

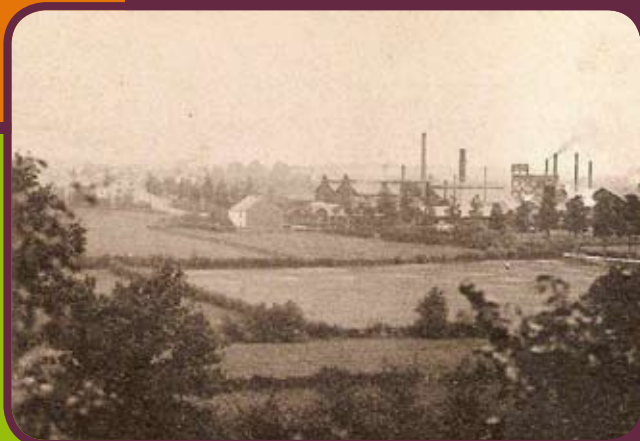
L A M B I O T T E & C I E S . A .



::: Acetals

Lambiotte
&Cie

Lambiotte & cie



Lambiotte & Cie started its activities in 1860 with forestry and sawmill activities, producing railway sleepers. In parallel and with a sustainable approach, the company valorised by-products by developing an innovative carbonization process to convert wood into charcoal. At the beginning of 20th century, one of the chemicals obtained with this technology was methanol used to produce formaldehyde.

By 1970, Lambiotte's activities in chemistry expanded: formaldehyde was used as a reagent in the production of acetals. Since then, the company has continued to develop its expertise in chemistry by developing new processes, making it the leader in the highly specialised field of acetals synthesis. Acetals are now the core-business of the company.

We at Lambiotte are offering a wide range of acetals, manufactured in dedicated facilities. Our technical expertise in this specialist field guarantees the highest and most constant quality and purity of product, allowing us to respond to specific demands of customers.

A specialized support team is available to give the customer technical advice, providing tailored formulae for many industrial sectors. In order to meet the customer's needs, we propose the services of our application laboratories in aerosols, cosmetics, coatings... A world-wide network of specialised distributors ensures fast product availability, delivery, and technical support to guarantee optimal client services. |





Acetals product range



“Acetals have very good toxicity and ecotoxicity profiles improving quality of life.”

Acetals are produced by reacting an alcohol with an aldehyde. They are a very stable chemical family with linear or cyclic structures.

Lambiotte’s acetals have very good toxicity and ecotoxicity profiles improving quality of life. Their atmospheric chemistry behaviour is also very good. GWP and POCP are low, ODP is zero.

Lambiotte offers a broad range of acetals with highly differentiated properties. Acetals have non to full miscibilities with water and are easy to blend with organic solvents. They improve the performance of our customers’ formulations.

Thanks to their high solvent power, acetals are widely used to solubilise a large range of products, such as resins, active ingredients, additives, etc.

Biosourced products are also available, confirming the sustainable character of the acetals. ■

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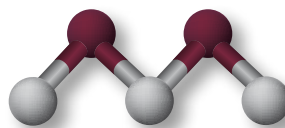


Methylal



DESCRIPTION

Molecular formula	C₃H₈O₂
Molecular weight	76,08
CAS number	109-87-5
EC number	203-714-2
IUPAC name	Dimethoxymethane
EC name	Dimethoxymethane



PROPERTIES

Boiling point (°C) at 1013 hPa			42,3
Freezing point (°C) at 1013 hPa			-104,8
Flash-point (°C) at 1013 hPa	DIN 51755 part 2	Closed cup	-30,5
Relative density at 20°C	OECD 109		0,86
Vapour pressure (kPa) at 20°C	ASTM D323 modified		40
Surface tension (mN/m) at 20°C			21,2
Water solubility (g/L) at 20°C		Methylal in water	330
Viscosity (kinematic) (10⁻⁷m²/s) at 25°C			3,71
Evaporation rate compared to	DIN 53170	Diethyl ether (= 1)	1,36
		Butyl acetate (= 1)	0,11

COMPARISON

	Methylal	Methylene Chloride	Acetone	MEK
Health				
Solvent Power				
Miscibility with water				

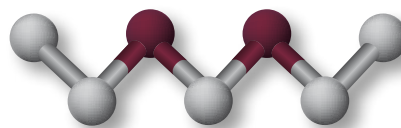
APPLICATIONS





DESCRIPTION

Molecular formula	$C_5H_{12}O_2$
Molecular weight	104,15
CAS number	462-95-3
EC number	207-330-6
IUPAC name	(Ethoxymethoxy)ethane
EC name	Diethoxymethane



