Sphere Fluidics

PICO-SURF™ USER GUIDE

Novel surfactants for the generation of picodroplets

WHAT IS PICO-SURF™?

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™ 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™ 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.

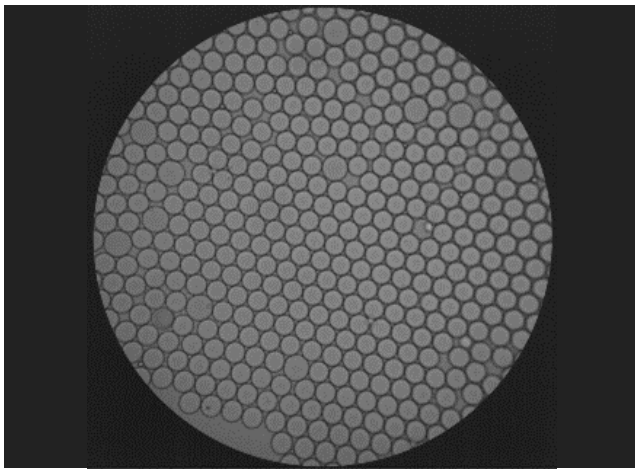
APPLICATIONS

Pico-Surf™ 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 (ESI) Mass Spectrometry

Pico-Surf™



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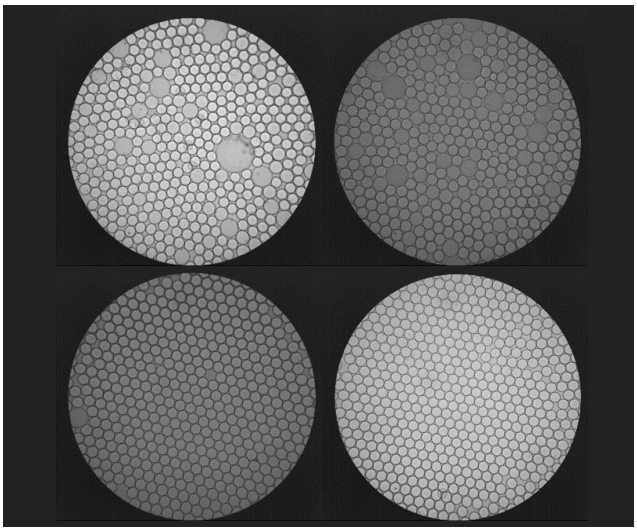

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Picodroplet fusion images illustrate how Pico-Surf™ offers the generation of robust, stable picodroplets following 95°C temperature treatments compared to commercial surfactants. This feature provides more reliable results.

PRODUCT SPECIFICATIONS

Pico-Surf™ in Novec™ 7500 is suitable for all applications, including cell secretion assays, cell growth studies and other cell and molecular biology assays. It offers both excellent picodroplet stability with very low fusion rates, as well as good performance in biological tests.

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

BENEFITS

Biocompatibility - designed for generating aqueous picodroplets in oil.

Highest picodroplet stability - shown by assessment of picodroplet fusion, interfacial tension and critical micelle concentration.

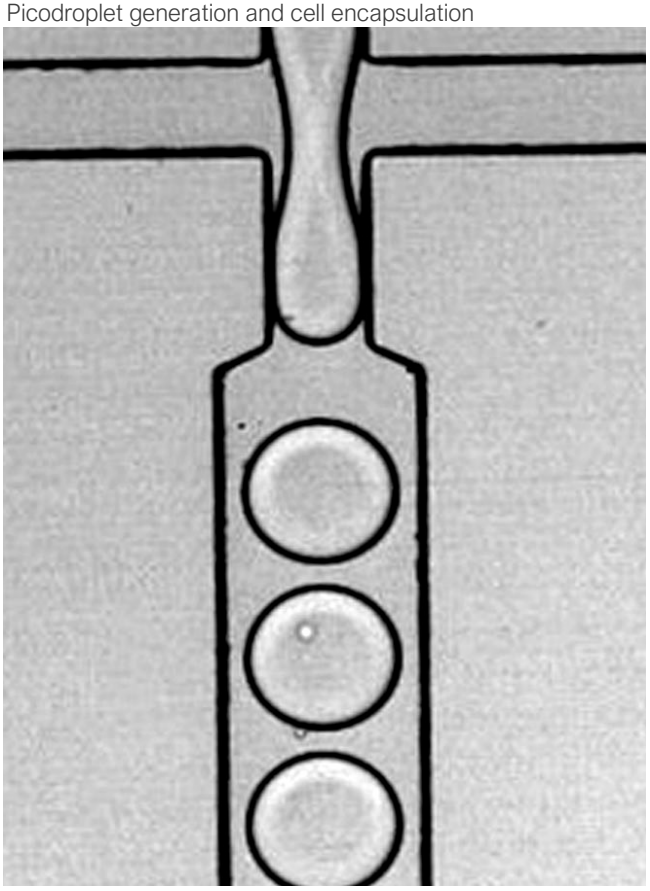
Stability at high temperature - demonstrated by the low level of picodroplet fusion.

Low voltage for piocdroplet sorting - purity and quality of the surfactants enables a more efficient picodroplet sorting process.

