



## 單相型絕緣冷卻液

## Single-Phase Dielectric Coolant ICE-5

### Product Description

TCLAD ICE-5 is a non-halogenated, eco-friendly fluid suitable for immersion cooling electrical systems. Its distinctive features allow it to offer excellent heat transfer performance, superior dielectric properties, and compatibility with electrical insulating materials. TCLAD ICE-5 is also suitable for single-phase immersion heat transfer applications, which don't require complex systems such as evaporators and condensers. It also provides a precise, stable, uniform thermal management system.

### Key Feature

- Excellent heat transfer performance
- Superior dielectric properties
- Low viscosity
- Exceptional material compatibility
- Outstanding anti-corrosion
- High thermal stability
- Non-volatile
- Readily biodegradable
- Non-toxic and halogen-free
- GWP<1

### Applications

- Aerospace/Military
- EV transmission fluid
- Charging station heat dissipation system
- High-performance computing liquid cooling
- Data center immersion cooling
- Immersion coolant for EV batter
- Servers and ASIC mining device

---

#### TCLAD

US [sales.us@tclad.com](mailto:sales.us@tclad.com)  
APAC [sales.asia@tclad.com](mailto:sales.asia@tclad.com)  
Europe [sales.eu@tclad.com](mailto:sales.eu@tclad.com)  
[www.tclad.com](http://www.tclad.com)



All statements, technical information and recommendations herein are based on tests we believe to be reliable, and THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MARKET ABILITY AND FITNESS FOR PURPOSE. Sellers' and manufacturers' only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCIDENTAL, OR CONSEQUENTIAL, INCLUDING LOSS OF PROFITS OR REVENUE ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT. No statement, purchase order or recommendation by seller or purchaser not contained herein shall have any force or effect unless in an agreement signed by the officers of the seller and manufacturer. All marks used above are trademarks and/or registered trademarks of TCLAD Inc and its affiliates in the U.S., Germany and elsewhere. © 2021 TCLAD Inc. All rights reserved. US

## Dielectric Coolant ICE-5

### Characteristics

Item	Unit	Typical value	Test method
Color	APHA	50	ASTM D1209
Acid Value	mg KOH/g	0.01	ASTM D974
Water Content	ppm	50	ASTM D1533
Kinematic Viscosity	cSt@20°C	5.2	ASTM D445
	cSt@40°C	3.3	ASTM D445
	cSt@100°C	1.3	ASTM D445
Viscosity Index	-	177	ASTM D2270
Coefficient of Expansion 1/°C		0.00087	ASTM D1903
Pour Point	°C	<-60	ASTM D97
Flash Point C.O.C	°C	160	ASTM D92
Fire Point, °C	°C	176	ASTM D92
Auto Ignition, °C	°C	>300	ASTM E659

*The values above are typical and do not constitute a contractual commitment. The present technical data sheet replaces all previous editions.*

### Heat Transfer Properties

Item	Unit	Typical value	Test method
Thermal Conductivity	W/m*K@20°C	0.141	ASTM D7896
	W/m*K@40°C	0.137	ASTM D7896
	W/m*K@100°C	0.124	ASTM D7896
Item	Unit	Typical value	Test method
Heat Capacity	kJ/kg*K@20°C	2.173	ASTM D7896
	kJ/Kg*K@40°C	2.246	ASTM D7896
	kJ/kg*K@100°C	2.436	ASTM D7896

#### TCLAD

US [sales.us@tclad.com](mailto:sales.us@tclad.com)  
 APAC [sales.asia@tclad.com](mailto:sales.asia@tclad.com)  
 Europe [sales.eu@tclad.com](mailto:sales.eu@tclad.com)  
[www.tclad.com](http://www.tclad.com)



All statements, technical information and recommendations herein are based on tests we believe to be reliable, and THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MARKET ABILITY AND FITNESS FOR PURPOSE. Sellers' and manufacturers' only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCIDENTAL, OR CONSEQUENTIAL, INCLUDING LOSS OF PROFITS OR REVENUE ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT. No statement, purchase order or recommendation by seller or purchaser not contained herein shall have any force or effect unless in an agreement signed by the officers of the seller and manufacturer. All marks used above are trademarks and/or registered trademarks of TCLAD Inc and its affiliates in the U.S., Germany and elsewhere. © 2021 TCLAD Inc. All rights reserved. US

