

MAY 20 2003 Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification

510K Summary

In accordance with the Food and Drug Administration Rule to implement provisions of the Safe Medical Devices Act of 1990 and in conformance with 21 CFR 807, this information serves as a Summary of Safety and Effectiveness for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate.

Company: Art Eilinsfeld, Director of Regulatory Affairs
Fresenius Medical Care North America
95 Hayden Ave.
Lexington, MA 02420
1-800-662-1237

Date: January 14, 2003

Trade Name: Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Common Name: Dialysate concentrate for hemodialysis (liquid or powder)

Classification Name and Reference: 21 CFR §876.5820 Dialysate concentrate for hemodialysis (liquid or powder) – Class II

Device Product Code and Panel Code: KPO, 78

Predicate Device(s): Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991); Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)

Description:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is designed to be used as direct product replacement for the current Granuflo® Concentrate (Series 1000, 2400, and 3000). The new product will be available in a non-granulated formula. It is used only during hemodialysis. It is manufactured using the same raw materials. The new Fresenius Naturalyte® Granuflo® Dry Acid Concentrate has the same chemical composition as the predicate devices. It is for single use only. It is supplied non-sterile and is non-pyrogenic.

Intended Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

Safety and Performance:

The intended use, technological characteristics, design features, and materials are substantially equivalent to the predicate devices previously cleared for market. The safety and effectiveness of the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is supported by the substantial equivalence information, materials data, device description, and performance testing.



MAY 20 2003

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

Mr. Arthur Eilinsfeld
Director of Regulatory Affairs
Fresenius Medical Care North America
95 Hayden Avenue
LEXINGTON MA 02173

Re: K030497

Trade/Device Name: Fresenius Naturalyte[®] Granuflo[®] Dry Acid Concentrate
Regulatory Number: 21 CFR §876.5820
Regulation Name: Hemodialysis system and accessories
Regulatory Class: II
Product Code: 78 KPO
Dated: February 14, 2003
Received: February 19, 2003

Dear Mr. Eilinsfeld:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (sections 531-542 of the Act); 21 CFR 1000-1050.

This letter will allow you to begin marketing your device as described in your 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of Compliance at one of the following numbers, based on the regulation number at the top of this letter:

8xx.1xxx	(301) 594-4591
876.2xxx, 3xxx, 4xxx, 5xxx	(301) 594-4616
884.2xxx, 3xxx, 4xxx, 5xxx, 6xxx	(301) 594-4616
892.2xxx, 3xxx, 4xxx, 5xxx	(301) 594-4654
Other	(301) 594-4692

Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its Internet address <http://www.fda.gov/cdrh/dsma/dsmamain.html>.

Sincerely yours,



Nancy C. Brogdon
Director, Division of Reproductive,
Abdominal, and Radiological Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure



Fresenius Medical Care

Indications for Use Statement

Device Name:

Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Indications for Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

PLEASE DO NOT WRITE BELOW THIS LINE - CONTINUE ON ANOTHER PAGE IF NEEDED

Concurrence of CDRH, Office of Device Evaluation (ODE)

Prescription Use
(Per 21 CFR 801.109)

OR

Over-The-Counter Use

Nancy C Brogdon
(Division Sign-Off)
Division of Reproductive, Abdominal,
and Radiological Devices

510(k) Number K030497

Fresenius Medical Care North America

Corporate Headquarters: 95 Hayden Avenue Lexington, MA 02420 (781) 402-9000

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Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

MAY 20 2003

Mr. Arthur Eilinsfeld
Director of Regulatory Affairs
Fresenius Medical Care North America
95 Hayden Avenue
LEXINGTON MA 02173

Re: K030497

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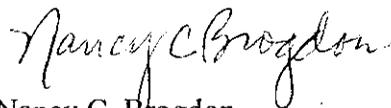
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Sincerely yours,



Nancy C. Brogdon
Director, Division of Reproductive,
Abdominal, and Radiological Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure



Fresenius Medical Care

Indications for Use Statement

Device Name:

Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Indications for Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

PLEASE DO NOT WRITE BELOW THIS LINE - CONTINUE ON ANOTHER PAGE IF NEEDED

Concurrence of CDRH, Office of Device Evaluation (ODE)

Prescription Use OR Over-The-Counter Use
(Per 21 CFR 801.109)

Nancy C Brogdon
(Division Sign-Off)
Division of Reproductive, Abdominal,
and Radiological Devices
510(K) Number K030497

Fresenius Medical Care North America

Corporate Headquarters: 95 Hayden Avenue, Lexington, MA 02420 (781) 482-5000

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February 19, 2003

Food and Drug Administration
Center for Devices and
Radiological Health
Office of Device Evaluation
Document Mail Center (HFZ-401)
9200 Corporate Blvd.
Rockville, Maryland 20850

FRESENIUS MEDICAL CARE
95 HAYDEN AVE
LEXINGTON, MA 02420
ATTN: ART EILINSFELD

510(k) Number: K030497
Received: 19-FEB-2003
Product: FRESENIUS NATURALYTE
GRANUFLO DRY ACID
CONCENTRATE 10XX
SERIES, 24XX SERIES,

The Center for Devices and Radiological Health (CDRH), Office of Device Evaluation (ODE), has received the Premarket Notification you submitted in accordance with Section 510(k) of the Federal Food, Drug, and Cosmetic Act (Act) for the above referenced product. We have assigned your submission a unique 510(k) number that is cited above. Please refer prominently to this 510(k) number in any future correspondence that relates to this submission. We will notify you when the processing of your premarket notification has been completed or if any additional information is required. YOU MAY NOT PLACE THIS DEVICE INTO COMMERCIAL DISTRIBUTION UNTIL YOU RECEIVE A LETTER FROM FDA ALLOWING YOU TO DO SO.

As a reminder, we would like to mention that FDA requires all 510(k) submitters to provide an indications for use statement on a separate page. If you have not included this indications for use statement in addition to your 510(k) summary (807.92), or a 510(k) statement (807.93), and your Truthful and Accurate statement, please do so as soon as possible. If the above mentioned requirements have been submitted, please do not submit them again. There may be other regulations or requirements affecting your device such as Postmarket Surveillance (Section 522(a)(1) of the Act) and the Device Tracking regulation (21 CFR Part 821). Please contact the Division of Small Manufacturers, International and Consumer Assistance (DSMICA) at the telephone or web site below for more information.

Please remember that all correspondence concerning your submission MUST be sent to the Document Mail Center (DMC)(HFZ-401) at the above letterhead address. Correspondence sent to any address other than the DMC will not be considered as part of your official premarket notification submission. Also, please note the new Blue Book Memorandum regarding Fax and E-mail Policy entitled, "Fax and E-Mail Communication with Industry about Premarket Files Under Review. Please refer to this guidance for information on current fax and e-mail practices at www.fda.gov/cdrh/ode/a02-01.html.

You should be familiar with the manual entitled, "Premarket Notification 510(k) Regulatory Requirements for Medical Devices" available from DSMICA. If you have other procedural or policy questions, or want information on how to check on the status of your submission (after 90 days from the receipt date), please contact DSMICA at (301) 443-6597 or its toll-free number (800) 638-2041, or at their Internet address <http://www.fda.gov/cdrh/dsmamain.html> or me at (301) 594-1190.

Sincerely yours,

Marjorie Shulman
Consumer Safety Officer
Premarket Notification Staff
Office of Device Evaluation

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K 030497

Fresenius Medical Care

February 14, 2003

Food and Drug Administration
Center for Devices and Radiological Health
Document Control Center (HFZ-401)
9200 Corporate Blvd.
Rockville, MD 20850

FDA/CDRH/137/10
2003 FEB 19 A 10:22

Subject: 510(k) Premarket Notification for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Dear Sir or Madam:

Fresenius Medical Care North America intends to begin marketing the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate as a direct replacement for the current GRANUFLO® Dry Acid Concentrate. Two copies of the 510(k) - Premarket Notification are enclosed.

If you have any questions, please feel free to contact me at (781) 402-9068 or Lynne Witkowski, an alternate contact, at 781-402-4021.

Sincerely,

Art Eilinsfeld
Director of Regulatory Affairs
Fresenius Medical Care North America

Attachment - 510k

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Fresenius Medical Care North America

Corporate Headquarters: 99 Maiden Avenue, Lexington, MA 02178 (781) 402-9000

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

A. CDRH PREMARKET SUBMISSION COVER SHEET

CDRH Submission Cover Sheet				
Date of Submission: February 14, 2003		FDA Document Number:		
Section A Type of Submission				
PMA	PMA Supplement	PDP	510(k)	Meeting
Original submission Modules submission Amendment Report Report Amendment	Regular Special Panel Track 30-day Supplement 30-day Notice 135-day Supplement Real-time Review Amendment to PMA Supplement	Presubmission summary Original PDP Notice of intent to start clinical trials Intention to submit Notice of Completion Notice of Completion Amendment to PDP Report	<input checked="" type="checkbox"/> Original Submission <input checked="" type="checkbox"/> Traditional <input type="checkbox"/> Special Abbreviated Additional Information Traditional Special Abbreviated	Pre-IDE meeting Pre-PMA meeting Pre- PDP meeting 180-day meeting Other (specify):
IDE	Humanitarian Device Exemption	Class II Exemption	Evaluation of Automatic Class III Designation	Other Submission
Original submission Amendment Supplement	Original submission Amendment Supplement Report	Original submission Additional information	Original submission Additional Information	Describe submission:
Section B Applicant or Sponsor				
Company/ Institution name: <i>Fresenius Medical Care North America</i>			Establishment registration number: <i>1225714</i>	
Division name (if applicable):			Phone number (include area code): <i>(781) 402-9068</i>	
Street address: <i>95 Hayden Ave.</i>			FAX number (include area code): <i>(781) 402-9082</i>	
City: <i>Lexington</i>	State/Province: <i>MA</i>	Country: <i>USA</i>		ZIP/Postal Code: <i>02420</i>
Contact Name: Arthur Eilinsfeld				
Contact Title: Director of Regulatory Affairs				

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Section C Submission correspondent (if different from above)			
Company/ Institution name: <i>same as above</i>		Establishment registration number:	
Division name (if applicable):		Phone number (include area code):	
Street address:		FAX number (include area code):	
City:	State/Province:	Country:	ZIP/Postal Code:
Contact name:			
Contact title:			
Section D1 Reason for Submission-PMA, PDP, or HDE			
<ul style="list-style-type: none"> New device Withdrawal Additional or expanded indications Licensing agreement 	<ul style="list-style-type: none"> Change in design, component or specification: Software Color additive Material Specifications Other (specify below) 	<ul style="list-style-type: none"> Location change: · Manufacturer · Sterilizer Packager Distributor 	
<ul style="list-style-type: none"> Process change · Manufacturing · Sterilization · Packaging · Other (specify below) 	<ul style="list-style-type: none"> Labeling change: · Indications · Instructions · Performance Characteristics · Shelf life · Trade Name · Other (specify) 	<ul style="list-style-type: none"> Report submission: · Annual or periodic · Post-approval study · Adverse reaction · Device defect · Amendment 	
<ul style="list-style-type: none"> Response to FDA correspondence · Request for applicant hold · Request for removal of applicant hold 		<ul style="list-style-type: none"> Change in ownership · Change in correspondent 	
Other reason (specify):			

