

Total - Product Report



TURCO® C-298 GL

Created on: 08.01.2007
Last changed on: 23.02.2007

Real subst.-no.: 262774
printing date: 02.03.2007
page: 1/6

I General Data:

Real substance name: TURCO® C-298 GL
Formulation number: TD-5100-AN, 262775, 3232-111

II Product properties:

General properties:

delivery state: liquid
state: liquid
odor: Surfactant
colour: Water White

Storage and Transportation:

Minimum storability: 36 months
Storage conditions to be kept: Store above 40 °F (5 °C), Store below 100°F (38°C), Thaw and mix thoroughly if frozen.

Phys.-chem. characteristics (Inspection plan plant PLANT 3584 Deleware, U-T):

No	Parameter	Range of values	Method
1	Visual appearance compared with standard (Info for QM insp.plan: clear-colorless)	corresponds to the standard	00513101
2	Cloud point (Conc.: 10 Vol%)	57 - 63 °C	00566301
3	pH-value (; Conc.: 10 Vol%)	8.30 - 8.50	00588801

No	Method	Method short text
1	00513101	APPEARANCE (US) - QCTM099A
2	00566301	HST-US E51C; Cloud Point, Upper

conc Len
100 - 8 50-70 5-15 min
100 - 20

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3	00588801	HST-US 400X; pH By pH Meter (Dilution)
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Physical-chemical characteristics (Certificate of analysis):

No	Parameter	Range of values	Method
1	Visual appearance compared with standard (Info for QM insp.plan: clear-colorless)	corresponds to the standard	00513101
2	Cloud point (Conc.: 10 Vol%)	57 - 63 °C	00566301
3	pH-value (; Conc.: 10 Vol%)	8.30 - 8.50	00588801

No	Method	Method short text
1	00513101	APPEARANCE (US) - QCTM099A
2	00566301	HST-US E51C; Cloud Point, Upper
3	00588801	HST-US 400X; pH By pH Meter (Dilution)

Physical-chemical characteristics (allgemein):

No	Parameter	Range of values	Method
1	Visual appearance compared with standard (Info for QM insp.plan: clear-colorless)	corresponds to the standard	00513101
2	fraction % Solids	24.95 %	00583801
3	fraction Volatile Organic Carbon (VOC)	0.1 %	00589901
4	Flash point	> 100 °C	00548001
5	Boiling point	> 100 °C	
6	Cloud point (Conc.: 10 Vol%)	57 - 63 °C	00566301
7	Solubility (qualitative) (Solvent: Water)	Complete	
8	pH-value (; Conc.: 10 Vol%)	8.30 - 8.50	00588801
9	Specific gravity	1.06	00564901

No	Method	Method short text
1	00513101	APPEARANCE (US) - QCTM099A
2	00583801	HST-US 021S; VOC % Solids (Non-Volatiles)
3	00589901	HST-US 524V VOC Via EPA 24 Or Equivalent
4	00548001	HST-US 027F; Flash Point: Tag CC Pensky-Martens CC
5		calculated

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6	00566301	HST-US E51C; Cloud Point, Upper
7		calculated
8	00588801	HST-US 400X; pH By pH Meter (Dilution)
9	00564901	HST-US E28D; Specific Gravity

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Adhesives

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III Compositions:

Formula:

Formula number: 262775
Formulation number: TD-5100-AN, 3232-111
Rezeptname: TD-5100-AN
Created on: 08.01.2007
Formula developer: Dubs, Ronald; HST Madison Hgts, Sr. Research Chemist; +1 248-577-4477

Manufacturing instructions: as DMS document HSV 32403 EN 00

Explanation to table following:

Column Pos.: same numbers mark alternative substances or respectively materials

Column aB: X means the substance will not be taken into account for chemical consumption

Real substance formulation:

Pos.	IRIS- Substance- no.	Real substance name	%TQ	aB
0010	157571	WATER, DI	74.950000 %	3222
0020	157533	SODIUM TRIPOLYPHOSPHATE (ANHY) 8358	5.000000 %	1106
0030	31477 ✓	Tripropylene glycol methyl ether	4.000000 %	✓
0040	121357	Rhodoclean EFC	8.250000 %	
0050	157031 ✓	PRIMARY ALCOHOL ETHOXYLATE	3.500000 %	3812
0060	79726	COBRATEC 99	0.200000 %	80 89
0070	22636 ✓	Sorbit 70%	1.300000 %	3111
0080	169487 ✓	Sodium nitrate	0.500000 %	1099
0090	2208 ✓	Phosphoric acid 75%	0.200000 %	3032
0100	157578 ✓	NAXONATE SC POWDER	1.900000 %	02 97
0120	263721 ✓	2-mercaptobenzimidazole 1997	0.200000 %	3925 / 115
			100.000 %	

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Chemical composition:

