pipette and bulb
- 250-ml flask or beaker

#### Reagents needed:

- Phenolphthalein indicator
- Bromocresol Green indicator (optional-used for running acid consumed test)
- 0.1 N Sodium Hydroxide
- 0.1 N Sulfuric acid (optional-used for running acid consumed test)

#### Total Acid Procedure:

1. Pipette a 10 ml sample of the bath into a clean, dry flask or beaker.
2. Add 3-5 drops of Phenolphthalein indicator and swirl to mix.
3. Using the burette, titrate with 0.1N Sodium Hydroxide until the mixture turns to a light permanent pink.
4. Record the number of ml of 0.1N Sodium Hydroxide as the Total Acid.

#### Calculation:

mL of Total acid X 0.52 = Percent by volume of CHEMFOS<sup>®</sup> 51HD

Points of Total Acid	Concentration of CHEMFOS <sup>®</sup> 51HD in percent by volume	Addition of CHEMFOS <sup>®</sup> 51HD Per 100 gallons of tank volume
7.7	4.0%	0 gal (0 L)
6.8	3.5%	0 gal (0L)
5.7	3.0%	0 gal (0 L)
4.8	2.5%	0.5 gal (1.9 L)
3.8	2.0%	1.0 gal (3.8 L)
2.8	1.5%	1.5 gal (5.7 L)
1.9	1.0%	2.0 gal (7.6 L)
1.0	0.5%	2.5 gal (9.5 L)

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The TA level is best controlled by the continuous addition of **CHEMFOS<sup>®</sup> 51HD** concentrate by using a metering pump rather than by infrequent additions of large amounts of chemical. After the bath has been adjusted to the proper concentration pH adjustments can be made.

### Acid consumed titration for pH control (optional):

1. Pipette a 10 ml sample of the bath into a clean, dry flask or beaker.
2. Add 5 drops of Bromocresol Green indicator and swirl to mix.
3. Using the burette, titrate with 0.1N Sulfuric Acid until the mixture turns from blue to green. (do not titrate further to the yellow)
4. Record the number of ml of 0.1N Sulfuric acid as the acid consumed (or negative free acid or pH control) value.

### pH determination (preferred method for pH control):

#### Equipment needed:

- pH meter
- Suitable pH electrode(s)
- Plastic squirt bottle (for rinsing the electrode)

#### Reagents needed:

- pH 4 buffer solution
- pH 7 buffer solution

#### pH meter procedure:

1. The pH of the operating solution should be checked with an electronic pH meter following calibration and operational procedures provided by the manufacturer.
2. Maintain the pH in the range of 4.5 – 5.8 for optimum quality.
3. pH adjustments can be made in the following manner:
  - a) To raise the pH approximately 0.1 units, add 30 mL of CHEMFIL BUFFER per 100 gallons of operating solution.
  - b) Frequent additions of **CHEMFOS<sup>®</sup> 51HD** should be used as indicated previously to lower pH and to keep the concentration constant. In the event of an emergency the pH can be lowered 0.1 units by adding approximately 65 mL of pH CONTROLLER solution per 100 gallons of operating solution. (It should be noted that the pH CONTROLLER only reduces the pH. It may also keep the total acid in range but does NOT add the additional chemistry needed to produce a quality coating and should not be used for on-going bath replenishment.)

# CHEMFOS 51HD

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### TECHNICAL DATA SHEET DISCLAIMER—INDUSTRIAL COATINGS:

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