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Section D2 Reason for Submission-IDE		
<input type="checkbox"/> New device <input type="checkbox"/> Addition of institution <input type="checkbox"/> Expansion/extension of study <input type="checkbox"/> IRB certification <input type="checkbox"/> Request hearing <input type="checkbox"/> Request waiver <input type="checkbox"/> Termination of study <input type="checkbox"/> Withdrawal of application <input type="checkbox"/> Unanticipated adverse event <input type="checkbox"/> Notification of emergency use <input type="checkbox"/> Compassionate use request <input type="checkbox"/> Treatment IDE <input type="checkbox"/> Continuing availability request <input type="checkbox"/> Other reason (specify):	<input type="checkbox"/> Change in: <input type="checkbox"/> Correspondent <input type="checkbox"/> Design <input type="checkbox"/> Informed consent <input type="checkbox"/> Manufacturer <input type="checkbox"/> Manufacturing process <input type="checkbox"/> Protocol-feasibility <input type="checkbox"/> Protocol-other <input type="checkbox"/> Sponsor <input type="checkbox"/> Report submission: <input type="checkbox"/> Current investigator <input type="checkbox"/> Annual progress <input type="checkbox"/> Site waiver limit reached <input type="checkbox"/> Final	<input type="checkbox"/> Response to FDA letter concerning: <input type="checkbox"/> Conditional approval <input type="checkbox"/> Deemed approved <input type="checkbox"/> Deficient final report <input type="checkbox"/> Deficient progress report <input type="checkbox"/> Deficient investigator report <input type="checkbox"/> Disapproval <input type="checkbox"/> Request for extension of time <input type="checkbox"/> to respond to FDA <input type="checkbox"/> Request meeting
Section D3 Reason for Submission- 510(k)		
<input type="checkbox"/> New device <input type="checkbox"/> Additional or expanded indications <input type="checkbox"/> Other reason (specify):	<input type="checkbox"/> Change in technology <input type="checkbox"/> Change in design	<input type="checkbox"/> Change in materials <input checked="" type="checkbox"/> Change in manufacturing process

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Section E Additional Information on 510(k) Submissions				
Product codes of devices to which substantial equivalence is claimed:				Summary of, or statement concerning safety and effectiveness data: <input checked="" type="checkbox"/> 510(k) summary attached 510(k) statement
1) KPO	2) KPO	3)	4)	
5)	6)	7)	8)	
9)	10)	11)	12)	
Information on devices to which substantial equivalence is claimed:				
510(k) Number	Trade or proprietary name			Manufacturer
1. K911459	Granulyte Powder Dialysate Concentrates and Mixer (currently marketed as Granuflo® Dry Acid Concentrate)			Fresenius Medical Care North America
2. K922005	Granulyte Dialysate Concentrates (currently marketed as Granuflo® Dry Acid Concentrate)			Fresenius Medical Care North America
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Section F Product Information - Applicable to All Applications				
Common or usual name or classification name: Dialysate Concentrate for Hemodialysis (liquid or powder)				
Trade or proprietary or name			Number	
1 Fresenius Naturalyte® Granuflo® Dry Acid Concentrate 10XX Series			1 See Appendix D	
2 Fresenius Naturalyte® Granuflo® Dry Acid Concentrate 24XX Series			2 See Appendix D	
3 Fresenius Naturalyte® Granuflo® Dry Acid Concentrate 30XX Series			3 See Appendix D	
4			4	
5			5	
6			6	
FDA document numbers of all prior related submissions (regardless of outcome):				
1 K911459	2 K922005	3	4	5
7	8	9	10	11
Data included in submission: <input checked="" type="checkbox"/> Laboratory testing Animal trials Human trials				
Section G Product Classification				
Product code: <i>78KPO</i>		C.F.R. Section: <i>876.5820</i>		Device class: Class I <input checked="" type="checkbox"/> Class II <input type="checkbox"/> Class III Unclassified
Classification panel: Gastroenterology - Urology				
Indications (from labeling): The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.				

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Note: Submission of this information does not affect the need to submit a 289I or 2891a Device Establishment Registration Form.		FDA Document Number:	
Section H Manufacturing/Packaging/Sterilization Sites			
<input checked="" type="checkbox"/> Original Add Delete	FDA establishment registration number: 1651896	<input checked="" type="checkbox"/> Manufacturer <input type="checkbox"/> Contract manufacturer	<input type="checkbox"/> Contract sterilizer <input type="checkbox"/> Repackager/relabeler
Company/Institution name: Fresenius Medical Care North America			
Division name (if applicable):		Phone number (include area code):	
Street Address: 5201 Regent Blvd.		Fax number (include area code):	
City: Irving	State/Province: TX	Country: USA	ZIP/Postal code: 75063
Contact name:			
Contact title:			
<input checked="" type="checkbox"/> Original Add Delete	FDA establishment registration number: 1527681	<input checked="" type="checkbox"/> Manufacturer <input type="checkbox"/> Contract manufacturer	<input type="checkbox"/> Contract sterilizer <input type="checkbox"/> Repackager/relabeler
Company/ Institution name: Fresenius Medical Care North America			
Division name (if applicable):		Phone number (include area code):	
Street address: 28157 Cedar Park Blvd.		FAX number (include area code):	
City: Perrysburg	State/Province: OH	Country: USA	ZIP/Postal Code: 43551
Contact name:			
Contact title:			

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

B. 510(k) ELEMENTS LIST

Authority 807.87	YES	NO	N/A	LOCATION
I. Critical Elements				
A. Is the product a device?	✓			Section III
B. Is the device exempt from 510(k) by regulation or policy?		✓		N/A
C. Is the device subject to review by CDRH?	✓			N/A
D. 1. Are you aware that this device has been the subject of a previous NSE decision?		✓		N/A
2. If yes, does this new 510(k) address the NSE issue(s) (e.g., performance data)?			✓	N/A
E. 1. Are you aware of the submitter being the subject of an integrity investigation?		✓		N/A
2. If yes, consult the ODE Integrity Officer.			✓	N/A
3. Has the ODE Integrity Officer given permission to proceed with the review? (Blue Book Memo #191-2 and Federal Register 90N-032, September 10, 1991)			✓	N/A
F. Does the submission contain information required under Sections 510(k), 513(f) and 513(i) of the Federal Food, Drug and Cosmetic Act and Subpart E of Part 807 in Title 21 of the Code of Federal Regulations:	✓			see below
1. Device trade or proprietary name	✓			Section II
2. Device common or usual name or classification name	✓			Section II
3. Establishment registration number (only applies if establishment is registered)	✓			Section II
4. Class into which the device is classified under 21 CFR Part 876	✓			Section II
5. Classification Panel	✓			Section II
6. Action taken to comply with Section 514 of the Act	✓			Section II
7. Proposed labels, labeling and advertisement (if available) that describe the device, its intended use and directions for use (Blue Book Memo #G91-1)	✓			Appendix F
8. A 510(k) summary of safety and effectiveness or a 510(k) statement that safety and effectiveness information will be made available to any person upon request	✓			Appendix A
9. For class III devices only, a class III certification and a class III summary			✓	N/A

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

Authority 807.87	YES	NO	N/A	LOCATION
10. Photographs of the device			✓	N/A
11. Engineering drawings for the device with dimensions and tolerances			✓	N/A
12. The marketed device(s) to which equivalence is claimed, including labeling and description of the device	✓			Sections III & IV
13. Statement of similarities and/or differences with marketed device(s)	✓			Sections III & IV
14. Data to show consequences and effects of a modified device(s)	✓			Section V
II. Additional information that is necessary under 21 CFR 807.87 (h)				
A. Submitter's name and address	✓			Section II
B. Contact person, telephone and fax number	✓			Section II
C. Representative/Consultant, if applicable			✓	N/A
D. Table of Contents with pagination	✓			Table of Contents
E. Address of manufacturing facility/facilities and, if appropriate, sterilization site(s). Registration number of each, when one exists	✓			Section II

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section I - Preliminary Information

III. Additional information that may be necessary under 21 CFR 807.87(h):	YES	NO	N/A	LOCATION
A. Comparison table of the new device to the marketed device(s)	✓			Section IV
B. Action taken to comply with voluntary standards	✓			Section II
C. Performance data				
Marketed device				
Bench testing			✓	N/A
Animal testing			✓	N/A
Clinical data			✓	N/A
New device				
Bench testing	✓			Section V and Appendix E
Animal testing			✓	N/A
Clinical data			✓	N/A
D. Sterilization information (Blue Book Memo #K90-1)			✓	Section IV
E. Software information (Blue Book Memo #K91-1)			✓	N/A
F. Hardware information			✓	N/A
G. If this 510(k) is for a kit, has the Kit Certification Statement been provided? (For Kit Submission Only)			✓	N/A
H. 1. Is this device subject to issues that have been addressed in specific guidance document(s)?		✓		N/A
2. If yes, continue with checklist from any appropriate guidance documents			✓	N/A
3. If no, 510(k) sufficiently complete to allow substantive review?	✓			
I. Truth and Accuracy Statement	✓			Section I
Miscellaneous				
Reference Guidance/s				
#86-3: Premarket Notification Review Program	✓			N/A
FDA95-4158: Premarket Notification; Regulatory Requirements for Medical Devices	✓			N/A

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Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification

Section I - Preliminary Information

C. PREMARKET NOTIFICATION TRUTHFUL AND ACCURATE STATEMENT

I certify that, in my capacity as Director of Regulatory Affairs for Fresenius Medical Care North America, I believe to the best of my knowledge, that all data and information submitted in this premarket notification are truthful and accurate and that no material fact has been omitted.



Arthur Eilinsfeld
Director of Regulatory Affairs

2/14/03

Date

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section II: General Device Summary

Indications for Use/Intended Use

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

The Indications for Use statement is provided in **Appendix B- Indications for Use Statement**.

Purpose of Submission

The purpose of this submission is to obtain FDA clearance for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate as a direct replacement for the current Granuflo® Dry Acid Concentrates. The new product will be marketed as a non-granulated product. (b)(4)

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The raw materials used in both processes are identical. The final products from either process are the same; therefore, upon dissolution both products are equally identical in analytes and chemical concentration as liquid acid concentrate.

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section II: General Device Summary

Submitter Information

Submitter's Name and Address:

Fresenius Medical Care North America
95 Hayden Avenue
Lexington, MA 02420
FDA Establishment Registration Number: 1225714

Contact Information:

Arthur E. Eilinsfeld
Director of Regulatory Affairs
Telephone: (781) 402-9068
Fax: (781) 402-9082

Alternate Contact:
Lynne Witkowski, Regulatory Affairs Specialist
Telephone: (781) 402-4021
Fax: (781) 402-9635

510K Summary

A 510K Summary is provided in **Appendix A**.

Performance Standards

No applicable performance standards have been issued under section 514 of the Food, Drug and Cosmetic Act for dialysate concentrates for hemodialysis (liquid or powder).

Voluntary Standards

The product complies with the applicable requirements of ANSI/AAMI RD61-2000.

Predicate Device

The predicate devices for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is:

- Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991)

- Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section III: Substantial Equivalence

Statement of Substantial Equivalence

Fresenius Medical Care North America believes that, within the meaning of the Medical Device Amendments of 1976, the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate, addressed in this 510(k) premarket notification is substantially equivalent to the following medical devices in commercial distribution:

- Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991)
 - Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)
-

Substantial Equivalence Decision Making Process

1. Is the product a device?

YES - The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is a device pursuant to 21 CFR §201 [321] (h).

2. Does the new device have the same intended use?

YES – The intended use for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is equivalent to the intended uses of both the predicate devices Granuflo® Dry Acid Concentrate.

Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Intended Use

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991)

And

Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)

Intended Use

The Granulyte Concentrate is indicated in the treatment of acute and chronic renal

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**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section III: Substantial Equivalence

failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

3. Does the device have technological characteristics that raise new types of safety or effectiveness questions?

NO – The technological characteristics of the Naturalyte® Granuflo® Dry Acid Concentrate are equivalent to those of the Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991) and Granulyte Dialysate Concentrate; (K922005, SE 03/30/94). The Naturalyte® Granuflo® Dry Acid Concentrate will be manufactured using the same USP grade raw materials or equivalent as the predicate. The indications for use, packaging materials and chemical equivalence will remain identical to that of the predicate. See Tables IV-1 for a comparison of the devices and features of the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate and the Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991) and Granulyte Dialysate Concentrate; (K922005, SE 03/30/94). The product will also be non-sterile. The label will state the product is non-pyrogenic.

