



## **T.C. 30-LV Sulfuric Acid Inhibitor**

**T.C. 30LV prevents overpickling of steel. . .**

### **And corrosion of profits!**

When acid pickling of steel is controlled to remove scale and rust and stops right there, that's a good thing. But when pickling goes on uncontrolled, consuming metal, consuming acid and promoting embrittlement, that's like any overdose – a good thing gone wrong.

Overpickling is easy to prevent. The addition of a tiny amount of T.C. 30LV – a mere 0.1% to 0.5% by weight of the concentrated sulphuric acid – acts to set up a protective buffer between acid and metal: The acid is free to attack rust and scale but is inhibited from attacking the metal. By this action T.C. 30LV saves money in many ways. One way, the savings on acid consumption alone, may even pay for the entire cost of adding T.C. 30LV.

If you're pickling steel with raw acid, look at the list of advantages you get by adding T.C. 30LV to the pickle. If you're using an inhibitor, check to see if you're getting all of the advantages you get with T.C. 30LV.

## PRIMARY APPLICATION

T.C. 30LV is a liquid material designed to inhibit sulfuric acid pickling solutions from attack on sound metal. By decreasing the iron build-up in the pickling bath, the addition of T.C. 30LV reduces acid consumption by as much as 30% to 40%. By the same token, metal loss is reduced and the life of the acid bath is prolonged. Added to either hot or cold, batch or continuous sulfuric acid pickling solutions. T.C. 30LV produces a controlled foam blanket, which reduces fumes. Additionally, it assures better rinsing.

## ADVANTAGES OF T.C. 30LV

1. Liquid material that can easily be proportioned in diluted sulfuric acid
2. No tars, scum, oil float or residues formed when added to either hot or cold sulphuric acid
3. Effective at low concentrations
4. Produces a foam blanket to reduce obnoxious, irritating and corrosive fumes
5. Has a pleasant odor
6. Reduces metal weight loss in the acid bath by reducing acid attack on descaled areas without decreasing rate of descaling
7. Increases the life of the acid bath by decreasing iron build-up rate. Reduces acid consumption by 30-40%
8. Reduces the entire cost of the pickling operation by saving acid consumption and reducing metal weight loss
9. Eliminates pitting; descaled metal is much brighter  
Reduces metal embrittlement caused by penetration of hydrogen gas into the metal

## CHEMICAL CHARACTERISTICS

Chemical composition	Surfactants and inhibitors in an acid medium
Physical form	As received: dark brown liquid As used: colorless solution
Odor	Concentrated: pleasant, sharp
Specific gravity	1.458 at 20°C (68°F)
Bulk density	1458 g/l (12.1 lbs/gal)
Viscosity	77 cps, Brookfield Spindle 1, 60 rpm
Flash point	75°C (167°F), Tag Closed Cup
Foaming tendency	High
Recommended diluents	None, added full strength to sulfuric acid pickling solutions
Maximum solubility	1.0% by volume in acid solutions
Behavior in hard water	Not applicable
Rinsability	Good
Biodegradable surfactants	Yes
Phosphate-free	No

Normal working concentrations	0.25% to 1.0% by weight of the concentrated acid in solution
Normal working temperatures	16° to 82°C (60° to 180°F)
pH	Concentrated: 1.0 As used: Assumes pH of pickling solution
Effect of prolonged boiling	None
Effect of working solutions on metals	Rate of metal loss from one-hour Immersion in T.C. 30LV at 1.0% by volume sulfuric acid, 74°C (165°F), Projected for one year, is as follows:

<u>Metal (alloy)</u>	<u>mm/yr</u>	<u>in/yr</u>
Steel (1010)	0.28	0.011
Stainless steel (316)	0.03	0.001
Stainless steel (403)	2.31	0.091
Copper	0.00	0.000
Brass	0.00	0.000
Aluminum (1100)	1.09	0.043

### APPLICATION PROCEDURE

T.C. 30LV has an acid base. It may, therefore, be added directly to the sulfuric acid concentrate when making up or adding to the pickling solution; or it may be added directly to the diluted pickling solution, hot or cold, and agitated.

Normal handling precautions for highly acidic materials should be observed. Rubber gloves, safety goggles or face shield, and protective clothing should be worn.

