

DRUG STABILITY GUIDE

OVERVIEW

EZ-FLOW™ Elastomeric Pumps (EZ-FLOW) offer a straightforward and secure drug delivery system suitable for nurses, pharmacists, and patients. The guidelines for utilizing the EZ-FLOW for medication administration were established based on assessments conducted by independent labs, examination of diverse medical literature, manufacturers' product details, and accessible data on drug stability pertaining to elastomeric infusion pumps.

The stability data presented in the table below pertains to the chemical stability of the tested drugs, not their sterility. This reference guide was created based on results from tests conducted by independent ISO/IEC 17025 certified laboratories, along with a review of various medical publications, including manufacturers' product information and available drug stability data for elastomeric infusion pumps.

DRUG STABILITY GUIDE

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
5-FU + SODIUM FOLINATE (ONCOFOLIC + RIBOFLUOR)	5mg/mL + 2mg/mL	NS	7 days	--	1
	36 mg/mL + 8.8 mg/mL	NS	7 days	--	1
ACYCLOVIR NA	10 mg/mL	NS	5 days	--	6
AGALSIDASE BETA (FABRAZYME)	0.05 mg/mL	NS	24 hours	--	7
	0.7 mg/mL	NS	24 hours	--	7
AMIKACIN	10 mg/mL	NS	48 hours	15 days	7
	20 mg/mL	NS	48 hours	15 days	7
AMOXICILLINE	1 mg/mL	NS	2 hours	6 hours	5
	40 mg/mL	NS	2 hours	6 hours	5
AMOXICILLINE + CLAVULANATE	10 mg/mL + 2 mg/mL	NS	--	6 hours	6
	20 mg/mL + 4 mg/mL	NS	--	6 hours	6
AMPICILLIN NA	12 mg/mL	NS	6 hours	4 days	8
	20 mg/mL	NS	24 hours	3 days	5
AMPICILLIN NA + SULBACTAM NA	30 mg/mL +15 mg/mL	NS	6 hours	2 days	5
AMPHOTERICIN B**	0.1 mg/mL	D5W	24 hours	4 days	1
	0.5 mg/mL	D5W	24 hours	4 days	1
	2 mg/mL	D5W	24 hours	4 days	1
AZITHROMYCIN	1 mg/mL	NS	24 hours	7 days	6
	2 mg/mL	NS	24 hours	7 days	6
AZTREONAM	10 mg/mL	NS	24 hours	7 days	4
	30 mg/mL	NS	24 hours	7 days	4
BUMETANIDE	0.016 mg/mL	D5W	24 hours	--	5
	0.16 mg/mL	D5W	24 hours	--	5
BUPIVACAINE HCL	5 mg/mL	RTU	2 days	15 days	1
BUPIVACAINE	0.125%	NS	30 days	--	5
	0.750%	NS	30 days	--	5

NS: NORMAL SALINE | D5W: GLUCOSE 5% DEXTROSE IN WATER | RTU: READY TO USE | W: WATER

*Possible precipitation depending on preparation, storage conditions, concentrations, pH, and diluents.

**Susceptible to crystallization when refrigerated.

^ separate: Tested Only Refrigerated and Only Room Temperature

combined: Tested Refrigerated + Room Temperature

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
CASPOFUNGIN ACETATE	0.2 mg/mL	NS	60 hours	14 days	5
	0.5 mg/mL	NS	60 hours	14 days	5
CEFAZOLIN NA	16.7 mg/mL	NS	48 hours	14 days	1
CEFEPIME	20 mg/mL	NS	24 hours	14 days	6
CEFOTAXIME	10 mg/mL	NS	24 hours	14 days	8
	15 mg/mL	NS	24 hours	14 days	8
CEFOTAXIME NA	16.66 mg/mL	NS	24 hours	3 days	6
CEFOXITIN	1 mg/mL	NS	48 hours	7 days	7
	10 mg/mL	NS	48 hours	7 days	7
CEFTAZIDIME	1 mg/mL	NS	24 hours	2 days	5
	40 mg/mL#	NS	12 hours	2 days	5
	40 mg/mL^	NS	24 hours	14 days	3
CEFTAZIDIME (INCL. PYRIDINE DETERMINATION)	9 mg/mL	NS	--	7 days	8
	60 mg/mL	NS	--	5 days	8
CEFTOLOZANE + TAZOBACTAM (ZERBAXA)	1 mg/mL + 0.5 mg/mL	NS	24 hours	14 days	7
	2 mg/mL + 1 mg/mL	NS	24 hours	14 days	7
	30 mg/mL + 15 mg/mL	NS	24 hours	14 days	7
CEFTRIAXONE**	10 mg/mL	NS	48 hours	14 days	7
	10 mg/mL	D5W	24 hours	6 days	1
	50 mg/mL	NS	48 hours	14 days	7
CEFUROXIME	1 mg/mL	NS	24 hours	3 days	6
	1 mg/mL	D5W	12 hours	3 days	6
	30 mg/mL	NS	24 hours	3 days	6
	30 mg/mL	D5W	12 hours	3 days	6
CIMETIDINE	1 mg/mL	NS	7 days	--	5
	6 mg/mL	NS	7 days	--	5
CIPROFLOXACIN	2 mg/mL	D5W	10 days	30 days	6
CISPLATIN*	0.1 mg/mL	NS	14 days	--	5
	0.2 mg/mL	NS	24 hours	7 days	3
	0.5 mg/mL	NS	14 days	--	5
CLINDAMYCIN PO4	6 mg/mL	NS	3 days	30 days	6
	12 mg/mL	NS	3 days	30 days	6
CLOXACILLIN	50 mg/mL	NS	24 hours	7 days	3
COLISTIMETHATE NA	3 mg/mL	NS	2 hours	1 day	5
CYCLOPHOSPHAMIDE	2 mg/mL	NS	48 hours	14 days	5
	20 mg/mL	NS	48 hours	7 days	5