4. Does descriptive or performance information demonstrate equivalence?

YES – Fresenius Medical Care North America believes that the information provided in this submission clearly describes the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate and demonstrates that it is substantially equivalent to both of the Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991) and Granulyte Dialysate Concentrate; (K922005, SE 03/30/94).

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**Fresenius Naturallyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section IV - Device Description

Device Description

The Fresenius Naturallyte® Granuflo® Dry Acid Concentrate is a direct replacement product for the previously cleared Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991) and Granulyte Dialysate Concentrate; (K922005, SE 03/30/94), which are now marketed as Granuflo® Dry Acid Concentrates (Series 1000, 2400, and 3000). The only differences between the subject device and the predicate devices are the new concentrate product will be provided as a non-granulated powder and the bags and cases will be rearranged to create lighter weighing cases of product. The chemical equivalents and chemical composition will remain identical to that of the previously cleared product. The product will also be manufactured via the same USP grade raw materials or equivalent of the following compounds: Calcium Chloride Dihydrate, Magnesium Chloride Hexahydrate, Sodium Diacetate, Sodium Chloride, Potassium Chloride, and Dextrose. Upon reconstitution, the concentrate will be equivalent to the previously cleared Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991) and Granulyte Dialysate Concentrate; (K922005, SE 03/30/94). Like the predicates, the label states to use water that meets or exceeds that of the AAMI/ANSI RD61 standard.

Like the current GRANUFLO® concentrates, the new version will be packaged in a low density polyethylene bag. One change between the current GRANUFLO® and the new device is the way it will be shipped in the case. The new case will weigh only 45lbs, compared to the current weight of 85lbs. Since the cases will be lighter, it will take double the amount of bags to reconstitute the product. Once reconstituted the product and formulation are identical.

Like the current GRANUFLO®, the device will be non-sterile. The concentrates will continue to be labeled non-pyrogenic.

Comparison of the Fresenius Naturallyte® Granuflo® Dry Acid Concentrate and the Fresenius Granuflo® Dry Acid Concentrates (Series 1000, 2400, and 3000)

Both the Fresenius Naturallyte® Granuflo® Dry Acid Concentrate and the Fresenius Granuflo® Dry Acid Concentrates (Series 1000, 2400, and 3000) have the following features:

- Manufactured from the same USP grade raw material
- Used during hemodialysis as dialysate;
- Identical Indications for Use;
- Complies with the ANSI/AAMI RD61 standard;
- Same chemical composition;
- Equivalent dilution ratios;
- Non-pyrogenic labeling;
- Single use only; and
- Non-sterile.

Fresenius Naturallyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification

Section IV - Device Description

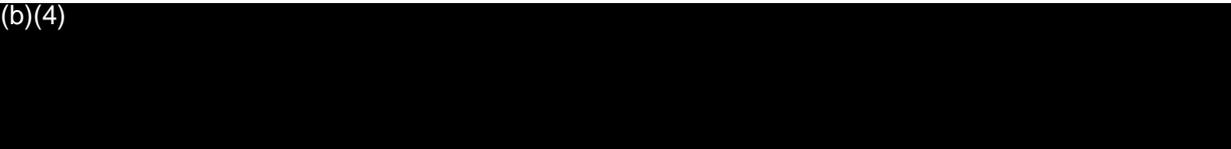
Description of the Manufacturing Process

Although the new Fresenius Naturallyte® Granuflo® Dry Acid Concentrate will be provided in a non-granulated formulation, the manufacturing process will be very similar to the predicate. The

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The manufacturing and packaging process of metering powders into individual bags is a standard process used in many industries, and is utilized by other dry acid concentrate manufacturers such as Rockwell and Minntech.

The use of the product from both processes is the same, in that, the individual bags are dissolved in a mixer with the appropriate amount of water to provide a liquid acid concentrate of various analytes. The raw materials used in manufacturing are identical to that of the predicate device.

Please see **Appendix G**, which provides a manufacturing flowchart for both the subject device and the predicate devices.

Catalog Numbers

A table listing the catalog number and ionic contribution per acid concentrate is provided in **Attachment D – Catalog Numbers**. The table compares the new product to the predicate in order to show that they are equivalent.

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section IV - Device Description

Table IV-1 Comparison of the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate to the Granuflo® Dry Acid Concentrates

	Subject Device	Predicate Device #1	Predicate Device #2
Features	Fresenius Naturalyte® Granuflo® Dry Acid Concentrate	Granulyte® Concentrate #K911459 (now called Granuflo®)	Granulyte® Concentrate #K922005 (now called Granuflo®)
Indications for Use	Identical	Identical	Identical
Granulated	No	Yes	Yes
Upon reconstitution	Identical Homogeneity	Identical Homogeneity	Identical Homogeneity
Dilution Ratios	Series 3000 - 1:34 Series 1000 - 1:35.83 Series 2400 - 1:44	Series 3000 - 1:34 Series 1000 - 1:35.83 Series 2400 - 1:44	Series 3000 - 1:34 Series 1000 - 1:35.83 Series 2400 - 1:44
Chemically Equivalent	Yes	Yes	Yes
Raw material used	(b)(4)		
Tolerances of Final Concentrate	(b)(4)		
Instructions for Use	Identical	Identical	Identical
Amount produced	500 liters	500 liters	500 liters
Single Use	Yes	Yes	Yes
Non-Pyrogenic	Yes	Yes	Yes
Sterilization	None	None	None
Packaging			
Case weight	45 lbs.	85 lbs.	85 lbs
Cases in batch	8 cases	4 cases	4 cases
Bags per case	3 bags	6 bags	6 bags
Bag material	Polyethylene	Polyethylene	Polyethylene

Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification

Section IV - Device Description

Biocompatibility

The packaging is equivalent to the predicate devices; therefore, no biocompatibility data will be required since the biocompatibility of the packaging material has already been demonstrated.

Sterilization

Like the predicates, the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is not provided sterile.

Packaging

The packaging process for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate will require some modification since the new product is designed to be non-granulated. Like the predicate devices, GRANUFLO® Dry Acid Concentrate K911459 and K922005, the subject device will be packaged in bags manufactured from low-density polyethylene. In addition, the bag design will be modified to create a larger bag neck, making it easier to pour product into the mixer. Fresenius also wants to improve the handling of the product by decreasing the weight of the cases from the current 85 lbs. to 45 lbs. It will now take eight (8) cases to fill a 500-liter tank, instead of the four (4) cases currently used. This will reduce the amount of bags per case from six to three. Instead of the twenty cases per pallet, there will now be forty cases per pallet.

Pyrogenicity

Like the predicate devices, the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate will be labeled non-pyrogenic. Pyrogen testing is done via the LAL method with a testing sensitivity of 0.06 EU/ml.

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section V - Performance Testing

Dissolution Testing

The three formulations of Fresenius Naturalyte® Granuflo® Dry Acid Concentrate were tested for proper dissolution. These formulations were chosen as representative the “worst case” product because they contained the highest concentration of salts in each product family. For each formula selected, the required chemical ingredients were weighed to produce 24-bags of product. The 24 bags of the subject device were then reconstituted to produce liquid acid concentrate. The liquid acid concentrate was tested for its chemical solute concentrations of Magnesium, Calcium, Potassium, Dextrose, Sodium, and Acetate(as Acetic Acid) Tests results were then compared to the equivalent Granuflo formula product specifications to verify that all chemical specifications are met for that formula. In addition, equivalence will be demonstrated by pulling “top” and “bottom” samples from the dissolution tank and showing, through chemical testing of these samples that their solute chemical concentration is equivalent. Each code was also visually inspected.

Conclusion:

The testing indicates that each of the formulations produced a homogeneous solution upon being mixed into dissolution. In addition, the product formula concentrations and chemical equivalence matched that of the labeling.

Each formulation was also tested for chemical equivalence to the labeling.

Results of this testing may be found in **Appendix E- Performance Testing**.

Compliance with ANSI/AAMI RD61-2000

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate has been designed to meet the performance requirements for Concentrates for Hemodialysis as specified in ANSI/AAMI RD61-2000. When applicable, all performance testing for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate was conducted in accordance with ANSI/AAMI RD61-2000. All materials used to manufacture the concentrate are of USP grade quality and comply with ANSI/AAMI RD61-2000 standard.

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

Section VI: Labeling and Promotional Literature

Device Labeling

Copies of the draft labeling for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate are provided in **Appendix F – Draft Subject Device Labeling**.

The labels are colored red to indicate this is an acid concentrate. The labels also have an area to state the chemical concentrations and chemical composition of the product. See **Appendix D – Catalog Numbers** which lists the chemical concentrations and ionic contribution of acid concentrate per each catalog number. Please note that since the product cases for the subject device has been designed to be lighter by half the weight, it will now take twice as much product to create the 500 liters. Upon reconstitution, the products are identical.

Note: the Instructions For Use for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is very similar, if not identical, to that of the predicate devices, Fresenius Granuflo® Concentrates current labeling.

Predicate Device

The predicate devices used for this submission are the:

- Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991)
- Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)

All predicate device literature, including a copy of the labeling and marketing brochures are located in **Appendix H – Predicate Device Labeling**.

Please note, that the original 510k labeling that was submitted in K911459 and K922005, was modified over the years in order to comply with the ANSI/AAMI RD-61 standard.

Both the original product label submitted with those 510k's are located in Appendix H, as well as, the current predicate device label for the Granuflo® Dry Acid Concentrates.

**Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
510(k) Premarket Notification**

510K Summary

In accordance with the Food and Drug Administration Rule to implement provisions of the Safe Medical Devices Act of 1990 and in conformance with 21 CFR 807, this information serves as a Summary of Safety and Effectiveness for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate.

Company: Art Eilinsfeld, Director of Regulatory Affairs
Fresenius Medical Care North America
95 Hayden Ave.
Lexington, MA 02420
1-800-662-1237

Date: January 14, 2003

Trade Name: Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Common Name: Dialysate concentrate for hemodialysis (liquid or powder)

Classification Name and Reference: 21 CFR §876.5820 Dialysate concentrate for hemodialysis (liquid or powder) – Class II

Device Product Code and Panel Code: KPO, 78

Predicate Device(s): Granulyte Powder Dialysate Concentrates and Mixer; (K911459, SE 07/17/1991); Granulyte Dialysate Concentrate; (K922005, SE 03/30/94)

Description:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is designed to be used as direct product replacement for the current Granuflo® Concentrate (Series 1000, 2400, and 3000). The new product will be available in a non-granulated formula. It is used only during hemodialysis. It is manufactured using the same raw materials. The new Fresenius Naturalyte® Granuflo® Dry Acid Concentrate has the same chemical composition as the predicate devices. It is for single use only. It is supplied non-sterile and is non-pyrogenic.

Intended Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

Safety and Performance:

The intended use, technological characteristics, design features, and materials are substantially equivalent to the predicate devices previously cleared for market. The safety and effectiveness of the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is supported by the substantial equivalence information, materials data, device description, and performance testing.

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Fresenius Medical Care

Indications for Use Statement

Device Name:

Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Indications for Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates.

