

# FluoroLine<sup>®</sup> Electrostatic Dissipative (ESD) Tubing

*Ideal solution for minimizing potential issues related to electrostatic discharge in the fab*

Electrostatic discharge can damage fluid handling components in OEM systems, leading to leakage or potentially hazardous conditions. Within semiconductor fabs, FluoroLine<sup>®</sup> Electrostatic Dissipative (ESD) PFA tubing minimizes potential issues related to electrostatic discharge in wet etch and clean (WEC) tools, lithography track tools and bulk solvent distribution.

We extrude static dissipative PFA stripes onto the outside of the tubing that can be grounded. Charge accumulation that develops on the outside of the tube as a result of fluid flow is redirected to external ground paths, maintaining chemical purity, ensuring safety and improving process yields. This high-purity PFA tubing comes in various standard sizes from 1/8" to 2".

## FluoroLine ESD Tubing Grounding Strap

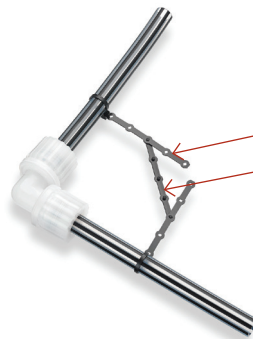
When static charges build up in the tube, the conductive stripe that has been extruded onto the outside of the tubing directs the static charge to ground through the FluoroLine ESD tubing grounding strap. This grounding strap wraps around the ESD tubing and attaches like most cable ties or zip ties. Once wrapped around the tubing, one end of the strap inserts into an integrated gear rack device then is pulled to tighten and create a connection.

The grounding strap is made of carbon-loaded polypropylene material that allows the charge to safely travel from the outside of the ESD tube, through the strap, to ground.

The strap is manufactured with a series of holes that can be used to ground the ESD charge or to connect additional grounding straps. To ground the ESD charge, attach a screw through one of the holes and secure the strap to ground.

## FluoroLine ESD Grounding Strap Connector

We also offer a carbon-loaded polypropylene grounding strap connector that enables you to easily connect multiple grounding straps (up to 5) with one screw. These connectors simplify grounding by minimizing the number of screws used.



FluoroLine ESD tubing grounding strap

FluoroLine ESD tubing grounding strap connector

Conductive grounding strap attaches to the FluoroLine ESD tubing directing the ESD charge to ground.

## APPLICATIONS


- High-purity chemical applications for WEC tools and bulk chemical distribution systems
- Flammable chemistries such as solvents

## FEATURES & BENEFITS

<b>Extruded stripe outside ESD tubing</b>	Provides a grounding path for electrostatic charge buildup in tubing
<b>The PFA wetted material is 100% virgin high-purity grade</b>	Provide the lowest extractable ionic and organic levels

## SPECIFICATIONS

### FluoroLine ESD tubing

<b>Materials of construction</b>	Wetted material is constructed of 100% virgin PFA 451 HP resin Nonwetted material is conductive carbon-loaded PFA
<b>Surface resistivity</b>	$1 \times 10^{5-6}$ Ohm/sq
<b>Sizes available*</b>	1/8" – 2"
<b>Approvals</b>	 Tested according to: ANSI/ESD S20.20:2014 ANSI/ESD S1.1:2006 EN-ISO 4413:2010 <b>FluoroLine ESD tube is approved by TUV.</b>

### Grounding strap and connector

<b>Materials of construction</b>	Carbon-loaded polypropylene
<b>Surface resistivity</b>	$1 \times 10^{5-6}$ Ohm/sq
<b>Dimensions</b>	1/8" – 1": 210 mm H x 9 mm W x 5.5 mm L (8.27" H x 0.35" W x 0.22" L) 1 1/4" – 2": 256 mm H x 9 mm W x 5.5 mm L (10.7" H x 0.35" W x 0.22" L) Connector: 99 mm H x 9 mm x 5.05 mm L (3.9" H x 0.35" W x 0.20" L)

\*Please contact local representative for availability.

### Installation Information

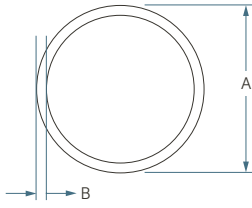
The recommended distance between grounding straps for effective grounding is  $\leq 10$  meters. Screw grounding strap to a known ground to earth. Up to 5 grounding straps may be overlapped and grounded using one screw.

Effective grounding includes attaching a grounding strap on either side of a fitting, valve or any other fluid handling component.

Entegris ESD tubing can be used with insert or flare style fittings.

