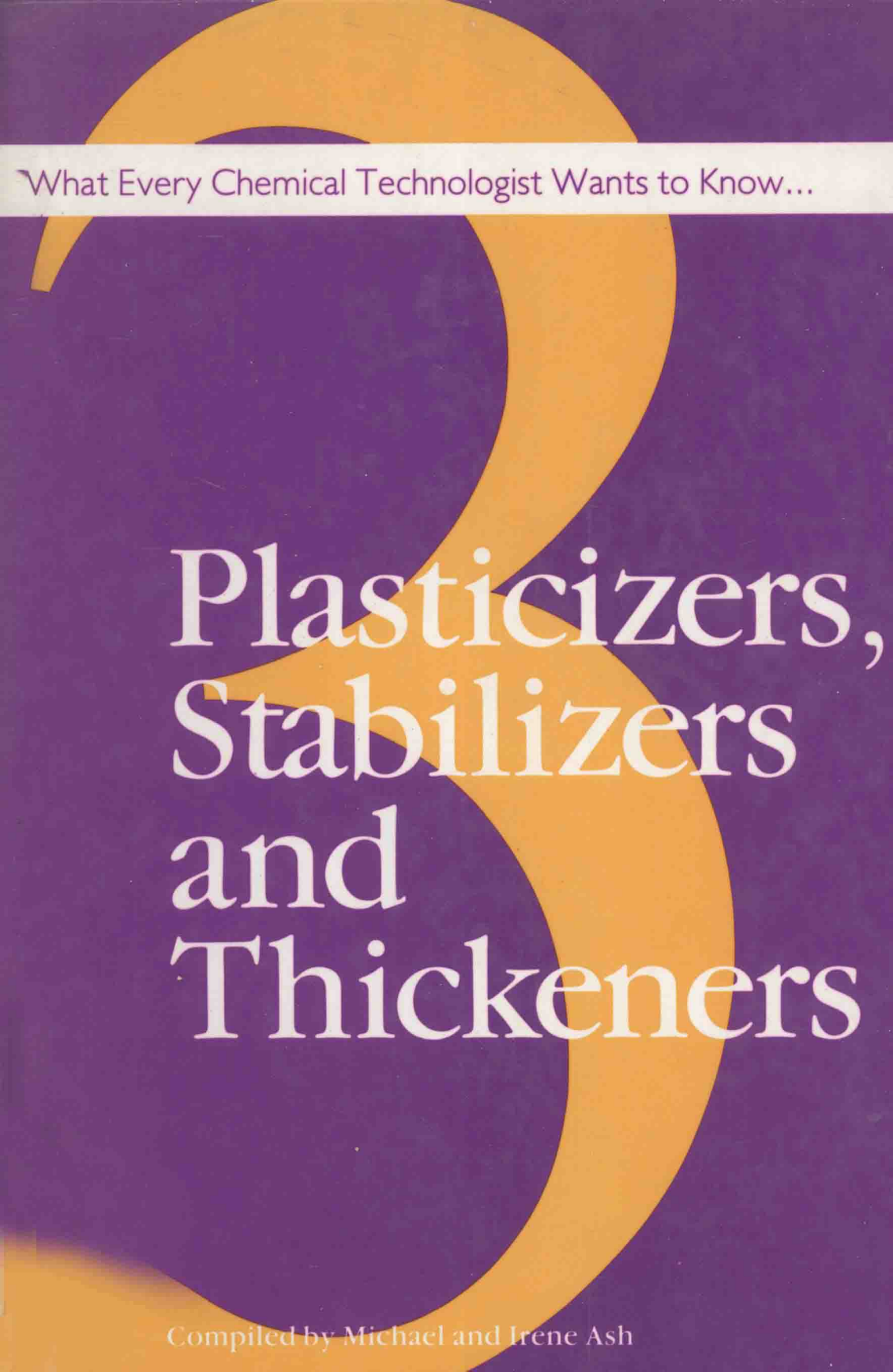




What Every Chemical Technologist Wants to Know...

Plasticizers, Stabilizers and Thickeners

Compiled by Michael and Irene Ash

What Every Chemical Technologist Wants to Know About...

Volume III

**Plasticizers, Stabilizers
and Thickeners**

**Compiled by
Michael and Irene Ash**



Edward Arnold

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Chemical Publishing Co., Inc.

