

# Smart Notes

Select adjustable tip spacing pipettes with the lowest tip attachment and ejection forces.



## Do the tip attachment and ejection force vary significantly among different adjustable tip spacing pipette brands?

**Yes.** Thermo Scientific™ E1-ClipTip™ Electronic Adjustable Tip Spacing Multichannel Equalizer Pipette has up to 87% lower tip attachment and up to 93% lower tip ejection forces compared to the other adjustable tip spacing pipettes. Several companies claim their pipettes have the lowest tip attachment and ejection forces, but fail to prove it with data. We have tested the adjustable tip spacing pipettes available on the market today to show the E1-ClipTip Equalizer Pipette requires the lowest forces to operate.

The force needed to attach and eject tips plays a crucial part in Good Laboratory Pipetting (GLP) for accuracy and precision, as well as in avoiding the risk of Repetitive Strain Injury (RSI) to the user, which should be taken into consideration when selecting a pipette. Adjustable tip spacing pipettes are often used to save time when pipetting samples between different labware formats. By reducing the amount of time and number of repetitive motions, pipetting is more efficient and less likely to have accidental errors<sup>1</sup>. **With the E1-ClipTip Equalizer Pipette there is the added benefit of interlocking ClipTip technology, which ensures secure tip attachment with a light touch<sup>2</sup>.** Combined with electronic tip ejection, index-finger operation and an adjustable finger rest, the E1-ClipTip Equalizer Pipette offers a more comfortable experience and improves ergonomics in pipetting.



# Why

The E1-ClipTip Equalizer Pipette has up to 87% lower tip attachment and up to 93% lower tip ejection forces compared to the other adjustable tip spacing pipettes.

## Tip attachment forces

Tip attachment forces were measured using the 8-channel E1-ClipTip Equalizer Pipette, and two other 8-channel adjustable tip spacing pipettes (Manufacturers A and B) with a volume range of 15–1250 µl. The tip attachment forces were measured ten times in a standardized way using a balance. The tests were performed with pipette tips and an attachment technique recommended by the manufacturer of each pipette model. **Tip attachment forces of the E1-ClipTip Equalizer Pipettes were up to 87% lower compared to the other adjustable tip spacing pipettes tested (Figure 1).**

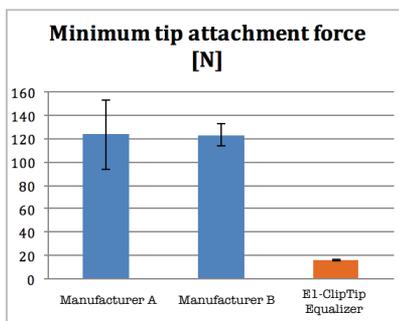


Figure 1. Average results from the tip attachment force measurements. Measurement unit is converted to Newton [N]. Error bars show standard deviation.

## Tip ejection forces

The tip ejection forces were measured ten times, with the same pipette and tip models as the tip attachment forces, in a standardized way using a digital force gauge. **Tip ejection forces of the E1-ClipTip Equalizer Pipettes are up to 93% lower compared to the other adjustable tip spacing pipettes tested (Figure 2). The tip ejection forces of E1-ClipTip Equalizer Pipettes are minimal, since tips are ejected electronically, triggered by a light touch on one of the tip ejection keys.** This unique feature is not offered by other adjustable tip spacing pipette manufacturers, and significantly contributes to optimum comfort and ease of pipetting.

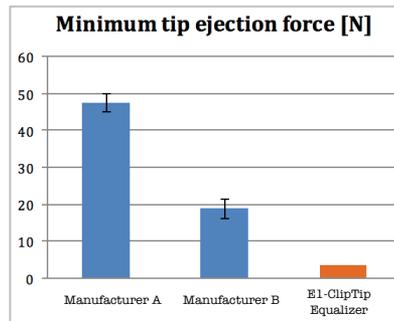


Figure 2. Average results from the tip ejection force measurements. Error bars show standard deviation. The E1-ClipTip Equalizer pipette is the only adjustable tip spacing pipette that has electronic tip ejection, requiring only a light press of the tip ejection keys. The ejection force is, therefore, constant and very low.



## Summary

Tip attachment and ejection forces play a significant role in Good Laboratory Pipetting (GLP) ergonomics, which optimizes pipetting comfort, accuracy and precision. The E1-ClipTip Equalizer Pipette requires 87% lower tip attachment forces and up to 93% lower tip ejection forces compared to other pipettes tested due to the unique ClipTip technology and the electronic tip ejection. This, combined with a personalized and versatile user interface, makes E1-ClipTip Equalizer Pipettes an ideal option for higher throughput and more complex applications by offering increased efficiency and improved pipetting ergonomics. The Thermo Scientific ClipTip Pipetting System is available in both manual and electronic pipettes.



## References

1. Liquid Transfer Application Team 2014. *Is there an easier and more efficient way to transfer liquids between various labware formats, than using traditional handheld pipettes?* (Smart Note, Thermo Fisher Scientific, SMHPE1CT0214)
2. Koivisto S., & Berghäll S. 2012. *Thermo Scientific ClipTip Technology—Part 1. Transform Your Daily Pipetting* (Application Note, Thermo Fisher Scientific, ANHPF1ClipTip0912)



Learn more about the revolutionary ClipTip System at [www.thermoscientific.com/cliptip](http://www.thermoscientific.com/cliptip)

thermoscientific.com

© 2016 Thermo Fisher Scientific Inc. All Rights Reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries. Specifications, terms and pricing are subject to change. Not all products are available in all countries. Please consult your local sales representative for details.

North America: 800 625 4327

Europe: Austria +43 1 801 40 0, Belgium +32 53 73 42 41, France +33 2 2803 2180, Germany national toll-free 08001-536 376, Germany international +49 6184 90 6000, Italy +39 02 02 95059 552, Netherlands +31 76 571 4440, Nordic/Baltic/CIS countries +358 10 329 2200, Russia +7 (495) 739 76 41, Spain/Portugal +34 93 223 09 18, Switzerland +41 44 454 12 12, UK/Ireland +44 870 609 9203, Asia: China +86 21 6865 4588 or +86 10 8419 3588, India toll-free 1800 22 8374, India +91 22 6716 2200, Japan +81 45 453 9220, Other Asian countries, +852 2885 4613, Countries not listed: +49 6184 90 6940, or +33 2 2803 2180.

SNHPE1CTEqu0216

**Thermo**  
SCIENTIFIC

A Thermo Fisher Scientific Brand