

Baxa Corporation

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## **Syringe Infuser Syringe Comparison**

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### Technical Paper

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Performance comparison of different manufacturers' syringes in the Braun Perfusor Basic syringe infuser.

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## Introduction

Different syringe manufacturers vary slightly in their manufacturing specifications for syringes designed to contain similar volumes. These dimensional variations may cause changes in performance when used with specific syringe infusers. Therefore, it is important to understand the effect, if any, that manufacturing variations in barrel size, length or other specifications may have on the performance, specifically the rate of administration, with syringe infusers.

The purpose of this characterization is to compare the delivered volume of different brands of 10 cc syringes in the B | Braun Perfusor<sup>®</sup> Basic syringe infuser. The Braun Perfusor is a variable rate syringe infuser commonly used to administer intermittent antibiotics, particularly in pediatric settings. Hospitals using BD syringes for IV doses program the Perfusors to match the BD syringe dimensions. Four different syringe types were chosen to represent the most commonly used syringes in US healthcare settings.

Other common syringe infusers were not included in this technical paper, because unlike the B. Braun Perfusor Basic, they infuse at a fixed rate and are therefore not affected by syringes' dimensional variations. These other syringe infusers include the Bard/Baxter Mini-Infuser<sup>™</sup> 150XL, Excelsior<sup>™</sup> Syringe Pump ESP and the Baxa MicroFuse<sup>®</sup> Dual Rate Syringe Infuser

## Test Description

1. Twelve (12) syringes of each type were filled with 10 cc of water.
2. The Perfusor was programmed according to the enclosed instructions for use to deliver the syringe volume at the 10, 15, 30 and 50 minute rates, respectively.
3. The syringe delivery was performed and recorded three separate times for each delivery setting.
4. In each example, the delivered volumes were weighed to the nearest 1/100<sup>th</sup> of a gram and recorded in the Results table.
5. A stopwatch recorded the delivery time for each sample.

## Results

Syringe Make and Sample #	10 Min Setting	15 Min Setting	30 Min Setting	50 Min Setting
B-D 1	9 min 59 sec	15 min 27 sec	30 min 22 sec	51 min 38 sec
B-D 2	10 min 16 sec	15 min 9 sec	30 min 27 sec	52 min 24 sec
B-D 3	10 min 7 sec	15 min 2 sec	31 min 27 sec	51 min 55 sec
<b>B-D Averages</b>	<b>10 min 6 sec</b>	<b>15 min 13 sec</b>	<b>30 min 45 sec</b>	<b>51 min 59 sec</b>
Terumo 1	9 min 6 sec	13 min 18 sec	28 min 16 sec	47 min 57 sec
Terumo 2	9 min 7 sec	13 min 14 sec	27 min 55 sec	47 min 25 sec
Terumo 3	9 min 2 sec	13 min 22 sec	28 min 33 sec	47 min 7 sec
<b>Terumo Averages</b>	<b>9 min 5 sec</b>	<b>13 min 18 sec</b>	<b>28 min 15 sec</b>	<b>47 min 30 sec</b>

Syringe Make and Sample #	10 Min Setting	15 Min Setting	30 Min Setting	50 Min Setting
Monoject 1	11 min 22 sec	16 min 18 sec	30 min 20 sec	51 min 6 sec
Monoject 2	10 min 57 sec	16 min 16 sec	31 min 46 sec	51 min 6 sec
Monoject 3	11 min 11 sec	15 min 18 sec	30 min 53 sec	51 min 1 sec
<b>Monoject Averages</b>	<b>11 min 10 sec</b>	<b>15 min 57 sec</b>	<b>31 min 00 sec</b>	<b>51 min 4 sec</b>
Codan 1	10 min 21 sec	14 min 43 sec	30 min 04 sec	52 min 24 sec
Codan 2	10 min 45 sec	14 min 45 sec	30 min 59 sec	51 min 41 sec
Codan 3	10 min 03 sec	15 min 31 sec	30 min 53 sec	52 min 00 sec
<b>Codan Averages</b>	<b>10 min 23 sec</b>	<b>15 min 00 sec</b>	<b>30 min 39 sec</b>	<b>52 min 02 sec</b>

## Conclusion

The data collected during this study demonstrated the following:

- Average BD syringe deliveries varied from 1 to 4% from their specified rate setting.
- Average Terumo syringe deliveries varied from 5 to 11% faster, as compared to the infuser's specified rate setting.
- Average Monoject syringe deliveries varied from 2 to 12% percent slower, as compared to the infuser's specified rate setting.
- Average Codan syringe deliveries varied from 0 to 4% percent slower, as compared to the infuser's specified rate setting.

The delivery variations in actual versus programmed infusion times from one manufacturer to another are very small, particularly in conjunction with a 10 mL dose volume. According to Michael Hurst, RPh, MBA; Vice President of Infusion Systems for Baxa Corporation, these variations for the Terumo, Monoject and Codan syringes in the B| Braun Perfusor are clinically insignificant for the intermittent IV drugs typically infused in the device.