PROPERTIES

Boiling point (°C) at 1013 hPa			87,1
Freezing point (°C) at 1013 hPa			-66,5
Flash-point (°C) at 1013 hPa		Closed cup	-7
Relative density at 20°C			0,83
Vapour pressure (kPa) at 20°C	ASTM D323 modified		17
Surface tension (mN/m) at 25°C			21,62
Water solubility (g/L) at 18°C		Ethylal in water	70
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 25°C			5,07
Evaporation rate compared to	DIN 53170	Diethyl ether (= 1)	3
		Butyl acetate (= 1)	0,25

HIGHLIGHTS



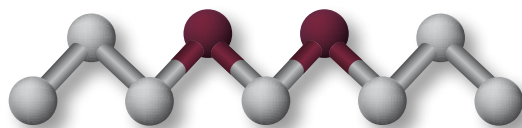
APPLICATIONS





DESCRIPTION

Molecular formula	$C_7H_{16}O_2$
Molecular weight	132,2
CAS number	505-84-0
EC number	208-021-9
IUPAC name	1-(Propoxymethoxy)propane
EC name	Dipropoxymethane



PROPERTIES

Boiling point (°C) at 1013 hPa			137,4
Freezing point (°C) at 1013 hPa			-97,3
Flash-point (°C) at 1013 hPa		Closed cup	26
Relative density at 20°C			0,83
Vapour pressure (KPa) at 20°C	ASTM D323 modified		<2
Surface tension (mN/m) at 25°C			23,43
Water solubility (g/L) at 20°C	OECD TG 105	Propylal in water	3,65
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 20°C			7,7
Evaporation rate compared to	DIN 53170	Diethyl ether (= 1)	14
		Butyl acetate (= 1)	1,25

HIGHLIGHTS



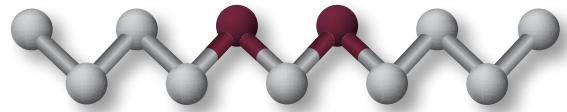
APPLICATIONS





DESCRIPTION

Molecular formula	$C_9H_{20}O_2$
Molecular weight	160,26
CAS number	2568-90-3
EC number	219-909-0
IUPAC name	1-(Butoxymethoxy)butane
EC name	1,1'-(Methylenebis(oxy))dibutane



PROPERTIES

Boiling point (°C) at 1013 hPa			177,9
Freezing point (°C) at 1013 hPa			-59,4
Flash-point (°C) at 1013 hPa	ASTM D73	Closed cup	62,2
Relative density at 20°C			0,84
Vapour pressure (kPa) at 20°C			0,08
Surface tension (mN/m) at 25°C			25,2
Water solubility (g/L) at 20°C		Butylal in water	0,22
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 25°C			11,8
Evaporation rate compared to	DIN 53170	Butyl acetate (= 1)	5,54

COMPARISON

	Butylal	Perchloro-ethylene	d-limonene	Dearomatized Hydrocarbons
Health				
Environment				
Degreasing power				

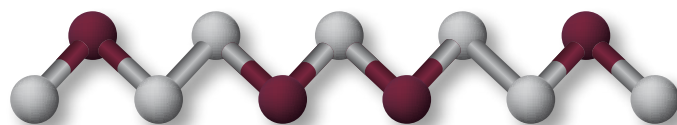
APPLICATIONS





DESCRIPTION

Molecular formula	C₇H₁₆O₄
Molecular weight	164,20
CAS number	4431-83-8
EC number	224-631-8
IUPAC name	2,5,7,10-Tetraoxaundecane
EC name	2,5,7,10-Tetraoxaundecane



PROPERTIES

Boiling point (°C) at 1013 hPa			210
Freezing point (°C) at 1013 hPa	ASTM D1177		< -65
Flash-point (°C) at 1013 hPa	ASTM D93	Closed cup	88
Relative density at 20°C			0,95
Vapour pressure (kPa) at 20°C	ASTM D323 modified		2,25
Surface tension (mN/m) at 25°C			31,5
Water solubility at 20°C			Fully miscible
Viscosity (kinematic) (10⁻⁷m²/s) at 25°C			15,32
Evaporation rate compared to	DIN 53170	Butyl acetate (= 1)	17,38

COMPARISON

	TOU	NMP/NEP	Chlorinated solvents	Aromatics
Labelling				
Smell				
Miscibility with water				

