

APPENDIX C
PHYSICAL CONSTANTS

RSV 0015373

PHYSICAL CONSTANTS

	<u>Page</u>
Vinyl Chloride General	C-1
VCM Vapor Pressure	C-2
Ethylene General	C-3
Acrylamide General	C-4
SLS General	C-5
THF General	C-6
THF Vapor Pressure	C-8
THF - Water Boiling Pt.	C-9
THF - Solids Solubility	C-10
THF - Viscosity versus Polymer Content	C-11
THF Distillation Cutoff	C-12
Percent THF - R.I.	C-13
Wt. % THF - R.I.	C-14
SFS General	C-15
APS General	C-16
APS - Solubility in H ₂ O	C-17
% SFS - Sp. Gravity	C-18
% APS - Sp. Gravity	C-19
MEHQ General	C-20
Caustic Concentration - Specific Gravity	C-21
Ammonia Concentration - Specific Gravity	C-22 - 23
Glycerine - H ₂ O Mixtures vs. Specific Gravity	C-24

PHYSICAL CONSTANTS DATA

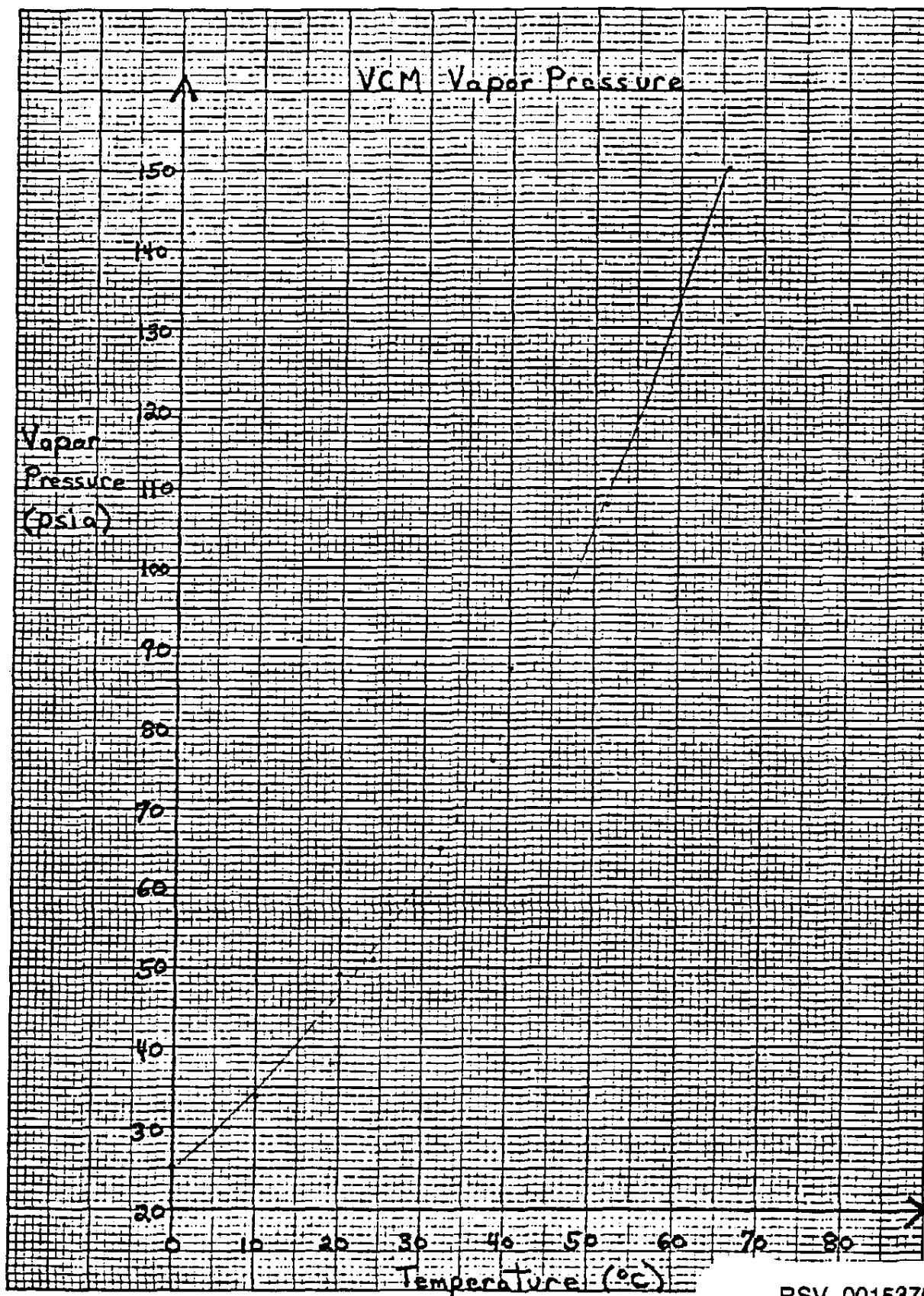
C-1

SUBSTANCE		STRUCTURAL FORMULA
Vinyl Chloride		CH ₂ = CHCl
Chloroethylene		
ANALYST	DATE	
M. E. Gibbs	3/17/65	
NAME		SOURCE & DATE
Formula	C ₂ H ₃ Cl	Physical Properties
Molecular Weight	62.501	Dreisbach, R. R.
Boiling Point		
Boiling Point at 760 mm	-13.37°C	"
Boiling Point at 100 mm	-55.8°C	"
Boiling Point at 30 mm	-77.95°C	"
Boiling Point at 10 mm	-87.5°C	"
Crystallizing Point	-153.79°C	"
Melting Point		
Freezing Point		
Specific Gravity at -20°C	0.983	"
Specific Gravity at 0°C		
Pounds per Gal. at 0°C		
Coefficient of Expansion		
Refractive Index at -10°C n _D	1.4046	"
Infra Red Spectrum (Reference)		
Ultra Violet Spectrum (Reference)		
Viscosity at -20°C	0.2780 cs	"
Viscosity at -10°C	0.2563 cs	"
Surface Tension at -10°C	20.88 dynes/cm	"
Solubility in Water		
Solubility in		
Solubility in		
Flash Point °F (M.C.S.)	-78.0°C	"
Fire Point °C		
Heat of Combustion		
Heat of Formation Liq. at 25°C	-144.0 kcal/mole	"
Thermal Stability (cal./hr/min.)		
Latent Heat of Fusion	18.14 cal/g	"
Latent Heat of Vap. at B.P.	79.53	"
Specific Heat Liq. at 293°K	0.38 cal/g °K	"
Critical Temperature	156.5°C	"
Critical Pressure	42000. mm	"
Dissociation Constant		
Autoignition Temperature	472°C	PPG Industries
Other Constants		
Toxicity (Give Reference)		

RSV 0015375

RSV 0015375

NOTE: These data should not be released outside of Hercules Chemical Company.



C-3

SUBSTANCE		STRUCTURAL FORMULA
Ethylene		$\text{CH}_2 = \text{CH}_2$
COMPILED BY	DATE	
M. E. Gibbs	3/17/65	
NAME	FORMULA	SOURCE & DATA
Formula	C_2H_4	Physical Properties II
Molecular Weight	28.052	Dreisbach, R. R.
Appearance		
Boiling Point at 760 mm	-103.71°C	"
Boiling Point at 100 mm	-131.78°C	"
Boiling Point at 30 mm	-144.00°C	"
Boiling Point at 10 mm	-153.22°C	"
Crystallizing Point	-169.15°C	"
Melting Point		
Solubility Point		
Specific Gravity at -10°C	0.384	"
Specific Gravity at 0°C	0.345	"
Pounds per Gal. at 0°C		
Coefficient of Expansion		
Refractive Index at 20°C		
Infrared Spectrum (References)		
Ultra Violet Spectrum (References)		
Viscosity at -125°C	0.23 cs	"
Viscosity at -105°C	0.16 cs	"
Surface Tension		
Solubility in Water		
Solubility in		
Solubility in		
Flash Point °F (Closed)		
Fire Point °C		
Heat of Combustion at 25°C	316.20 kcal/mole	"
Heat of Formation		
Thermal Stability (cal./kg./min.)		
Latent Heat of Fusion		
Latent Heat of Vap. at B.P.	115.39 cal/g	"
Specific Heat Vap. 300°K	0.3725 cal/g °K	"
Critical Temperature	9.90°C	"
Critical Pressure	38380. mm	"
Dissociation Constant		
Critical Density	0.21 g/ml	"
Other Constants		
Toxicity (Give Reference)		

