



# Technical Process Bulletin

Technical Process Bulletin No. 289502

This Revision: 10/01/2004

## Turco 4409-GL

### 1. Introduction:

Turco 4409-GL is a clear, slightly yellow liquid acid cleaner and deoxidizer designed for use on ferrous and nonferrous alloys by immersion, spray and hand wipe methods. T-4409-GL is designed specifically for use in overhaul of jet engine components. This is usually the final step in the 4 stage overhaul procedure

#### Features:

1. Cleaner can be diluted to meet specific cleaning/deoxidizing requirements.
2. Readily rinses from parts with water or steam.
3. Imparts satin finish on aluminum alloys (castings should be pretested for concentration and exposure time).
4. Produces excellent base for paint on aluminum alloys.
5. Removes rust from ferrous alloys.

### 2. Operating Summary:

Chemical:	Bath Preparation per 100 gallons
Turco 4409-GL	25 to 50 gallons (ambient tank cleaning)
	5 to 10 gallons (hot tank cleaning)
Operation and Control:	
Turco 4409-GL	5 to 50 gallons per 100 gallon tank
Temperature	Ambient to 150° F (65° C)
Time	3 to 10 minutes

### 3. The Process:

The usual process to clean and condition surfaces consists of the following steps:

- A. Remove excess oils and grease, if present
- B. Treat with TURCO 4409-GL solution
- C. Water rinse
- D. Dry

The typical 4 stage engine overhaul process used to to clean jet engine components includes the following steps:

- A. Alkaline Rust Remover (TURCO 4181-L or TURCO 4181-GL)
- B. Water rinse
- C. Acid Scale Conditioner (Scale Gon #5, Scale Gon #7)
- D. Water rinse
- E. Permanganate Scale Conditioner (TURCO 4338-L {preferred})
- F. Water rinse
- G. Final Acid Scale remover (TURCO 4409-GL)
- H. Water rinse

#### 4. Materials:

TURCO 4409-GL  
TURCO 4181-L or TURCO 4181-GL  
Scale Gon #5 or Scale Gon #7  
TURCO 4338-L  
Testing Reagents and Apparatus

#### 5. Equipment:

Acid resisting (rubber, stainless steel or plastic) buckets, troughs or other suitable container should be used to hold the diluted TURCO 4409-GL solution. Mild steel tanks and equipment are not suitable for long term storage. Galvanized containers should not be used. If production conditions warrant, troughs may be installed to collect the TURCO 4409-GL coating chemical run-off for reuse.

Long-handled, window type brushes, clean cloths or synthetic sponges may be used to brush on the TURCO 4409-GL solution.

#### 6. Application of TURCO 4409-GL:

##### Buildup:

For hand wipe application dilute TURCO 4409-GL to 15% in water at room temperature.

For ambient immersion application, add 25% to 50% TURCO 4409-GL to water.

For hot tank immersion application, add 5% to 10% TURCO 4409-GL to water and heat to the desired temperature, not to exceed 65°C.

For spray application, add 15 gallons TURCO 4409-GL to 85 gallons water and heat to the desired temperature, not to exceed 65°C. Spray by means of a siphon or nonatomizing spray method, followed by a water rinse.

NOTE: Operators should be equipped with rubber gloves, aprons and goggles to avoid contact with the solution. Adequate ventilation should be provided.

##### Operation:

Always add TURCO 4409-GL to water. Mechanical agitation is recommended.

Selecting the size area to be treated at one time will depend on the method of application, condition of the metal surface, temperature and part configuration. A typical treatment time is where the TURCO 4409-GL solution is in contact with the metal surface between three and ten minutes.

TURCO 4409-GL solution is normally applied at temperatures between room and 120° Fahrenheit.

TURCO 4409-GL solution should not be allowed to dry on the metal surface prior to a thorough rinse. A thorough rinse with clean water is necessary to remove both residual TURCO 4409-GL solution and oils that have been lifted from the metal surface.

Good results start with cleaning. A clean surface is a "water break-free surface". The rinse water sheets out over the aluminum surface, while oil remaining on the surface will cause the water to bead up. Chemical cleaners will lift and break down oils on the surface and assist in rinsing them from the surface on the metal.

#### 7. Testing and Control:

Never pipet by mouth, use a pipet filler.

##### Concentration:

The concentration of the treatment solution is determined by a simple titration.

Obtain a sample from the tank and allow to cool to room temperature. Pipet 10 mL of the cooled bath sample into a 25 mL beaker and add approximately 100 mL of DI Water. Titrate with TS 89 to a pH 4.

##### Calculation:

$$\text{mL of TS 89} \times 1.96 = \% \text{ by volume Turco 4409-GL}$$

NOTE: To to increase the concentration of Turco 4409-GL by one per cent, add one gallon of Turco 4409-GL to a 100 gallon tank.

#### 8. Storage Requirements:

Transport and store TURCO 4409-GL in closed containers between 0°C and 50°C. Do not store with chlorine containing compounds.

#### 9. Waste Disposal Information:

Applicable regulations concerning disposal and discharge of chemicals should be consulted and followed.

Disposal information for the chemical products used in this process is given on the Material Safety Data Sheet for each product.

#### 10. Precautionary Information:

Before handling the chemical products used in the process, the first aid and handling recommendations on the Material Safety Data Sheet for the product should be read, understood and followed.

The processing bath is acidic. Do not get in eyes, on skin or on clothing. In case of contact, follow the recommendations found in the Material Safety Data Sheet for TURCO 4409-GL.

Testing Reagents and Apparatus  
(Order only those items which are not already on hand)

<u>Code</u>	<u>Quantity</u>	<u>Item</u>
205943 .....	1 .....	Pipet, 10-mL
205700 .....	1 .....	Buret, 25 mL
205402 .....	1 .....	Beaker, 250 mL
205289 .....	1.0 L .....	Titrating Solution 89 (Sodium Hydroxide, 1.0N)

- \* \* \* \* \*

®Registered trademark of Henkel Corporation.

Henkel Technologies  
32100 Stephenson Highway  
Madison Heights, MI 48071  
Telephone: 248-583-9300  
Fax: 248-583-2976

"The information presented herein is our interpretation of certain test results and field experience to date. This information is not to be taken as warranty or representation for which we assume legal responsibility, nor as permission or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification." © Henkel Corporation.

**Form Revised 04 June 2001**