APPLICATIONS

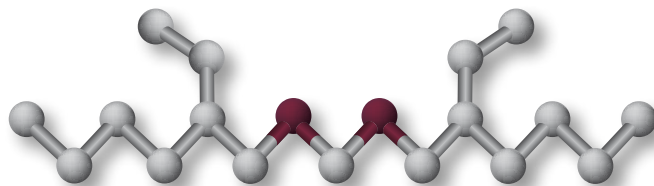




2-Ethylhexylal

DESCRIPTION

Molecular formula	$C_{17}H_{36}O_2$
Molecular weight	272,4
CAS number	22174-70-5
EC number	244-815-1
IUPAC name	3-(((2-Ethylhexyl)oxy)methyl)heptane
EC name	3,3'-[Methylenebis(oxyethylene)]bisheptane



PROPERTIES

Boiling point (°C) at 1013 hPa			290
Freezing point (°C) at 1013 hPa	ASTM D1177		< - 65
Flash-point (°C) at 1013 hPa	NBN T52-110	Closed cup	142
Relative density at 20 °C	OECD TG 109		0,85
Vapour pressure (kPa) at 20°C and 50°C	Method A4 (Dir. 92/69/EEC)		< 0,01
Surface tension (mN/m) at 25°C		ring method	25,2
Water solubility (g/L) at 20°C	OECD TG 105	2-Ethylhexylal in water	<0,00 1
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 25°C			28,46
Evaporation rate compared to	DIN 53170	Butyl acetate (= 1)	No evaporation

HIGHLIGHTS

VOC FREE

NON VOC ACCORDING TO:

- DIRECTIVE 1999/13/EC :
ITS VAPOUR PRESSURE AT 293,15 K IS LOWER THAN 0,01 KPA
- DIRECTIVE 2004/42/CE :
ITS BOILING POINT IS OVER 250°C AT 101.3 KPA.

ALLOWS FORMULATING NON VOC ADHESIVES FOLLOWING ISO 16000-6

APPLICATIONS

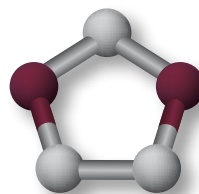


Dioxolane



DESCRIPTION

Molecular formula	$C_3H_6O_2$
Molecular weight	74,08
CAS number	646-06-0
EC number	211-463-5
IUPAC name	1,3-Dioxolane
EC name	1,3-Dioxolane



PROPERTIES

Boiling point (°C) at 1014 hPa	OECD 103		76
Freezing point (°C) at 1014 hPa	OECD 102		< - 90
Flash-point (°C) at 1026,2 hPa	ISO 2719 :2002	Closed cup	≤ 2,5
Relative density at 20°C	OECD 109		1,06
Vapour pressure (kPa) at 20°C	OECD 104		10,1
Surface tension (mN/m) at 25°C			34,3
Water solubility at 20°C			Fully miscible
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 20°C			5,53
Evaporation rate compared to	DIN 53170	Diethyl ether (= 1)	3,6
		Butyl acetate (= 1)	0,29

COMPARISON

	Dioxolane	NMP/NEP	THF	Chlorinated solvents
Health & Environment				
Solvent Power				
Miscibility with water				

APPLICATIONS

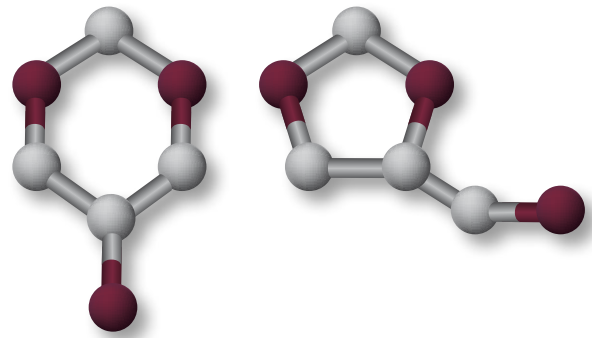




Glycerol formal

DESCRIPTION

Molecular formula	2 (C ₄ H ₈ O ₃)
Molecular weight	104,11
CAS number	4740-78-7 and 5464-28-8
EC number	225-248-9 and 226-758-4
IUPAC name	1,3-dioxan-5-ol and 1,3-dioxolan-4-ylmethanol
EC name	Reaction mass of 1,3-dioxan-5-ol and 1,3-dioxolan-4-ylmethanol



