



# Smooth Operator

New Eppendorf micromanipulators TransferMan® 4r and InjectMan® 4  
with unprecedented movement control



Covering a broad range of applications, Eppendorf micromanipulation systems provide a high level of flexibility.

# »The new Eppendorf micromanipulators combine an intuitive user interface with an unprecedented movement control.«

Everyone who performs microinjection knows what's most important to guarantee best results: precision, fast processing and ease of use. With this in mind, we developed the TransferMan® 4r and InjectMan® 4 to make your work as easy as possible.

## Microinjection into suspension cells

- > Production of genetically modified animals using pronuclear and cytoplasmic injection (e.g. TALEN)
- > Applications in animal reproductive medicine (e.g. mouse ICSI)
- > Serial injection into fish embryos (e.g. Zebrafish, Medaka)
- > Injection into *C. elegans*, other worms, insects, etc.



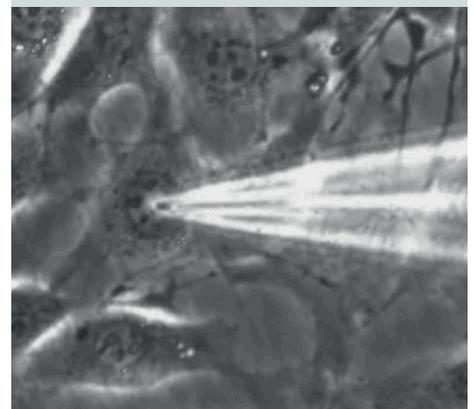
## Manipulation of suspension cells

- > Stem cell transfer
- > Nuclear transfer
- > Transplantation of cells
- > Selection and isolation of individual cells (e.g. biopsies)



## Other application examples

- > Semi-automatic microinjection into adherent cells
- > Positioning and selection of microparticles
- > Microdissection of chromosomes, etc.
- > Automatic dispensing of cell suspensions or solutions



# TransferMan® 4r

The user-friendly TransferMan 4r combines an ergonomic and innovative operation concept that is ideal for manipulation of suspension cells such as oocytes and blastocysts. Application-specific user profiles simplify the individual workflow process with four predefined application masks to choose from (e.g. for cell transfer, DNA injection, etc.). The freely programmable »My application« mask can be optimized for specific individual needs.

## Features/advantages

- > Maximum stability ensures vibration-free work
- > One-hand operation for capillary and angle settings
- > Programmable Z-axis limit for preventing capillary breakage
- > Connection with Eppendorf PiezoXpert® and Eppendorf electronic microinjectors

1 4th gear: Unique DualSpeed™ joystick for precise, instantaneous control and positioning using two different speed modes

2 Ergonomically shaped control panel for fatigue-free work

3 Optimized user interface for various applications simplifies work procedures

4 Simple and quick capillary and sample change using automated home function

5 Selection and programming of additional functions (e.g. storage of up to 5 positions, limit, Y-off)

6 Comfortable, individual speed adjustment



The unique DualSpeed™ joystick combines precise and intuitive, direct movement with dynamic movement control for covering longer distances or speeding up sample processing.

Furthermore, the dynamic movement mode can easily be switched off depending on the application need and personal preference.

# InjectMan<sup>®</sup> 4

The InjectMan 4 is ideal for microinjection into adherent cells, smaller organisms and embryos in the early stages of development. The combination of InjectMan 4, FemtoJet<sup>®</sup> 4i or FemtoJet<sup>®</sup> 4x enables a fast, semi-automatic injection. Furthermore, the InjectMan 4 is the ideal micromanipulator for all complex applications that require a dynamic movement mode and direct control of the injection process via the joystick button. The axial movement ensures the optimal protection of sensitive cells and the lowest possible mortality rate.

## Features/advantages

- > Maximum stability ensures drift-free work
- > Selection and programming of additional functions (e.g. axial movement, step injection)
- > Connection with Eppendorf PiezoXpert for piezo-assisted penetration over a pre-defined distance
- > PC interface for remote control



1 Dynamic movement control via joystick

2 Define injection levels and prevention of capillary breakage by programming the Z-axis limit

3 Connection with FemtoJet 4i, FemtoJet 4x for semi-automated axial injection

4 Simple and quick capillary and sample exchange using automated home function

5 Optimized user interface for various applications

The easily adjustable angle of the holding and injection capillaries can be set from 0° to 90°.