ISBN 0 7131 3673 1

First published in the United Kingdom
by Edward Arnold,
Education, Academic and Medical Publishing Div.
of Hodder and Stoughton Ltd.
41 Bedford Square, London WC1B 3DQ

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Printed in the United States of America

PREFACE

This reference book is the third volume in the set of books entitled WHAT EVERY CHEMICAL TECHNOLOGIST WANTS TO KNOW . . . SERIES. This compendium serves a unique function for those involved in the chemical industry—it provides the necessary information for making the decision as to which trademark chemical product is most suitable for a particular application.

The chemicals included in this third book of the series have their major function as plasticizers, stabilizers, and thickeners, however, complete cross-referencing is provided for the multiple functions of all the chemicals.

The first section which is the major portion of each volume contains the most common generic name of the chemicals as the main entry. All these generic entries are in alphabetical order. Synonyms for these chemicals are then listed. The CTFA name appears alongside the appropriate generic name. The structural and/or molecular formula of the chemical is listed whenever possible. The generic chemical is sold under various tradenames and these are listed here in alphabetical order for ease of reference along with their manufacturer in parentheses. The *Category* subheading lists all the possible functions that the chemical can serve. Because of differences in form, activity, etc., individual tradenames of the generic chemical are used in particular applications more frequently. These are delineated in the *Applications* section. The differences in properties, toxicity/handling, storage/handling, and standard packaging are specified in the subsequent sections wherever distinguishing characteristics are known.

The second section of the volume TRADENAME PRODUCTS AND GENERIC EQUIVALENTS helps the user who only knows a chemical by one tradename to locate its main entry in section 1. The user can look up this tradename in this section of the book and be referred to the appropriate, main-entry, generic chemical name.

The third section GENERIC CHEMICAL SYNONYMS AND CROSS REFERENCES provides a way of locating the main entries by knowing only one of the synonyms. If the generic chemical is not in the volume, it will refer you to the volume in which it is contained.

The fourth section TRADENAME PRODUCT MANUFACTURERS lists the full addresses of the companies that manufacture or distribute the tradename products found in the first section.

The following is a list of the six volumes that comprise this series:

Volume I	Emulsifiers and Wetting Agents
Volume II	Dispersants, Solvents and Solubilizers
Volume III	Plasticizers, Stabilizers and Thickeners
Volume IV	Conditioners, Emollients and Lubricants
Volume V	Resins
Volume VI	Polymers and Plastics

This series has been made possible through long hours of research and compilation and the dedication and tireless efforts of Roberta Dakan who helped make this distinctive series possible. Our appreciation is extended to all the chemical manufacturers and distributors who supplied the technical information.

M. and I. Ash

NOTE

The information contained in this series is accurate to the best of our knowledge; however, no liability will be assumed by the publisher for the correctness or comprehensiveness of such information. The determination of the suitability of any of the products for prospective use is the responsibility of the user. It is herewith recommended that those who plan to use any of the products referenced seek the manufacturer's instructions for the handling of that particular chemical.

OTHER BOOKS BY MICHAEL AND IRENE ASH

A Formulary of Paints and Other Coatings, Volumes I and II
A Formulary of Detergents and Other Cleaning Agents
A Formulary of Adhesives and Sealants
A Formulary of Cosmetic Preparations
The Thesaurus of Chemical Products, Volumes I and II
Encyclopedia of Industrial Chemical Additives, Volumes I-IV
Encyclopedia of Surfactants, Volumes I-IV
Encyclopedia of Plastics, Polymers and Resins, Volumes I-IV
What Every Chemical Technologist Wants to Know About. . .
 Volume I—Emulsifiers and Wetting Agents
 Volume II—Dispersants, Solvents and Solubilizers