PLEASE DO NOT WRITE BELOW THIS LINE - CONTINUE ON ANOTHER PAGE IF NEEDED

Concurrence of CDRH, Office of Device Evaluation (ODE)

Prescription Use _____
(Per 21 CFR 801.109)

OR

Over-The-Counter Use

Fresenius Medical Care North America

Corporate Headquarters: 775 Madison Avenue, Livingston, NJ 07033 (763) 402-4000

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AAMI RD61 STANDARD CHECKLIST

	RD-61 Standard Requirements	Dry Acid Concentrate
General (4.1.1)	General Labeling Requirements for Concentrates	
	a) Name and address	a) Provided on label
	b) Date of Manufacture	b) Provided on label
	c) Lot/Batch No.	c) Provided on label
	d) Weight per container of each ingredient	d) Provided on label
	e) Batch systems volume of conc. water	e) N/A since the product is not used in batch systems
	f) For proportioning systems, ratio of conc. & water to be mixed	f) The label states the ratio of water to concentrate required for a particular machine.
	g) Trade name	g) Provided on label
	h) Statement for storage requirements	h) Statement on label to avoid excessive temperature
	i) Any special requirements	i) All instructions are listed on the label.
	j) Warning of bacterial growth in bicarbonate concentrate	j) N/A product is not bicarbonate
	k) Statement to test the final conductivity and pH	k) Statement provided on label
	l) Statement to use water that meets ANSI/AAMI RD62:2001	l) Statement provided on label
4.1.2	Labeling requirements for liquid concentrate	
	a) Expiration date of liquid concentrate	a) N/A for this product since it's a dry concentrate
	b) Composition of the dialysate in mEq/L	b) N/A for this product since it's a dry concentrate
	c) Statement that the solution is nonpyrogenic	c) N/A for this product since it's a dry concentrate
	d) Fill volume of the container	d) N/A for this product since it's a dry concentrate
	e) The dilutional effects on the final dialysate of any liquid spikes	e) N/A for this product since it's a dry concentrate
	f) Nominal conductivity of the final dialysate when mixed using manufacturer's instructions	f) N/A for this product since it's a dry concentrate
4.1.3	Labeling requirements for powder concentrates	
	a) Conc. generators proportioning system or dialysis machine	a) The ratio of concentrate to water is stated on the label
	b) Length of time conc. generator can expect to function	b) N/A

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AAMI RD61 STANDARD CHECKLIST

	c) Amount of water required to reconstitute the concentrate	e) Information on label
	d) Time limit use on bicarbonate conc. to prevent bacteria	d) N/A product is not bicarbonate
	e) Water quality that should be used to mix the conc.	e) Statement provided on label
4.1.4	Aqueous Concentrate	
	a) Label includes instructions on mixing thoroughly	a) N/A, product is not aqueous
	b) Once opened, bicarbonate must be used within a specific time	b) N/A product is not bicarbonate or aqueous
	c) Labels are provided to distinguish among solutions	c) N/A, product is not aqueous
4.1.5	Dry Concentrate	
	a) Label includes recommended storage conditions and mixing precautions	a) Information on label
	b) The numbers symbol should be easily visible and in the boundaries of the symbol	b) Standard is met, information on label
	c) The container for proportioning systems shall display a geometric symbol	c) The label contains the appropriate symbol per the requirements
	d) Directions should instruct the user on proper use of the product, i.e. quality of water to be used, use of testing method to ensure proper dilution, any specific precautions	d) Instructions for use are located on the product label
	e) Labels should be a specific color per the type of product	e) Labels red in color indicating acid concentrate. Complies with standard.
	f) Means should be provided to readily distinguish between dry concentrates and their ratios	f) Requirements met – refer to label
4.2	Requirements for the concentrate	
4.2.1	Physical state	
	a) Concentrate for hemodialysis may be supplied in dry and/or aqueous form	a) This product is a dry concentrate
4.2.2	Solute concentrations	

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AAMI RD61 STANDARD CHECKLIST

4.2.2.1	Liquid solute concentrations	
	a) All electrolytes shall be present within $\pm 5\%$ or $\pm 0.1\text{mEq/L}$ or greater except sodium, which shall be present within $\pm 2.5\%$, Dextrose shall be present within $\pm 5\%$ or $\pm 5\text{mg/dL}$, whichever is greater, of the labeled concentration.	a) N/A, the product is a dry concentrate
4.2.2.2	Powder Weights	
	a) When the concentrate is packaged in dry form and mixed according to manufacturer's instruction, the final concentrate shall meet 4.2.2.1	a) Product is validated to meet these requirements
4.2.3	Water Quality	
	a) Water quality used to manufacture the concentrate shall be in accordance with ANSI/AAMI RD62:2001	a) Statement provided on label
4.2.4	Bacteriology	
	a) Bicarbonate supplied as a liquid must be provided in a sealed container and must contain no more than 200CFU/mL at the end of its shelf life	a) N/A, product is not bicarbonate
4.2.5	Fill Volume	
	a) Fill volumes of a liquid with batch systems shall be within 2%	a) N/A, product is not used with batch systems
	b) Nonbatch systems, fill is greater than 97% of stated volume	b) The volume produced is located on the label
4.2.6	PH	
	a) pH levels should meet the levels listed in the standard	a) Label states to check for pH and conductivity prior to dialysis treatment

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AAMI RD61 STANDARD CHECKLIST

4.2.7	Chemical grade	
	a) All chemicals shall meet the requirements of the current USP-NF	a) All chemical used in the concentrate are purchased from approved vendors and are tested according to USP methods or other validated test methods.
4.2.8	Particulates	
	a) Dialysate concentrate shall be filtered through a 1.2 micron or finer particulate filter	a) The label states to use such a filter upon reconstituting the concentrate. Performed at the clinics
4.2.9	Additives	
	a) All ingredients in final concentrate shall be listed on the label	a) All ingredients are listed on the label
4.2.10	Containers	
	a) Containers should not interact chemically or physically with their contents	a) The container material that contacts the dry concentrate product is tested for biocompatibility and stability studies are performed.
	b) Each container shall be marked with the appropriate color and symbol to indicate its contents	b) Each container is labeled accordingly to the standard
4.2.11	Pyrogenicity	
	a) The concentrate shall be shown to be non-pyrogenic. If LAL is used, max. endotoxin shall not exceed 2 EU/mL	a) Product labeled non-pyrogenic and complies with standard.
4.2.12	Bulk Delivered Concentrate	
	a) When the concentrate is delivered in bulk form, a responsible person must comply with the contents of this section as described in RD61.	a) N/A - This section does not apply to the manufacture. It is not a bulk delivered concentrate.

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AAMI RD61 STANDARD CHECKLIST

4.2.13	Concentrate Generators	
	a) All applicable sections of this document dealing with powder are met	a) Please see the appropriate sections for compliance to this standard
	b) Container will function with the machine as defined by the manufacturer	b) N/A
	c) Label shall clearly indicate the machines for which the concentrate generator is intended	c) The label states the ratio of concentrate for the proportioning machine the product should be used with
	d) Amount of time is indicated that the container can reasonably be expected to provide solution	d) N/A, we manufacture the concentrate
	e) Any additional information that the user might need to know	e) Please refer to product label
4.3	Manufacturing Equipment	
	a) Any material components used in manufacturing shall not interfere with concentrate and alter the product	a) Surface contact areas are stainless steel or are in compliance with the standard.
5.0	Tests	
	a) Defines test methods to be used and mentions that other test methods may be used where validation of the test method is demonstrated	a) Tests are performed according to USP, but other validations are performed to ensure quality and/or compliance to the standard
5.1	Labeling and documentation requirements	
	a) Compliance with the labeling requirements of 4.1.1 can be determined by inspection	a) Compliance with this standard. Refer to Section 4.1.1.
5.2	Testing to meet the requirements for the concentrate	
5.2.1	Physical State	
	a) Concentrate supplied in aqueous or dry form	a) Compliance verified by visual inspection
5.2.2	Solute concentrations	
	a) Compliance with the requirements of 4.2.2 for calcium, potassium, magnesium, and sodium and or other equivalent analytical methods	a) Product complies with standards. Product is validated according to the appropriate test methods

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AAMI RD61 STANDARD CHECKLIST

5.2.3	Water Quality	
	a) Use water in compliance with section 4.2.3 and ANSI/AAMI standards	a) Statement provided on label
5.2.4	Bacteriology	
	a) Concentrate containing bicarbonate supplied as a liquid must be provided in a sealed container and not contain more than 200 CFU/ml	a) N/A, product is not bicarbonate
5.2.5	Fill Volume	
	a) Fill volumes of a liquid with batch systems shall be within 2%	a) N/A, product is not used with batch systems
	b) Nonbatch systems, fill is greater than 97% of stated volume	b) The volume produced is located on the label
5.2.6	pH	
	a) Dialysate pH to be determined by appropriate dilution and then measuring pH with a glass electrode	a) Procedure performed at clinics. Statement to test pH is on label.
5.2.7	Chemical Grade	
	a) Purity of chemicals can be determined by test methods outlined in the USP	a) Design history files prove that USP methods or other validation procedures have been used to assure purity of the chemicals
5.2.8	Particulates	
	a) The concentrate shall be filtered through a 1.2 micron or finer particulate filter	a) Stated on label. To be performed by the clinics.
5.2.9	Additives	
	a) Compliance with 4.2.9 (ingredients on label) can be determined by inspection of records. All ingredients in the final concentrate shall be listed on the label.	a) All ingredients are stated on the label

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AAMI RD61 STANDARD CHECKLIST

5.2.10	Containers	
	a) Tests for plastic containers	a) All packaging material in contact with product are validated to ensure product purity.
	b) Compliance with 4.2.10	b) N/A – Product is a dry concentrate
5.2.11	Pyrogenicity	
	a) Compliance with 4.2.11 determined by USP-NL or LAL test	a) Product is labeled non-pyrogenic and testing is performed in accordance with the standard.
5.3	Manufacturing Equipment	
	a) Biocompatibility of material components used in the manufacturing equipment should be verified	a) Complies to standard based on design control

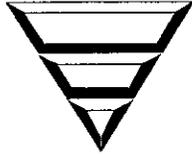
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Naturalyte® GRANUFLO® Dry Acid Concentrate
 Product Formula Chart
 January 14, 2003

Ionic Contribution of Acid Concentrate						
Current Code No.		0FD1003-NP	0FD1029-NP	0FD1042-NP	0FD1052-NP	0FD1062-NP
New Code No.		0FD1003-3B	0FD1029-3B	0FD1042-3B	0FD1052-3B	0FD1062-3B
Constituent						
SODIUM	mEq/L	(b)(4)				
POTASSIUM	mEq/L					
CALCIUM	mEq/L					
MAGNESIUM	mEq/L					
ACETATE	mEq/L					
CHLORIDE	mEq/L					
DEXTROSE	mg/dL					
Current Code No.		0FD2401-NP	0FD2418-NP	0FD2419-NP	0FD2426-NP	
New Code No.		0FD2401-3B	0FD2418-3B	0FD2419-3B	0FD2426-3B	
Constituent						
SODIUM	mEq/L	(b)(4)				
POTASSIUM	mEq/L					
CALCIUM	mEq/L					
MAGNESIUM	mEq/L					
ACETATE	mEq/L					
CHLORIDE	mEq/L					
DEXTROSE	mg/dL					
Current Code No.		0FD3006-NP	0FD3007-NP	0FD3013-NP	0FD3018-NP	0FD3026-NP
New Code No.		0FD3006-3B	0FD3007-3B	0FD3013-3B	0FD3018-3B	0FD3026-3B
Constituent						
SODIUM	mEq/L	(b)(4)				
POTASSIUM	mEq/L					
CALCIUM	mEq/L					
MAGNESIUM	mEq/L					
ACETATE	mEq/L					
CHLORIDE	mEq/L					
DEXTROSE	mg/dL					

Naturalyte® GRANUFLO® Dry Acid Concentrate
 Product Weight Chart
 January 14, 2003