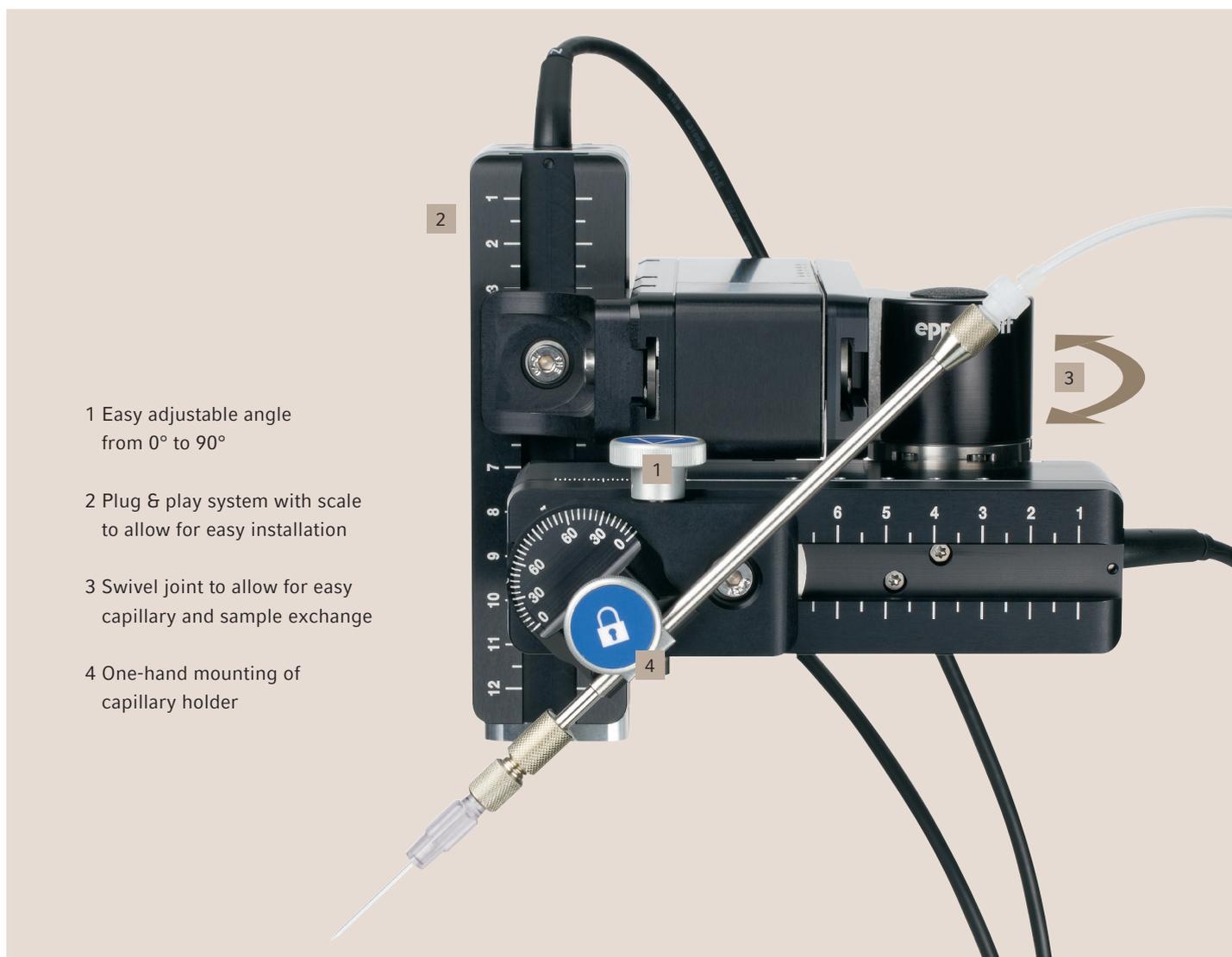
## Plug & Play Motor Modules

True to its roots, the new Eppendorf electronic micromanipulators convince with outstanding technical performance and an overall ergonomic concept. The robust and reliable devices are ergonomically correct and function with maximum stability.

The exceptional directness and smoothness of the movement in all directions make these manipulators ideal platforms for use in a broad range of applications.

Easily adaptable to all major microscope models, both, TransferMan® 4r and InjectMan® 4, can be coupled with the electronic microinjectors FemtoJet® 4i, FemtoJet® 4x and the Eppendorf PiezoXpert®. This allows for integration of the operating functions.