C-4

71. Additional sheets if necessary.

RSV 0015378

PHYSICAL CONSTANTS DATA

C-5

IDENTIFICATION		STRUCTURAL FORMULA	
Sodium Lauryl Sulfate (Sipex UD)		$C_{12}H_{25}OSO_3Na$	
COMPILED BY M. E. Gibbs			
DATE 3/5/70			
NAME		SOURCE & DATE	
Formula		Alcolac Chemical Co.	
Molecular Weight			
Appearance	Thin Liquid		
Boiling Point at 760 mm			
Boiling Point at mm			
Boiling Point at mm			
Boiling Point at mm			
Crystallizing Point			
Melting Point			
Solution Point			
Specific Gravity @ 25°C, Lbs/Gal	8.4	"	
Specific Gravity @ °C		"	
Pounds per Gal. @ °C		"	
Coefficient of Expansion			
Refractive Index @ n _D			
Infra Red Spectrum (Reference)			
Ultra Violet Spectrum (Reference)			
Viscosity @ 25°C, cps	50	"	
Viscosity @			
Surface Tension			
Solubility in Water			
Solubility in			
Solubility in			
Flash Point °F (Method)			
Fire Point °C			
Heat of Combustion			
Heat of Formation			
Thermal Stability (cal./kg/min.)			
Latent Heat of Fusion			
Latent Heat of Vap.			
Specific Heat			
Critical Temperature			
Critical Pressure			
Dissociation Constant			
Other Constants	Cation	Sodium	"
	Alkyl Sulfates, %	29	"
	Free Fatty Alcohol, %	1.0	"
	Total Inorganic Salts	1.0	"
	Iron, ppm	1	"
	Color	Pale	"
	Odor	Mild	"
	pH (10% Solution)	8.0	"
	Cloud Point, °C	12	"
	Clarification Point, °C	15	"
Stability (Give Reference)			

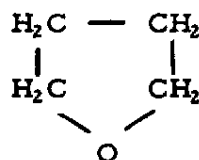
RSV 0015379

NOTE: These data should not be used for identification purposes.

TETRAHYDROFURAN (THF)

C-6

Formula:

GENERAL

Molecular Weight	72.107
Boiling Point (at 760 mm Hg) °C	66
°F	151
Freezing point °C	-108.5
°F	-163
Density-Liquid (20°C), g/cc	0.888
lb/gal	7.4
Vapor (air = 1)	2.49
Refractive Index, N _D ²⁰	1.4073

THERMODYNAMIC

Specific heat, PCU/lb/°C	
Liquid 20°C	0.469*
50°C	0.496*
Vapor (Cp) 66°C	0.37*
Latent heat of vaporization, PCU/lb, 66°C	98.1*
Critical temperature, °C	268
Critical pressure, atm	51.2
Heat of combustion, kg-cal/mole	597*
Heat of formation, kg-cal/mole	52.7*

FLUID

Viscosity, millipoises, 20°C	5.3
Surface tension, dynes, cm at 25°C	26.4
Coefficient of cubical expansion, 20°C	0.00129

ELECTRICAL

Conductivity (25°C), mhos/cm	1.5 x 10 ⁻⁸
Dielectric constant, 20°C	7.58
30°C	7.25
Dipole moment (25-50°C), Debye units	1.7

(continued)

RSV 0015380

Tetrahydrofuran (THF) (cont'd)OTHER PROPERTIES

Flash Point (Tag closed or open cup), °C	- 14.5
°F	+ 6
Flammability limits, % by volume in air, 25°C	
lower	2
upper	11.8
Ignition temperature, °C	321
°F	610
Solubility parameter	9.1*
Hydrogen-bonding index	5.5
Miscibility: water, esters, ketones, alcohols, di- ethyl ether; aliphatic, aromatic, and chlori- nated hydrocarbons	infinite
Evaporation rate, (n-butyl acetate = 1.0)	8.0
Octane number, (research method)	72.9

*Calculated values

Reference: DuPont Company, "Properties and Uses of DuPont Tetrahydrofuran"