Pos.	IRIS- Substance- no.	Chemical substance	CAS no.	%AS	aB
0010	1	Water	7732-18-5	75.428000 %	
0020	241762	Terpene EO/PO block copolymer~	174955-61-4	8.250000 %	
0030	3310	Tripropyleneglycol monomethylether	25498-49-1	4.000000 %	
0040	51899	Fatty alcohol ethoxylate C12-15 9EO	68131-39-5	3.499979 %	
0050	147015	Sodium cumenesulphonate	28348-53-0	1.767000 %	
0060	159418	Metaphosphoric acid, trisodium salt	7785-84-4	1.666700 %	
0070	931	Na4-diphosphate	7722-88-5	1.666650 %	
0080	376	Na5-triphosphate	7758-29-4	1.666650 %	
0090	391	Sorbitol	50-70-4	0.910000 %	
0100	18599	Na-nitrate	7631-99-4	0.500000 %	
0110	874	Benzotriazole, 1,2,3-	95-14-7	0.200000 %	
0120	941	Phosphoric acid	7664-38-2	0.150000 %	
0130	365	Na2-sulfate	7757-82-6	0.095000 %	
0140	33069	Ethylenoxid	75-21-8	0.000021 %	
				99.800 %	

*Bio
Sequester*

Formulation in materials:

Pos.	Material no.	Material	amount	aB

IV Manufacturing instructions:

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V Additional information:

Authorisation group: YHST_0000
Specification type: REAL_SUB
First creation: 08.01.2007 DUBSR
Changes header data: 23.02.2007 DICERBO
Last update:
 Specification: UT20070223 23.02.2007 DICERBO
 Formula 262775: UT20070207 07.02.2007 CALDWEJ



LABORATORY REPORT:

Report No. 0701
Date: 2-19-200
Page: 1/4

Henkel Corporation
32100 Stephenson Highway
Madison Heights, MI 48071

TITLE: Turco C-298 CL: A New Replacement for Ridoline 298 in Aerospace Cleaning

DATE INITIATED: 1-19-2006

DATE COMPLETED: 1-8-2007

REFERENCE NUMBER: 3232-111 and Referenced Pages

PREPARED BY: Ronald Dubs

OBJECTIVE:

Field reports of corrosion problems with Ridoline 298 used in mild steel tanks prompted a Program to develop a product which was safe on mild steel, passes the corrosion requirements of BAC 5749 and possesses the same cleaning performance as Ridoline 298 but without borate (EU requirement), silicate and APE (Henkel/EU requirement) surfactants.

Results:

Corrosion Testing:

3232-111 (Turco C-298 GL) Immersion Corrosion Testing

Volume %	Boeing BAC 5749 Limit		Turco C 298-GL 150° F, 24 hours					Ridoline 298 20 V% 150° F, 24 hours
	mg/24 hr +/-	100	20	15	8	5		
1020 Carbon Steel			1.9				62.2	
2024-T3 Alclad AZ31B, Magnesium, Cr Sealed	40	108.8	20.1	26.7	20.5	36.1	37.1	
4130 Steel	20	29.9	6.0	9.1	6.2	13.7	14.1	
4130 Cd Plate	30	5.4	0.5	3.8	5.4	3.6	14.7	
Ti-6Al-4V	10	6.2	3.3	14	15.5	13.0	14.9	
15-5-PH Stainless Steel	5	0	0.8	0.1	0.1	0.3	0.6	
Aluminum Bronze (C63000)	30	0.5	0.3	0.1	0	0.1	1.4	
	10	5.4	1.8	3.1	3.3	2.0	10.4	

Sandwich Corrosion per ASTM F-1110 was run and found to be better than Ridoline 298 Although some degree of 'fogging' of the cladding was still observed.

Cleaning Performance:

Cleaning tests were performed at 10 V% at 150° F using cosmolene, red grease, and red lipstick and 'Sharpie' marking ink (aged at 100° F, 24 hours) applied to 2024-T3 alclad aluminum and 2024-T3 bare aluminum.

Turco C-298-GL performed as well or better for cleaning of cosmolene, red grease and red lipstick applied to 2024-T3 alclad aluminum. Ridoline 298 performed slightly better on the 'Sharpie' marker applied over 2024-T3 alclad aluminum. Ridoline 298 performed equal or slightly better on all soils applied to 2024-T3 bare aluminum. The slightly better performance of Ridoline 298 on the 'Sharpie' marking ink and on soils applied on 2024-T3 bare may be attributed at least in-part to the higher etch rate on aluminum.