In combination, a micromanipulation system like this provides best performance and easiest operation.

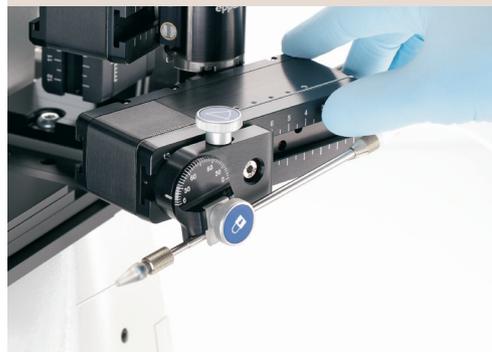


1 Easy adjustable angle from 0° to 90°

2 Plug & play system with scale to allow for easy installation

3 Swivel joint to allow for easy capillary and sample exchange

4 One-hand mounting of capillary holder



Swivel out function for easy capillary exchange.

# Examples of Micromanipulation Workstations



## Workstation for embryo manipulation techniques:

### Recommended setup

- > 2× TransferMan® 4r
- > 1× Microscope adapter (to be specified at time of order)
- > 1× CellTram® Air/1× CellTram vario
- > 1× set of 25 VacuTips
- > 1× set of 25 TransferTips® (to be specified at time of order)

### Optional

- > 1× Eppendorf PiezoXpert®
- > 1× set of 25 Piezo Drill Tips (to be specified at time of order)

## Workstation for generation of transgenic animals using pronuclear injection:

### Recommended setup

- > 2× TransferMan 4r
- > 1× Microscope adapter (to be specified at time of order)
- > 1× CellTram Air
- > 1× FemtoJet® 4i or FemtoJet® 4x
- > 1× set of 25 VacuTips
- > 2× racks of 96 Microloader

### Optional

- > 1× Eppendorf PiezoXpert

## Workstation for injection into fish embryos:

### Recommended setup

- > 1× InjectMan® 4
- > 1× Universal stand
- > 1× FemtoJet® 4x
- > 2× racks of 96 Microloader

### Optional

- > 1× Eppendorf PiezoXpert

## Workstation for adherent cell injection and for injection into *Drosophila*, *C. elegans* etc.:

### Recommended setup

- > 1× InjectMan 4
- > 1× Microscope adapter (to be specified at time of order)
- > 1× FemtoJet 4i
- > 2× racks of 96 Microloader

Compatible to all major  
microscope brands



# Eppendorf Micromanipulation Systems



## Eppendorf PiezoXpert®

Our device for piezo-assisted micromanipulation facilitates easy perforation of cells for subsequent microinjection or manipulation. The piezo impulses are transmitted onto the attached microcapillary directly and without loss. Intuitive operation and a wide adjustment range ensure best performance and reproducible work. The electronic coupling with the TransferMan 4r and InjectMan 4 enables semi-automatic piezo-supported cell penetration.



## FemtoJet® 4i / FemtoJet® 4x

Eppendorf FemtoJet 4i and 4x are perfectly suited for injecting small to intermediate volumes (up to 1  $\mu$ L) featuring a wide range of functionality, simple operation and electronic coupling to both, TransferMan 4r and InjectMan 4, allowing for easy controlling of the injection process. The FemtoJet 4i features a built-in compressor to independently deliver the required pressure. Both units convince with highest precision that allows for reproducible injections.



## CellTram® Air/Oil/vario

CellTram Air, CellTram Oil and CellTram vario—manual microinjectors for pressure control, manual microinjection, and liquid dispensing—are designed with special emphasis on optimal ergonomics, operational comfort, and high

precision. All models offer simple and reliable performance suiting all applications and personal working techniques, satisfying even the most demanding requirements.

# Eppendorf Micromanipulation Accessories



## Eppendorf Antivibration Pads

The antivibration pads are specifically designed to effectively protect your micromanipulation system against extreme vibrations. The pads are simply directly positioned under the base points of your microscope. Five different sizes are available, from XS to XL. The various pads are optimized for specific load ranges to guarantee perfect results.