C-8

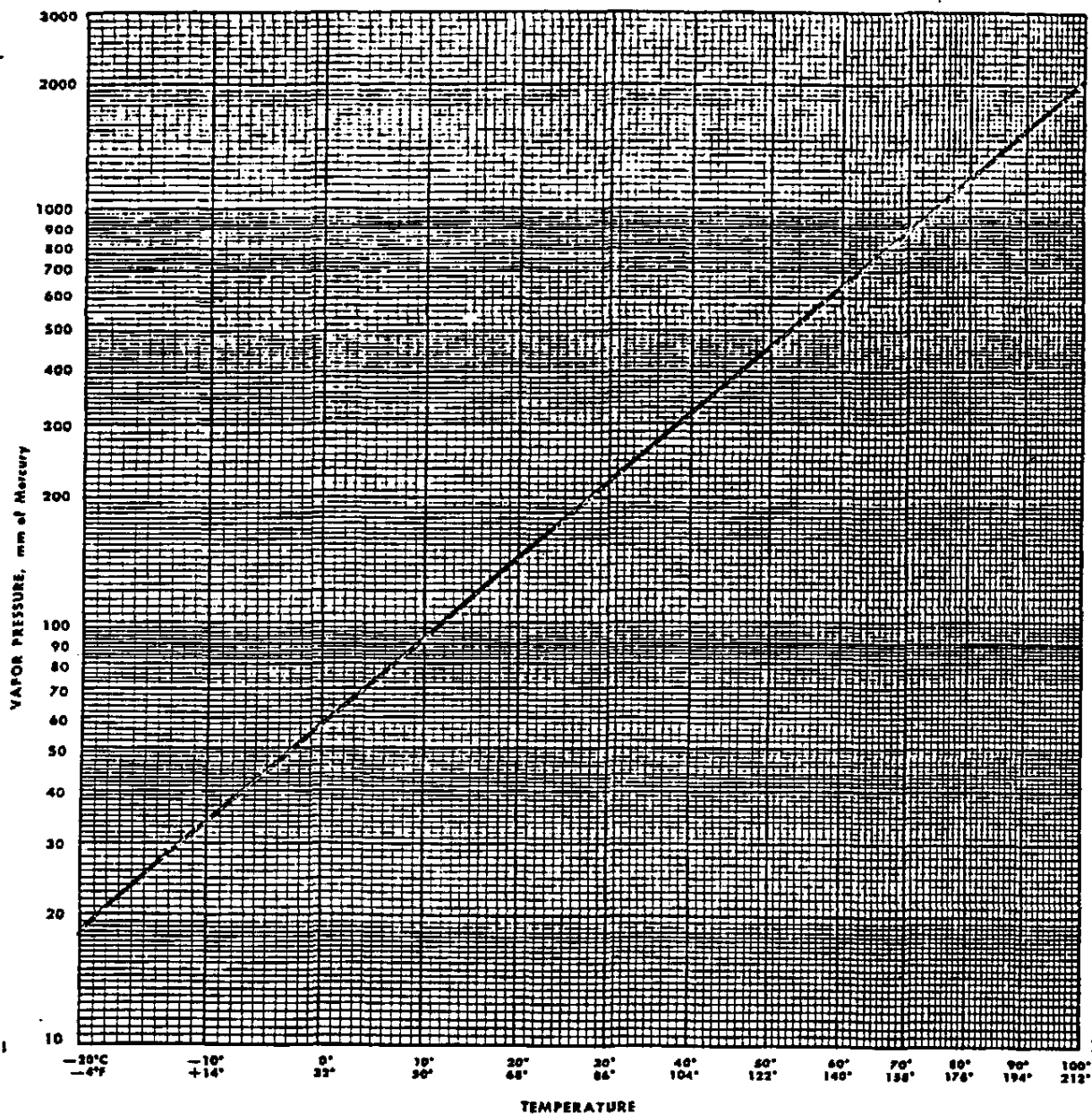


FIGURE 1
VAPOR PRESSURE OF THF

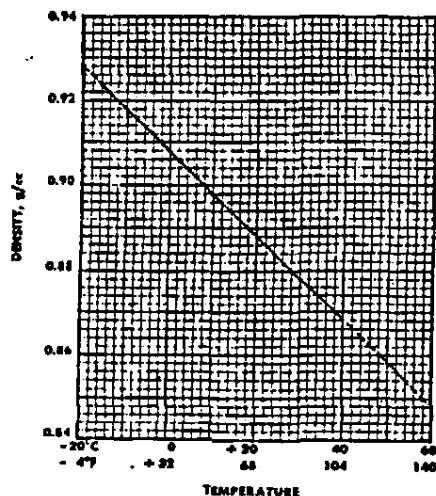
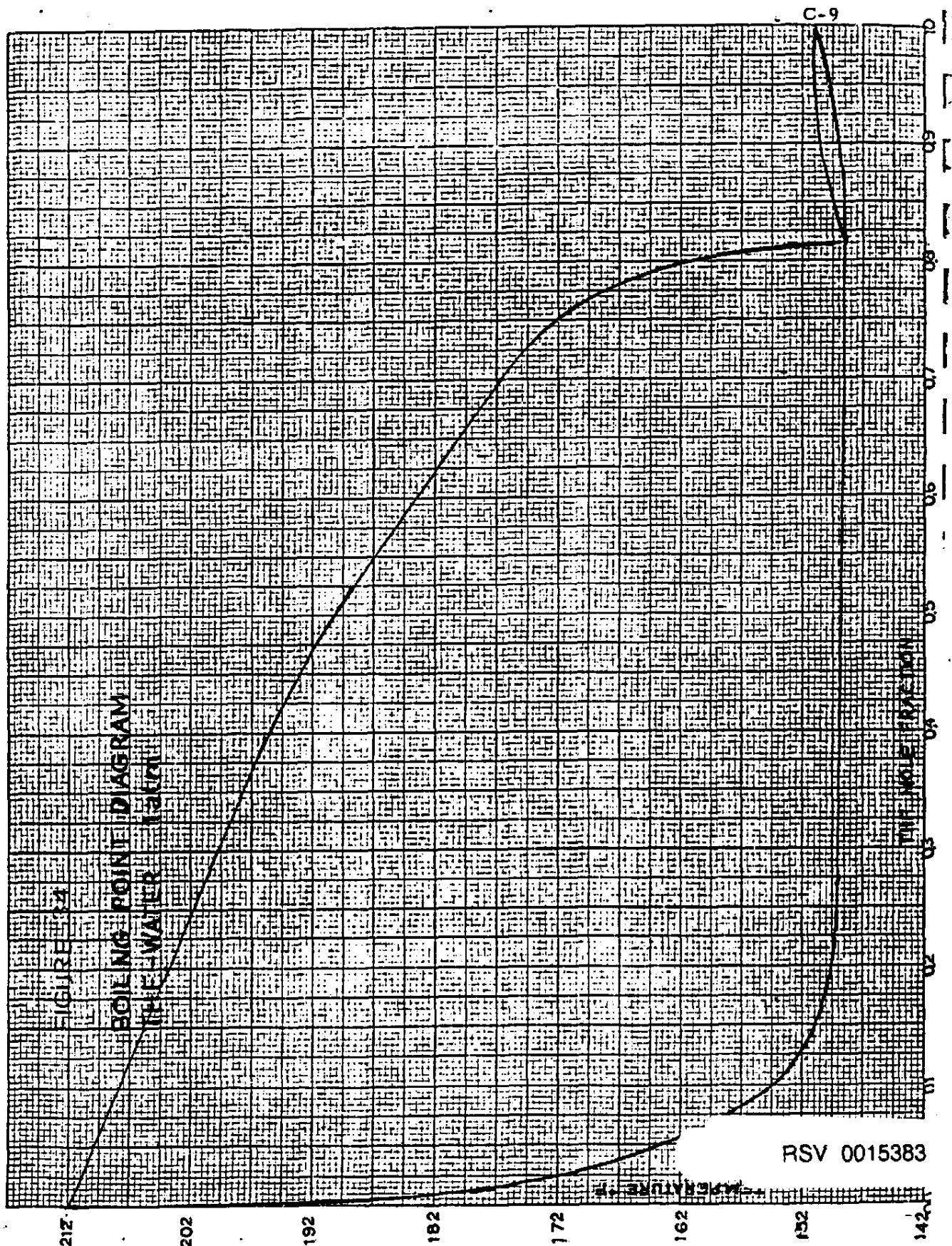


FIGURE 2
DENSITY OF THF

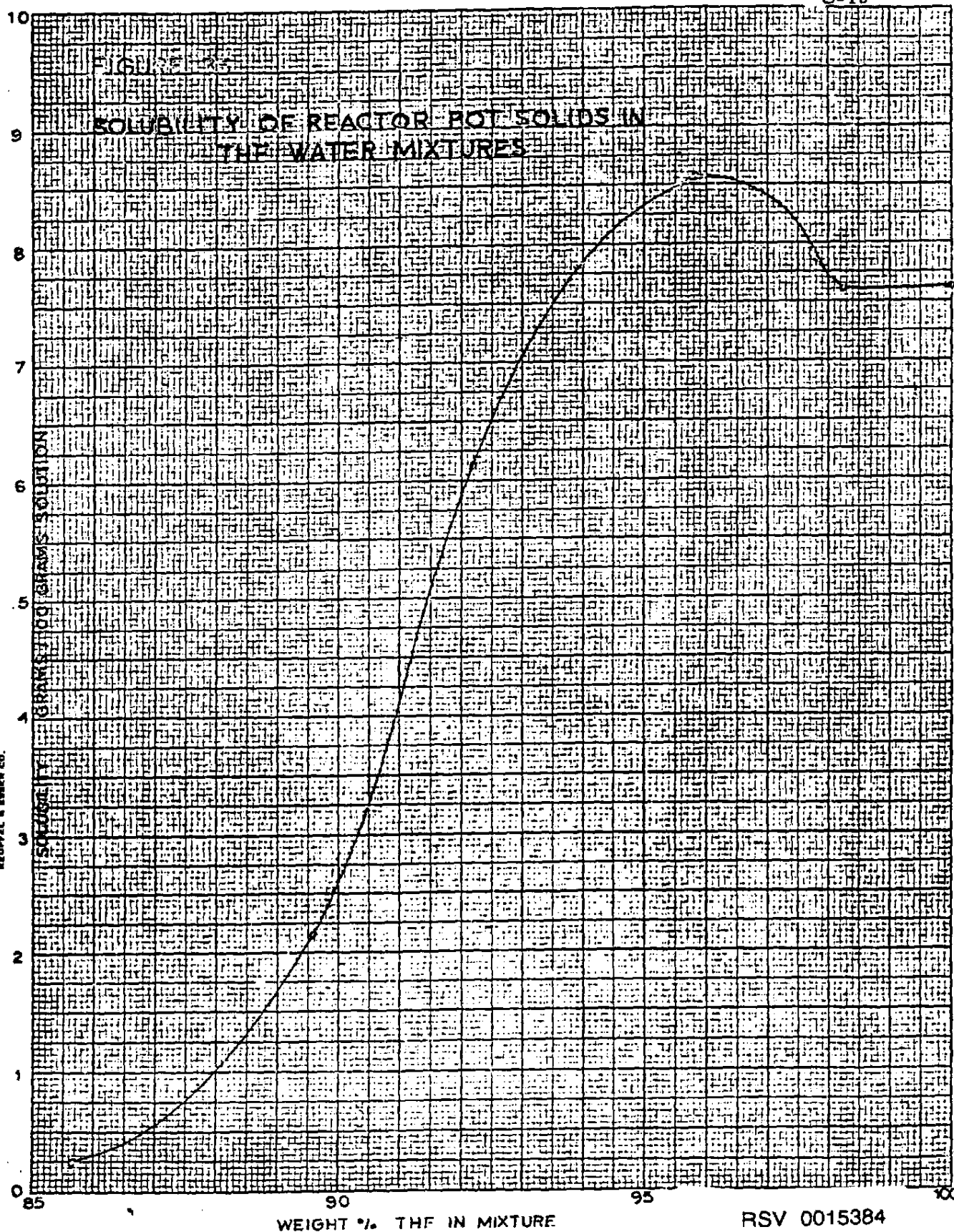
RSV 0015382

K-E 10 X 10 TO 1/2 INCH 46 1472
 7/8 X 10 INCHES
 MADE IN U.S.A.
 REUPPEL & REUPPEL CO.