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
DAPTOMYCIN (CUBICIN)	1 mg/mL	NS	24 hours	10 days	7
	5 mg/mL	NS	24 hours	10 days	7
	20 mg/mL	NS	24 hours	10 days	1
DEFEROXAMINE	0.022 mg/mL	NS	48 hours	14 days	3
DEFEROXAMINE MESYLATE	5 mg/mL	NS	48 hours	14 days	1
	100 mg/mL	NS	48 hours	14 days	1
DOXORUBICIN	2 mg/mL	NS	14 days	22 days	1
DOXYCYCLINE	1 mg/mL	NS/D5W	12 hours	3 days	2
	1.5 mg/mL	NS/D5W	12 hours	3 days	2
ERTAPENEM	5 mg/mL#	NS	6 hours	24 hours	6
	20 mg/mL	NS	6 hours	24 hours	6
	5 mg/mL^	NS	--	7 days	1
	10 mg/mL^	NS	24 hours	7 days	5
	20 mg/mL^	NS	24 hours	5 days	5
ETOPOSIDE	0.2 mg/mL	NS	4 days	--	5
	0.4 mg/mL	NS	24 hours	--	5
FERINJECT (IRON (III) SUCROSE COMPLEX)	2 mg/mL	NS	3 days	--	1
	5 mg/mL	NS	3 days	--	1
FLOXURIDINE	10 mg/mL	NS	24 hours	14 days	9
FLUCLOXACILLIN	10 mg/mL	NS	24 hours	2 days	5
	70 mg/mL	NS	24 hours	2 days	5
FLUCONAZOLE	2 mg/mL	RTU	48 hours	7 days	1
FLUOROURACIL (5-FU)*	5 mg/mL	D5W/NS	45 days	--	1
	50 mg/mL	RTU	45 days	--	1
FOLINIC ACID	4 mg/mL	NS	24 hours	14 days	3
FOSCARNET NA	12 mg/mL	NS	7 days	14 days	10
	24 mg/mL	RTU	7 days	14 days	10
FOSFOMYCIN DISODIUM	16.6 mg/mL	D5W	2 days	--	1
	40 mg/mL	D5W	2 days	--	1
FOSFOMYCIN NA	20 mg/mL	NS	24 hours	--	1
	20 mg/mL	NS	1 hour at 37°C	--	1
FUROSEMIDE	10 mg/mL	NS	4 days	7 days	2
GANCICLOVIR*	1 mg/mL	NS	48 hours	14 days	1
	1 mg/mL	D5W	48 hours	14 days	5
	10 mg/mL	NS	48 hours	14 days	1
	10 mg/mL	D5W	48 hours	14 days	5