Experimental:

Ridoline 298 was examined to determine the raw material sources responsible for corrosion. The following materials were found to contain chloride and both individually and collectively contribute to increased rates of corrosion on mild steel,

Miranol JS Concentrate
Tamol L Concentrate
Surmax 727-NA

Initial evaluation targeted replacement of Miranol JS concentrate with Miranol JBS. Alternative surfactants to replace the nonylphenol ethoxylate, Igepal CO-630 with a linear or slightly branched alcohol ethoxylate equivalent in HLB to Igepal CO-630 were investigated. Both cleaning performance and corrosion were found not to be as good as Ridoline 298.

Additional raw materials were sequentially removed and it was discovered that Tamol L Concentrate and Surmax 727-NA also contributed to corrosion of mild steel and were removed from the formula. At the same time, it was found that Chemax 802-C was not playing any beneficial role in the formula and was removed. Because Miranol JBS did not provide the necessary cleaning performance when used in conjunction with a number of different linear alcohol ethoxylates, it was also removed in favor of a linear alcohol ethoxylate blend.

The first blend investigated was a combination of Genapol UD series branched alcohol ethoxylates balanced to give a cloud point of approximately 140° F for a 10 V% solution of the cleaner.

In order to achieve the 10 V% cloud point of 140° F as well as a minimum cloud point of 120° F for the concentrate a number of hydrotropes were investigated.

Triton H-66
Sodium Xylene Sulfonate
Sodium Cumene Sulfonate
Akzo Nobel AG-6202 (hexyl glycoside)

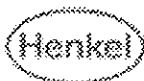
Sodium cumene sulfonate was found to be the most effective hydrotrope.

In addition, in order to meet the cloud point requirements and also the surfactant concentration necessary for improved cleaning, the condensed phosphate content of the formula was reduced. The sodium hexametaphosphate was removed entirely and the sodium tripolyphosphate was reduced from 7.4% to 5.0%.

Cleaning performance of the formula was still not as good as Ridoline 298. The next change in surfactant blends to better approximate the performance of Igepal CO-630. was a combination of Rhodoclean EFC (a biodegradable terpene EO-PO alkoxylate used in combination with a higher cloud point linear alcohol ethoxylate for which Tomadol 25-9 was found to give the best balance of cloud point control and cleaning performance.

The addition of different glycol ethers to improve the removal of the 'Sharpie' marker ink were investigated and tripropylene glycol methyl ether was found to Work the best while having the lowest environmental impact of the glycol ethers Tested.

The formula was optimized for cleaning and was re-tested for corrosion performance. After screening various inhibitors it was found that a combination of benzotriazole and 2-mercapto-benzimidazole gave the best corrosion performance.



Technical Process Bulletin

Technical Process Bulletin No.

This Revision: 02/12/2007

TURCO C-298 GL

Immersion Cleaner for Aluminum and Aluminum Alloys

1. Introduction:

TURCO C-298 GL is a liquid immersion cleaner for aluminum and aluminum alloys. It is formulated for use in anodizing and conversion coating lines. It is free rinsing and will remove a variety of soils including oils, greases, inks, and wax based markings. It contains no silicates or borates.

2. Operating Summary:

<u>Chemical:</u>	<u>Bath Preparation per 100 Gallons:</u>
TURCO C-298 GL	8 to 20 gallons
<u>Operation and Control:</u>	
Concentration Range:	12.3 - 30.5 mL (8-20 V%)
Normal Operating pH Range:	6.7 - 8.7 (For information only)
Time:	5 to 15 minutes
Temperature:	130 to 160°F, maximum (54 to 71°C)

3. The Process:

- A. Cleaning with TURCO C-298 GL
- B. Water rinsing
- C. Etch or bright dip (optional)
- D. Water rinsing (optional)
- E. Deoxidizing /desmutting with suitable TURCO DEOXALUME material (optional)
- F. Water rinsing
- G. Required anodizing or conversion coating.

4. Materials:

TURCO C-298 GL

Testing reagents and apparatus

5. Equipment:

The process and related equipment, pumps, and piping for use with this solution should be constructed of stainless steel. The heat exchanger plates should be stainless steel. All process circulating pump seals, valve seats, and other elastomers which come in contact with the working process solution should be Buna-N, Teflon or Viton. EPDM elastomers should be avoided.

Automatic process control equipment, which promotes consistent quality and controlled costs, is available. Auxiliary equipment, which is engineered and specified for this process, include air operated chemical transfer pumps, chemical metering pumps, reliable level controls, solenoid valve assemblies and bulk storage tanks. All chemical pump seals, valve seats and other elastomers which come in contact with the concentrated solution can be Buna-N, Teflon, Viton, or Hypalon.

Our sales representative should be consulted for information on Henkel Surface Technologies automatic process control equipment for this process or other matters related to this process. In addition, the "Henkel Surface Technologies Equipment Design Manual" may be consulted.