## Dielectric Coolant ICE-5

Item	Unit	Typical value	Test method
Density	kg/m <sup>3</sup> @20°C	861	ASTM D4052
	kg/m <sup>3</sup> @40°C	846	ASTM D4052
	kg/m <sup>3</sup> @100°C	801	ASTM D4052

Item	Unit	Typical value	Test method
Viscosity	mPa*s@20°C	4.5	ASTM D445
	mPa*s@40°C	2.8	ASTM D445
	mPa*s@100°C	1.1	ASTM D445

## Dielectric Properties

Item	Unit	Typical value	Test method
Breakdown Voltage	KV@RT	>70	IEC 60156
Volume Resistivity	GΩ*m@90C	>100	IEC 60247
Dielectric Constant	@90°C/1kHz	2.8	IEC 60247
	@RT/20~40GHz	2.3	IEC 62209
Dissipation Factor	@90 °C, %	<1	IEC 60247

*The values above are typical and do not constitute a contractual commitment. The present technical data sheet replaces all previous editions.*

## Environmental features

Item	Unit	Typical value	Test method
Total S, P, Cl	ppm	<1	ICP-OES
PFAS	-	0	-
GWP	-	0	-
ODP	-	0	-
Biodegradability	%	>60	OECD 301F
Renewable Carbon*	%	53-100	-

\* Carbon of raw material can be selected from renewable sources.

### TCLAD

US [sales.us@tclad.com](mailto:sales.us@tclad.com)  
APAC [sales.asia@tclad.com](mailto:sales.asia@tclad.com)  
Europe [sales.eu@tclad.com](mailto:sales.eu@tclad.com)  
[www.tclad.com](http://www.tclad.com)



All statements, technical information and recommendations herein are based on tests we believe to be reliable, and THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MARKET ABILITY AND FITNESS FOR PURPOSE. Sellers' and manufacturers' only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCIDENTAL, OR CONSEQUENTIAL, INCLUDING LOSS OF PROFITS OR REVENUE ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT. No statement, purchase order or recommendation by seller or purchaser not contained herein shall have any force or effect unless in an agreement signed by the officers of the seller and manufacturer. All marks used above are trademarks and/or registered trademarks of TCLAD Inc and its affiliates in the U.S., Germany and elsewhere. © 2021 TCLAD Inc. All rights reserved. US

## Dielectric Coolant ICE-5

### Material Compatibility

Item		Materials
Plastic	Acceptable	PPS, PMMA, POM, PET, Epoxy
	Marginally Acceptable*	PC, PC/GF, PE, PP
	Unacceptable	PVC, CPVC, ABS, PS, Nylon
Rubber	Acceptable	PTFE, FFKM, FKM, Viton®ETP, TPU
	Marginally Acceptable*	NBR, HNBR, ACM, Nylon
	Unacceptable	EPDM, AEM, PU, SBR, VMQ, CR, NR

\* Test condition and supplier dependent.

---

### TCLAD

US [sales.us@tclad.com](mailto:sales.us@tclad.com)  
APAC [sales.asia@tclad.com](mailto:sales.asia@tclad.com)  
Europe [sales.eu@tclad.com](mailto:sales.eu@tclad.com)  
[www.tclad.com](http://www.tclad.com)



All statements, technical information and recommendations herein are based on tests we believe to be reliable, and THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MARKET ABILITY AND FITNESS FOR PURPOSE. Sellers' and manufacturers' only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCIDENTAL, OR CONSEQUENTIAL, INCLUDING LOSS OF PROFITS OR REVENUE ARISING OUT OF THE USE OR THE INABILITY TO USE THE PRODUCT. No statement, purchase order or recommendation by seller or purchaser not contained herein shall have any force or effect unless in an agreement signed by the officers of the seller and manufacturer. All marks used above are trademarks and/or registered trademarks of TCLAD Inc and its affiliates in the U.S., Germany and elsewhere. © 2021 TCLAD Inc. All rights reserved. US