## Eppendorf Cell Imaging Dishes

The Eppendorf 35 mm Cell Imaging Dish supports a premium performance in microinjection

- > Low rim side walls allow for easier access for microinjection
- > The polygonal gripping zone improves handling of dishes supported by comprehensive marks for facilitated orientation
- > A TC treated glass surface enables attachment of most adherent cells
- > A central cavity for concentrated growth and staining of cells reduces costs of antibodies and dyes



## Eppendorf Microcapillaries

Eppendorf offers a wide range of excellent microcapillaries, designed to give you fast, efficient and reproducible results for the most common applications.

All microcapillaries offer you reproducible quality through narrowly defined specifications and intensive quality control, as well as the greatest security through effective sterilization methods.

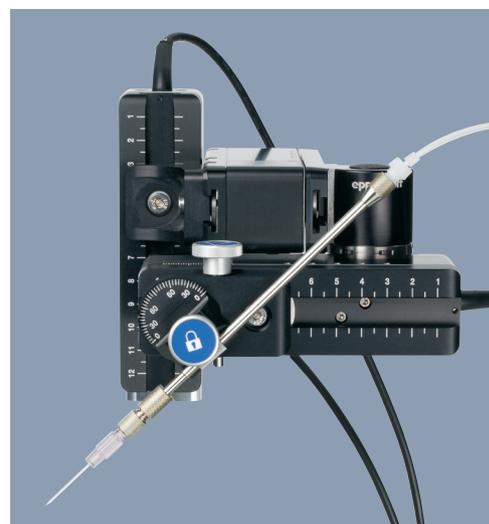
- > VacuTips for holding of suspension cells
- > TransferTips for stem cell transfer etc.
- > Femtotips and Femtotips II for microinjection of minimal volumes
- > Piezo Drill Tips for piezo-assisted micromanipulation

# Technical Specifications



Control board	TransferMan® 4r	InjectMan® 4
Control	One joystick for movement control in X-, Y-, Z-dimension	
Dimensions (W×H×D)	205 mm × 288 mm × 152 mm	
Weight (incl. mains/power supply device)	1.8 kg	
External device/PC	Serial interface SubD9, male	
Working area	Coarse, fine, x-fine	
Speed control	Proportional and dynamic kinetics	Dynamic kinetics

Motor module	TransferMan® 4r/InjectMan® 4
Max. travelling distance	≥20 mm
Weight (complete)	2.15 kg
Stepper motor	X-, Y-, Z-module
Module (X,Y,Z)	
Step size (computational resolution)	<20 nm
Speed	0–10,000 µm/s
Mechanical adjustability	>80 mm
Dimensions	129 mm × 51 mm × 36 mm
Direction of rotation	-45° – +90°
Capillary exchange	Direction of rotation: forward (swivel out)
Sample replacement	Direction of rotation: backward (swivel in)
Operating angle of angle head	0° – 90°



<b>Eppendorf PiezoXpert®</b>	
<b>Applications</b>	<ul style="list-style-type: none"> <li>&gt; Transfer of embryonic or induced pluripotent stem cells into blastocysts</li> <li>&gt; Mouse ICSI (Intracytoplasmic Sperm Injection)</li> <li>&gt; Enucleation/nuclear transfer</li> <li>&gt; Blastomere biopsy from mouse embryos</li> <li>&gt; Biopsy of equine embryos for PDG (Preimplantation Genetic Diagnosis)</li> </ul>
<b>Input voltage</b>	100 V–240 V, 50–60 Hz
<b>Power input</b>	18 W
<b>Max. power input</b>	<0.18 A
<b>Interface</b>	USB 2.0 (for technical service)
<b>Dimensions (W × H × L)</b>	17 cm × 11.5 cm × 23 cm
<b>Weight</b>	2.8 kg



	<b>CellTram® Air</b>	<b>CellTram® Oil</b>	<b>CellTram® vario</b>
<b>Applications</b>	<ul style="list-style-type: none"> <li>&gt; Gentle holding of suspension cells (e.g. ICSI)</li> <li>&gt; Manual microinjection</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Microtransfer techniques, e.g. microinjection of single cells or into plant cells, etc.</li> <li>&gt; Holding of suspension cells during biopsy techniques</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Precise and sensitive handling of microtransfer techniques (e.g. ICSI, stem cell transfer, biopsy techniques, transplantation experiments, etc.)</li> </ul>
<b>Generation of pressure</b>	Cylinder/piston system, air-filled	Cylinder/piston system, oil-filled; QuickValve re-filling system	Cylinder/piston system with gear, oil-filled; QuickValve re-filling system
<b>Calculated volume change per revolution</b>	88 µL	9.6 µL	9.6 µL/960 nL (coarse/fine)
<b>Maximum capacity</b>	2,640 µL	960 µL	960 µL
<b>Minimum adjustable volume</b>	<200 nL	<20 nL	<20 nL/<2 nL (coarse/fine)
<b>Maximum pressure</b>	2,900 hPa	20,000 hPa	20,000 hPa
<b>Pressure tube</b>	Polyethylene, 1 m length, 1 mm inner diameter; can be elongated to 2 m length (Order no. 5176 114.004 and 5176 220.009)		





