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
  o 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
  • Macrodrip 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
    o 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

<table>
<thead>
<tr>
<th>Flow Rate (mL/hr)</th>
<th>10 drops = 1mL (drops/per min)</th>
<th>15 drops = 1mL (drops/per min)</th>
<th>20 drops = 1mL (drops/per min)</th>
<th>60 drops = 1mL (drops/per min)</th>
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<td>2</td>
<td>3</td>
<td>10</td>
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<td>6</td>
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<td>750</td>
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<tr>
<td>1000</td>
<td>167</td>
<td>250</td>
<td>333</td>
<td>1000</td>
</tr>
</tbody>
</table>
Appendix B: Example of BD Alaris™ Pump Tubing Insert

--- TEAR TO OPEN ---

**BD Alaris™ Pump Infusion Set**
Back Check Valve

**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 1/3 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 minute 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 syringe 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.
- Product use 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 nonhazardous waste disposal.

**Symbols Glossary**
(http://www.bd.com/symbols-glossary)

- [2] Do not re-use
- [STERILE] Fluid path sterilized using irradiation
- [REF] Catalogue number
- [KEEP OUT OF REACH OF CHILDREN]
- [2797] Manufacturer
- [NONPYROGENIC]
- [DO NOT RE-STERILIZE]
- [LOT]
- [DO NOT RE-STERILIZE]
- [KEEP DRY]
- [CAUTION]
- [USE BY DATE]

**Rx Only**

**DHF** or Natural Rubber Latex are not part of the material formulation.

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