

# Pico-Surf™



Novel surfactants for the generation of picodroplets

# What is Pico-Surf™ 1?

Picodroplet technology is a rapidly growing area of interest and has many potential applications. This technology is particularly important where experiments need to be conducted on only a few nanolitres or picolitres of sample containing, for example, cells or biologically relevant solutions, such as proteins. As a result, picodroplet technology enables scientists to perform thousands to millions of reactions simultaneously.

**Pico-Surf™ 1** is a proprietary biocompatible surfactant in a fluorocarbon carrier oil. The surfactant acts to stabilise picodroplets and their cellular or molecular contents over a wide range of temperatures and biological conditions, allowing the picodroplets to be reliably stored for many hours in suitable conditions.

Pico-Surf™ 1 was developed to support the generation of aqueous solution-in-oil picodroplets for molecular biology assays, cell secretion assays, cell growth studies and electrospray ionisation mass spectrometry.



Pico-Surf™ 1 is available in two standard (2% and 5%) premade solutions in either Novec™ 7500 or Fluorinert™ FC-40 fluoruous oils.

Product Name	Volume	Product Type	Product Code
Pico-Surf™ 1 (2% (w/w) in FC-40)	10mL	Surfactant	C011
Pico-Surf™ 1 (5% (w/w) in FC-40)	10 mL	Surfactant	C012
Pico-Surf™ 1 (2% (w/w) in FC-40)	50 mL	Surfactant	C013
Pico-Surf™ 1 (5% (w/w) in FC-40)	50 mL	Surfactant	C014
Pico-Surf™ 1 (2% (w/w) in Novec™ 7500)	10 mL	Surfactant	C021
Pico-Surf™ 1 (5% (w/w) in Novec™ 7500)	10 mL	Surfactant	C022
Pico-Surf™ 1 (2% (w/w) in Novec™ 7500)	50 mL	Surfactant	C023
Pico-Surf™ 1 (5% (w/w) in Novec™ 7500)	50 mL	Surfactant	C024

## Applications

Pico-Surf™ 1 is commonly used in a wide range of microfluidic application workflows, including antibody discovery, cell line development, synthetic biology, stem cell analysis, antibiotic resistance studies and single cell disease research.

Other major applications are developing in single cell diagnostics, prognostics and single cell genome editing.

## Applications include

(but are not limited to):

- **Single Cell Isolation**
- **Single Cell Analysis**
- **Cell Secretion Assays**
- **Cell and Molecular Biology Assays**
- **Cell Growth Studies**
- **Electrospray Ionisation Mass Spectrometry**

## Key Benefits of Pico-Surf™ 1

- **Allows consistent formation and stabilization of picodroplets from 8 pL to 700 pL (volume)**
- **Manufactured to high quality standards through stringent quality assurance**
- **High purity**
- **Ready to use**
- **Long shelf life**
- **Animal Origin Free**

# Which Pico-Surf™ 1 is best for my experiment?

## I am a new user

We recommend trying Pico-Surf™ 1, 5% in Novec™ 7500, first as this is suitable for all applications, including cell secretion assays, cell growth studies and other cell and molecular biology assays.



## Carrier fluid properties

Deciding which carrier fluid (Novec™ 7500 or FC-40) to choose will depend greatly on the application and experiment.

Pico-Surf™ 1, 5% in Novec™ 7500 (C022 and C024), offers both excellent picodroplet stability with very low fusion rates, as well as good performance in biological tests.

However please note that Fluorinert™ FC-40 is more viscous than Novec™ 7500 (0.77 cSt compared to 2.2 cSt) and has a greater resistivity ( $4.0 \times 10^{15}$  Ohm-cm in comparison to  $2.2 \times 10^8$  Ohm-cm), thus may offer advantages in certain applications.

Property	Unit	Novec™ 7500	Fluorinert™ FC-40
Boiling point	°C	128	165
Pour point	°C	-100	-57
Molecular weight	g/mol	414	650
Critical Temperature	°C	261	270
Critical pressure	MPa	1.55	1.18
Vapour pressure	kPa	2.1	0.29
Heat of vaporization	kJ/kg	89	68
Liquid density	Kg/m <sup>3</sup>	1614	1855
Coefficient of expansion	K <sup>-1</sup>	0.0013	0.0012
Kinematic viscosity	cSt	0.77	2.2
Absolute viscosity	cP	1.24	4.1
Specific heat	J/kg-K	1128	1100
Thermal conductivity	W/m-K	0.065	0.065
Surface tension	mN/m	16.2	16
Solubility of water in fluid	ppm by weight	45	<7
Solubility of fluid in water	ppm by weight	<4 ppb	<5
Dielectric strength 0.1" gap	kV	>25	>40
Dielectric constant @ 1kHz	-	6.1	1.9
Volume resistivity	Ohm-cm	$10^8$	$10^{15}$

## How do I use Pico-Surf™ 1?

### Pico-Surf™ general information

Pico-Surf™ 1 is provided as a clear liquid in amber bottles. Store in an enclosed container at room temperature. Stable for 12 months when stored as recommended. Use directly; no further formulation required. For research use only.

### Picodroplet storage and incubation

We recommend storing picodroplets generated with Pico-Surf™ 1 in sterile, plastic microcentrifuge tubes. However, they can also be stored in any container that has hydrophobic surface properties. For medium to long-term storage, particularly at higher temperatures, we recommend topping up the emulsion with mineral oil to prevent evaporation.

### Picodroplet size

Picodroplet size has an influence on the performance of the surfactant. As a picodroplet increases in size, the chances of coalescence also increases.

The maximum size of picodroplet we recommend is 110  $\mu\text{m}$  diameter (700 pL).

It is worth noting that each lot of Pico-Surf™ 1 could behave slightly differently as the end product is a polymer mixture. This means that the same flow rates will not always generate exactly the same size picodroplets from experiment to experiment. On receiving a new lot of Pico-Surf™, we recommend testing it to fine-tune the conditions most suited for your needs and to ensure strict reproducibility.

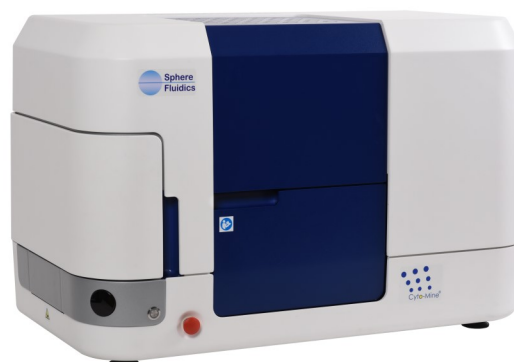


## Instrumentation also available

### Cyto-Mine®

#### The Single Cell Analysis and Monoclonality Assurance System

Selective screening, cell isolation and clone verification integrated into a single platform. Reduce your timelines, increase screening capability and delivery monoclonality. Accelerate your biologics discovery and cell line development workflows.



### Research Instruments

- Picodroplet Single Cell Encapsulation System
- Picodroplet Single Cell Assay and Isolation System

Enabling you to generate, sort, and retrieve picodroplets for a range of applications. Both are compatible with our range of microfluidic specialist chemicals and biochips, as well as other standard and custom biochips from other sources.

Notes:

Sphere Fluidics Ltd is an ISO 9001:2015 accredited company.  
Pico-Surf™ is a trademark of Sphere Fluidics Ltd.  
Fluorinert™ and Novec™ are trademarks of 3M.  
All Sphere Fluidics' supplied chemicals and bioreagents are Animal Origin Free and GLP-compliant.  
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