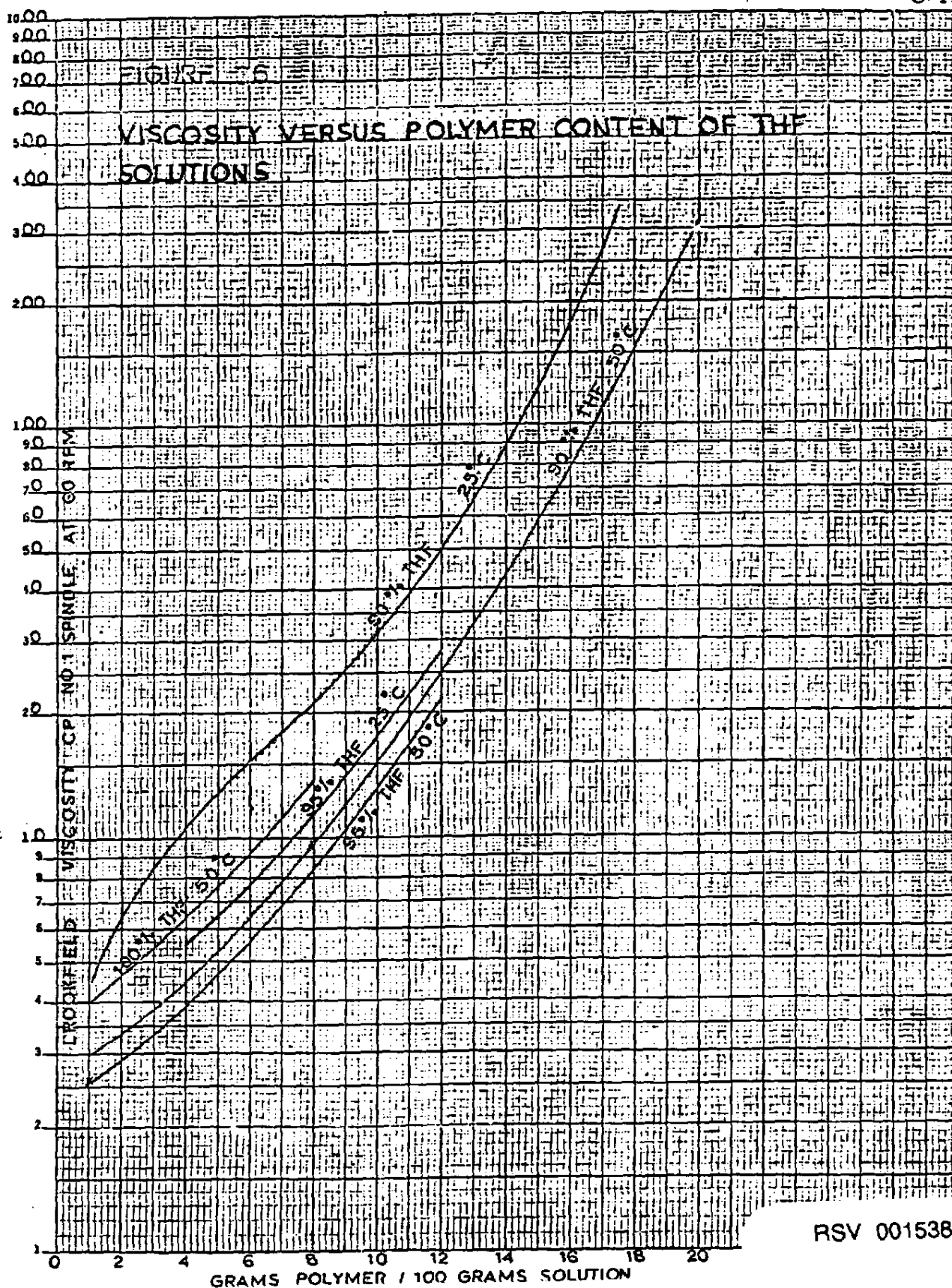
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SOLUBILITY OF REACTOR POT SOLIDS IN THE WATER MIXTURES



K-E
10 X 10 TO 1/8 INCH 461472
7/8 X 10 INCHES
KUMFEL & BERRY CO.

RSV 0015384



K&E SEMI-LOGARITHMIC 48 5010
5 CYCLES X 140 DIVISIONS
MADE IN U.S.A.
KEUFFEL & ESSER CO.

