



ESDU 02001

Issued May 2002
With Amendment A
November 2006

Viscosity of liquids: Aliphatic nitriles

Endorsed by
The Institution of Chemical Engineers

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THE PREPARATION OF THIS DATA ITEM

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VISCOSITY OF LIQUIDS: ALIPHATIC NITRILES

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Data Sheets for each of the liquids are given in the following order:-

Formula	Name	Alternative Name(s)
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ALKANENITRILES

1. CH ₃ CN	Ethanenitrile	Acetonitrile	Cyanomethane	Methyl cyanide	7
2. CH ₃ CH ₂ CN	Propanenitrile	Propionitrile	Cyanoethane	Ethyl cyanide	9
3. CH ₃ [CH ₂] ₂ CN	Butanenitrile	Butyronitrile	1-Cyanopropane	Propyl cyanide	11
4. CH ₃ [CH ₂] ₃ CN	Pentanenitrile	Valeronitrile	1-Cyanobutane	Butyl cyanide	13
5. CH ₃ [CH ₂] ₄ CN	Hexanenitrile	Capronitrile	1-Cyanopentane	Pentyl cyanide	14
6. CH ₃ [CH ₂] ₅ CN	Heptanenitrile	Enanthonitrile	1-Cyanoheptane	Hexyl cyanide	15
7. CH ₃ [CH ₂] ₆ CN	Octanenitrile	Caprylonitrile	1-Cyanoheptane	Heptyl cyanide	16
8. CH ₃ [CH ₂] ₇ CN	Nonanenitrile	Pelargonitrile	1-Cyanooctane	Octyl cyanide	17
9. CH ₃ [CH ₂] ₈ CN	Decanenitrile	Caprinitrile	1-Cyanononane	Nonyl cyanide	18
10. CH ₃ [CH ₂] ₉ CN	Undecanenitrile		1-Cyanodecane	Decyl cyanide	19
11. CH ₃ [CH ₂] ₁₀ CN	Dodecanenitrile	Laurnitrile	1-Cyanoundecane	Undecyl cyanide	20
12. CH ₃ [CH ₂] ₁₁ CN	Tridecanenitrile		1-Cyanododecane	Dodecyl cyanide	21
13. CH ₃ [CH ₂] ₁₂ CN	Tetradecanenitrile	Myristonitrile	1-Cyanotridecane	Tridecyl cyanide	22

Formula	Name	Alternative Name(s)	
14. $\text{CH}_3[\text{CH}_2]_{13}\text{CN}$	Pentadecanenitrile	1-Cyanotetradecane Tetradecyl cyanide	23
15. $\text{CH}_3[\text{CH}_2]_{14}\text{CN}$	Hexadecanenitrile Palmitonitrile	1-Cyanopentadecane Pentadecyl cyanide	24
16. $\text{CH}_3[\text{CH}_2]_{15}\text{CN}$	Heptadecanenitrile Margaritrile	1-Cyanoheptadecane Heptadecyl cyanide	25
17. $\text{CH}_3[\text{CH}_2]_{16}\text{CN}$	Octadecanenitrile Stearonitrile	1-Cyanoheptadecane Heptadecyl cyanide	26

ALKENENITRILES

18. $\text{H}_2\text{C}=\text{CHCN}$	Propenenitrile	Acrylonitrile	Cyanoethene	Vinyl cyanide	27
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VISCOSITY OF LIQUIDS: ALIPHATIC NITRILES

1. INTRODUCTION

This Item presents values for the viscosity at saturation pressure, in tabular form, for liquid aliphatic nitriles. In general the range covered is from just above the melting temperature to about 0.9 times the critical temperature.

The values given are based on data which are believed to be the most reliable available and have been reviewed and suitably extended. In common with other Items, quantities are expressed in SI units and conversion factors to other units are provided in Section 3.

Section 4 gives the procedure used to obtain the values of viscosity presented and indicates the effect of pressure. Section 5 gives an explanation of the Tables and indicates the uncertainties in the values presented.

Appendix A provides a complete bibliography of data sources for this Item. Data sources for individual compounds are listed on the appropriate Data Sheet.

2. NOTATION AND UNITS

The SI unit of dynamic viscosity is the newton second per square metre (N s/m^2). The values presented in the tables are given in millinewton second per square metre (mN s/m^2), a submultiple which is convenient for the magnitudes considered and which is equal to the c.g.s. centipoise (cP).

A, B	dimensionless constants for each liquid in Equation (4.1)	–
C	constant for each liquid in Equation (4.2)	K
D	constant for each liquid in Equation (4.1)	mN s/m^2
p	pressure	N/m^2 (Pa)
T	kelvin temperature	K
t	Celsius temperature, $T - 273.15$	$^{\circ}\text{C}$
α	constant in Equation (4.3)	m^2/N
η	dynamic viscosity	mN s/m^2 (cP)
θ	dimensionless temperature dependent variable in Equation (4.2)	–

Subscripts

c	denotes value at the critical point
p	denotes value at pressure p
r	denotes reduced quantity, <i>e.g.</i> $T_r = T/T_c$.