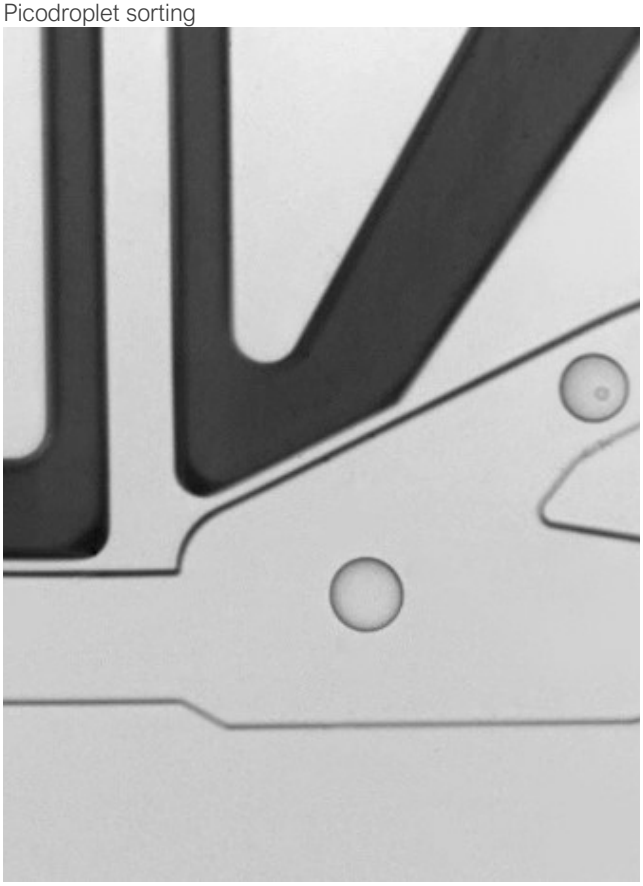
Excellent batch to batch reproducibility - all products undergo rigorous QC and QA testing to ensure batch consistency.

Patented molecular structure - patent freedom to operate in a wide range of application areas.

Picodroplet generation and cell encapsulation



Picodroplet sorting



GENERAL INFORMATION

Pico-Surf™ 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™ 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

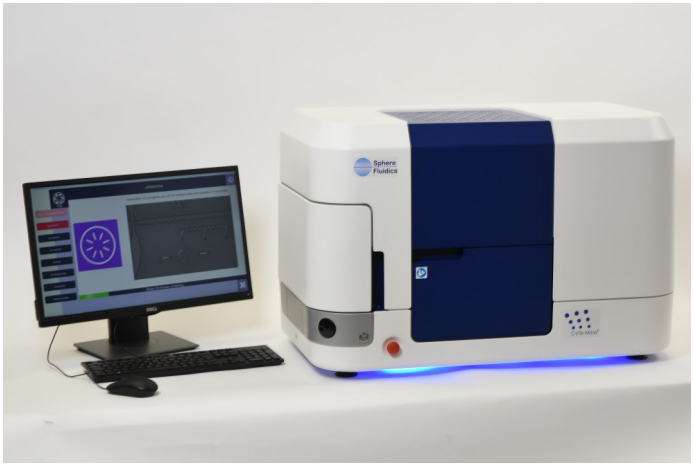
Picodroplet size has an influence on the performance of the surfactant. As a picodroplet increases in size, the chances of coalescence also increases. The maximum size of picodroplet we recommend is 110 µm diameter (700 pL). It is worth noting that each lot of Pico-Surf™ could behave slightly differently 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.

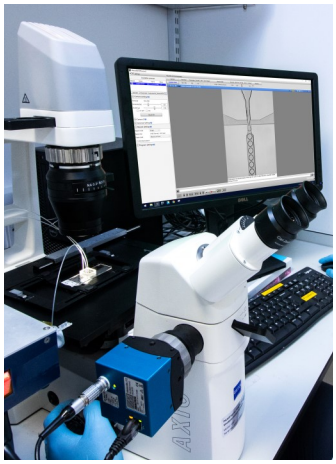
On receiving a new lot of Pico-Surf™, we recommend testing it to fine-tune the conditions most suited for your needs and to ensure strict reproducibility.

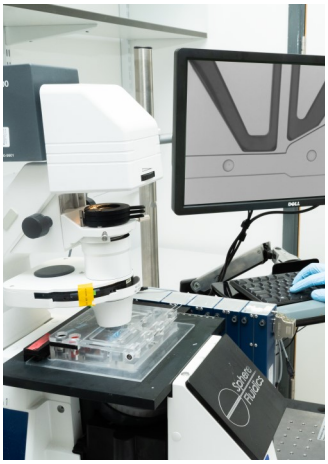
PRODUCT ORDERING INFORMATION

Product Name	Product Code	Volume	Product Type
Pico-Surf™ (2% (w/w) in Novec™ 7500)	C021	10 mL	Surfactant
Pico-Surf™ (5% (w/w) in Novec™ 7500)	C022	10 mL	Surfactant
Pico-Surf™ (2% (w/w) in Novec™ 7500)	C023	50 mL	Surfactant
Pico-Surf™ (5% (w/w) in Novec™ 7500)	C024	50 mL	Surfactant

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**

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

Sphere Fluidics

Sphere Fluidics Ltd is an ISO 9001:2015 accredited company.

All Sphere Fluidics' supplied chemicals and bioreagents are Animal Origin Free and GLP-compliant.

For research and development purposes only.

Product specifications subject to change without notice.

CE

ISO 9001

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