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
GENTAMYCIN SO4	0.5 mg/mL	NS	7 days	7 days	1
	5 mg/mL	NS	7 days	14 days	1
	10 mg/mL	NS	48 hours	28 days	13
GRANISETRON	0.02 mg/mL	NS	48 hours	7 days	5
	0.02 mg/mL	D5W	6 hours	3 days	5
	0.5 mg/mL	NS	48 hours	7 days	5
	0.5 mg/mL	D5W	6 hours	3 days	5
HUMAN PLASMA GLOBULIN (HIZENTRA)	200 mg/mL	RTU	7 days	--	1
IFOSFAMIDE	0.6 mg/mL#	NS/D5W	24 hours	3 days	6
	0.6 mg/mL^	D5W	7 days	--	1
	40 mg/mL#	NS/D5W	24 hours	3 days	6
	40 mg/mL^	D5W	3 days	--	1
IMIPENEM + CILASTATIN NA (PRIMAXIN)	5 mg/mL + 5 mg/mL	NS	24 hours	3 days	5
KETAMINE	1 mg/mL	NS	48 hours	--	5
	2 mg/mL	NS	48 hours	--	5
LEVOBUPIVACAINE	0.125%	NS	30 days	--	5
	0.750%	NS	30 days	--	5
LEVOFLOXACIN	0.5 mg/mL	NS/D5W	7 days	14 days	6
	5 mg/mL	NS/D5W	7 days	14 days	6
LIDOCAINE	0.50%	NS	30 days	--	5
	2%	NS	30 days	--	5
LINCOMYCIN	1.2 mg/mL	NS	24 hours	1 day	1
	10 mg/mL	NS/D5W	24 hours	1 day	1
LINEZOLID	0.15 mg/mL	NS	24 hours	13 days	1
	2 mg/mL	NS	24 hours	13 days	1
MAGNESIUM SO4	20 mg/mL	NS	24 hours	29 days	5
MEROPENEM	2.5 mg/mL#	NS	6 hours	24 hours	6
	5 mg/mL^	NS	24 hours	10 days	5,7
	10 mg/mL	NS	21 hours	5 days	13
	20 mg/mL#	NS	6 hours	24 hours	6
	20 mg/mL^	NS	24 hours	4 days	5, 6, 7
METHOTREXATE	0.3 mg/mL	NS	7 days	7 days	6
	25 mg/mL	NS	7 days	7 days	6

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
METHYLPREDNISOLONE	10 mg/mL	NS	2 hours	7 days	2
METOCLOPRAMIDE	5 mg/mL	NS	48 hours	2 days	8
METRONIDAZOLE	5 mg/mL	RTU	24 hours	10 days	2
MICAFUNGIN	0.5 mg/mL	NS	24 hours	4 days	1
	1.5 mg/mL	NS	--	9 days	12
	2 mg/mL	NS	24 hours	4 days	1
MORPHINE SO4	1 mg/mL	NS	7 days	--	1
	20 mg/mL	NS	7 days	--	1
NAFCILLIN	5 mg/mL	NS	30 hours	14 days	7
	50 mg/mL	NS	48 hours	14 days	13
NEFOPAM	10 mg/mL	NS	24 hours	1 day	5
NORMAL SALINE	0.9% NaCl	--	15 days	15 days	5
OFLOXACIN	0.4 mg/mL	NS	7 days	14 days	5
	2 mg/mL	NS	7 days	14 days	5
ONDANSETRON HCL	0.03 mg/mL	NS/D5W	7 days	21 days	6
	0.7 mg/mL	NS/D5W	4 days	10 days	6
OXACILLIN	10 mg/mL	NS	4 days	8 days	6
	100 mg/mL	NS	4 days	8 days	6
PACLITAXEL	0.3 mg/mL	NS/D5W	24 hours	7 days	1
	1.2 mg/mL	NS/D5W	24 hours	7 days	1
PAMIDRONIC ACID SODIUM SALT	30 µg/mL	NS	2 days	27 days	1
	0.4 mg/mL	NS	2 days	27 days	1
	30 µg/mL	D5W	2 days	27 days	1
	30 µg/mL	NS	29 days	--	1
PENICILLIN G (K)	20,000 units/mL	NS	24 hours	4 days	5
	20,000 units/mL	NS	24 hours	14 days	14
	100,000 units/mL	NS	24 hours	14 days	14
PENICILLIN G (NA)	2,000 units/mL	NS	2 hours	3 days	6
	100,000 units/mL#	NS	2 hours	1 day	6
	100,000 units/mL^	NS	6 hours	--	5
PIPERACILLIN	10 mg/mL	NS	3 days	14 days	5
	80 mg/mL	NS	24 hours	5 days	5
PIPERACILLIN NA + TAZOBACTAM NA	10 mg/mL + 1.25 mg/mL#	NS	48 hours	21 days	7
	10 mg/mL + 1.25 mg/mL^	NS	24 hours	28 days	5
	80 mg/mL + 10 mg/mL#	NS	48 hours	21 days	7
	80 mg/mL + 10 mg/mL^	NS	24 hours	28 days	5