RSV 0015385

Rev. 8/12/71

C-12

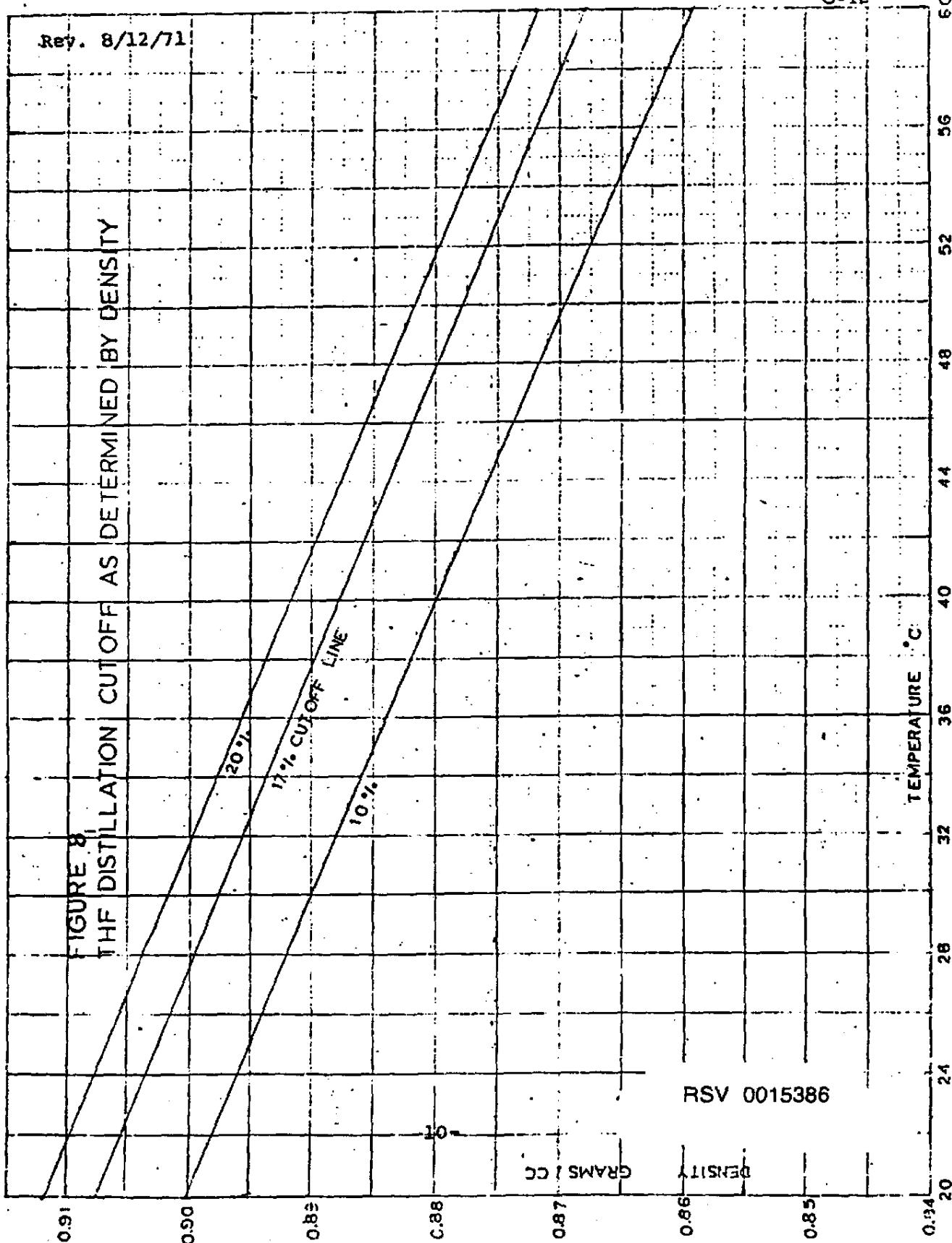
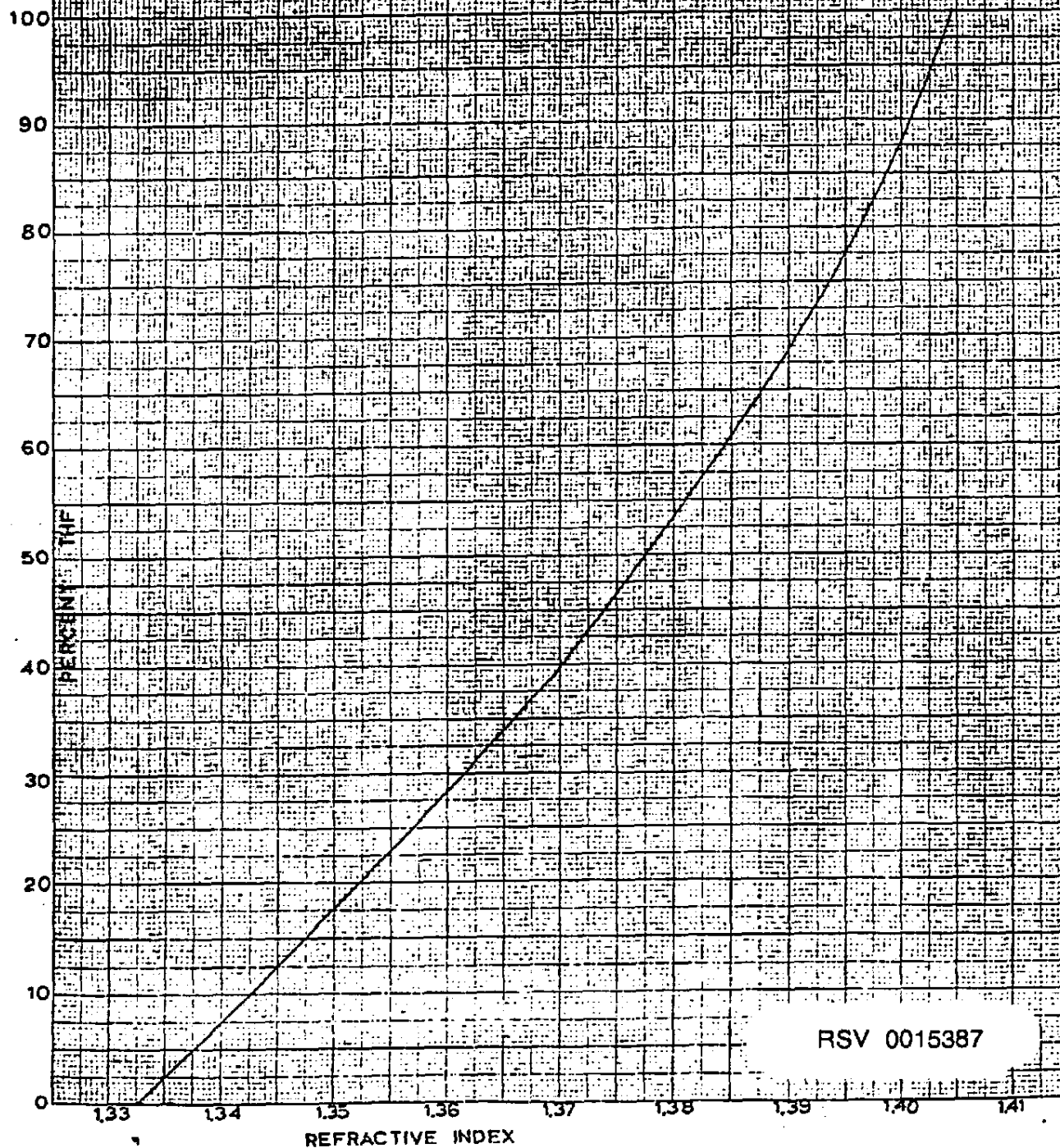
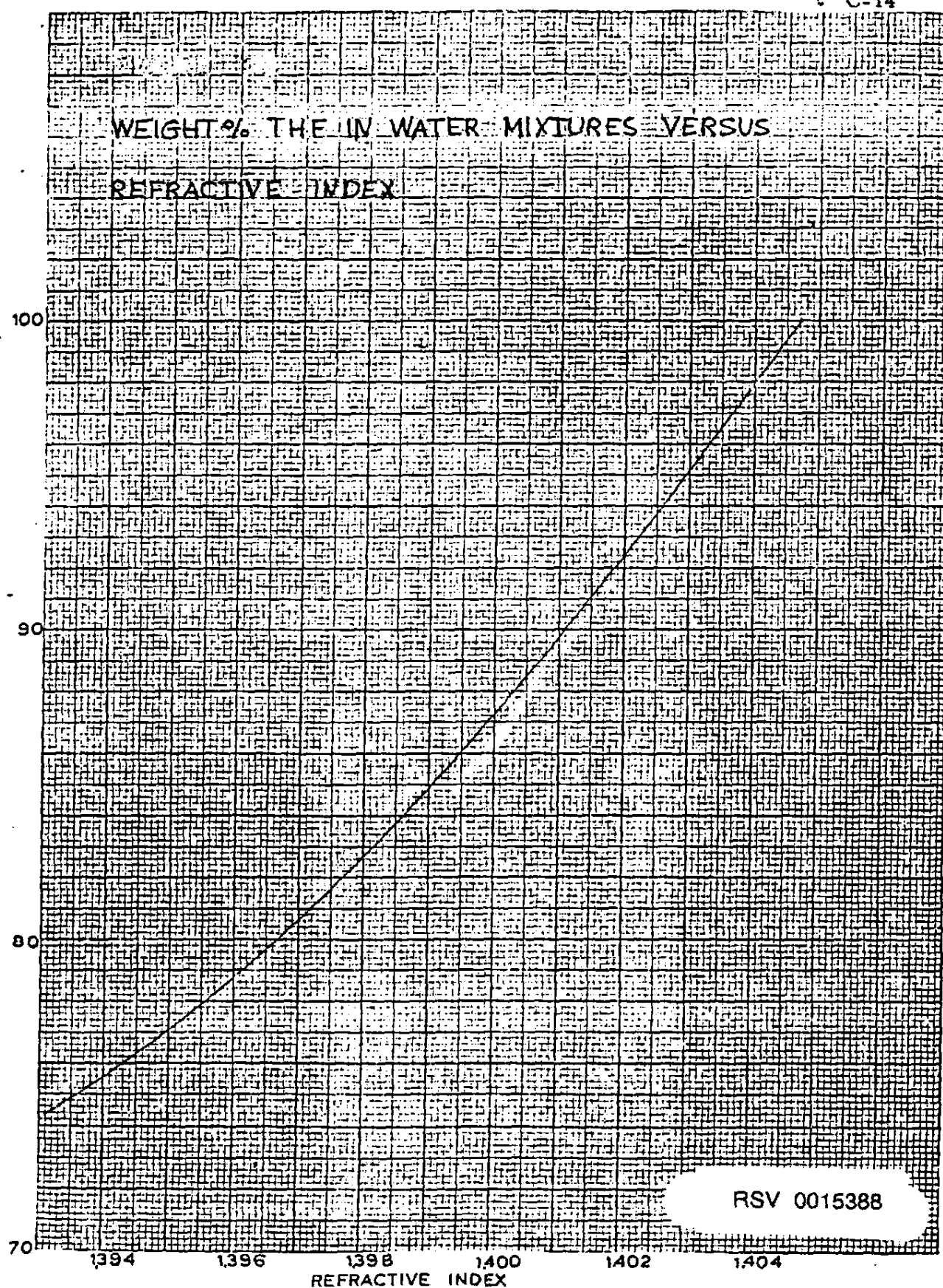


FIGURE 3 THE WATER MIXTURE COMPOSITION VERSUS REFRACTIVE INDEX



RSV 0015387



SODIUM FORMALDEHYDE SULFOXYLATE
(SFS)

Structural Formula: $\text{NaHSO}_2 \cdot \text{CH}_2\text{O} \cdot 2\text{H}_2\text{O}$