Chemical Composition						
New Code No.		0FD1003-3B	0FD1029-3B	0FD1042-3B	0FD1052-3B	0FD1062-3B
Constituent	per case					
Sodium Chloride	kg	(b)(4)				
Potassium Chloride	kg					
Calcium Chloride	kg					
Magnesium Chloride	kg					
Sodium Diacetate	kg					
Dextrose	kg					
New Code No.		0FD2401-3B	0FD2418-3B	0FD2419-3B	0FD2426-3B	
Constituent	per case					
Sodium Chloride	kg	(b)(4)				
Potassium Chloride	kg					
Calcium Chloride	kg					
Magnesium Chloride	kg					
Sodium Diacetate	kg					
Dextrose	kg					
New Code No.		0FD3006-3B	0FD3007-3B	0FD3013-3B	0FD3018-3B	0FD3026-3B
Constituent	per case					
Sodium Chloride	kg	(b)(4)				
Potassium Chloride	kg					
Calcium Chloride	kg					
Magnesium Chloride	kg					
Sodium Diacetate	kg					
Dextrose	kg					



Fresenius Medical Care
North America

**Study:
Naturalyte Granuflo Dry Acid Concentrate
Dissolution Verification**

Tuesday, January 14, 2003
Irving Concentrate Manufacturing
Irving, TX

080000

55'

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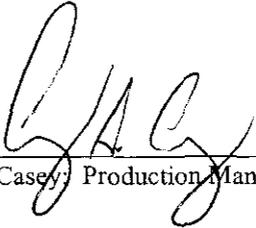
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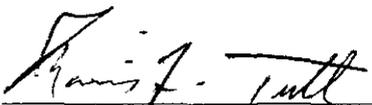
1.0 Approvals

Approval of this study will be the joint responsibility of the following people:



Craig Casey: Production Manager

1-21-03
Date



Marvin Tull: QS Manager

1-22-03
Date

Pat Sharp: Director, Mfg Engineering

Date

1.0 Approvals

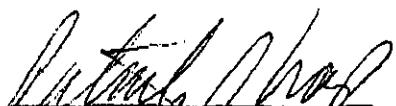
Approval of this study will be the joint responsibility of the following people:

Craig Casey: Production Manager

Date

Marvin Tull: QS Manager

Date



Pat Sharp: Director, Mfg Engineering

01-21-03
Date

2.0 Product Background

The goal of this project is to develop a non-granulated form of dry acid concentrate. The name selected for this new product is Naturalyte Granuflo Dry Acid Concentrate.

Chemical ingredients for the Naturalyte Granuflo dry Acid Concentrate (Naturalyte) product will be identical to the existing Granuflo® product (the Predicate Device), with the exception of (b)(4) (b)(4) (b)(4)

product, once reconstituted, should be chemically equivalent to the other.

The products also differ in the way they are packaged. The existing Granuflo® product is packaged six-bags per case, with a total of 24 bags required to produce 500 liters of liquid acid concentrate. The Naturalyte product will be packaged three bags per case (two "blend" bags and one dextrose bag) and also requires 24 total bags to produce 500 liters of liquid acid concentrate.

3.0 Purpose

This Study will demonstrate that the current dry-powder dissolution process will dissolve the new "Naturalyte Granuflo Dry Acid Concentrate" (Naturalyte) product to produce a 500-liter homogeneous solution of liquid concentrate. Furthermore, this study will demonstrate that the homogeneous solution of liquid concentrate produced is chemically equivalent to the reconstituted Granuflo® product (the Predicate Device). Equivalence will be demonstrated by comparing the solute chemical concentration for reconstituted Naturalyte to the chemical specifications for the equivalent Granuflo formulation. Post-mixing homogeneity will be demonstrated by pulling "top" and "bottom" samples from the dissolution tank and showing, through chemical testing of these samples, that their solute chemical concentration is equivalent.

To produce a homogeneous concentrate solution, 24-bags of the dry-powder product are mixed with the required volume of hemodialysis quality water in a Fresenius Dissolution Unit. The Fresenius Dissolution Unit is a controlled device, which regulates water input into a mix tank and informs the operator to empty the 24-bags of dry-powder product into the tank at a designated time in the units cycle. Once the bags have been added, the unit fills the tank to the required level with hemodialysis quality water and, then, mixes the product for the programmed period of time to produce a homogeneous solution of liquid acid concentrate. Total cycle time is approximately 45 minutes.

To demonstrate chemical equivalence, one formulation will be selected from each of the proposed Naturalyte product series (1000, 2400 and 3000 series). For each formula selected, the required chemical ingredients will be weighted to produce 24-bags of product (16 blend bags and 8 dextrose bags). The 24 bags (all of one formula) will be reconstituted using the Fresenius Dissolution Unit to produce liquid acid concentrate. A "top" and "bottom" samples of the liquid acid concentrate will be obtained from the dissolution tank and tested for their chemical solute concentrations of Magnesium, Calcium, Potassium, Dextrose, Sodium, and Acetate (as Acetic Acid). Test results will be compared to the equivalent Granuflo formula product specifications to verify that all chemical specifications are met for that formula. Since chemical specifications are the same for the reconstituted Naturalyte as for the reconstituted Granuflo, in-specification results will be prima facie evidence that the two products are chemically equivalent.

4.0 Process

Three dissolution's will be performed, one for each code type: 1000, 2400, and 3000 series. A total of 24 bags will be dissolved for each formula type, which is the proper amount for the 500 liter tank.

Formulation 2418, 3006, and 1062 will be utilized for the test.

4.1 Procedure

4.1.1 Weighing and Dissolution

1. Weigh Ingredients into plastic Bags. The laboratory scale will be used to weigh MgCl, CaCl, KCl, and Na Diacetate in grams. Dextrose and Salt weights will be weighed in pounds (convert grams to pounds) using the floor scale in the batch room. Use the fill weights determined in section 3.1.2.
2. Label all bags with a number which correlates to a matrix with the ingredient fill weights (Attachment one)
3. Fill the equivalent of 4 granuflo cases of bags: 16 blend bags and 8 Dextrose bags.
4. Following the Granuflo dissolution unit instructions, empty the contents of the bags into the dissolution unit.
5. Allow the dissolution unit to complete the mix cycle.
6. Pull two one-liter samples of the liquid concentrate, one from the top of the tank and one from the drain valve (bottom). Test the sample for all analytes using the Irving QCP procedures for Naturalyte testing, or other approved methods.

4.1.2 Fill Weights

Ingredient	1062		2418		3006	
	Gram Weight		Gram Weight		Gram Weight	
	Two Blend Bags	One Dex Bag	Two Blend Bags	One Dex Bag	Two Blend Bags	One Dextrose Bag
Salt	(b)(4)					
Dextrose	(b)(4)					
KCl	(b)(4)					
MgCl	(b)(4)					
CaCl	(b)(4)					
Sod Diac	(b)(4)					

4.1.3 Criteria of Acceptance

1. All bags must completely dissolve during the mix cycle.
2. Test results for the reconstituted product must meet specification for all analytes.
3. The final mix must be homogeneous, with no component test result variations greater than 2% from the top of the tank and the drain sample for all ingredients.

5.0 Test Results

5.1 Results and Conclusion

Twenty-four bags of each formulation were made according to the weights provided. For each formulation, the twenty-four bags were dumped into the granuflo dissolution unit, and run through the sequence of operation of the dissolution unit. The dissolution unit performs following processes:

Process Step	Approx. Time (min)
Fill	5
Add Bags	Manually Dispensed
Mix	45
Dearation	5
Final Fill	3
Homogenize	10

At the end of the process, all added material was in solution. This is evidenced by visual inspection, which showed the liquid in the tank was clear with no visible particles, and results obtained from tank sample testing.

The criteria of acceptance were fully met for the 1062 and the 3006 products.

1. All bags were completely dissolved during the mix cycle.
2. All analyte results were found to meet specifications for their respective formulation.
3. There was no more than a two- percent (2%) variation between samples pulled from the top of the tank and bottom of the tank (drain), based on test results for these samples. These results indicate that the dissolution unit produced a homogenous solution and that the variation found between the top and bottom sample is acceptable when normal test variation is considered.

The criteria of acceptance were not fully met for the 2418 product. Those criterion that were met and those that were not are detailed below:

1. All bags were completely dissolved during the mix cycle. *Criteria Met.*
2. All analyte results did **not** meet specifications for their respective formulation (see attached results). *Criteria not met.*
3. There was no more than a two- percent (2%) variation between samples pulled from the top of the tank and bottom of the tank (drain), based on test results for these samples. These results indicate that the dissolution unit produced a homogenous solution and that the variation found between the top and bottom sample is acceptable when normal test variation is considered. *Criteria Met.*

Based on our investigation, the most likely cause for the failure of the 2418 formula to meet all of its chemical concentration specifications is due to an operator error. An addendum to this study will be drafted with controls to reduce potential operator errors. As part of this addendum, an additional 24 bags of 2418 product will be prepared and tested. This study will be approved if the 2418 product, which is prepared under the addendum, meets all of the study criteria for acceptance.

		Na (total)	Na (tit)	K	Ca	Mg	Cl	Acetate*	Dex	Factor	
1062	label spec	(b)(4)									
	conc. Spec	(b)(4)									
											All Analytes Meet Product Spec?
	Top Sample	(b)(4)									Yes
	% from nom										
	Drain Sample	(b)(4)									Yes
	% from nom										
	%diff Top.Drain	(b)(4)									Meets Study Acceptance Criteria?
											Yes

* As Acetic Acid

000010 63

64

71000

		Na (total)	Na (tit)	K	Ca	Mg	Cl	Acetate*	Dex	Factor	
2418	label spec	(b)(4)									
	conc. Spec	(b)(4)									
											All Analytes Meet Product Spec?
	Top Sample	(b)(4)									NO
	% from nom	(b)(4)									
	Drain Sample	(b)(4)									NO
	% from nom	(b)(4)									
	%diff Top:Drain	(b)(4)									Meets Study Acceptance Criteria? Yes

* As Acetic Acid

Based on review of the Out-of-Specification results, it is believed that an Operator weighing and/or filling error occurred. This formula will be retested.

		Na (total)	Na (tit)	K	Ca	Mg	Cl	Acetate*	Dex	Factor		
3006	label spec	(b)(4)										
	conc. Spec	(b)(4)										
											All Analytes Meet Product Spec?	
	Top Sample	(b)(4)										YES
	% from nom	(b)(4)										
	Drain Sample	(b)(4)										YES
	% from nom	(b)(4)										
	%diff Top:Drain	(b)(4)										Meets Study Acceptance Criteria? Yes

* As Acetic Acid

159
000010

**Attachment 1:
Bag Fill Weights (1 of 3)**

Blend Bags: Formula 1062						
Bag Number	Salt	KCl	MgCl	CaCl	Sod Diac	Dextrose
Target wt	(b)(4)					
Record Actual Weights Below						
1	(b)(4)					(b)(4)
2	(b)(4)					(b)(4)
3	(b)(4)					(b)(4)
4	(b)(4)					(b)(4)
5	(b)(4)					(b)(4)
6	(b)(4)					(b)(4)
7	(b)(4)					(b)(4)
8	(b)(4)					(b)(4)
9	(b)(4)					(b)(4)
10	(b)(4)					(b)(4)
11	(b)(4)					(b)(4)
12	(b)(4)					(b)(4)
13	(b)(4)					(b)(4)
14	(b)(4)					(b)(4)
15	(b)(4)					(b)(4)
16	(b)(4)					(b)(4)
17						(b)(4)
18						(b)(4)
19						(b)(4)
20						(b)(4)
21						(b)(4)
22						(b)(4)
23						(b)(4)
24						(b)(4)

Filled by EC JSB

1-22-03

**Attachment 1:
Bag Fill Weights (2 of 3)**

Blend Bags: Formula 2418						
Bag Number	Salt	KCl	MgCl	CaCl	Sod Diac	Dextrose
Target wt	(b)(4)					
Record Actual Weights Below						
1	(b)(4)					
2	(b)(4)					
3	(b)(4)					
4	(b)(4)					
5	(b)(4)					
6	(b)(4)					
7	(b)(4)					
8	(b)(4)					
9	(b)(4)					
10	(b)(4)					
11	(b)(4)					
12	(b)(4)					
13	(b)(4)					
14	(b)(4)					
15	(b)(4)					
16	(b)(4)					
17						(b)(4)
18						
19						
20						
21						
22						
23						
24						

