



## Checking for the Availability of Thermophysical Data

### The Dortmund Data Bank

The Dortmund Data Bank (DDB) is a factual data bank for thermodynamic and thermophysical data compiled from primary sources like scientific publications, theses, company reports, deposited documents, and private communications. Only experimental data from the original publications are stored and all sources are available at DDBST GmbH.

Besides the easily accessible thermophysical properties from scientific literature (J. Chem. Eng. Data, J. Chem. Thermodyn., Fluid Phase Equilib., Thermochim. Acta, and Int. J. Thermophys.) DDB contains a great part of data not available via the open literature (systematic measurements for the development of predictive tools, private communications, confidential data from industry, BSc., MSc and Ph.D. theses, ... from all over the world). These data will not be provided by online services and are not made available to competitors of DDBST GmbH. The DDB offers vast amounts of information for a wide variety of applications in chemical engineering, environmental protection, and plant safety. It is especially valuable for the design of separation processes, e.g. distillation, extraction, absorption, crystallization, evaporation, ...

Besides covering the most common components the DDB contains data for e. g. ionic liquids, biofuel components, amines used in gas treating, polymers, electrolytes, and more.

### Distribution Channels

The DDB is distributed as an in-house data bank together with a software package (DDBSP) for data retrieval, visualization, regression and export to other applications like spreadsheets or chemical process simulators. In addition, this software package includes many state-of-the-art property estimation models for pure component and mixture properties like UNIFAC, mod. UNIFAC, PSRK, VTPR, COSMO-RS(OI), COSMO-SAC as well as process synthesis tools and further utilities.

As a second distribution channel, the Dortmund Data Bank is used within our consulting services, either in form of simple data deliveries but more often in combination with advanced services like data regression (e. g. for  $g^E$  models like Wilson, NRTL and UNIQUAC or pure component vapor pressure equations like simple or extended Antoine, Wagner, heat capacity polynomial parameters, parameters for a variety of DIPPR and PPDS equations). Data are also bundled with specific available or custom-tailored software tools. In many cases, data are delivered

together with property estimation results. In addition, missing data can be measured at our partner organisation LTP GmbH.

Major parts of the Dortmund Data Bank except e.g. adsorbent/adsorptive equilibria as well as many data supplied by the Gas Processors Association (GPA) are also included in DETHERM ([i-systems.dechema.de](http://i-systems.dechema.de)).

### The Online DDB Search

Online DDB Search has been developed to enable a world-wide access to the contents of the Dortmund Data Bank. The site allows checking for the availability of thermophysical data free of charge and in addition it offers qualified consulting beyond just data delivery upon request.

The screenshot shows the 'Online DDB Search' interface. It features a search form with the following fields: 'DDB No.', 'Name', 'CAS-RN', and 'Formula'. Each field has a corresponding 'Search' button. Below the search form, there are instructions: 'Enter a DDB number, a name or part of name, a CAS registry no. or an empirical formula (case-sensitive preferred) to search for components', 'Search for multiple DDB numbers (separated by space) is possible', and 'Name accepts multiple search strings (but searches only a limited number of names per component)'. At the bottom, there is a footer with the text 'Dortmund Data Bank Version: April 2017' and '© Dortmund Data Bank by DDBST GmbH'.

DDB Online Search is explicitly not a web shop and it is not possible to buy data through this service directly. DDB Online Search is designed as an information source only and request will always be answered by one of DDBST's employees.

### Supported Data Banks

The DDB currently contains more than 317,000 pure component data sets with more than 2,000,000 data tuples. For mixtures, more than 1 million data sets with more than 8 million data tuples are available (Version 2018).

The online DDB search covers the complete list of data banks of the Dortmund Data Bank. Included are the data banks for

- Pure component properties
  - P-v-T related data (vapor pressures, critical data, densities, virial coefficients, and more)
  - Transport properties (viscosities, thermal conductivities, ...)
  - Enthalpies (phase change, formation, ...)
  - Heat capacities
  - Surface tensions
  - and more
- Mixture properties
  - Vapor-liquid equilibria
  - Liquid-liquid equilibria (miscibility gaps)
  - Solid-liquid equilibria (solubilities)
  - Activity coefficient at infinite dilution
  - Gas solubilities
  - Azeotropic and zeotropic data
  - Heats of mixing
  - Densities, volumes and excess volumes
  - Excess heats of mixing
  - Critical data of mixture
  - Salt solubilities
  - Vapor-liquid equilibria for electrolyte containing mixtures
  - Octanol-water partition coefficients
  - Adsorbent/adsorptive equilibria
  - Polymer related information (covering phase equilibria data and more)
  - Dynamic and kinematic viscosities
  - Thermal conductivities
  - Speeds of sound
  - Surface tensions
  - Dielectric constants