MW: 154.12

Melting Point: 64°C

Water Solubility: 86 oz/gal at 86°F

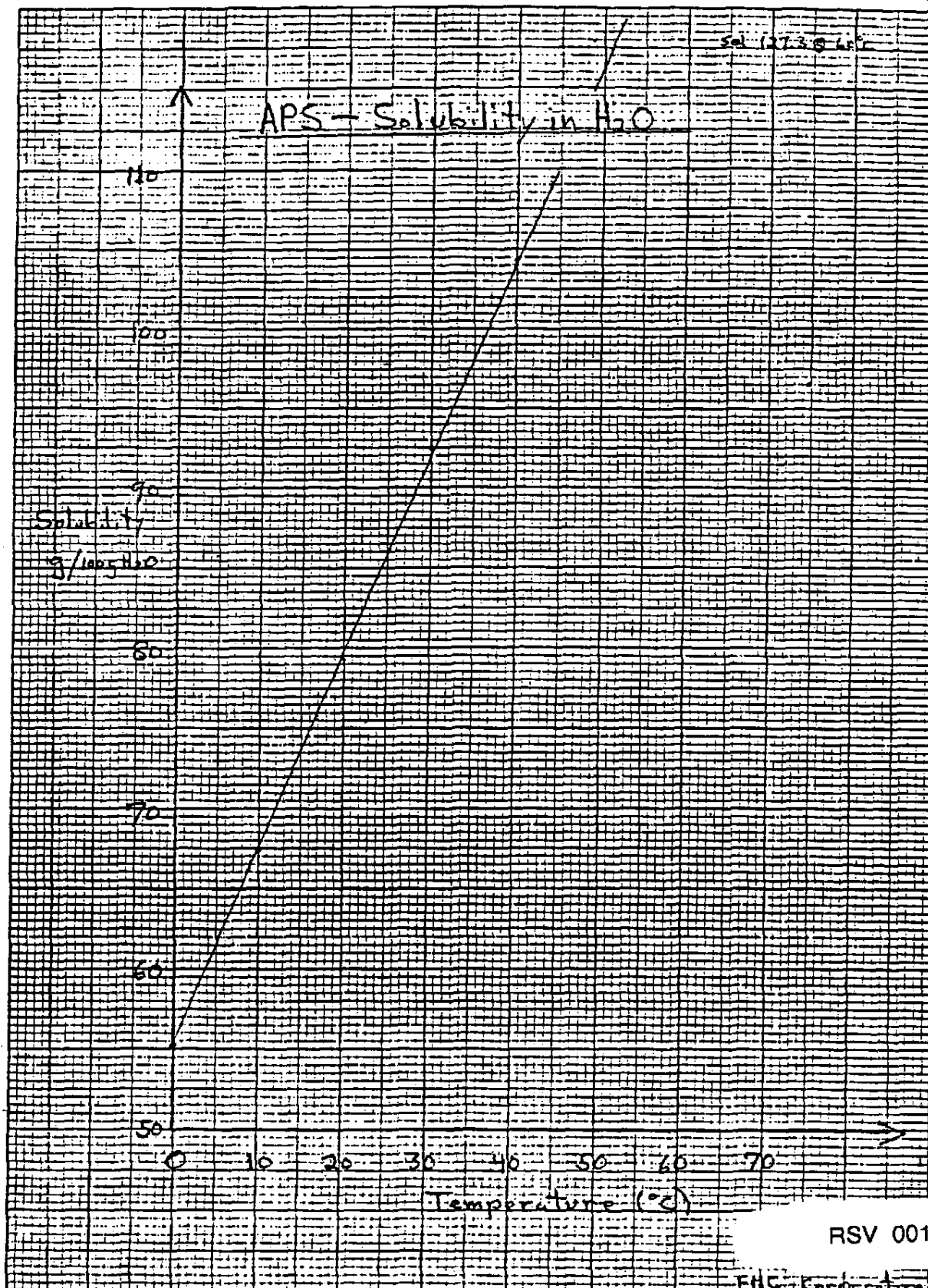
AMMONIUM PERSULFATE (APS)

Formula: $(\text{NH}_4)_2 \text{S}_2\text{O}_8$
MW: 228.2
Ref. Index: 1.5016
Sp. Gr. (crystal density): 1.98 (g/cc)
Decomposition Temp.: 175°C
Loosebulk Density: 1.05 g/cc

Rohm and Haas
FMC Corporation

Reference: Perry's Chemical Engineer's Handbook (eth ed)
Handbook of Chemistry and Physics (48th ed)