Filled by EC JBB

1-23-03

**Attachment 1:
Bag Fill Weights (3 of 3)**

Blend Bags: Formula 3006						
Bag Number	Salt	KCl	MgCl	CaCl	Sod Diac	Dextrose
Target wt	(b)(4)					
Record Actual Weights Below						
1	(b)(4)					
2	(b)(4)					
3	(b)(4)					
4	(b)(4)					
5	(b)(4)					
6	(b)(4)					
7	(b)(4)					
8	(b)(4)					
9	(b)(4)					
10	(b)(4)					
11	(b)(4)					
12	(b)(4)					
13	(b)(4)					
14	(b)(4)					
15	(b)(4)					
16	(b)(4)					
17						(b)(4)
18						(b)(4)
19						(b)(4)
20						(b)(4)
21						(b)(4)
22						(b)(4)
23						(b)(4)
24						(b)(4)

Filled by EL JBB

1-24-03

000015

FINISHED PRODUCT SODIUM ANALYSIS

PRODUCT CATALOG #: 1062

LOT #: DISSOLUTION STUDY

DETERMINATION OF SODIUM CONCENTRATION: OCP1.2.2

(b)(4)

1. Dilution Series (b)(4)
2. Standard: (b)(4)
3. Experimental Results:

<p>^{SPT} 1/22/03</p> <p>Sample #1 DRAIN SAMPLE</p> <p>(b)(4)</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p>	<p>^{SPT} 1/22/03</p> <p>Sample #3 TOP SAMPLE</p> <p>(b)(4)</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p> <p>X 10⁻¹ meq/L Na⁺</p>
--	--

AVG CONCENTRATIONS:

^{SPT}
1/22/03

DRAIN (b)(4) X 10⁻¹ meq/L Na⁺

TOP #3 (b)(4) X 10⁻¹ meq/L Na⁺

4. Concentration Calculation:

(Avg Conc.) ((b)(4)) = Conc. (Meq/L)

Concentration: ^{SPT}
1/22/03 DRAIN #1 (b)(4) meq/L

^{SPT}
1/22/03 DRAIN #3 (b)(4) meq/L

Completed By: mm

Date: 1/22/03

Checked By: W

Date: 1-23-03

000016

CONTROLLED

BATCH TANK POTASSIUM ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 1062

QCP1.2.2

SAMPLE PREPARATION:

DILUTION SERIES:

(b)(4)

STANDARD: (b)(4) PPM K+ / (b)(4) MLS 1% NA+ PER 100 MLS STAND. VOLUME)

LOT #: 116103 EXP. DATE: 1123103

EXPERIMENTAL RESULTS:

(b)(4)

112263 AVERAGE AMOUNT: (b)(4) PPM K+

CONCENTRATE CALCULATION:

(b)(4) 112263 (b)(4)

(b)(4)
= (b)(4) EQ/L K+

COMPLETED BY: mm

CHECKED BY: (Signature)

DATE: 112263

DATE: 1-22-03

080017

CONTROLLED

70

BATCH TANK MAGNESIUM AND CALCIUM ANALYSIS

P1 DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 1062

MAGNESIUM CONCENTRATION

SAMPLE PREPARATION: (b)(4)
DILUTION SERIES: (b)(4)

STANDARDS: (b)(4) PPM MG++ LOT #: 116603 EXP. DATE: 1123603
(b)(4) PPM MG++ LOT #: 116603 EXP. DATE: 1123603

EXPERIMENTAL RESULTS:

(b)(4) PPM MG++ (b)(4) PPM MG++
(b)(4) PPM MG++ (b)(4) PPM MG++

AVERAGE CONCENTRATION: (b)(4) PPM MG++

CONCENTRATION CALCULATION:

(b)(4) PPM MG++ (b)(4) MLS (1 MEQ / 12.156 MGS) =
(b)(4) MEQ/L MG++

CALCIUM CONCENTRATION:

QCP1.3.1

EDTA MOLARITY: (b)(4) M

EXPERIMENTAL RESULTS:

(b)(4) LS EDTA

hm
1122603

CONCENTRATION CALCULATION:

(b)(4)

(b)(4) 25 M L S
MEQ/L CA++ & MG++

(b)(4) MEQ/L MG++

(b)(4) MEQ/L CA++

COMPLETED BY: hm
DATE: 1122603

CHECKED BY: (Signature)
DATE: 1-22-03

CONTROLLED

080013 71

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 1062

SPECIFIC GRAVITY:

SAMPLE READ (b)(4) - CORRECTION FACTOR (b)(4)
SPECIFIC GRAVITY (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4) G

TITRATION PROCESS: TITRANT NORMALITY (b)(4) N

TITRANT QUANT (b)(4) MLS

BLANK (b)(4) MLS

NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

D = DENSITY (G/L) = SPECIFIC GRAVITY

W = WEIGHTMENT OF SAMPLE

(b)(4) (1000) = (b)(4) mEq/L CHLORIDE

(b)(4) (b)(4) mEq/L Cl⁻ - mEq K⁺ - mEq Ca⁺⁺/Mg⁺⁺ TO (b)(4) CALCULATED mEq/L SODIUM

COMPLETED BY: [Signature]
DATE: 1-22-03

CHECKED BY: [Signature]
DATE: 1/23/03

CONTROLLED

72

BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 1062

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = ((b)(4)) (10) = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COLORLESS TO LIGHT AMBER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLEAR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COMPLETED BY: (Signature)
DATE: 1-22-03

CHECKED BY: (Signature)
DATE: 1-23-03

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 1062

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY

(b)(4)

N

TITRANT QUANT

(b)(4)

MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

$$\frac{(b)(4)}{25 \text{ MLS}} (1000) =$$

$$(b)(4) \text{ MEQ/L}$$

COMPLETED BY: BA

CHECKED BY: W

DATE: 01-22-03

DATE: 1-23-03

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74

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BATCH TANK MAGNESIUM AND CALCIUM ANALYSIS

P1 DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 1062

MAGNESIUM CONCENTRATION

SAMPLE PREPARATION:

DILUTION SERIES

STANDARDS: (b)(4) PPM MG++

LOT #: 116103 EXP. DATE: 1/23/03

(b)(4) PPM MG++

LOT #: 116103 EXP. DATE: 1/23/03

EXPERIMENTAL RESULTS:

(b)(4) PPM MG++

(b)(4) PPM MG++

PPM MG++

PPM MG++

AVERAGE CONCENTRATION: (b)(4) PPM MG++

CONCENTRATION CALCULATION:

(b)(4)

CALCIUM CONCENTRATION:

QCP1.3.1

EDTA MOLARITY: (b)(4) M

EXPERIMENTAL RESULTS:

(b)(4) MLS EDTA

CONCENTRATION CALCULATION:

(b)(4) MLS EDTA) (b)(4) M) (2EQ / M) (1000MEQ / EQ)
25 MLS

(b)(4) MEQ/L CA++ & MG++

MEQ/L MG++

(b)(4) MEQ/L CA++

COMPLETED BY: _____

CHECKED BY: [Signature]

DATE: 1-22-03

DATE: 1-22-03

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BATCH TANK CHLORIDE ANALYSIS

PRODUC

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 1062

SPECIFIC GRAVITY.

SAMPLE (b)(4) - CORRECTION FACTOR (b)(4)
SPECIFIC GRAVITY (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGH (b)(4) G
TITRATION PROCESS: (b)(4) TITRANT NORMALITY (b)(4) N
TITRANT QUANT. (b)(4) MLS
BLANK (b) MLS
NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

D = DENSITY (G/L) = SPECIFIC GRAVITY

W = WEIGHTMENT OF SAMPLE

(b)(4) (b)(4)
(1000) = (b)(4) mEq/L CHLORIDE

(b)(4) CALCULATED mEq/L SODIUM

COMPLETED BY: [Signature]
DATE: 1-22-03

CHECKED BY: [Signature]
DATE: 1-23-03

FMC Form No.: 2024 12/01 Revision: 1

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BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 1062

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COLORLESS TO LIGHT AMBER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLEAR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COMPLETED BY: BS
DATE: 1-22-03

CHECKED BY: W
DATE: 1-23-03

000005

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 1062

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY

(b)(4) _____ N

TITRANT QUANT

(b)(4) _____

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

(b)(4) _____ (1000)
25 MLS

(b)(4) _____ MEQ/L

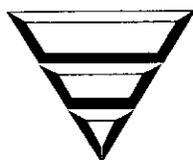
COMPLETED BY: BT
DATE: 1-22-03

CHECKED BY: MU
DATE: 1-23-03

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CONTROLLED

79



Fresenius Medical Care
North America

**Addendum to Study:
Naturalyte Granuflo Dry Acid Concentrate
Dissolution Verification**

February 3, 2003
Irving Concentrate Manufacturing
Irving, TX

0800007

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3.0 Conclusion and Approval of Results..... 6

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1.0 Reason for Addendum

To demonstrate chemical equivalence between the existing Granuflo product and the proposed Naturalyte product, one formulation was selected from each of the proposed Naturalyte product series (1000, 2400 and 3000 series). For each formula selected, the required chemical ingredients were weighed to produce 24-bags of product (16 blend bags and 8 dextrose bags). The 24 bags of Naturalyte product (all of one formula) were then reconstituted using the Fresenius Dissolution Unit to produce liquid acid concentrate. The liquid acid concentrate was tested for its chemical solute concentrations of Magnesium, Calcium, Potassium, Dextrose, Sodium, and Acetate (as Acetic Acid). Test results were then compared to the equivalent Granuflo formula product specifications to verify that all chemical specifications are met for that formula. This comparison found that the 1026 (1000 series) and the 3006 (3000 series) met all specifications. The 2418 (2400 series) product, however, failed to meet all chemical specifications, even though the reconstituted product samples (top and bottom sample) tested within two percent (2%) of each other (this criteria met specifications).

An investigation of the out-of-specification results indicated that the most likely cause for these out-of-specification results was a weighing error. This is supported by the fact that many of the analytes met specifications (Sodium, Chlorides, Dextrose), while others did not or were close to the specification limit (Potassium, Calcium, Acetate). The fact that some analytes were in specification and other were out rules out any apparent improper dilution issues. Moreover, since the "top" and "bottom" sample were within specification and no un-dissolved materials were observed in the mixing tank, the solution was properly mixed to produce a homogeneous solution, ruling out any apparent mixing issues. Finally, to rule out any issues with the calculations, which determined the quantity of each chemical ingredient to add per bag, the calculations were independently verified by two different individuals and found to be correct as specified in this study's protocol.

The investigation ruled out several potential causes for the out-of-specification results obtained for the 2418 product and pointed towards an operator weighing error as the root cause. The fact that some materials were in-specification, some at the upper end of the specification limit or exceeding this limit, and others at the bottom end of the limit or exceeding this limit, also supports that weighing errors is the most likely cause for the out-of-specification results. The weighing process required to produce the "test product" is a highly labor intensive process, with potential for errors from improper tare during the weighing process, a mixing of an ingredient weight, and or other potential mis-weighing issues.

Since the most likely cause for the out-of-specification results are a weighing error, additional 2418 product will be produced with additional controls on the weighing process. The testing for the 2418 product, as outlined in the original protocol, will be repeated, with additional controls added for the weighing process.

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2.0 Changes to Process

Except for the changes outlined below, the process, as originally defined in this study (Section 4.0 of the Naturalyte Granuflo Dry Acid Concentrate Dissolution Verification study) will be followed.