## DIMENSIONS

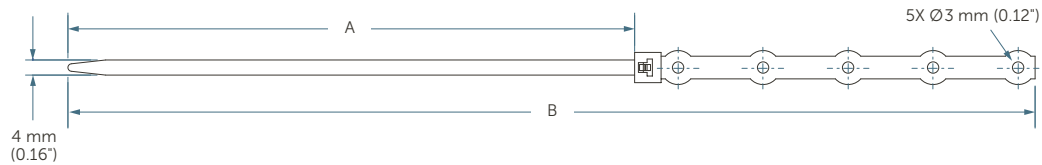
### FluoroLine ESD Tubing



### Flow recommendations:

Size	A Outside diameter	B Wall thickness	Minimum bend radius
1/8"	3.18 mm ±0.08 mm (0.125" ±0.003")	0.508 mm ±0.10 mm (0.020" ±0.004")	13 mm (0.5")
1/4"	6.35 mm ±0.102 mm (0.250" ±0.004")	1.194 mm ±0.10 mm (0.047" ±0.004")	38 mm (1.5")
3/8"	9.52 mm ±0.102 mm (0.375" ±0.004")	1.575 mm ±0.127 mm (0.062" ±0.005")	51 mm (2.0")
1/2"	12.70 mm ±0.127 mm (0.500" ±0.005")	1.575 mm ±0.127 mm (0.062" ±0.005")	58 mm (2.3")
3/4"	19.05 mm ±0.127 mm (0.750" ±0.005")	1.575 mm ±0.127 mm (0.062" ±0.005")	229 mm (9.0")
1"	25.40 mm ±0.127 mm (1.000" ±0.005")	1.575 mm ±0.127 mm (0.062" ±0.005")	279 mm (11.0")
1 1/4"	31.75 mm ±0.203 mm (1.250" ±0.008")	1.905 mm ±0.127 mm (0.075" ±0.005")	318 mm (12.5")
1 1/2"	38.10 mm ±0.203 mm (1.500" ±0.008")	2.184 mm ±0.127 mm (0.086" ±0.005")	572 mm (22.5")
2"	50.80 mm ±0.25 (2.000" ±0.01")	2.296 mm ±0.203 mm (0.090" ±0.008")	635 mm (25")

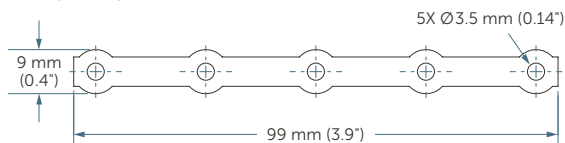
### FluoroLine ESD Tubing Grounding Strap



Part number	Dimension A	Dimension B	Tubing sizes
PLAT-STRAP-E1	104 mm (4.1")	210 mm (8.3")	1/8" to 1"
PLAT-STRAP-E2	150 mm (5.9")	256 mm (10.1")	1 1/4" to 2"

### FluoroLine ESD Grounding Strap Connector

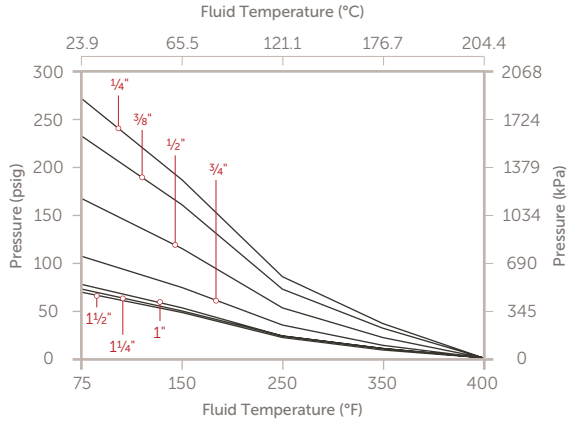
PLAT-STRAP-C



## PERFORMANCE DATA

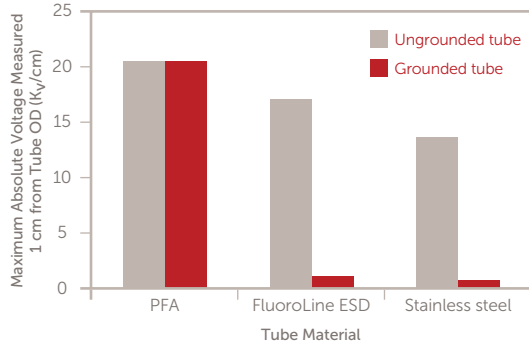
This graph illustrates pressure versus temperature for the full range of sizes (1/4" to 1 1/2").

### Pressure vs. Temperature



## Static Dissipative Properties

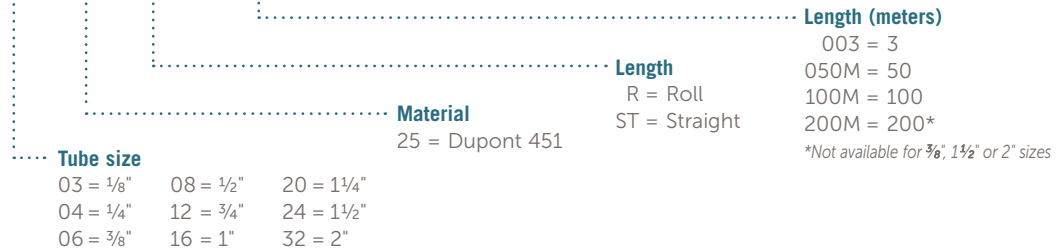
Deionized (DI) water flow was alternated with XCDA® (Extreme Clean Dry Air) flow creating a static charged system. Three tubing materials were tested including standard PFA tube, the ESD PFA tube and the stainless steel tube. Maximum absolute voltage was measured and monitored at 1 cm distance from the outside of each tube.



## ORDERING INFORMATION

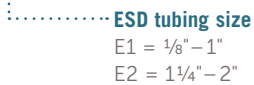
FluoroLine ESD Tubing: part number

PLAT - - 25 - -



Grounding Strap: part number

PLAT-STRAP-



Grounding Strap Connector: part number

PLAT-STRAP-C

Note: ESD grounding straps and grounding connectors are sold in quantities of 100.

#### FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit [entegris.com](http://entegris.com) and select the [Contact Us](#) link to find the customer service center nearest you.

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