

Thermo Scientific ClipTip Technology – Part 1

Transform Your Daily Pipetting

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Key Words

- **Tip Fitting** – is the part of the pipette shaft that positions, connects and seals the pipette to the tip.
- **Conical Tip Fitting** – the system by which a cone shaped pipette fitting utilizes friction to attach to a compatible cone shape tip fitting.
- **Cylindrical Tip Fitting** – the system by which a cylindrical shaped pipette fitting utilizes friction to attach to a compatible cylindrical shape tip fitting.
- **Interlock Technology** – the system by which a pipette fitting opens clips on tip fitting and locks the tip into place forming an airtight seal with the sealing ring.

Introduction

In liquid handling, it is a challenge to ensure a quality seal in daily pipetting. The ideal solution is for the pipette and tip to form a system that increases confidence in reproducibility, reduces forces required to attach and detach the system, and secures the best possible accuracy and precision. With the introduction of innovative technologies, Thermo Scientific continues to improve pipetting efficiencies.

Innovative ClipTip Technology

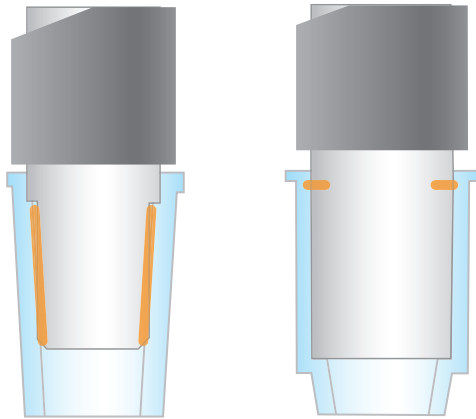
The Thermo Scientific® F1-ClipTip® interlock technology is based on flexible clips positioned evenly around the top of the tip. During attachment the unique tip fitting shape opens the clips, and the clips pass over the fitting flange and return to closed position. The clips lock the tip behind the flange creating a complete seal with the sealing ring (figure 1). In addition, the lock ensures the tip will not loosen, or fall off during pipetting or touch-off.

Tip ejection is achieved by opening the clips with the clip opener mechanism (figure 2). After the clips have opened, the ejection mechanism pushes the unlocked tip off from the tip fitting.



The F1-ClipTip system forms an airtight seal on every channel.

Friction Sealing System Diagram shows the sealing area highlighted in orange.



A fallen tip wastes precious sample, and your time.

Friction sealing system

Pipettes with a friction seal system rely on a user's force to attach tips to the pipette, which varies from user to user. There are two types of friction based sealing systems; conical and cylindrical (figure 3). The sealing area is usually large and depending on the quality of the tip used, the conical tip fitting method requires relatively high attachment forces to achieve sufficient sealing. It is possible to use excessive force in attachment phase and therefore the tips may jam having a considerable affect on force required to eject the tips common contributing to repetitive strain injuries. Attaching the tips with the same force every time is challenging, which reduces the reliability of seal. Repeatedly forcing tips to properly attach wears the tip cone over time which leads to inconsistencies, inaccuracies and imprecision. Also, using an insufficient amount of force with friction sealing systems increases the risk of tips becoming loose, or even falling off.

ClipTip System Diagram shows how the clips lock the tip firmly in place.

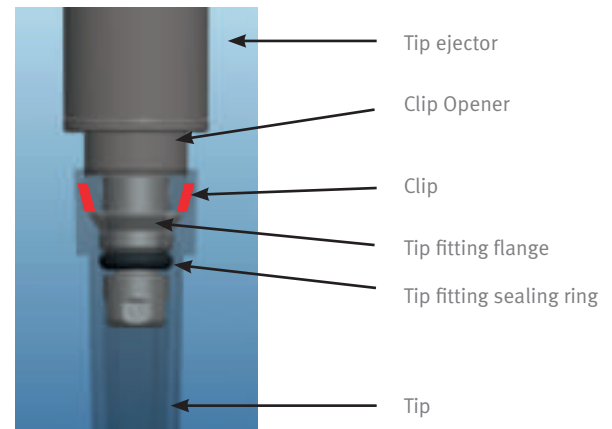


Figure 1: Clips closed behind the flange. The tip is sealed.

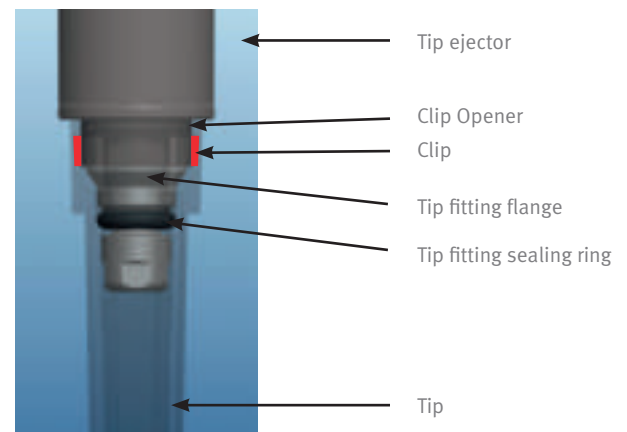


Figure 2: During tip ejection clips are opened and tip ejector pushes the tip off.

Interlocking system

The interlocking tip attachment system provides an easy method to use correct attachment force for tips. Each time ClipTip pipette tips are on, they are sealed.

The seal will last for as long as the tips are attached to the pipette regardless of application or touch-off pressure (e.g. tip touching to container wall to wipe off outside droplets). Since the tips are locked with the clips they are always attached with the same force. Tip ejection of the ClipTip interlocking system requires less than 50% of the force required for conical tip fitting system. If a sufficient force level is not reached during attachment the ClipTip tips remain in the tip rack. This ensures that there is no risk for intermediately attached tips to fall off during use to waste valuable samples and time as is the case with other systems.

ClipTip system - sealed in security

The Thermo Scientific ClipTip pipette tips form a complete and reliable seal with the tip fitting sealing ring in the F1-ClipTip pipette. The interlocking clips maintain the sealing force with the sealing ring.

The tip fitting is acid resistant AISI 316 steel, which is a commonly used material in appliances where corrosion resistance is needed (e.g. chemical and petrochemical industry). The material is both mechanically durable and chemically resistant. The probability of sample contamination by metal ions from the tip fitting during intended use is infinitesimal as there is no liquid contact to metal.

The sealing rings are FVM fluorosilicone (tip fitting sealing ring) and EPDM rubber (other sealing rings), which are commonly used sealing materials. Endurance testing of sealing rings showed that they seal the tip reliably after prolonged use. It is recommended to change the tip fitting sealing ring with regular maintenance of the pipette. Information about maintenance can be found from the F1-ClipTip Instructions for Use. With highly sensitive applications and aggressive chemicals the use of filter tips is recommended.

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