



Calculating Flow Rates

Updated April 22, 2020

Calculating mL per hour

- Total volume in mLs/total time in hours = mL per hour

$$\frac{\text{Volume (mL)}}{\text{Time (hr)}} = \text{Flow Rate (mL/hr)}$$

- Example: The Clinician has ordered 1000mL NS to be infuse over 4 hours
 - 1000mL/4 hours = 250mL/hr

Calculating Flow Rate (drops per minute = gtts/min)

- Refer to [Appendix A](#) for a [Reference Gravity Flow Rate Chart](#)
- Determine the drop factor of the tubing you will be utilizing as you will need this for your calculation (Example of how to read BD Alaris™ Pump tubing insert refer to [Appendix B](#))
 - Drop factor: Number of drops in 1 mL of solution referred to as gtts/mL
 - Microdrip tubing: Typically 60 gtts/mL
 - Macrodrop tubing: Typically 10-20 gtts/mL
- Take the total volume (mLs) divided by time (minutes), then multiple that number by the drop factor (gtts/mL) = IV flow rate in drops per minute (gtts/min)

$$\frac{\text{Volume (mL)}}{\text{Time (min)}} \times \text{Drop Factor (gtts/mL)} = \text{Flow Rate (gtts/min)}$$

- Example: The clinician has ordered 1000 mL NS to be infuse over 4 hours. You have macrodrip tubing with a drop factor of 10 gtts/mL.
 - Convert hours to minutes
 - 4 hours x 60 minutes = 240 minutes
 - (1000mL/240min) x 10 gtts/mL = 41.66 gtts/min (round to 42 gtts/min)

The following are some factors that may alter gravity flow rate:

- Height of infusion bag
- Distance to patient
- Size of catheter
- Viscosity of infusion (e.g. crystalloid, propofol, etc.)

For any additional questions related to this information, please visit www.bd.com/MMSCOVID, call 858-617-1316 or email GMB-AlarisMedSafetyProgram@bd.com.



Appendix A: **Reference Gravity Chart of Drops per Minute**



Flow Rate (mL/hr)	<u>10 drops</u> = 1mL (drops/per min)	<u>15 drops</u> = 1mL (drops/per min)	<u>20 drops</u> = 1mL (drops/per min)	<u>60 drops</u> = 1mL (drops/per min)
10	2	2	3	10
25	4	6	8	25
50	8	12	17	50
75	12	19	25	75
100	17	25	33	100
125	21	31	42	125
150	25	37	50	150
175	29	43	58	175
200	33	50	67	200
250	42	62	83	250
300	50	75	100	300
400	66	100	133	400
500	83	125	167	500
750	125	187	250	750
1000	167	250	333	1000



Appendix B: Example of BD Alaris™ Pump Tubing Insert

Priming Volume & Set Length

Directions for Use (e.g. proper priming, etc.)

Recommendations

----- TEAR TO OPEN -----

BD Alaris™ Pump Infusion Set
Back Check Valve
 2 SmartSite™ Y-sites

REF 2420-0007
 ≈ 25 ml; ≈ 297 cm (117 in)

WARNING:
 TO PREVENT FREE-FLOW, CLOSE SET CLAMP WHEN SAFETY CLAMP ON PUMP SEGMENT IS OPEN.

Directions: Use Aseptic Technique

1. Prior to every access, swab y-site with 70% isopropyl alcohol and allow to dry (approximately 30 seconds).
2. Close roller clamp.
3. Spike solution container and hang.
4. Squeeze and release middle of drip chamber until approximately 2/3 full. Open vent cap on spike after filling drip chamber if container requires venting.
5. Open roller clamp to prime. If applicable, attach syringe to y-site and aspirate miniscule air bubbles. Close roller clamp.
6. Insert pump segment into pump. (For proper placement information refer to pump User Manual.)

Cautions and Recommendations:

- Do not place on sterile field. Do not use if protective end caps are not in place, if package is open, or if product is damaged or leaks.
- Safety clamp on pump segment is closed when white slide clamp is extended. To open, press grooved blue tab while pushing the white slide clamp into the blue housing.
- If y-site is accessed by a needle, the valve will be damaged causing leakage. Replace set immediately.
- Do not use blunt cannula with y-site.
- Do not leave slip luer syringes unattended in y-site.
- During use of y-site, fluid may be observed between the housing and blue piston. This fluid does not enter the fluid path and requires no action.
- For product questions, contact your BD representative. Consult facility protocols. The CDC, Infusion Nurses Society, and other organizations publish information useful in developing facility guidelines.
- Reuse compromises safety and efficacy.
- Set can be used for pump or gravity infusion.
- The set should be changed according to facility protocol or in accordance with currently recognized guidelines for IV therapy.
- To dispose of this set adhere to local and/or other governing regulations for medical device and/or biohazardous waste disposal.

20
ml

Drop Factor
(i.e. 20 drops per mL)

Symbols Glossary
<http://www.bd.com/symbols-glossary>

Do not reuse	Fluid path sterilized using irradiation	Keep away from sunlight	Consult instructions for use
Do not use if package is damaged	Catalogue number	Fragile, handle with care	Conformité Européenne Notified Body 2797
Do not resterilize	Batch code	Temperature limit	Manufacturer
Nonpyrogenic	Use by date	Keep dry	Caution
Drops per millilitre			

Rx Only
 DEHP or Natural Rubber Latex are not part of the material formulation.

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