1. Attachment 1, Bag Fill Weight will be modified to include "added by" and "check by" columns. One "added by" and "check by" column will be added for each of the currently existing "weight" columns (see Section 2.1 for sample form).
2. For each and every ingredient weighing operation, the operator will document the correct weight for that ingredient under the correct chemical heading (e.g., Salt), then initial the "added by" box adjacent to this entry. A second individual, that has observed the weighing operation will verify that the ingredient was correctly weighted and the correct weight was entered by initialing the "check by" box adjacent to the corresponding operator's entries (recorded weight and operator's initials). This process of documenting the chemical ingredient weight, initially in the "added by" box, and verification of process and weigh entry accuracy by a second individual will be repeated for each and every ingredient required to produce the 24 bags for this re-test of product 2418.
3. In addition to the above, the operator will document that they started the dissolution tank cycle, emptied all of the material contained in the 24 bags into the dissolution tank, and checked the mix tank for any un-dissolved materials. The operator shall also record the mixing cycle start and finish times. These steps shall be verified by a second person to have been properly performed.
4. The collection of the "top" and "bottom" sample shall be documented and verified by a second individual to have been properly collected, then submitted to the laboratory for testing.

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2.1 Modified Bag Fill Weights form

Bag Fill Weights

Blend Bags: Formula: 2418																		
Bag Number	(b)(4)																	
Target wt	(b)(4)																	
Record Actual Weights Below																		
	Weight	Added By	Check By															
1																		
2	-																	
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		

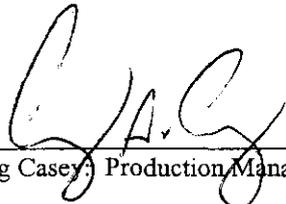
000001

3.0 Conclusion and Approval of Results

Test results from the initial study found that the 1026 (1000 series) and the 3006 (3000 series) met all specifications. The 2418 (2400 series) product, however, failed to meet all chemical specifications, even though the reconstituted product samples (top and bottom sample) tested within two percent (2%) of each other (this criteria met specifications). Based on an investigation of the out-of-specification 2418 test results, an operator weighing error is the most likely cause for the out-of-specification results. For this reason, an additional 24-bags of the 2418 product was prepared and tested, this time with additional controls on the weighing process. All test results for the second 2418 product meet the original study acceptance criteria (see attached summary of test results).

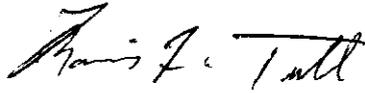
Based on the study results, there is prima facie evidence that the Naturalyte Granuflo Dry Acid Concentrate product is chemically equivalent to the existing Granuflo product. Furthermore, this study has demonstrated that the Naturalyte Granuflo Dry Acid Concentrate product will fully dissolve to produce a homogeneous solution of liquid acid concentrate when reconstituted with a Fresenius Dissolution Unit.

Approval of the conclusion for this study will be the joint responsibility of the following people:



Craig Casey: Production Manager

2-7-03
Date



Marvin Tull: QS Manager

02-09-03
Date

Pat Sharp: Director, Mfg Engineering

Date

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85'

3.0 Conclusion and Approval of Results

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Based on the study results, there is prima facie evidence that the Naturalyte Granuflo Dry Acid Concentrate product is chemically equivalent to the existing Granuflo product. Furthermore, this study has demonstrated that the Naturalyte Granuflo Dry Acid Concentrate product will fully dissolve to produce a homogeneous solution of liquid acid concentrate when reconstituted with a Fresenius Dissolution Unit.

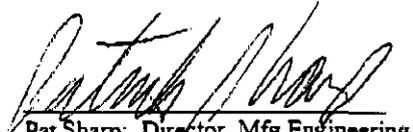
Approval of the conclusion for this study will be the joint responsibility of the following people:

Craig Casey: Production Manager

Date

Marvin Tull: QS Manager

Date



Pat Sharp: Director, Mfg Engineering

02-07-03

Date

4.0 Attachments/Supporting Documents

000001

		Na (total)	Na (tit)	K	Ca	Mg	Cl	Acetate*	Dex	Factor	
2418	label spec	(b)(4)									
	conc. Spec										
											All Analytes Meet Product Spec?
	Top Sample	(b)(4)									YES
	% from nom										
	Drain Sample	(b)(4)									YES
	% from nom										
	%diff Top:Drain	(b)(4)									Meets Study Acceptance Criteria?
											Yes

* As Acetic Acid

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88

**Attachment 1:
Bag Fill Weights (2 of 3)**

Blend Bags: Formula: 2418	
Bag Number	(b)(4)
Target wt	(b)(4)
Record Actual Weights Below	
	(b)(4)
1	(b)(4)
2	(b)(4)
3	(b)(4)
4	(b)(4)
5	(b)(4)
6	(b)(4)
7	(b)(4)
8	(b)(4)
9	(b)(4)
10	(b)(4)
11	(b)(4)
12	(b)(4)
13	(b)(4)
14	(b)(4)
15	(b)(4)
16	(b)(4)
17	(b)(4)
18	(b)(4)
19	(b)(4)
20	(b)(4)
21	(b)(4)
22	(b)(4)
23	(b)(4)
24	(b)(4)

080018

FOR 2418

on: 2/3/03

Attachment 1:

Process:

Performed By:

Checked By:

1. Empty all bags into dissolution unit and turn on the cycle,
After the mix is complete, verify all material is dissolved.

Start Time: 12:25 pm End Time: 2:15 pm

EL

JPH

2. Sample the top and bottom and bring to lab for testing.

EL

JPH

000007

FINISHED PRODUCT SODIUM ANALYSIS

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

1. Dilution Series (b)(4)
2. Standard: (b)(4)
3. Experimental Results:
- | | |
|---|---|
| TOP
Sample #1 ^{JPK} 2/3/03 | DRAIN
Sample #3 ^{JPK} 2/3/03 |
| (b)(4) X 10 ⁻¹ meq/L Na ⁺ | (b)(4) X 10 ⁻¹ meq/L Na ⁺ |
| (b)(4) X 10 ⁻¹ meq/L Na ⁺ | (b)(4) X 10 ⁻¹ meq/L Na ⁺ |
| (b)(4) X 10 ⁻¹ meq/L Na ⁺ | (b)(4) X 10 ⁻¹ meq/L Na ⁺ |
| (b)(4) X 10 ⁻¹ meq/L Na ⁺ | (b)(4) X 10 ⁻¹ meq/L Na ⁺ |

^{JPK} 2/3/03 **AVG CONCENTRATIONS:**

TOP SAMPLE #1 ^{JPK} 2/3/03	(b)(4) X 10 ⁻¹ meq/L Na ⁺
DRAIN SAMPLE #3	(b)(4) X 10 ⁻¹ meq/L Na ⁺

4. Concentration Calculation:

(Avg Conc.) (b)(4)

TOP SAMPLE (b)(4) meq/L DRAIN SAMPLE (b)(4) meq/L

Concentration: #1 ^{JPK} 2/3/03 #3 ^{JPK} 2/3/03

Completed By: ham

Date: 2/3/03

Checked By: JPK

Date: 2/3/03

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91

BATCH TANK POTASSIUM ANALYSIS

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

QCP1.2.2

SAMPLE PREPARATION:

DILUTION SERIES:

(b)(4)

STANDARD: (b)(4) PPM K+ / (b)(4) (b)(4) 1 MLS 1% NA+ PER 100 MLS STAND. VOLUME)

LOT #: 1130103 EXP. DATE: 21063

EXPERIMENTAL RESULTS:

(b)(4) PPM K+ (b)(4) PPM K+
(b)(4) PPM K+ (b)(4) PPM K+

AVERAGE AMOUNT: (b)(4) PPM K+

CONCENTRATE CALCULATION:

(b)(4) PPM K+ (b)(4) / (b)(4) MLS (b)(4) MLS / (b)(4) MLS (1 MEQ / 39.1 MGS)
= (b)(4) MEQ/L K+

COMPLETED BY: mm

CHECKED BY: [Signature]

DATE: 213103

DATE: 2-3-03

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92

BATCH TANK MAGNESIUM AND CALCIUM ANALYSIS

PRO

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

MAGNESIUM CONCENTRATION

SAMPLE PREPARATION:

DILUTION SERIES: (b)(4) MLS/ (b)(4) MLS: (b)(4) MLS/ (b)(4) MLS

STANDARDS: (b)(4) PPM MG++ LOT #: 12063 EXP. DATE: 2/6/03
(b)(4) PPM MG++ LOT #: 12063 EXP. DATE: 2/6/03

EXPERIMENTAL RESULTS:

(b)(4) PPM MG++ (b)(4) PPM MG++
(b)(4) PPM MG++ (b)(4) PPM MG++

AVERAGE CONCENTRATION: (b)(4) PPM MG++

CONCENTRATION CALCULATION:

(b)(4) PPM MG++ (b)(4) MLS/ (b)(4) (b)(4) (b)(4) (1 MEQ / 12.156 MGS) =
(b)(4) MEQ/L MG++

CALCIUM CONCENTRATION:

QCP1.3.1

EDTA MOLARITY: (b)(4) M

EXPERIMENTAL RESULTS:

(b)(4) MLS EDTA

CONCENTRATION CALCULATION:

(b)(4) M (2EQ / M) (1000MEQ / EQ)

25 MLS

(b)(4) MEQ/L CA++ & MG++
(b)(4) MEQ/L MG++
(b)(4) MEQ/L CA++

COMPLETED BY: mm
DATE: 2/3/03

CHECKED BY: SPG
DATE: 2/3/03

000010

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

SPECIFIC GRAVITY:

SAMPLE READING: 1.2120 - CORRECTION F (b)(4) (b)(4)
SPECIFIC GRAVITY (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT (b)(4) G

TITRATION PROCESS: (b)(4) TITRANT NORMAL (b)(4) N

TITRANT QUANT. (b)(4) MLS

BLANK (b)(4) MLS

NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

D = DENSITY (G/L) = SPECIFIC GRAVITY

W = WEIGHTMENT OF SAMPLE

(b)(4) mEq/L CHLORIDE

(b)(4) CALCULATED mEq/L SODIUM

COMPLETED BY: [Signature]

CHECKED BY: [Signature]

DATE: 2-3-03

DATE: 2/3/03

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080011

94

BATCH TANK DEXTROSE ANALYSIS

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COLORLESS TO LIGHT AMBER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLEAR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COMPLETED BY: [Signature]
DATE: 2-3-03

CHECKED BY: [Signature]
DATE: 2/3/03

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95'

BATCH TANK ACETIC ACID ANALYSIS

TOP SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS: TITRANT NORMALITY: (b)(4) N
TITRANT QUANT (b)(4) (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

$$\frac{(b)(4) (b)(4) (1000)}{25 \text{ MLS}} = (b)(4) \text{ MEQ/L}$$

COMPLETED BY: [Signature]
DATE: 2-3-03

CHECKED BY: [Signature]
DATE: 2/3/03

000000

CONTROLLED

96

BATCH TANK POTASSIUM ANALYSIS

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

QCP1.2.2

SAMPLE PREPARATION:

DILUTION SERIES: (b)(4)

STANDARD (b)(4) PPM K+ / (b)(4)

LOT #: 1130603 EXP. DATE: 2/6/03

EXPERIMENTAL RESULTS:

(b)(4) PPM K+ (b)(4) PPM K+
(b)(4) PPM K+ (b)(4) PPM K+

AVERAGE AMOUNT: (b)(4) PPM K+

CONCENTRATE CALCULATION:

(b)(4)

COMPLETED BY: mm

CHECKED BY: [Signature]

DATE: 2/3/03

DATE: 2-3-03

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97

BATCH TANK MAGNESIUM AND CALCIUM ANALYSIS

PRC

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

MAGNESIUM CONCENTRATION

SAMPLE PREPARATION:

DILUTION SERIES (b)(4)