6. Cleaning with the TURCO C-298 GL cleaner solution:

Buildup:

Fill the tank about three-fourths full with room temperature water. For every 100 gallons of final solution volume add 8 to 20 gallons of TURCO C-298 GL chemical, (the specific amount to be added depends on the desired bath strength). Circulate until thoroughly mixed. Finally, add sufficient water to bring solution up to the working level. Heat to the desired operating temperature.

Operation:

Time: 5 to 15 minutes
Temperature: 130 to 160°F (54 to 71°C)

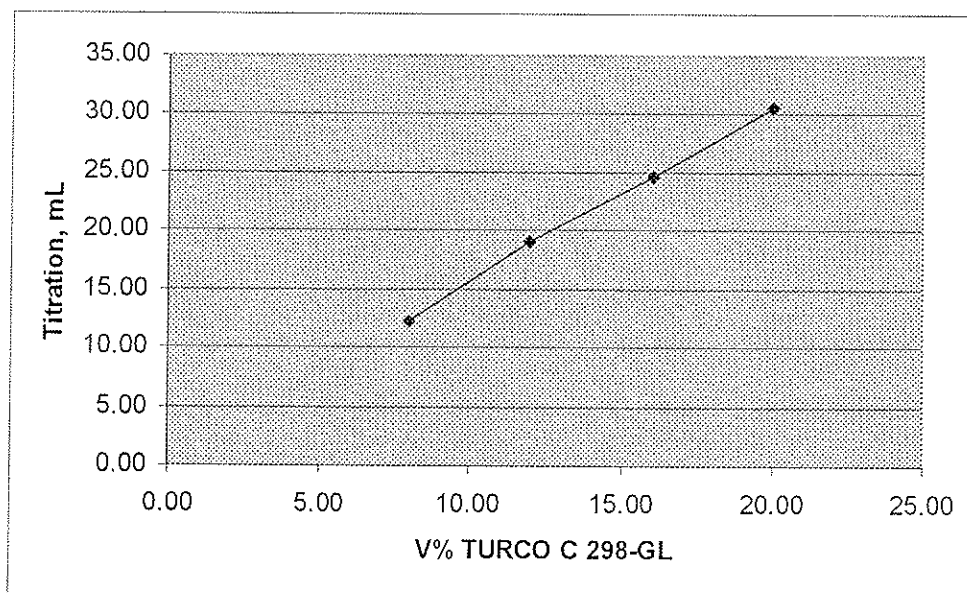
It is recommended that the bath be continuously agitated by mechanical means such as a Lightin' Mixer or similar device while processing work. Air agitation is to be avoided.

7. Testing and Control:

TURCO C-298 GL Cleaner Concentration:

Using a 25 mL measuring pipet, transfer 10 mL sample into a 100 mL volumetric flask. Make to volume with deionized water and mix. Using a 25 mL measuring pipet, transfer a 5 mL aliquot into a clean Erlenmeyer Flask or a beaker. Add about 25 mls of DI water. Add 10 drops of Indicator 99 and swirl to mix. The solution may turn blue. Add 5 ml of Auxiliary Test Solution 76 and swirl to mix. The solution will turn pink. Slowly begin adding Titrating Solution 45, while swirling until 1 or 2 drops changes the mixture from Pink to a Blue (not Purple) end-point. Read the concentration of the surfactant in the bath from the following chart, or use the following formula to calculate the concentration.

$$\% \text{ by volume TURCO C-298 GL} = \text{TS 45 mL} \times 0.65$$



Recommended Replenishment:

To increase the concentration by 1 V% add 4 liters of TURCO C-298 GL per 100 gal.

8. After Treatment:

After cleaning with TURCO C-298 GL, the work is thoroughly rinsed in cold water. The rinse should be continuously overflowed and the overflow should be regulated with the rate of production so that the main body of the rinse never becomes excessively contaminated.

9. Storage Requirements:

TURCO C-298 GL is a liquid product which may freeze after extended storage at low temperatures. It is recommended that the product be stored above 32°F. If the product does become frozen it should be moved to a warm place and allowed to thaw. After complete thawing, and thorough mixing the product may be used with no loss of effectiveness.

10. Waste Disposal Information:

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

Disposal information for the chemical, in the form as supplied, is given in the Material Data Safety Sheet for this product.

11. Precautionary Information:

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

The processing bath is alkaline and may cause irritation of the skin and eyes. Do not get in eyes, on skin or on clothing. Do not take internally. Wear face shield, rubber gloves, and protective clothing when handling. In case of contact, follow the recommendations on the Material Data Safety Sheets for TURCO C-298 GL.

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

<u>Code</u>	<u>Quantity</u>	<u>Item</u>
*****	1	Buret, 50-ml
592488	1	Flask, Erlenmeyer, 250-ml
595541	1	Pipet, 25 mL Measuring
592415	250 mL	Indicator 99, 250 ml
592453	1.0L	Aux Test Solution 76
592451	1.0L	Titrating Solution 45

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