	FemtoJet® 4i	FemtoJet® 4x
<b>Applications</b>	<ul style="list-style-type: none"> <li>&gt; Microinjection into suspension or adherent cells</li> <li>&gt; Semi-automatic, serial injection in combination with InjectMan 4</li> <li>&gt; Ideal for serial injection volumes from femtoliter to up to 100 pL</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Microinjection into <i>C. elegans</i>, early fish embryos, <i>Xenopus</i> oocytes</li> <li>&gt; Semi-automatic, serial injection in combination with InjectMan 4</li> <li>&gt; Preferably used for injecting higher volumes (up to 1 µL) and/or longer injection series</li> </ul>
<b>Pressure supply</b>	Integrated compressor	External pressure source required
<b>Pressure display</b>		Can be set to hPa or psi
<b>Programmable parameters</b>	Injection time, injection pressure, compensation pressure	
<b>Injection time</b>	0; 10–99; 99 s; can be set in increments of 0.01 s	
<b>Injection pressure</b>	0; 5–6,000 hPa (87 psi)	
<b>Compensation pressure</b>	0; 5–6,000 hPa (87 psi)	
<b>Clean function</b>	Maximum rinsing pressure 6,000 hPa (87 psi)	
<b>Dimensions (W × H × D)</b>	21,3 cm × 25 cm × 20,7 cm	
<b>Weight</b>	5 kg	3.5 kg
<b>Serial interface</b>	RS-232, USB (for service only)	



#### Antivibration Pads

Size	Weight range
XS	4.5–6.0 kg
S	6.0–8.0 kg
M	8.0–10.0 kg
L	10.0–12.5 kg
XL	12.5–16.5 kg

**Ordering information**

<b>Description</b>	<b>International Order no.</b>	<b>North America Order no.</b>
TransferMan® 4r, micromanipulator with DualSpeed™ joystick for direct and dynamic movement control (for research use only)	5193 000.012	5193000020
InjectMan® 4, micromanipulator with dynamic movement control (for research use only)	5192 000.019	5192000027
<b>Microscope adapter, for TransferMan® 4r and InjectMan® 4</b>		
Leica 1, for Leica® DMI3000 B, 3000 M, 4000 B, 5000 B, 5000 M, 6000 B, DM IRB E, HC, and DM IRE 2 microscopes	5192 301.000	5192301000
Leica 2, for Leica® DM IL LED and HC microscopes	5192 302.007	5192302007
Nikon 1, for Nikon Eclipse® Diaphot 200, 300 and Eclipse® Ti-E, Ti-U, Ti-S, TE200, TE300, TE2000 microscopes	5192 316.008	5192316008
Olympus 1, for Olympus® IX50, IX51, IX70, IX80, and IX81 microscopes	5192 306.002	5192306002
Olympus 2, for Olympus® IX53, IX73, IX83 microscopes	5192 307.009	5192307009
Zeiss 1, for Zeiss Axiovert® 100 and AxioObserver A1, D1, and Z1 microscopes	5192 311.006	5192311006
Zeiss 2, for Zeiss Axio Vert.A1 microscope	5192 312.002	5192312002
Universal stand, for mounting TransferMan® 4r and InjectMan® 4 micromanipulators on upright microscopes and stereo microscopes independent of the microscope tripod used	5192 325.007	5192325007
Adapter bridge, for mounting TransferMan® 4r and InjectMan® 4 micromanipulators on microscope adapters for TransferMan® NK 2, InjectMan® NI 2 and PatchMan™ NP 2	5192 321.001	5192321001
<b>Accessories for TransferMan® 4r and InjectMan® 4</b>		
Positioning aid, pack of 2, for mounting universal capillary holder on TransferMan® 4r and InjectMan® 4	5192 072.001	5192072001
Spare parts kit	5192 071.005	5192071005
Connecting cable, for connecting Eppendorf micromanipulators with FemtoJet® 4i and FemtoJet® 4x	5181 070.015	920005845
Connecting cable, connecting Eppendorf micromanipulators with PC or Eppendorf PiezoXpert®	5181 150.094	920005837
Headstage holder, for pre-amplifier, for InjectMan® 4	5192 073.008	5192073008
Foot control, for Eppendorf micromanipulators	5181 150.051	920005799
<b>Microinjectors &amp; Eppendorf PiezoXpert®</b>		
FemtoJet® 4i, programmable microinjector with integrated compressor	5252 000.013	5252000021
FemtoJet® 4x, programmable microinjector with external pressure supply	5253 000.017	5253000025
CellTram® Air, pneumatic, manual microinjector	5176 000.017	920002021
CellTram® Oil, hydraulic manual microinjector	5176 000.025	920002030
CellTram® vario, hydraulic manual microinjector with gear	5176 000.033	920002111
Eppendorf PiezoXpert®, for piezo-assisted micromanipulation, incl. actuator, foot control and spacer plate	5194 000.016	5194000024
<b>Antivibration Pads™</b>		
Antivibration Pad XS, weight range 4.5–6.0 kg	5181 301.009	920007945
Antivibration Pad S, weight range 6.0–8.0 kg	5181 303.001	920007953
Antivibration Pad M, weight range 8.0–10.0 kg	5181 305.004	920007961
Antivibration Pad L, weight range 10.0–12.5 kg	5181 307.007	920007970
Antivibration Pad XL, weight range 12.5–16.5 kg	5181 309.000	920007988

