

INCH-POUND

NOTICE OF  
CHANGEMIL-STD-1844  
NOTICE 1  
15 January 1991MILITARY STANDARD  
GAS CHROMATOGRAPHY METHOD FOR DETERMINATION OF  
TRACE CHLORINATED SOLVENTS IN HYDRAULIC FLUID

TO ALL HOLDERS OF MIL-STD-1844

1 THE FOLLOWING PAGES OF MIL-STD-1844 HAVE BEEN REVISED AND SUPERSEDED THE  
PAGES LISTED

NEW PAGE	DATED	SUPERSEDED PAGE	DATE
1	15 January 1991	1	30 March 1984
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2	15 January 1991	2	30 March 1984

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS

3 Holders of MIL-STD-1844 will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking points until the military standard is completely revised or canceled.

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MIL-STD- 1844  
30 March 1984

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GAS CHROMATOGRAPHY METHOD FOR DETERMINATION OF  
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AMSC N/A

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MIL-STD-1844

FOREWARD

1 This Military Standard is approved for use by all Air Force activities

2 Recommended corrections, additions or deletions should be addressed to  
Directorate of Aerospace Fuels Management, SA-ALC/SFRT-1, Kelly AFB TX  
78241-5000

3 In furtherance of the Defense Standardization Program, it is essential that  
a single, clear and concise procedure for determining the chlorine concentration  
in a petroleum base hydraulic fluid in the range of 0 to 500 ug/gm chlorine be  
made available

4 Initial research efforts proved that analysis for trace amounts of chlorine  
by several analytical procedures such as gas chromatography and microcoulometry  
produced uniquely dissimilar values which could not be used together in  
correlation studies

5 A decision was made to select electron capture gas chromatography as the  
optimum choice of methodology

Supersedes page 11 and 111 of 30 Mar 1984

i  
MIL-STD-1844

## 1. SCOPE

1.1 Principal Statement. This military standard describes a procedure for determining the chlorine concentration in a petroleum base hydraulic fluid in the range of 0 to 500  $\mu\text{g}/\text{gm}$  chlorine

## 2. REFERENCE DOCUMENT

MIL-H-5606

## 3. DEFINITIONS

$\mu\text{g}$  - Abbreviation for microgram, a measure of weight 1000  $\mu\text{g}$  = 1 mg

$\mu\text{l}$  - Abbreviation for microliter, a measure of volume 1000  $\mu\text{l}$  = 1 ml

$\mu\text{g}/\text{gm}$  - Abbreviation for microgram per gram, a measure of concentration

gm - Abbreviation for gram, a measure of weight. 1 gm = 1000 mg

mg - Abbreviation for milligram, a measure of weight. 1000 mg = 1 gm

ml - Abbreviation for milliliter, a measure of volume 1 ml = 1000  $\mu\text{l}$

baseline resolution - In gas chromatography, the condition where the separation between components is sufficient to cause the peak trace for one component to return to the baseline before the peak trace for the next component rises from the baseline

carcinogenic - The tendency to produce cancer

concentration - The amount of a given substance contained in a unit quantity of sample

elute - In gas chromatography, to remove the components from the absorbent (packed column)

elution order - The order in which components elute from a column

internal standard - A material added to a sample in a known amount to serve as a reference for calculation

linear operating range - The range of peak areas or heights where a plot of concentration versus peak area or height results in a straight line i.e. detector response is directly proportional to concentration

relative response factor - Used to compensate for differences in detector response to different components. The concentration of the component divided by its peak area or height relative to the peak area or height of an internal standard and its concentration.

## MIL-STD-1844

## 4 GAS CHROMATOGRAPHY METHOD FOR DETERMINATION OF TRACE CHLORINATED SOLVENTS IN HYDRAULIC FLUID

4.1 Summary of Method A known amount of internal standard is added to a known amount of sample. The mixture is diluted, then injected into a gas chromatograph equipped with an electron capture detector. The concentrations of chlorinated solvents are determined by using response factors previously calculated from calibration standards and an internal standard method.

4.2 Gas Chromatograph Any gas chromatograph, commercially available or custom designed, may be used provided the system has an oven that may be temperature programmed and sufficient sensitivity to detect trace amounts of chlorinated solvents when operated in accordance with the manufacturer's instructions. (One commercially available unit is the Varian Gas Chromatograph, National Stock Number (NSN) 6630-01-268-1671. This unit or any other equivalent unit may be used.)

4.2.1 Operating Conditions

Oven temperature program	- 80°C for 5 min, then 25°C/min to 300°C and hold for 15 minutes
Injector temperature	- 300°C
Detector temperature	- 350°C
Detector	- electron capture
Carrier gas	- nitrogen or 95% argon/5% methane at 30 ml/minute
Column	- twelve feet of 1/8 inch O D, stainless steel tubing packed with 10% SP2100 on 80/100 Supelcoport, or any equivalent packed column that provides base-line resolution for the chlorinated solvents. A capillary (WCOT) column is also acceptable, provided the analyst is experienced in its use and can achieve baseline resolution of the chlorinated solvents.
Sample size	- 0.2 - 0.5 microliters

4.2.2 Data Collection A recording potentiometer with full scale deflection of 10.0 mV or less may be used. Or an electronic integrator that measures peak retention times and either peak heights or peak areas (preferable) is also acceptable. Or a data system that incorporates peak measurements and data reduction may also be used.

## MIL-STD-1844

## CONTENTS

		<u>Page</u>	
Paragraph	1	SCOPE-----	1
	1 1	Principal statement-----	1
	2	REFERENCE DOCUMENT-----	1
	3	DEFINITIONS-----	1
	4	GAS CHROMATOGRAPHY METHOD-----	2
	4 1	Summary of method-----	2
	4 2	Gas chromatograph-----	2
	4 2 1	Operating conditions-----	2
	4 2 2	Data collection-----	2
	4 3	Material and supplies-----	3
	4 4	Preparation, calibration, standardization -	3
	4 4 1	Preparation of standard stock and working solutions-----	3-5
	4 4 2	Preparation of internal standard stock and working solutions-----	5-6
	4 4 3	Preparation of calibration standard stock and working solutions-----	6-8
	4 4 4	Standardization of gas chromatograph-----	8
	4 4 5	Analysis of calibration standard-----	9
	4 5	Analysis of hydraulic fluid samples-----	9
	4 5 1	Sample preparation-----	10
	4 5 2	Blank preparation-----	10
	4 5 3	Analysis of samples-----	10
	4 5 4	Calculations-----	10-11
	4 5 5	Final calculations-----	11
	4 6	Precision-----	11
	5	GENERAL INFORMATION-----	12
	5 1	isothermal operation of gas chromatograph--	12
	5 2	Loss of resolution-----	12
Table	1		13
Figure	2		14
Figure	3		15-16

Supersedes page iv of 30 Mar 1984