PROPERTIES

Boiling point (°C) at 1014 hPa			193,9
Freezing point (°C) at 1014 hPa	NFT 78 102 / ASTM D1177		< -50
Flash-point (°C) at 1026,2 hPa	NBN-EN 22719	Closed cup	99
Relative density at 20°C			1,22
Vapour pressure (kPa) at 20°C	ASTM D323 modified		0,03
Surface tension (mN/m) at 25°C			44,49
Water solubility at 20°C			Fully miscible
Viscosity (kinematic) (10 ⁻⁷ m ² /s) at 20°C			117
Evaporation rate compared to	DIN 53170	Butyl acetate (= 1)	No evaporation

HIGHLIGHTS

MADE FROM RENEWABLE RESOURCES
INDICATED BY EMEA TO BE USED IN ORAL, DERMAL AND INJECTABLE VETERINARY PRODUCTS
OUR GLYCEROL FORMAL IS CONFORMED TO EP 2012 (7.3-3947)

APPLICATIONS






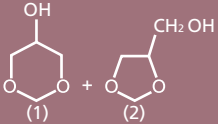
	Methylal	Ethylal	Propylal	Butylal	TOU	2-Ethylhexylal	Dioxolane	Glycerol formal
REACH	01-2119664781-31-0000	01-2119947549-21-0000	Registration in 2018	Registration in 2013	Registration in 2013	Registration in 2013	01-2119490744-29-0001	Registration in 2013
EC	203-714-2	207-330-6	208-021-9	219-909-0	224-631-8	244-815-1	211-463-5	226-758-4 for CAS N° 5464-28-8 and 225-248-9 for CAS N° 4740-78-7
Register of Flavouring Substances	FL N°: 06.074; CoE N°: 10031	FL N°: 06.064 ; CoE: 10012	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Inventory of Cosmetic Ingredients	Listed	Not listed	Not listed	Listed	Not listed	Not listed	Listed	Not listed
WGK - Germany	1	1	Not available	1	1	Not listed	1	Not available
FOPH (BAG/OFSP/UFSP) - Switzerland	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
TSCA	Listed	Listed	Listed	Listed	In progress	Not listed	Listed	Listed as CAS N° 68442-91-1 EPA PMN N° P 10-310 and P 10-408 each N° for CAS N° 4740-78-7 alone and mixtures of CAS N° 4740-78-7 and 5464-28-8
State Right-to-Know List : Illinois, Massachusetts, Minnesota, New Jersey, Pennsylvania,	Listed on all lists	Listed on New Jersey	Not listed	Not listed	Not listed	Not listed	Listed on Massachusetts, New Jersey, Pennsylvania	Not listed (3 CAS N°)
California Proposition 65 List	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
DSL/NDSL	Listed on DSL	Listed on NDSL	Listed on NDSL	Listed on DSL	Not listed	Not listed	Listed on DSL	Listed on NDSL as CAS N° 68442-91-1
WHMIS Ingredient List	Listed	Not listed	Not listed	Not listed	Not listed	Not listed	Listed	
ENCS	2-498	Not listed	Not listed	Not listed	Not listed	Not listed	5-500	Not listed
IECSC	Listed	Listed	Not listed	Listed	Not listed	Not listed	Listed	Listed for CAS N° 4740-78-7
ECL	KE-11074	KE-23849	KE-12221	Not listed	Not listed	Not listed	KE-12027	Not listed
ASIA-PAC	Listed	Listed	Listed	Listed	Not listed	Not listed	Listed	Listed for CAS N° 5464-28-8 and 4740-78-7
AICS	Listed	Listed	Not listed	Listed	Not listed	Not listed	Not listed	Listed for CAS N° 5464-28-8
NZ/IOC	Listed	Listed	Not listed	Listed	Not listed	Not listed	Listed	Listed for CAS N° 5464-28-8 and 4740-78-7
HSNO	Approved	Approved	Not listed	Not listed	Not listed	Not listed	Approved	Approved for CAS N° 5464-28-8
PICCS	Listed	Listed	Not listed	Listed	Not listed	Not listed	Listed	Not listed



Applications

	Methylal	Ethylal	Propylal	Butylal	TOU	2-Ethylhexylal	Dioxolane	Glycerol Formal
Coatings								
Inks								
Adhesives								
Cleaning								
Aerosols								
Cosmetics								
Pharmaceuticals								
Veterinary								
Synthesis								
Textile / Leather								
Agrochemical								
Polyurethane								