MEDICATION	CONCENTRATION	DILUENT	ROOM TEMP	REFRIGERATED	REF
RANITIDINE	0.5 mg/mL	NS	48 hours	21 days	1
	0.5 mg/mL	D5W	48 hours	21 days	1
	2 mg/mL	NS	7 days	21 days	1
	2 mg/mL	D5W	7 days	21 days	1
RIBODRONAT (PAMIDRONIC ACID SODIUM SALT)	30 µg/mL	NS/D5W	48 hours	27 days	1
	30 µg/mL	NS	29 days	--	1
	0.4 mg/mL	NS	48 hours	27 days	1
RIFAMPICIN	0.5 mg/mL	NS	24 hours	6 days	1
	3 mg/mL	NS	24 hours	6 days	1
ROPIVACAINE	0.2 mg/mL	NS	24 hours	14 days	1
	5 mg/mL	NS	24 hours	14 days	1
	0.10%	NS	30 days	--	5
	0.75%	NS	30 days	--	5
TEICOPLANIN	1 mg/mL	NS	24 hours	7 days	5
	20 mg/mL	NS	24 hours	7 days	5
TEMOCILLIN	10 mg/mL#	NS	24 hours	14 days	5
	10 mg/mL^	NS	24 hours	--	1
	20 mg/mL#	NS	24 hours	14 days	5
	80 mg/mL^	NS	24 hours	--	1
TICARCILLIN DISODIUM CLAVULANATE K	31 mg/mL	NS	24 hours	7 days	11
TIGECYCLINE	0.5 mg/mL	NS	24 hours	2 days	1
	1 mg/mL	NS	24 hours	2 days	1
TOBRAMYCIN	0.2 mg/mL	NS	24 hours	14 days	1
	10 mg/mL	NS	24 hours	14 days	1
VANCOMYCIN	4 mg/mL#	NS/D5W	4 days	21 days	6
	15 mg/mL#	NS/D5W	48 days	14 days	6
	15 mg/mL^	NS	48 hours	30 days	6
VINCRIStINE	1 mg/mL	NS	21 days	--	5
VENOFER (IRON (III) HYDROXIDE SUCROSE)	1 mg/mL	NS	24 hours	24 hours	1

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Source Notes:

1. Data on File, Integrated Medical Systems, Inc. (IMS), April 2024.
2. *Drug Stability for Easypump® II*, B.Braun Medical Inc., June 2020.
3. *Stability Data for Drugs Using Homepump Eclipse and Homepump C-Series Disposable Ambulatory Infusion System*, Halyard Health, March 2015.

Guidelines:

1. ICH (International Conference of Harmonization) Guidance on Drug Stability Study.
2. USP Chapter on Stability Studies and Good Chromatographic Practices.
3. Drug Manufacturer Product Information.
4. PDR (Physicians' Desk Reference), 60th Edition, Medical Economics Company, Oradell, NJ 2003, USA.
5. US FDA 21 CFR Part 58 (Good Laboratory Practice for Non-clinical Laboratory Studies).
6. ISO/IEC 17025 General Requirements for The Competence of Testing and Calibration Laboratories.

Laboratory Testing References:

1. Testing completed by ECOTOX Testing Service, Oldenburg, Germany.
2. Testing completed by Henkel AG & Co. KGaA, Düsseldorf, Germany.
3. Testing completed by Laboratory Faculte de Medecine et Pharmacie, France.
4. Testing completed by Philips Innovation Service, Eindhoven, Netherland.
5. Testing completed by Toxikon Europe NV, Leuven, Belgium.
6. Testing completed by SGS Life Science Services, Lincolnshire IL, U.S.A.
7. Testing completed by Nelson Labs, Leuven, Belgium.
8. Testing completed by Selvita S.A., Kraków, Poland.
9. Testing completed by TÜV SÜD PSB Pte. Ltd. Laboratory Services, Singapore, SMARTeZ Pumps (2015).
10. Testing completed by Beckman Industrial Corp., U.S.A.
11. Testing completed by Pyramid Laboratories, U.S.A.
12. Testing completed by TÜV SÜD PSB Pte. Ltd. Laboratory Services, Singapore (2023).
13. Testing completed by TÜV SÜD PSB Pte. Ltd. Laboratory Services, Singapore (2017).
 - a. FT-IR Analysis testing completed by TÜV SÜD PSB Pte. Ltd. Laboratory Services, Singapore, SMARTeZ® and AccuFlo™ (2015).
 - b. FT-IR Analysis testing completed by TÜV SÜD PSB Pte. Ltd. Laboratory Services, Singapore, SMARTeZ® and EasyPump™ (2015).
14. ASHP (American Society of Health-System Pharmacists), Extended Stability for Parenteral Drugs, 7th Edition

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