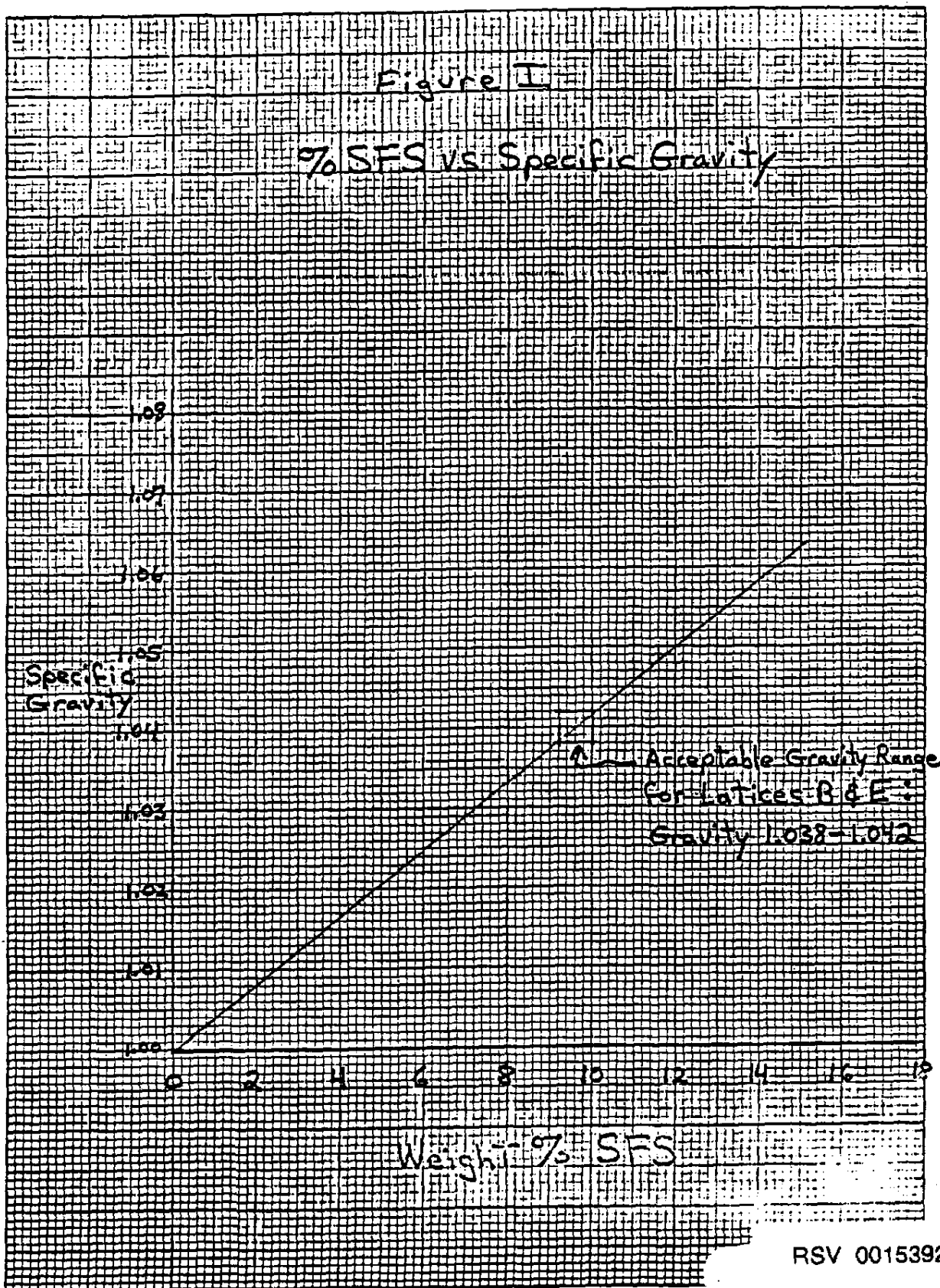
RSV 0015390



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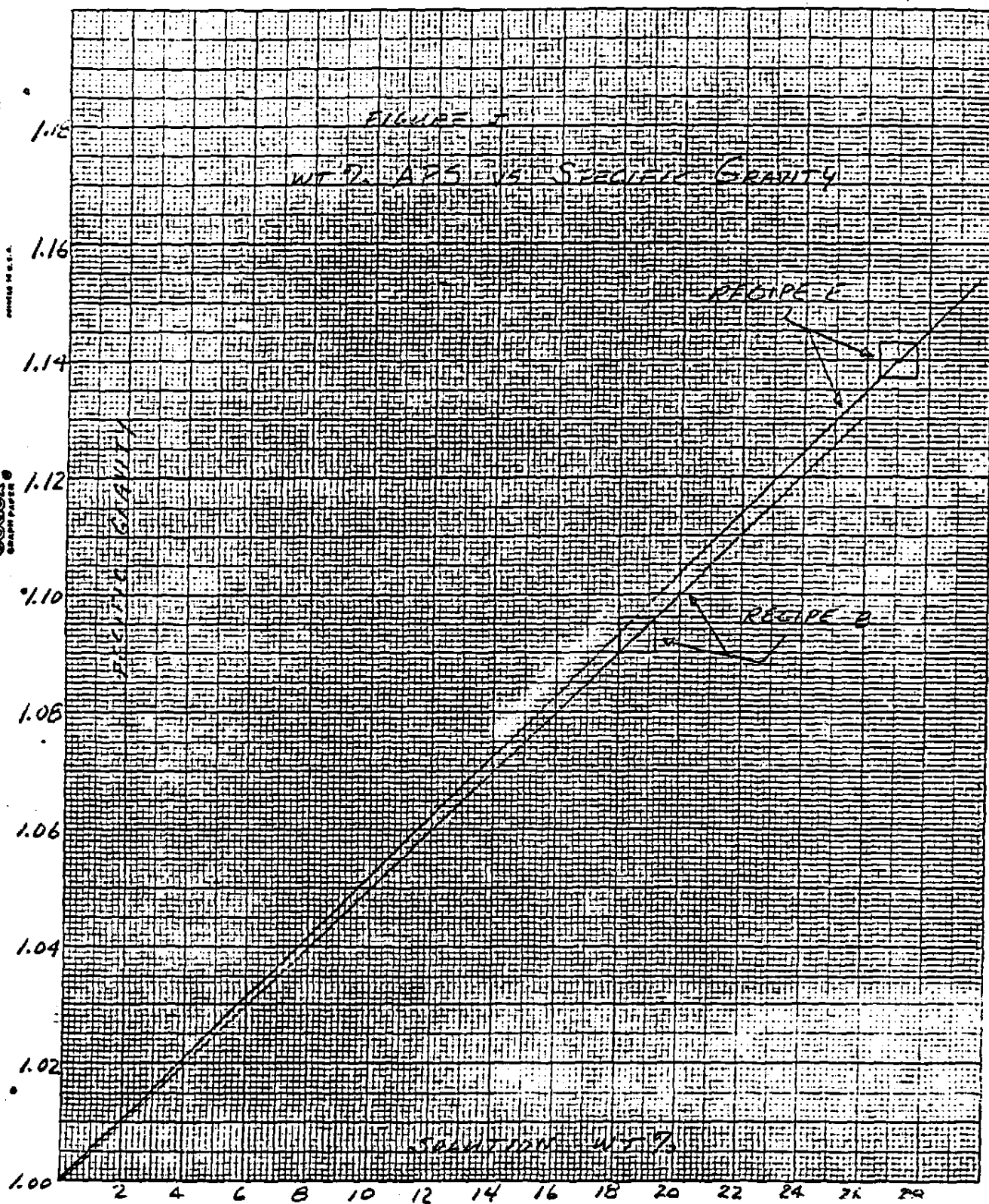
FHC Corporation data

Figure I
% SFS vs Specific Gravity



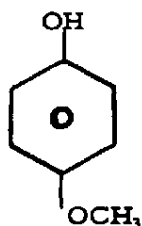
60000 IN STOCK DIRECT FROM COBES BOOK CO. INC. NEWARK, N.J. 07102
 GRAPH PAPER

NO. 300 30 DIVISIONS PER INCH BOTH WAYS. 100 BY 300 DIVISIONS.



MONO METHYL ETHER HYDROQUINONE (MEHQ)