**Online DDB Search** Dortmund Data Bank  
Thermophysical Data for Process Design

**Query**

Selected System/Mixture

DDB#	Name	CAS-RN	Formula	Overview	Details
11	Ethanol	64-17-5	C <sub>2</sub> H <sub>5</sub> O	Overview	Details
110	Methanol	67-56-1	CH <sub>3</sub> O	Overview	Details

Search mixtures containing this mixture as subsystem

**Mixture Data**

Databank	Sets	Points	Temperature Range	Pressure Range	
Vapor-Liquid Equilibria	VLE	61	873	273-433 K	2-1735 kPa
Heats of Mixing	HE	7	49	298-413 K	101-1376 kPa
Activity Coefficients at Infinite Dilution (Pure Solvents)	ACT	8	8	298-424 K	n.a.
Heat Capacities of Mixtures, Excess Heat Capacities	CPE	3	21	298-441 K	101 kPa (const.)
(A)zeotropic Data	AZD	48	48	273-433 K	40-1013 kPa
Solid-Liquid Equilibria	SLE	2	10	144-175 K	n.a.
Densities and Volumes of Mixtures, Excess Volumes	VE	50	657	273-338 K	100-40000 kPa
Mixture Viscosities	VIS	28	293	273-338 K	101 kPa (const.)
Mixture Surface Tensions	MSFT	6	48	273-333 K	n.a.
Mixture Speeds of Sound	MSOS	3	45	298 K (const.)	101 kPa (const.)
Mixture Thermal Conductivities	MTCN	1	10	298-323 K	101 kPa (const.)
Mixture Dielectric Constants	MDEC	17	242	288-318 K	n.a.
Mixture P-v-T Data	MPVT	31	271	298-423 K	150-40080 kPa
Mixture Flash Points	MFLP	2	22	283-286 K	n.a.
Diffusion Coefficients	DIF	1	31	323-378 K	25-234 kPa
<b>Total</b>		<b>268</b>	<b>2628</b>		

**Properties Data Point Distribution**

Some free data for this system can be found in our DDB Explorer Edition and in these web pages.

New System/Query Back

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What are "Sets" and "Points" in the Dortmund Data Bank?  
 Online DDB search information page  
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 Overall Statistics on Systems, Sets, and Points  
 Direct link to this DDB search page  
 (3.36 seconds)

## Terms and Conditions of Use

### Prices

DDBST GmbH provides Online DDB Search free of charge. Please take a look at the price lists for data sets, complete or partial data banks and software for further information.

### Copyright

Online DDB Search results can be distributed freely and no copyright is reserved for the search results as long as they are distributed together with a link or reference to the DDB or Online DDB Search.

### Typical Outputs

A typical output includes details about the data types, the temperature and pressure ranges, and the number of sets and points (where available).

This first example below shows all available data for the binary mixture of ethanol and methanol.

The second example shows all data for the pure component Ethyl tert-butyl ether where only a few data are available.

**Online DDB Search** Dortmund Data Bank  
Thermophysical Data for Process Design

**Query**

Selected Component

DDB#	Name	CAS-RN	Formula	Overview
1109	Ethyl tert-butyl ether (ETBE)	637-92-3	C <sub>8</sub> H <sub>18</sub> O	Overview

Search mixtures containing this component

**Pure Component Data**

Property	Points	Sets	Temperature Range	States	Set#
Critical Data	1	1	(Hidden) Critical Point	Liquid	1
Density	662	84	295-473 K	Liquid	84
Gibbs Energy of Formation	1	1	298-298 K	Gas/Vapor	1
Heat of Vaporization	1	1	298-298 K	Vapor-Liquid	1
Melting Point	1	1	(Hidden) Solid-Liquid	Liquid	1
Molar Heat Capacity (CP)	27	7	273-333 K	Liquid	7
Molar Saturation Heat Capacity	32	1	277-341 K	Liquid Phase of VLE	1
Speed of Sound	224	15	293-665 K	Liquid	8
			Supercritical		4
			Vapor Phase of VLE		1
			Liquid Phase of VLE		1
Sld. Heat of Formation	2	2	298-298 K	Gas/Vapor	1
			Liquid		1
Surface Tension	2	2	297-298 K	Liquid	2
Vapor Pressure	389	48	278-485 K	Vapor-Liquid	48
Viscosity (Dynamic)	3	1	293-303 K	Liquid	1
EOSMD-HS a Profile	available				

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