



## DICYCLOPENTADIENE (DCPD)

3a,4,7,7a-tetrahydro-4,7-methano-1*H*-indene (C<sub>10</sub>H<sub>12</sub>)

### General

Dicyclopentadiene or DCPD is the dimer of cyclopentadiene (CPD) formed by a Diels-Alder addition reaction. DCPD products originate from high-temperature cracking of petroleum fractions and are best characterized as highly reactive intermediates used for a wide range of resins, i. e. aromatic hydrocarbons, unsaturated polyesters, phenolics and epoxies.

### Available Grades

DCPD RESIN GRADE - Most used in aromatic hydrocarbon and unsaturated polyester resins.  
 DCPD, UPR GRADE - Developed for use in unsaturated polyester resins.

### Physical Properties

CPD, although a stable molecule, has a strong tendency to form the more stable dimer DCPD. This dimerization already takes place at room temperature and its rate rapidly increases with elevated temperatures. This reaction however is reversible too; DCPD “cracks” at temperatures above 140°C to form two CPD molecules. The physical properties of pure CPD and DCPD are given below as well as some product specific characteristics and compositions.

Physical Property	Pure Cyclopentadiene	Pure Dicyclopentadiene
Refractive Index (n <sub>D</sub> )	1.4429 (20°C)	1.5061 (35°C)
Boiling Point (°C)	41.5	170
Melting Point (°C)	-85	33.6
Autoignition Temperature (°C, in air)	640	503
Specific Gravity (Water=1)	0.98024 (20°C)	0.9770 (35°C)
Specific Heat (20°C)	0.91 kJ/kg K	1.44 kJ/kg K
Heat of Vapor	394 kJ/kg @ 20°C	342 kJ/kg @ 32°C
Heat of Dimerization / Cracking	584 kJ/kg (dimerization)	2800 kJ/kg (cracking)

### Product Typical Properties

Test Parameter	DCPD RESIN GRADE	DCPD UPR GRADE
Color	3 – 7.5 Gardner	2 – 5 Gardner
Refractive Index (n <sub>D22</sub> )	1.512	1.512
Specific Gravity (20°C)	0.98	0.98
Vapor Pressure (20°C)	~ 4.8 kPa	~ 4.8 kPa
Relative Vapor Density (Air=1)	~ 4.5	~ 4.5
Flash Point	40	> 25 °C
Pour Point (ASTM D 6749)	< -50 °C	< -50 °C
Freezing Point (ASTM D 5972)	< -23 °C	< -2.2 °C
Apr. Boiling Point (°C)	160 – 180	160 – 175
Autoignition Temp. (°C, in air)	> 600	> 600
Water (ppm)	0 – 150	0 – 150
Sulfur (ppm)	0 – 100	0 – 50
Appearance	Clear and free of sediment	Clear and free of sediment

Note 1: As the products originate from petroleum cracker operations these values may vary during the year as result of changing operational conditions of the cracker.

Note 2: The data above are typical values, not to be construed as specifications. Users should confirm results by their own tests.

## Product Typical Composition

Component	DCPD RESIN GRADE	DCPD, UPR GRADE
Endo-DCPD	73 – 83 %	83 – 88 %
Exo-DCPD	0.5 – 1 %	0.5 – 1 %
CPD-mCPD codimer	7 – 13 %	2 – 6 %
Isoprene-CPD codimer	1 – 5 %	1 – 5 %
Butadiene-CPD codimer	0 – 5 %	0 – 5 %
Piperylene-CPD codimer	0 – 2 %	0 – 2 %
CPD-trimer	0 – 1 %	0 – 0.1 %
CPD	0 – 1 %	0 – 1 %
m-Bicyclononadiene	0 – 2 %	0 – 2 %
Benzene	<0.01 %	<0.01 %
Toluene	<0.02 %	< 0.01 %

Note 1: All data are given in %-w/w unless stated otherwise.

Note 2: As the products originate from petroleum cracker operations these values may vary during the year as result of changing operational conditions of the cracker.

## Production Locations

Terneuzen (The Netherlands)

## Suggested Applications

Because the (di-)cyclopentadiene molecule is reactive with many other monomers it has a variety of applications as a raw material for the production of resins including aromatic hydrocarbon resins, unsaturated polyester resins, phenolic resins, epoxy resins, alkyds, acrylates, lattices, specialty resins and for other specialty intermediates.

DCPD RESIN GRADE is generally used in the production of cyclo-aliphatic and C5/C9 aromatic hydrocarbon resins but may also be used in the production of unsaturated polyester resins.

DCPD UPR GRADE is designed for use in the production of unsaturated polyester resins. It contains less trimers and co-dimers and has favorable color characteristics compared to DCPD RESIN GRADE.

## More Information

For more information about the aromatic products of Dow (i.e. Sales Specifications, Safety Data Sheets) and to contact the Customer Information Group please visit our website at:

[www.dow.com](http://www.dow.com)

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