

Ejection and Mounting Forces of Labcon Pipette Tips on Various Pipettors

Background:

The strain put on the hand and arm muscles during pipetting can be detrimental if precautions are not taken. Many researchers in the life science field perform several pipetting applications on a daily basis without considering the amount of force it takes to mount and eject each tip. Labcon has worked to develop pipette tips that fit the abundance of pipettors, while still requiring minimal force to use. The purpose of this study is to examine the ejection and mounting forces involving in pipetting and how they vary depending on the brand of pipettor used.

Procedure:

All pipettors were tested using Labcon pipette tips: product number 1017 and lot number 434SQ. A total of eight pipettors were tested for the amount of force required to mount and eject Labcon's tips. The following pipettors were used:

1. Gilson Pipetman P-200
2. Gilson Pipetman Ultra U-200
3. Biohit mLine 200
4. Eppendorf Research 200
5. Thermo Focus 20-200
6. VWR Signature
7. Hamilton 200
8. Socorex Acura

Six trials were performed to determine ejection force and four trials were run to determine mounting force. For each pipettor, a tip was mounted and the pipettor was attached to a ring stand with a clamp. Using a Mark-10 MG20 force gauge, the ejection button was depressed enough to eject the tip. The peak force required to eject the tip was recorded. The direct force placed on the rack when mounting was recorded as the mounting force. All force values were recorded in pounds and converted to kilograms (1lb=0.452kg).

Results:

The pipettors all had low ejection and mounting forces using 1017 tips as displayed in Fig 2 and 3. The Thermo-focus 20-200 had the lowest ejection force of 0.84kg. The Eppendorf research 200 had the lowest mounting force of 1.09kg.

pipettor	force	1	2	3	4	5	6	average
P200	ejection	1.26	0.99	1.06	1.22	1.27	1.21	1.17
	mounting	1.4	1.38	1.32	1.38			1.37
U200	ejection	0.91	0.97	0.85	0.9	0.81	0.71	0.86
	mounting	1.3	1.31	1.39	1.29			1.32
Biohit	ejection	1.13	1.39	1.22	1.16	1.35	1.32	1.26
	mounting	1.92	1.98	1.98	2.15			2.01
Eppendorf	ejection	1.43	1.19	1.54	1.32	1.4	1.43	1.39
	mounting	1.02	1.11	1.03	1.21			1.09
Thermo	ejection	0.82	0.78	0.85	0.83	0.86	0.88	0.84
	mounting	1.59	1.63	1.72	1.6			1.64
VWR	ejection	1.47	1.31	1.43	1.38	1.47	1.46	1.42
	mounting	0.92	1.19	1.19	1.28			1.15
Hamilton	ejection	1.38	1.5	1.43	1.36	1.44	1.65	1.46
	mounting	1.93	1.65	1.79	1.78			1.79
Socorex	ejection	2.03	1.85	1.67	2	1.73	1.88	1.86
	mounting	2.02	1.92	1.56	1.73			1.81