		Methylal	Ethylal	Propylal
Molecular formula		$C_3H_8O_2$	$C_5H_{12}O_2$	$C_7H_{16}O_2$
Chemical structure		$CH_3-O-CH_2-O-CH_3$	$CH_3-CH_2-O-CH_2-O-CH_2-CH_3$	$CH_3-(CH_2)_2-O-CH_2-O-(CH_2)_2-CH_3$
IUPAC name		Dimethoxymethane	(Ethoxymethoxy)ethane	1-(Propoxymethoxy)propane
EC name		Dimethoxymethane	Diethoxymethane	Dipropoxymethane
CAS N°		109-87-5	462-95-3	505-84-0
EC N°		203-714-2	207-330-6	208-021-9
Molecular weight		76,08	104,15	132,2
Relative density 20°C		0,86	0,8319	0,83
Boiling point (°C) 101 325 Pa		42,3	87,1	137,4
Freezing point (°C)		-104,8	-66,5	-97,3
Flash point (°C)	Closed cup (Pensky-Martens)	-30,5	-7	26
Surface tension (mN/m)		21,20	21,62	23,43
Vapour pressure (kPa) 20°C (ASTM D 323 modified)		40	17	2
Kinematic viscosity (10^{-7} m ² /s) 25°C		3,71	5,07	7,7
Autoignition temperature (°C) (ASTM E 659)		260	240	330
Explosion limits (Vol%)		LEL ₂₀ : 2,2	LEL : 2,1	Not available
		UEL ₂₀ : 19,9	UEL : 20	
Evaporation (DIN 53170) rate compared to.	Diethyl ether (= 1)	1,36	3	14
	Butyl acetate (= 1)	0,11	0,25	1,25
Vapour density		2,6	3,6	4,6
Refractory index n_D^{20}		1,35	1,37	1,3930
Solubility of the acetal in water (g/L)		330	70	0,40
Kauri-butanol index (ASTM D 1133-90) measured with	gum 4938	101	92	73
	gum 4939	164	120	94
Solubility parameters (MPa ^{1/2})	Total δ_t	18,24	17,06	16,84
	Dispersion δ_d	14,83	14,87	15,11
	Polarity δ_p	6,01	4,67	3,95
	Hydrogen bond δ_h	8,76	6,95	6,32

Butylal	TOU	2-ethylhexylal	Dioxolane	Glycerol formal
$C_9H_{20}O_2$	$C_7H_{16}O_4$	$C_{17}H_{36}O_2$	$C_3H_6O_2$	2 ($C_4H_8O_3$)
$CH_3-(CH_2)_3-O-CH_2-O-(CH_2)_3-CH_3$	$CH_3-O-(CH_2)_2-O-CH_2-O-(CH_2)_2-O-CH_3$	$CH_3-(CH_2)_3-CH(C_2H_5)-CH_2-O-CH_2-O-CH_2-CH(C_2H_5)-(CH_2)_3-CH_3$		
1-(Butoxymethoxy)butane	2,5,7,10-Tetraoxaundecane	3-(((2-Ethylhexyl)oxy)methoxy)methyl)heptane	1,3-Dioxolane	1,3-dioxan-5-ol and 1,3-dioxolan-4-ylmethanol
1,1'-(Methylenebis(oxy))dibutane	2,5,7,10-Tetraoxaundecane	3,3'-(Methylenebis(oxyethylene))bisheptane	1,3-Dioxolane	Reaction mass of 1,3-dioxan-5-ol and 1,3-dioxolan-4-ylmethanol
2568-90-3	4431-83-8	22174-70-5	646-06-0	4740-78-7 and 5464-28-8
219-909-0	224-631-8	244-815-1	211-463-5	225-248-9 and 226-758-4
160,26	164,2	272,4	74,08	104,11
0,84	0,95	0,848	1,06	1,2185
177,9	210	290	76	193,9
-59,4	< -65	< -65	< -90	< -50
62,2	88	142	<= 2,5	99
25,2	31,5	25,2	34,3	44,49
0,079	2,25	<0,01	10,1	0,03
11,8	15,32	28,46	5,53	117
220	210	280	274	>400
LEL20 : 0,65	LEL100 : 0,75	Not available	LEL : 2,3 +/-10	Not available
UEL180 : 23,6	UEL180 : 38,2		UEL: 30,5 +/-5	
Not available	Not available	No evaporation	3,6	Not available
5,54	17,38	No evaporation	0,29	Not available
5,5	5,7	9,4	2,6	Not available
1,41	1,41	1,4350	1,4	1,45
0,2225	Fully miscible	< 0,01	Fully miscible	Fully miscible
62	> 200	31	>218	71
75	> 200	33	>207	74
16,23	18,74	Not available	22,07	25,79
14,70	15,16		16,95	16,37
3,43	6,09		7,85	11,99
5,96	9,19		11,76	19,63



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