Normal use range of T.C. 30LV is from 0.1% to 0.5% by *weight of* the concentrated acid, although in practice acid and additive are proportioned by volume measure. As a convenience, the table below converts weight units into volume units.

% by weight of Sulfuric acid, 60° Be or 66° Be	To prepare 1,000 gallons of pickling solution: Pint of T.C. 30LV required for addition by weight of:					
	0.1%	0.2%	0.3%	0.4%	0.5%	
1%	0.055	0.110	0.165	0.220	0.275	
2%	0.110	0.220	0.330	0.440	0.550	
5%	0.275	0.550	0.825	1.100	1.375	
10%	0.550	1.100	1.650	2.200	2.750	

\*Although 60°Be is lower in concentration than 66° Be, more of the former is, of course, added to obtain solutions of equivalent strength. Thus, the amount of T.C. 30LV is the same of both acids.

NOTE: If a concentration of T.C. 30LV greater than 0.5% by weight of acid is employed, or if there is too much mechanical agitation of the inhibited pickling bath, excessive foam may develop.

When steel is pickled prior to phosphating, electroplating, tinning or galvanizing, the film deposited by the inhibitor should first be removed and the surface neutralized. A solution of T.C. PH Booster is excellent for this purpose.

The table below indicates the concentrations required to prepare a 3785-liter (1000 gallon) pickling solution:

For 66° Baume Concentrated Sulfuric Acid:

% acid by weight	water		acid		½ liters (pints) of T.C. 30LV required for addition by weight of			
	kl	(gal)	L	(gal)	0.2%	0.3%	0.4%	0.5%
1%	3.78	(994.2)	22.0	( 5.8)	0.110	0.165	0.220	0.275
2%	3.75	(988.4)	44.1	(11.6)	0.220	0.330	0.440	0.550
5%	3.68	(971.0)	110.2	(29.0)	0.550	0.825	1.100	1.375
10%	3.55	(942.0)	218.4	(58.0)	1.100	1.650	2.200	2.750

For 60° Baume Concentrated Sulfuric Acid:

1%	3.77	(992.4)	28.9	( 7.6)	0.110	0.165	0.220	0.275
2%	3.74	(984.8)	57.8	(15.2)	0.220	0.330	0.440	0.550
5%	3.66	(962.0)	144.4	(38.0)	0.550	0.825	1.100	1.375
10%	3.51	(924.0)	288.8	(76.0)	1.100	1.650	2.200	2.750

## NOTES ON USE

Avoid contact or mixing with chlorine-releasing materials.

When iron salts reach 9 to 10% (determined with titration procedure 20), T.C. 30LV loses its ability to prevent attack on steel. At this point, spent solution should be discarded.

When phosphating, electroplating or tinning of steel will follow the pickling process, the inhibiting film should be removed and the surface neutralized with a short rinse in T.C. pH Booster solution.

**Safety and Handling Precautions:** T.C. 30LV is a highly acidic material containing phosphoric acid. Direct contact causes burns of eyes and may cause burns of skin. Harmful if swallowed. Avoid contact with eyes, skin and clothing. Wear safety goggles, rubber gloves and other suitable protective clothing. Wash thoroughly after handling. Use with adequate ventilation; avoid breathing mist. Do not take internally.

**First Aid in Case of Contact:** Immediately flush skin or eyes with plenty of water for at least 15 minutes: for eyes, seek medical attention. Remove contaminated clothing and shoes and wash them before reuse. If swallowed, wash out mouth thoroughly with water. Drink plenty of water followed by milk of magnesia. Contact a physician.

**KEEP OUT OF REACH OF CHILDREN.**

**DISPOSAL**

Spent pickling solutions should be neutralized with an alkaline material, diluted and discharged in accordance with federal, state and local regulations. Haul away sludge.

**PACKAGING**

Packaged inside poly containers in non-returnable fiber drums.

**SHIPMENT**

May be shipped by any common carrier. Freight classification is "Compound, Cleaning, Liquid – Corrosive Material."

**STORAGE**

Suitable for general indoor storage. Keep container close when not in use.

Effect of high temperature storage	None
Effect of low temperature storage	None at -9°C (15°F)
Effect of prolonged storage	None