ABBREVIATIONS

@	.....	at
anhyd.	.....	anhydrous
APHA	.....	American Public Health Association
approx.	.....	approximately
aq.	.....	aqueous
ASTM	.....	American Society for Testing and Materials
avg.	.....	average
B.P.	.....	boiling point
Btu	.....	British thermal unit
C	.....	degrees Centigrade
CAS	.....	Chemical Abstracts Service
cc	.....	cubic centimeter(s)
CC	.....	closed cup
cm	.....	centimeter(s)
cm ³	.....	cubic centimeter(s)
COC	.....	Cleveland Open Cup
compd.	.....	compound, compounded
conc.	.....	concentrated, concentration
cP, cps	.....	centipoise
cs, cSt	.....	centistokes
CTFA	.....	Cosmetic, Toiletry and Fragrance Association
DEA	.....	diethanolamine
disp	.....	dispersible, dispersion
dist	.....	distilled
DOT	.....	Department of Transportation
DW	.....	distilled water
EO	.....	ethylene oxide
equiv.	.....	equivalent
F	.....	degrees Fahrenheit
F.P.	.....	freezing point
FDA	.....	Food and Drug Administration
ft ³	.....	cubic foot, cubic feet
g	.....	gram(s)
gal	.....	gallon(s)
HLB	.....	hydrophile-lipophile balance
insol.	.....	insoluble
IPA	.....	isopropyl alcohol
kg	.....	kilogram(s)
l, L	.....	liter(s)
lb	.....	pound(s)
M.P.	.....	melting point
M.W.	.....	molecular weight
max	.....	maximum
MEA	.....	monoethanolamine
MEK	.....	methyl ethyl ketone
mfg.	.....	manufacture
MIBK	.....	methyl isobutyl ketone
min	.....	minute(s)
min.	.....	mineral, minimum
MIPA	.....	monoisopropanolamine

misc.	miscible
ml	milliliter(s)
mm	millimeter(s)
NF	National Formulary
no.	number
o/w	oil-in-water
OC	open crucible
PEG	polyethylene glycol
pH	hydrogen-ion concentration
pkgs	packages
PMCC	Pensky Marten closed cup
POE	polyoxyethylene, polyoxyethylated
POP	polyoxypropylene
PPG	polypropylene glycol
pt.	point
R&B	Ring & Ball
RD	Recognized Disclosure
ref.	refractive
rpm	revolutions per minute
R.T.	room temperature
s	second(s)
sol.	soluble, solubility
sol'n.	solution
sp.gr.	specific gravity
SS	stainless steel
std.	standard
SUS	Saybolt Universal seconds
TCC	Taggart closed cup
TEA	triethanolamine
tech.	technical
temp.	temperature
theoret.	theoretical
TLV	threshold limit value
TOC	Taggart open cup
UL	Underwriter's Laboratory
USP	United States Pharmacopoeia
uv, UV	ultraviolet
veg	vegetable
visc.	viscosity, viscous
w/o	water-in-oil
wt	weight
≈	approximately equal to
<	less than
>	greater than
≤	less than or equal to
≥	greater than or equal to

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Acetylated lanolin alcohol (CTFA)

SYNONYMS:

Lanolin, alcohols, acetates

CAS No.:

61788-49-6

TRADENAME EQUIVALENTS:

Acetol 1706 [Emery]

Acetulan [Amerchol; Amerchol Europe]

Crodalan LA [Croda Inc.]

Fancol ALA [Fanning]

Hetlan AC [Heterene]

Ritawax ALA [Rita]

CATEGORY:

Plasticizer, penetrant, binder, emollient, lubricant, cosolvent, solvent, stabilizer, solubilizer, suspending agent, water repellent

APPLICATIONS:

Cosmetic industry preparations: (Acetulan; Fancol ALA); baby products (Acetol 1706); body rubs (Acetulan); creams and lotions (Hetlan AC); hair sprays and preparations (Acetulan); makeup (Acetulan); nail polish removers (Acetulan); pressed powders (Acetulan); toiletries (Acetulan; Fancol ALA)

Industrial applications: aerosols (Acetulan); silicone emulsions (Acetulan)

Pharmaceutical applications: (Acetulan); acne products (Acetulan); antiseptics (Acetulan); ointments (Acetulan); sunscreens (Acetol 1706; Acetulan); suppositories (Acetulan)

PROPERTIES:

Form:

Liquid (Hetlan AC)

Thin, oily liquid (Acetulan)

Oily liquid (Fancol ALA)

Acetylated lanolin alcohol (cont' d.)