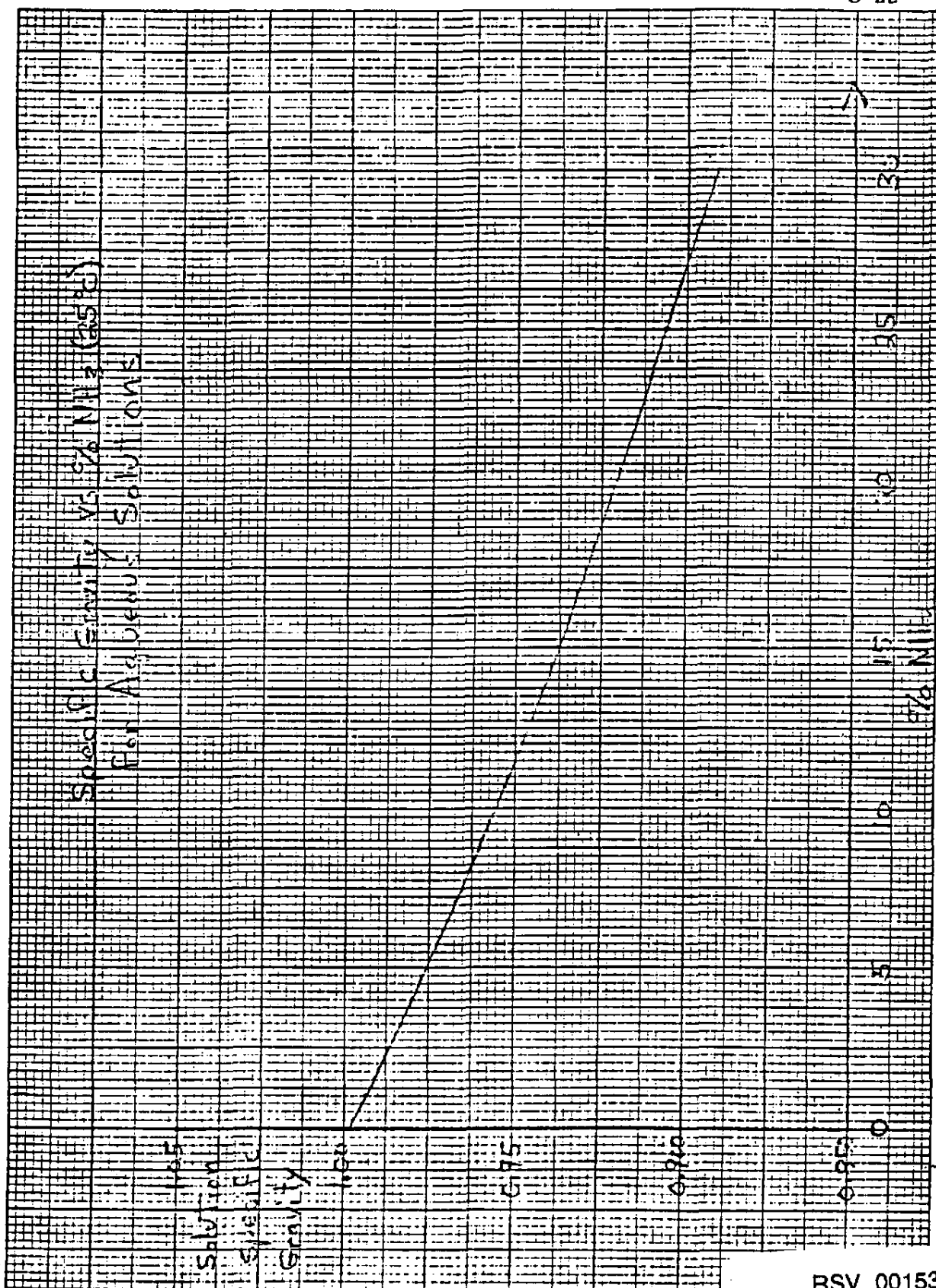
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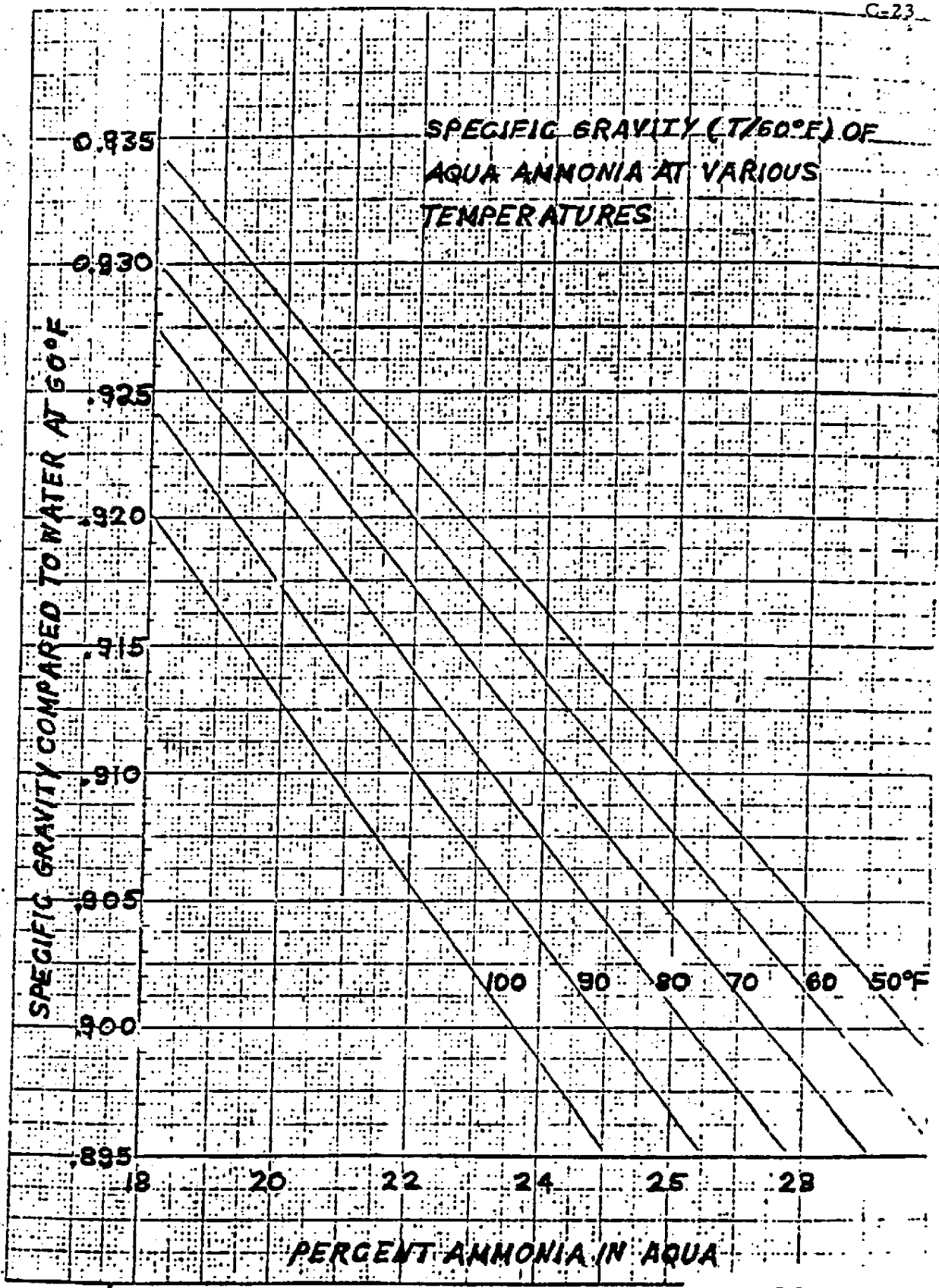


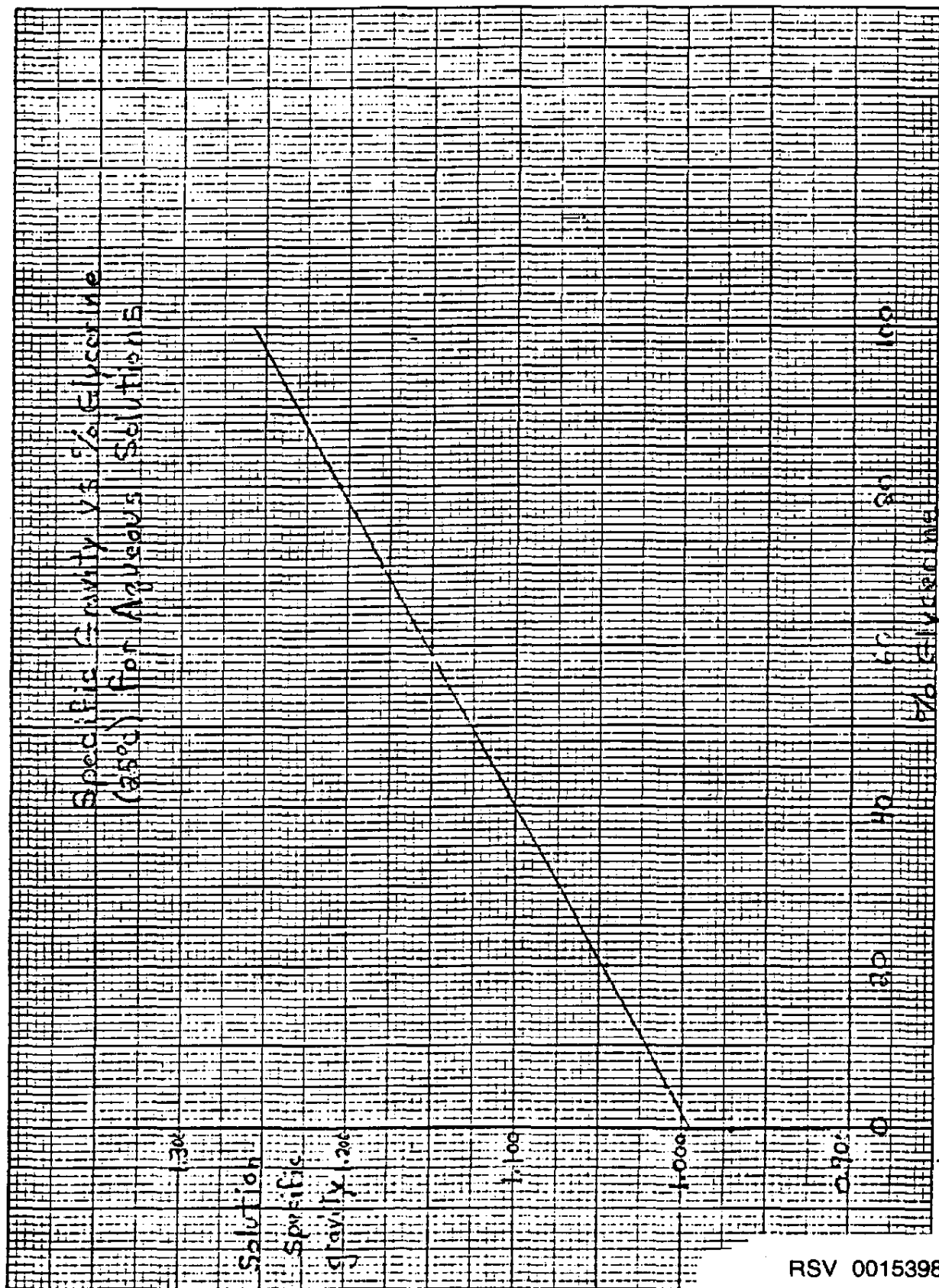
Molecular Weight:	124.13
Appearance :	White crystals
Melting Point :	54-56°C
Boiling Point :	246°C
Flashpoint (Cleveland Open Cup)	132°C
Fire Point (Cleveland Open Cup)	135°C
Solubility in H ₂ O at 25°C, g/100 g solvent:	4

Reference: Eastman Chemical Products, Inc.

24h 10/71







RSV 0015398