Fig 1. Mounting and Ejection Forces of 1017 Tips on Various Pipettors

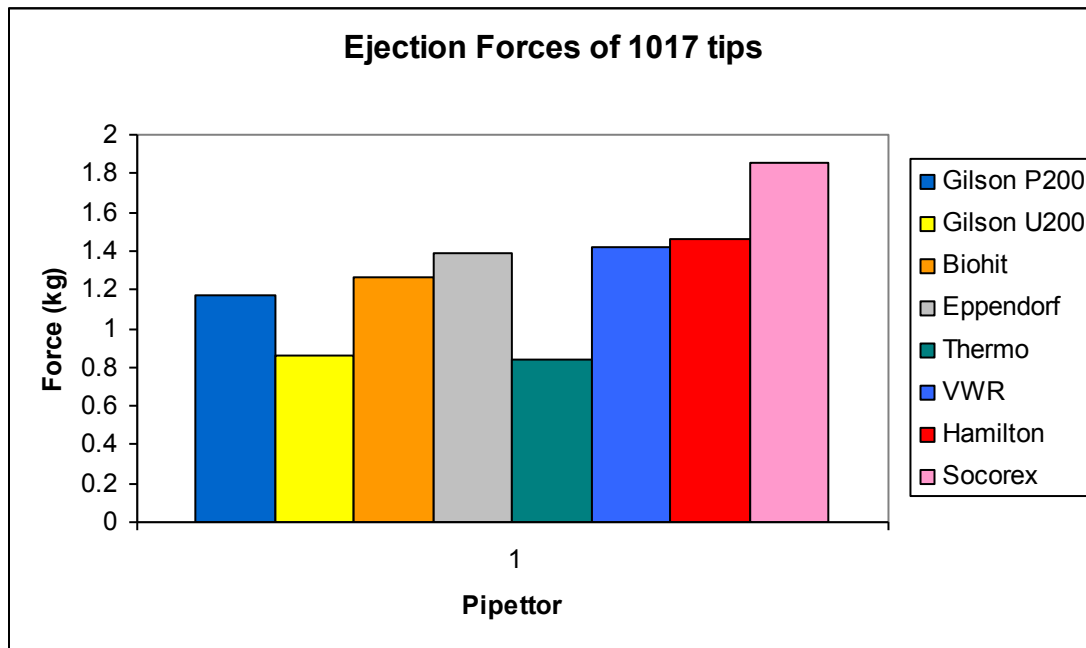


Fig 2. Ejection Forces of 1017 Pipette Tips

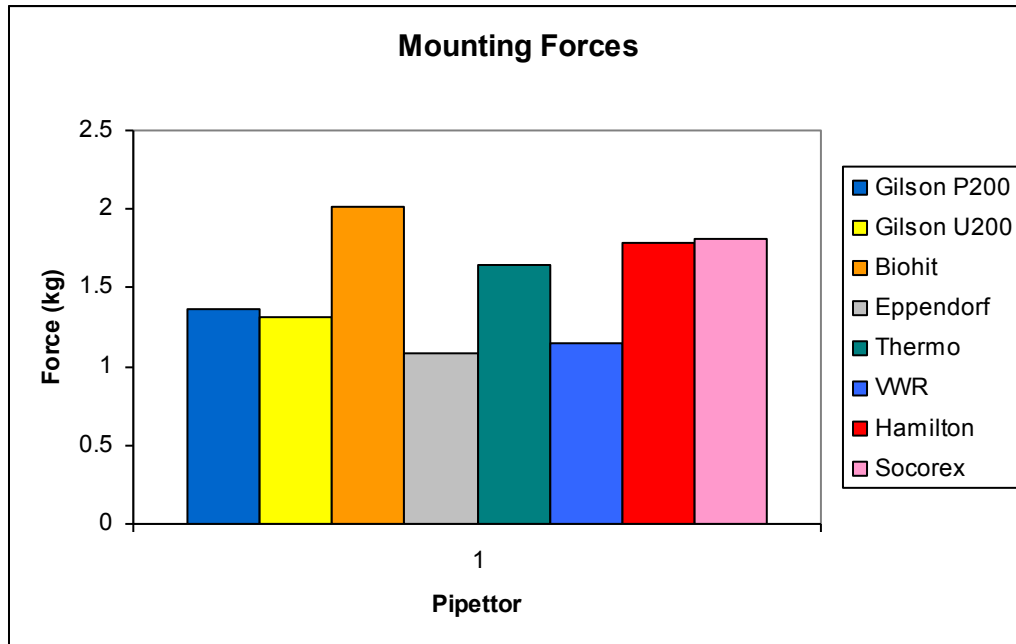


Fig 3. Mounting Forces of 1017 Pipette Tips

Discussion:

In many laboratories, you will find a variety of different pipettors. Because more than one brand of pipettor are found in most labs, having a pipette tip with a consistent seal on each one is desirable. From the data gathered in this experiment, it is apparent that Labcon's 1017 tip will not only fit a wide variety of pipettors, but require consistent ejection and mounting forces as well. These consistently low force values translate to less hand and arm strain for the busy technician. There are also no surprises when switching pipettors. With the 1017 tip, you can expect virtually the same ejection and mounting forces regardless of the pipettor.