

JMQ HAS ASKED FOR
DATA ON VCM & COC
PHOTO DEGRADATION AND
VCM SOLUBILITY IN WATER.

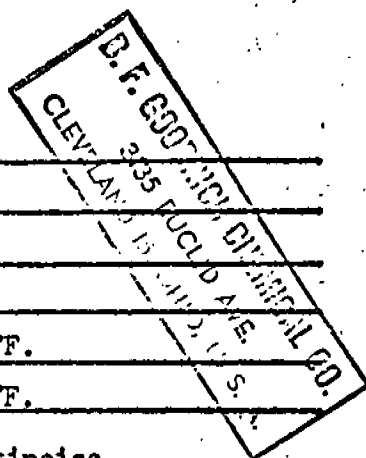
THIS IS ALL AD WAS
ABLE TO FIND IN A
FEW HOURS OF LOOKING.

BSK
6/14/74

B.F. GOODRICH CHEMICAL COMPANY

PHYSICAL PROPERTIES DATA SHEET

Vinyl Chloride (Chloroethylene)

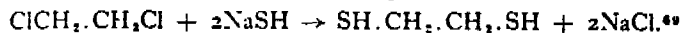


Formula:	$\text{CH}_2 = \text{CHCl}$								
Molecular Weight:	62.5								
Boiling Point:	+7.93°F.								
Freezing Point:	-244.82°F.								
Specific Gravity:	1.00 gm/ml. @ -22°F.								
	0.914 gm/ml. @ 68°F.								
Viscosity:	<table border="0"> <thead> <tr> <th>°F.</th> <th>μ, Centipoise</th> </tr> </thead> <tbody> <tr> <td>-40°F.</td> <td>0.34</td> </tr> <tr> <td>32°F.</td> <td>0.225</td> </tr> <tr> <td>86°F.</td> <td>0.181</td> </tr> </tbody> </table>	°F.	μ , Centipoise	-40°F.	0.34	32°F.	0.225	86°F.	0.181
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Surface Tension:	<table border="0"> <thead> <tr> <th>°F.</th> <th>γ, dynes/cm.</th> </tr> </thead> <tbody> <tr> <td>14°F.</td> <td>20.88</td> </tr> <tr> <td>-4°F.</td> <td>22.27</td> </tr> <tr> <td>-22°F.</td> <td>23.87</td> </tr> </tbody> </table>	°F.	γ , dynes/cm.	14°F.	20.88	-4°F.	22.27	-22°F.	23.87
°F.	γ , dynes/cm.								
14°F.	20.88								
-4°F.	22.27								
-22°F.	23.87								
Index of Refraction:	$n_d^{20} = n_d^{10} = 1.4046$ $n_d^{15} = 1.398$								
Specific Heat:	Liquid - 0.38 BTU/lb. °F. Vapor - 0.205 BTU/lb. °F. @ 77°F.								
Heat of Vaporization:	128.27 BTU/lb. @ 77°F. 143.15 BTU/lb. @ +8°F.								
Flash Point:	(Closed Cup) (Open Cup) -78°C.								
Auto Ignition Temperature:									
Explosive Limits:	4 to 22% by volume in air								
Critical Properties:	$t_c = 313.7^\circ\text{F.}$ $p_c = 55.2 \text{ atm.}$ $d_c = 0.370 \text{ gm./ml.}$								
Solubility in Water:	1.0% by weight @ 15°C. (sat'd.) 2.0% by weight @ 38°C. (sat'd.)								
Solubility of Water in:	0.11%								
Allowable Concentration in Air:	500 ppm. for 8 hr. exposure								
Thermal Conductivity:	0.08 BTU/hr. ft. ² °F./ft. (estimated by Girdler)								

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Ref: Dow Chemical Company, "Vinyl Chloride Monomer Bul."

Sodium hydrogen sulphide gives the dimercaptan:

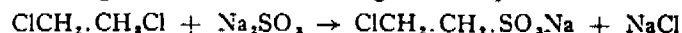


Heated in ethanol containing sodium ethoxide, DCE forms ethyl vinyl ether:⁷⁰



Other vinyl ethers may be obtained similarly.

An interesting synthesis of taurine and N-methyltaurine from DCE was reported⁷¹ in which DCE and Na_2SO_3 are condensed to sodium chloroethylsulphonate which is then aminated with ammonia or methylamine. Taurine is a detergent intermediate. This work might well be restudied using modern aprotic solvents:



4. VINYL CHLORIDE—PREPARATION AND PROPERTIES¹

Vinyl chloride, chloroethylene, monochloroethylene, chloroethene, VC or VC monomer, is with the exception of its precursor, DCE, the halogenated organic compound made in largest tonnage. ~~It was first prepared by Regnault² who observed that exposure to sunlight converts the mobile volatile liquid to a white, amorphous powder now known as poly(vinyl chloride) or PVC.~~ Until 1965 for many years vinyl chloride was the synthetic polymer produced in largest amount; in that year it was surpassed by polyethylene. Production of both polymers is growing rapidly and the prediction has been made³ that PVC will resume the lead at least in packaging as a result of the recent discovery that clear bottles can be made from it. Over 3,000,000 tons are produced annually.

In view of the great industrial importance of vinyl chloride, it was inevitable that great deal of research should have been devoted to lowering its cost of production; this effort shows no sign of abatement and, in fact, the present situation must be described as fluid, with five different raw materials: coal, natural gas, ethane, naphtha and gas oil and a multitude of processes competing for the market.

4.1. Production via Acetylene

Although Regnault first made vinyl chloride from 1,2-dichloroethane by the action of alkali, this process is not used for economic reasons, one half of the chlorine is

¹ Meadow and Reid, *J. Am. Chem. Soc.*, 1934, 56, 2177.

² Ernst and Berndt (I. G. Farben.), GP 525,188 (1931). Reppe (I. G. Farben.), GP 550,495 (1932), 550,525 (1930).

³ Shuck and Degering, *Ind. Eng. Chem.*, 1947, 39, 906.

The aid of Dr S. A. Miller on Sections 4 and 5 of this chapter is acknowledged. The author has borrowed extensively from the literature review in his *Acetylene. Its Properties, Manufacture and Uses* (Academic Press, N.Y., Vol. I, 1965; Vol. II, 1966).

⁴ Regnault, *Ann.*, 1835, 14, 22.

⁵ *Chem. Eng. News*, 1966, 44, (46), 33.