Color:

Pale yellow (Acetulan; Hetlan AC)

Odor:

Practically odorless (Acetulan)

Faint, characteristic (Hetlan AC)

Solubility:

Sol. in aerosol propellants (Acetulan)

Sol. in alcohols (Ritawax ALA)

Sol. in butyl stearate (Acetulan)

Sol. in castor oil (Acetol 1706; Acetulan)

Sol. in 95% ethanol (Acetulan)

Sol. in ethyl acetate (Acetulan)

Sol. in most fatty chemicals (Crodalan LA)

Sol. in isopropanol (Acetulan)

Sol. in isopropyl myristate (Acetulan)

Sol. in isopropyl palmitate (Acetol 1706; Acetulan)

Sol. in min. oil (Acetol 1706; Acetulan; Ritawax ALA)

Sol. in olive oil (Acetol 1706)

Sol. in common organic solvents (Acetulan)

Sol. in silicones (Acetulan)

Sol. in sulfonated castor oil (Acetulan)

Sol. in veg. oil (Acetulan)

Insol. in water (Acetol 1706; Crodalan LA); insol. in water but easily dispersed in presence of emulsifiers and surfactants (Acetulan)

Sp.gr.:

0.850–0.880 (Acetulan)

Visc.:

10 cps (Acetulan)

Acid No.:

1.0 max. (Acetulan; Hetlan AC)

Iodine No.:

8–12 (Acetulan)

Saponification No.:

180–200 (Acetulan; Hetlan AC)

Hydroxyl No.:

8.0 max. (Acetulan; Hetlan AC)

Stability:

Excellent resistance to hydrolysis within broad pH range (Acetulan)

pH:

Neutral (Acetulan)

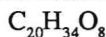
Acetyl tributyl citrate (CTFA)

SYNONYMS:

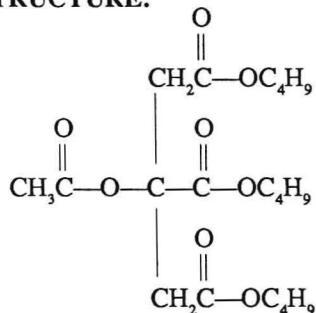
2-(Acetyloxy)-1,2,3-propanetricarboxylic acid, tributyl ester

1,2,3-Propanetricarboxylic acid, 2-(acetyloxy)-, tributyl ester

EMPIRICAL FORMULA:



STRUCTURE:



CAS No.:

77-90-7

TRADENAME EQUIVALENTS:

ATBC [Croda Chem. Ltd.]

Citroflex A-4 [Morfex]

Generically sold by: [Unitex]

CATEGORY:

Plasticizer

APPLICATIONS:

Food applications: food packaging (ATBC)

Industrial applications: cellulose (generic; Citroflex A-4); plastics (generic; Citroflex A-4)

PROPERTIES:

Form:

Liquid (generic; ATBC)

Color:

Colorless (generic)

Odor:

Odorless (generic)

Solubility:

Insol. in water (generic)

Sp.gr.:

1.046 (generic)

Density:

8.74 lb/gal (generic)

Visc.:

42.7 cps (generic)

Acetyl tributyl citrate (cont' d.)

B.P.:

172–174 C (1 mm) (generic)

M.P.:

–80 C (generic)

Pour Pt.:

–60 C (generic)

Flash Pt.:

204 C (generic)

Ref. Index:

1.4408 (generic)

STORAGE/HANDLING:

Combustible (generic)

Acetyl triethyl citrate (CTFA)

SYNONYMS:

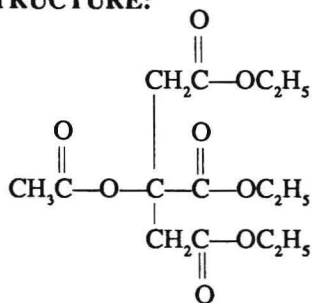
2-(Acetyloxy)-1,2,3-propanetricarboxylic acid, triethyl ester

1,2,3-Propanetricarboxylic acid, 2-(acetyloxy)-, triethyl ester

EMPIRICAL FORMULA:

$C_{14}H_{22}O_8$

STRUCTURE:



CAS No.:

77-89-4

TRADENAME EQUIVALENTS:

Citroflex A-2 [Morflex]

Generically sold by: [Unitex]

CATEGORY:

Solvent plasticizer

APPLICATIONS:

Industrial applications: cellulotics (generic; Citroflex A-2); plastics (generic; Citroflex A-2)

Acetyl triethyl citrate (cont'd.)

