MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

SUGGESTED FORMULATION

Ingredient Listing	Qty.	Unit	NDC #	Supplier	Lot Number	Expiry Date
Piperacillin Sodium , USP	TBD					
Tazobactam (Anhydrous), USP	4.500	g				
Sterile Water For Injection, USP	150.0	mL				
Sterile Water For Injection, USP	q.s. to 180.0	mL				
Sodium Hydroxide 10% solution	As required					

MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

SPECIAL PREPARATORY CONSIDERATIONS

Suggested Preparatory Guidelines

☐ Non-Sterile Preparation ■ Sterile Preparation

Processing Error / Testing Considerations: To account for processing error, pH testing, sterility and endotoxin testing considerations during preparation, it is suggested to measure an additional **5 to 9%** of the required quantities of ingredients.

Special Instruction: This formula may contain one or more Active Pharmaceutical Ingredients (APIs) that may be classified as hazardous, please refer & verify the current NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings. At this time, **General Chapter <800> Hazardous Drugs – Handling in Healthcare Settings** is informational and not compendially applicable unless otherwise specified by regulators and enforcement bodies. For information on the scope, intended applicability, and implementation context for USP General Chapter <800>, see: https://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare.

This formula must be prepared within the appropriate facilities under adequate environmental conditions, following the necessary guidelines and procedures as stated within *USP 797* and *USP 800*, when handling hazardous drugs. Only trained and qualified personnel must prepare this formula.

All heat stable, reusable materials and equipment must be sterilized and depyrogenated by dry heat sterilization at 250°C for 2 hours prior to use.

Every batch of final product compounded using this procedure must be sterility and endotoxin tested before being dispensed.

All required personal protective equipment (sterile and hazardous if applicable), such as but not limited to, gowns, aprons, sleeves, gloves both inner and outer if applicable, shoe covers, hairnet, head cap, beard cover, eyewear, appropriate face mask, respirator and face shield, etc., where applicable must be worn at all times. In addition, proper personnel cleansing must be done before entering the buffer or clean area.

If applicable, follow all required procedures for hazardous drug handling including but not limited to procurement, transport, storage, preparation, dispensing, administration, clean up (spills) & disposal.

Filter integrity must be validated by performing a filter stress test. If the test demonstrates that the filter might be defective, the solution must be discarded and remade.

If you are a registered 503B facility, please refer to all relevant guidance documents including but not limited to the Code of Federal Regulations (CFR), Guidance for Industry (GFIs) and Compliance Policy Guides (CPGs).

This procedure requires the use of very small quantities of ingredients. All calculations and preparation techniques must be verified before dispensing the final product.

MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

SUGGESTED PREPARATION (for 180 mL)

Weigh and / or measure the following ingredients when appropriate:

Ingredient Listing	Qty.	Unit	Multiplication factor (*): ____	Processing Error	Qty. to measure
Piperacillin Sodium , USP §	TBD				
Tazobactam (Anhydrous), USP §	4.500	g			
Sterile Water For Injection, USP §	150.0	mL			
Sterile Water For Injection, USP §	q.s. to 180.0	mL			
Sodium Hydroxide 10% solution §	As required				

* Takes into account increased batch size conversions and density conversions, if required.
§ Weigh / measure just prior to use.

Preparatory Instruction

IMPORTANT: All preparatory procedures must be performed using proper Aseptic Technique

1. **Ingredient quantification:**

A. Determine the potency of Piperacillin Sodium based on the certificate of analysis:

	100%
MINUS	
Water Content (from certificate of analysis)	_____ %
DIVIDED BY	100
EQUALS	
Quantity of water free Piperacillin Sodium, in decimal	_____
MULTIPLIED BY	
Assay on anhydrous basis result (from certificate of analysis)	_____ µg/mg
MULTIPLIED BY (Multiplication factor – µg to grams /mg to grams)	0.001
EQUALS	
i. Potency of Piperacillin Sodium (Base equivalent) in g/g	_____

MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

2. **Ingredient quantification:**

A. Determine the quantity of Piperacillin Sodium required to make a **Piperacillin (Base)** 200 mg/mL Intravenous Injection, batch size (180 mL):

Quantity of **Piperacillin (Base)** required for the batch	36.000 g
DIVIDED BY	
Potency of **Piperacillin Sodium (Base equivalent)**, in g/g (Step 1Ai)	_____
EQUALS	
i. Quantity of Piperacillin Sodium needed for the batch	_____ **g**
MULTIPLIED BY	
Processing error adjustments (5 to 9%)	1.05 to 1.09
EQUALS	
ii. Quantity of Piperacillin Sodium needed *plus* processing error adjustments	_____ **g**

3. **Equipment sterilization:**

Following the manufacturer's specifications, sterilize and depyrogenate all heat stable, reusable materials and equipment, then return to ambient temperature.