## Ordering information

Consumables	International Order no.	North America Order no.
Microloader, 2 Racks à 96 tips, 0.5–20 µL, 100 mm	5242 956.003	930001007
VacuTip™, holding capillary, 35° tip angle, 15 µm inner diameter, 1 mm flange, sterile, set of 25	5175 108.000	930001015
VacuTip™ FCH, holding capillary, 25° tip angle, 60 µm inner diameter, 0.5 mm flange, sterile, set of 25	5175 240.006	5175240006
Piezo Drill Tip Mouse ICSI, for piezo-assisted mouse ICSI, 25° tip angle, 6 µm inner diameter, 6 mm flange, sterile, set of 25	5175 220.005	930001091
Piezo Drill Tip ES, for piezo-assisted mouse ES cell transfer, 25° tip angle, 15 µm inner diameter, 6 mm flange, sterile, set of 25	5175 250.001	930001104
TransferTip® (ES), for ES cell transfer, 20° tip angle, 15 µm inner diameter, 1 mm flange, sterile, set of 25	5175 107.004	930001040
TransferTip-RP (ICSI), for sperm injection using the ICSI technique, 35° tip angle, 4 µm inner diameter, 0.5 mm flange, sterile, set of 25	5175 114.000	930001074
TransferTip-F (ICSI), for sperm injection using the ICSI technique, 35° tip angle, 4 µm inner diameter, 0.4 mm flange, sterile, set of 25	5175 106.008	930001031
TransferTip-R (ICSI), for sperm injection using the ICSI technique, sterile, 35° tip angle, 4 µm inner diameter, 1 mm flange, set of 25	5175 113.004	930001066
Polar Body Biopsy Tip MML, transfer capillary for laser-assisted polar body biopsy, 35° tip angle, 19 µm inner diameter, 1.9 mm flange, sterile, set of 25	5175 210.000	5175210000
Polar Body Biopsy Tip FCH, transfer capillary for laser-assisted polar body biopsy, 15° tip angle, 20 µm inner diameter, 0.5 mm flange, sterile, set of 25	5175 230.000	5175230000
IMSI/TESE Tip, for selection and transfer of sperm for subsequent ICSI, 35° tip angle, 8 µm inner diameter, 1.9 mm flange, sterile, set of 25	5175 117.000	5175117000
<b>Eppendorf Cell Imaging Dishes , TC treated, sterile, free of detectable pyrogens, DNA, RNase and DNase. Non-cytotoxic.</b>		
Eppendorf Cell Imaging Dish 145 µm, 35 x 10 mm	0030 740.009	0030740009
Eppendorf Cell Imaging Dish 170 µm, 35 x 10 mm	0030 740.017	0030740017

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