PROPERTIES:

Form:

Liquid (generic)

Color:

Colorless (generic)

Odor:

Odorless (generic)

Solubility:

Slightly sol. in water (generic)

Sp.gr.:

1.135 (23 C) (generic)

Density:

9.47 lb/gal (generic)

Visc.:

53.7 cps (generic)

B.P.:

131–132 C (1 mm) (generic)

M.P.:

–50 C (generic)

Pour Pt.:

–47 C (generic)

Flash Pt.:

187 C (generic)

Ref. Index:

1.4386 (23 C) (generic)

STORAGE/HANDLING:

Combustible (generic)

Algin (CTFA)

SYNONYMS:

Alginic acid, sodium salt

Sodium alginate

CAS No.:

9005-38-3

TRADENAME EQUIVALENTS:

Dariloid QH [Kelco/Div. of Merck & Co.]

Kelco-Gel HV, LV [Kelco/Div. of Merck & Co.] (specially clarified, low-calcium)

Kelco-Pac [Kelco/Div. of Merck & Co.] (specially clarified, low-calcium)

Kelcosol [Kelco/Div. of Merck & Co.]

Algin (cont'd.)

TRADENAME EQUIVALENTS (cont'd.):

Kelgin F, HV, LV, MV, RL, XL [Kelco/Div. of Merck & Co.] (refined)
Kelgin QH, QL, QM [Kelco/Div. of Merck & Co.] (treated for improved dispersion)
Keltex, P, S [Kelco/Div. of Merck & Co.] (industrial)
Keltone [Kelco/Div. of Merck & Co.]
Kelvis [Kelco/Div. of Merck & Co.] (refined)

CATEGORY:

Stabilizer, thickener, gelling agent, gum, emulsifier

APPLICATIONS:

Cosmetic industry preparations: (Kelcosol)

Food applications: (Dariloid QH; Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltone; Kelvis); dairy (Dariloid QH); food emulsifying (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltone; Kelvis); food packaging (Kelgin)

Industrial applications: adhesives (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); ceramics (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); explosives (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); industrial processing (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); latexes (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); paper mfg. (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); polishes (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); textile printing/dyeing (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis); water treatment (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis)

Industrial cleaners: (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Keltone; Kelvis)

PROPERTIES:

Form:

Fibrous particles (Kelco-Gel HV, LV; Kelcosol; Keltone)

Granular (Dariloid QH; Kelco-Pac; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Keltex, P, S; Kelvis)

Color:

Light ivory (Dariloid QH)

Ivory (Kelco-Pac; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL; Kelvis)

Cream (Kelco-Gel HV, LV; Kelcosol; Keltone)

Tan (Keltex, P, S)

Solubility:

Sol. in milk (Dariloid QH)

Sol. in cold or hot water (Kelcosol; Kelgin F, HV, LV, MV, QH, QL, QM, RL, XL;

Keltex; Keltone; Kelvis)

Sp.gr.:

1.59 (Kelgin F, HV, LV, MV, RL, XL; Kelvis)

1.64 (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Keltone)

Bulk Density:

43.38 lb/ft³ (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Keltone)

54.62 lb/ft³ (Kelgin F, HV, LV, MV, RL, XL; Kelvis)

Visc.:

10 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin RL)

30 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin QL, XL)

50 cps (Brookfield, 1%, LVF, 60 rpm) (Kelco-Gel LV)

55 cps (Brookfield, 1%, LVF, 60 rpm) (Kelco-Pac)

60 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin LV)

180 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin QM)

300 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin F)

400 cps (Brookfield, 1%, LVF, 60 rpm) (Kelco-Gel HV; Kelgin MV, QH; Keltone)

760 cps (Brookfield, 1%, LVF, 60 rpm) (Kelvis)

765 cps (Brookfield, 1%, LVF, 60 rpm) (Keltex P)

800 cps (Brookfield, 1%, LVF, 60 rpm) (Kelgin HV; Keltex)

1300 cps (Brookfield, 1%, LVF, 60 rpm) (Kelcosol; Keltex S)

Ref. Index:

1.3342 (Kelco-Gel HV, LV)

1.3343 (Kelgin F, HV, LV, MV, RL, XL; Kelvis)

pH:

Neutral (Kelgin QH, QL, QM; Keltex, P, S)

7.2 (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Keltone)

7.5 (Kelgin F, HV, LV, MV, RL, XL; Kelvis)

Surface Tension:

62 dynes/cm (Kelgin F, HV, LV, MV, RL, XL; Kelvis)

70 dynes/cm (Kelco-Gel HV, LV; Kelco-Pac; Kelcosol; Keltone)

Alginic acid (CTFA)

SYNONYMS:

Norgine

CAS No.:

9005-32-7