4. **Medium preparation:**

A. In the given order, sequentially add the following ingredients to the Sterile Water for Injection (150.0 mL *plus* processing error adjustments):

-Piperacillin Sodium (amount determined in Step 2Aii)
-Tazobactam(Anhydrous)

Specifications: Continuously mix until all solid particles have completely dispersed.

End result: Homogeneous liquid-like dispersion.

Note: Add the next ingredient, once the previous one has been completely added and dispersed.

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

5. **pH testing:**

A. Draw an appropriate amount of the mixture (Step 4A).

B. Test the pH of the sample. It should lie between 5.0 and 7.0.

C. If the pH < 5.0, carefully add, in a dropwise fashion, the Sodium Hydroxide 10% Solution to the mixture:

1. Draw and transfer 1 or 2 drops of the Sodium Hydroxide 10% Solution to the mixture.
2. Stir for at least 5 minutes to evenly disperse the Sodium Hydroxide 10% Solution.
3. Re-test the pH.
4. Continue to add the Sodium Hydroxide 10% Solution until the pH of 5.0 and 7.0 is obtained.

IMPORTANT: Do not allow the pH to rise above 7.0.

Note: Once the pH has been adjusted to between 5.0 and 7.0, a clear homogeneous solution will result.

6. **Filling to volume:**

A. Add additional Sterile Water for Injection to the above mixture to fill to the required batch size (180.0 mL *plus* processing error adjustments).

Specifications: Continuously mix until homogenous.

End result: Homogeneous liquid-like solution.

7. **Filtering and transferring:**

Aseptically filter the solution through a 0.22-µm sterile filter into the recommended dispensing container (see Packaging requirements). Transfer the remainder into a separate dispensing container. This is to be used as the test sample for sterility and endotoxin testing.

8. **Filter integrity test:**

Validate filter integrity by performing a filter stress test. If the test demonstrates that the filter might be defective, the solution must be discarded and remade.

9. **Terminal Sterilization:**

In relation to the chemical composition of the formulation, final packaging, etc., select and validate an end-stage sterilization method and follow the manufacturer's specifications.

10. **Sterility testing:**

Validate the test sample for sterility and endotoxins, in accordance to current USP 797 regulatory guidelines.

MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

SUGGESTED PRESENTATION

Estimated Beyond-Use Date		24 hours controlled room temperature, 48 hours refrigerated, as per USP 797. BUD based on successful endotoxin test result.	Packaging Requirements		Sterile, tightly closed, unit-dose injection vials.
Auxiliary Labels	1	Use as directed. Do not exceed prescribed dose.		6	Consult your health care practitioner if any prescription or over-the-counter medications are currently being used or are prescribed for future use.
	2	Keep out of reach of children.		7	Do not use if discolored.
	3	Discard container after use.		8	Keep at controlled room temperature (20°C – 25°C), refrigerated (2°C – 8°C). Do not freeze.
	4	Equilibrate to room temperature before use.		9	**Preservative free solution, single use only. Discard any unused portion.**
	5	Slightly hypertonic, inject slowly.		10	Hypertonic solution. Diluted before use or inject slowly.
Pharmacist Instructions	Add any auxiliary labels specific to the API to the dispensing container as deemed necessary.				
Patient Instructions	Contact your pharmacist in the event of adverse reactions.				

Suggested Formula	Piperacillin 200 mg/mL, Tazobactam 25 mg/mL Intravenous Injection (Preservative Free Solution, 180 mL)	FIN	F 008 819

REFERENCES

1. Parenteral Preparations. In: Allen, LV, Jr. *The Art, Science, and Technology of Pharmaceutical Compounding Fifth Edition.* American Pharmacists Association; 2016: 399.
2. Piperacillin Sodium. In: Sweetman SC, ed. *Martindale: The Complete Drug Reference, 38th Edition.* London, England: The Pharmaceutical Press; 2014: 340.
3. Tazobactam Sodium. In: Sweetman SC, ed. *Martindale: The Complete Drug Reference, 38th Edition.* London, England: The Pharmaceutical Press; 2014: 369.
4. Piperacillin Sodium (Monograph). *United States Pharmacopeia XLIII / National Formulary 38.* Rockville, MD. US Pharmacopeial Convention, Inc. 2020: 3564.
5. Tazobactam (Monograph). *United States Pharmacopeia XLIII / National Formulary 38.* Rockville, MD. US Pharmacopeial Convention, Inc. 2020: 4224.
6. USP <797>. *United States Pharmacopeia XLIII / National Formulary 38.* Rockville, MD. US Pharmacopeial Convention, Inc. 2020: 7037.