STANDARDS: (b)(4) PPM MG++ LOT #: 130103 EXP. DATE: 2/6/03

(b)(4) PPM MG++ LOT #: 130103 EXP. DATE: 2/6/03

EXPERIMENTAL RESULTS:

(b)(4) PPM MG++ (b)(4) PPM MG++
(b)(4) PPM MG++ (b)(4) PPM MG++

AVERAGE CONCENTRATION: (b)(4) PPM MG++

CONCENTRATION CALCULATION:

(b)(4) (b)(4) (1 MEQ / 12.156 MGS) =
(b)(4) MEQ/L MG++

CALCIUM CONCENTRATION:

QCP1.3.1

EDTA MOLARITY: (b)(4) M

EXPERIMENTAL RESULTS:

(b)(4) MLS EDTA

CONCENTRATION CALCULATION:

(b)(4) MLS EDTA (b)(4) M (2EQ / M) (1000MEQ / EQ)

25 MLS

= (b)(4) MEQ/L CA++ & MG++

= (b)(4) MEQ/L MG++

(b)(4) MEQ/L CA++

COMPLETED BY: mm

CHECKED BY: JPL

DATE: 2/3/03

DATE: 2/3/03

000015

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

SPECIFIC GRAVITY:

SAMPLE READING (b)(4) CORRECTION FACTOR (b)(4) SPECIFIC GRAVITY: (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4)
TITRATION PROCESS: (b)(4) TITRANT NORMALITY (b)(4) N
TITRANT QUANT (b)(4) MLS
BLANK (b)(4) MLS
NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

- V = MLS OF TITRANT
- N = NORMALITY OF TITRANT
- D = DENSITY (G/L) = SPECIFIC GRAVITY
- W = WEIGHTMENT OF SAMPLE

(b)(4) (1000) = (b)(4) DRIDE

(b)(4) mEq/L (b)(4) mEq K⁺ - m (b)(4) Mg⁺⁺ TOTAL = (b)(4) CALCULATED mEq/L SODIUM

COMPLETED BY: [Signature]
DATE: 2-3-03

CHECKED BY: [Signature]
DATE: 2/3/03

CONTROLLED

BATCH TANK DEXTROSE ANALYSIS

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: $\frac{(b)(4)}{[redacted]}$
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = $\left(\frac{(b)(4)}{[redacted]} \right) (10) = \frac{(b)(4)}{[redacted]} \text{ G/L}$

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COLORLESS TO LIGHT AMBER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLEAR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COMPLETED BY: [Signature]
DATE: 2-3-03

CHECKED BY: SP6
DATE: 2/3/03

080000

BATCH TANK ACETIC ACID ANALYSIS

DRAIN SAMPLE
DISSOLUTION STUDY
FORMULA: 2418

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY:

(b)(4)

N

TITRANT QUANT.

(b)(4)

MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

$$\frac{(b)(4)}{25 \text{ MLS}} =$$

$$(b)(4) \text{ MEQ/L}$$

COMPLETED BY:

[Signature]

DATE:

2-3-03

CHECKED BY:

[Signature]

DATE:

2/3/03

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CONTROLLED

101

FINISHED PRODUCT SODIUM ANALYSIS

PRODUCT CATALOG #: 2418
LOT #: DISSOLUTION STUDY

DETERMINATION OF SODIUM CONCENTRATION: QCP1.2.2

- 1. Dilution Series (b) (4) MLS/ (b) (4) MLS; — MLS/ — MLS
- 2. Standard: (b) (4) LOT #: (b) (4) EXP. DATE: (b) (4)

3. Experimental Results:

Sample #	DRAIN	TOP
(b)(4)	X 10 ⁻¹ meq/L Na ⁺	(b)(4) X 10 ⁻¹ meq/L Na ⁺
(b)(4)	X 10 ⁻¹ meq/L Na ⁺	(b)(4) X 10 ⁻¹ meq/L Na ⁺
(b)(4)	X 10 ⁻¹ meq/L Na ⁺	(b)(4) X 10 ⁻¹ meq/L Na ⁺
(b)(4)	X 10 ⁻¹ meq/L Na ⁺	(b)(4) X 10 ⁻¹ meq/L Na ⁺

AVG CONCENTRATIONS:

DRAIN #1	(b)(4)	10 ⁻¹ meq/L Na ⁺
TOP #3	(b)(4)	10 ⁻¹ meq/L Na ⁺

4. Concentration Calculation:

(Avg (b)(4)) (b)(4)

Concentration: DRAIN #1 (b)(4) meq/L TOP #3 (b)(4) meq/L

Completed By: mm
Date: 1/24/03

Checked By: LC
Date: 1-24-03

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CONTROLLED

102

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 2418

SPECIFIC GRAVITY:

SAMPLE READING: (b)(4) - CORRECTION FACTOR (b)(4)
SPECIFIC GRAVITY: (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4) G

TITRATION PROCESS: TITRANT NORMALITY (b)(4) N

TITRANT QUANT. (b)(4) MLS
BLANK (b)(4) MLS
NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V) (N) (D) (1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

- V = MLS OF TITRANT
- N = NORMALITY OF TITRANT
- D = DENSITY (G/L) = SPECIFIC GRAVITY
- W = WEIGHTMENT OF SAMPLE

$$(b)(4) (1000) = (b)(4) \text{ mEq/L CHLORIDE}$$

$$(b)(4) \text{ mEq/L } (b)(4) \text{ mEq K}^+ - \text{mEq Ca}^{2+}/\text{Mg}^{++} \text{ TOTAL} = (b)(4) \text{ CALCULATED mEq/L SODIUM}$$

COMPLETED BY: W
DATE: 1-24-03

CHECKED BY: huy
DATE: 1/24/03

CONTROLLED

103

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 2418

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY:

(b)(4)

N

TITRANT QUANT. (b) MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

$$\frac{(b)(4)}{25 \text{ MLS}} (1000) = (b)(4) \text{ MEQ/L}$$

COMPLETED BY: W
DATE: 1-24-03

CHECKED BY: ham
DATE: 1-24-03

BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 2418

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = ((b)(4)) (10) = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	[/]	[]
COLORLESS TO LIGHT AMBER?	[/]	[]
CLEAR?	[/]	[]

COMPLETED BY: W
DATE: 1-24-03

CHECKED BY: mm
DATE: 1/24/03

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	K012403RUN1	CA012403RUN1	MG012403RUN1
	K meq/L	Ca meq/L	Mg meq/L
2418 - TOP	(b)(4)	(b)(4)	(b)(4)
2418 -DRAIN			

COMPLETED BY: *kw*
DATE: 1.24.03
REVIEWED BY: *JOG*
DATE: 1/24/03

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Analyst
Date Started
Worksheet
Comment
Methods

NESTOR
8:26 AM 1/24/03
K012403RUN1
51.15
K

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: K Concentrate (Flame)

Element - Matrix: (b)(4)
Instrument Type:
Conc. Units:
Instrument Mode:
Sampling Mode:
Calibration Mode:
Measurement Mode:
Replicates Standard:
Replicates Sample:

Expansion Factor: (b)(4)
Minimum Reading:
Smoothing: -
Conc. Dec. Places:

Wavelength: (b)(4)
Slit Width:
Gain:
Lamp Current:
Lamp Position:
Background Correction:

STANDARD 1: (b)(4)
STANDARD 2:
STANDARD 3:
STANDARD 4:
STANDARD 5:
Reslope Rate:
Reslope Standard No.:
Reslope Lower Limit:
Reslope Upper Limit:
Recalibration Rate:
Calibration Algorithm:
Cal. Lower Limit:
Cal. Upper Limit:
SIPS:

Measurement Time: (b)(4)
Pre-Read Delay:
Flame Type:
Air Flow:
Acetylene Flow:
Burner Height:
Probe Height:
Rinse Rate:
Rinse Time:
CAL ZEROPos:
STANDARD 1Pos:
STANDARD 2Pos:
STANDARD 3Pos:
STANDARD 4Pos:
STANDARD 5Pos:

000001

CCVPos:

4

RSD Limit:
RSD Test Min. Abs:
Cor. Coeff. Limit:
Inst. Detection Limit:
Reqd. Detection Limit:

(b)(4)

Sample ID Conc meq/L %RSD Mean Abs Weight Volume Readings

CAL ZERO (b)(4)
STANDARD 1
STANDARD 2

Curve Fit = Quadratic Origin

Characteristic Conc (b)(4)
r
Calculated Conc
Residuals

W0545: CCV result OVER the calibration range

~CCV (b)(4)
CAL ZERO
STANDARD 1
STANDARD 2
STANDARD 3
STANDARD 4
STANDARD 5

Curve Fit = Quadratic Origin

Characteristic Conc (b)(4)
r
Calculated Conc
Residuals

W0557: CCV signal overrange

QC Test: CCV recovery 101.1%R - w ithin limits

~CCV (b)(4)
3AT034-1
3AT034-3
3AT045-1

W0557: Sample signal overrange

3AT045-3 (b)(4)
3AT046-1
3AT046-3
3AT047-1
3AT047-3
2418 - TOP
2418 -DRAIN

QC Test: CCV recovery 101.7%R - w ithin limits

~CCV (b)(4)

000005

108

Analyst
Date Started
Worksheet
Comment
Methods

NESTOR
11:06 AM 1/24/03
CA012403RUN1
31.19
Ca

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: Ca CONCENTRATE (Flame)

Element - Matrix: Ca - CONCENTRATE

Instrument Type: (b)(4)
Conc. Units:
Instrument Mode:
Sampling Mode:
Calibration Mode:
Measurement Mode:
Replicates Standard:
Replicates Sample:

Expansion Factor: (b)(4)
Minimum Reading:
Smoothing:
Conc. Dec. Places:

Wavelength: (b)(4)
Slit Width:
Gain:
Lamp Current:
Lamp Position:
Background Correction:

STANDARD 1: (b)(4)
STANDARD 2:
STANDARD 3:
STANDARD 4:
STANDARD 5:
Reslope Rate:
Reslope Lower Limit:
Reslope Upper Limit:
Recalibration Rate:
Calibration Algorithm:
Cal. Lower Limit:
Cal. Upper Limit:
SIPS:

Measurement Time: (b)(4)
Pre-Read Delay:
Flame Type:
Air Flow:
Acetylene Flow:
Burner Height:
Probe Height:
Rinse Rate:
Rinse Time:
CAL ZEROPos:
STANDARD 1Pos:
STANDARD 2Pos:
STANDARD 3Pos:
STANDARD 4Pos:
STANDARD 5Pos:
CCVPos:

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109

RSD Limit: (b)(4)
 RSD Test Min. Abs: (b)(4)
 Cor. Coeff. Limit: (b)(4)
 Inst. Detection Limit: (b)(4)
 Reqd. Detection Limit: (b)(4)

Sample ID	Conc meq/L	%RSD	Mean Abs	Weight	Volume	Readings
CAL ZERO	(b)(4)					
STANDARD 1	(b)(4)					
STANDARD 2	(b)(4)					
STANDARD 3	(b)(4)					
STANDARD 4	(b)(4)					
STANDARD 5	(b)(4)					

Curve Fit (b)(4)
 Characteristic Conc = (b)(4)
 r (b)(4)
 Calculated Conc (b)(4)
 Residuals (b)(4)
 QC Test: CCV recovery 98.5%R - w within limits

~CCV (b)(4)

3A T034-1	(b)(4)
3A T034-3	(b)(4)
3A T045-1	(b)(4)
3A T045-3	(b)(4)
3A T046-1	(b)(4)
3A T046-3	(b)(4)
3A T047-1	(b)(4)
3A 7-3	(b)(4)
2418 -TOP	(b)(4)
2418 -DRA	(b)(4)

QC Test: CCV recovery 99.9%R - w within limits

~CCV (b)(4) 1/24/03

Solution	Conc	Flag	Test and Action
(b)(4)	(b)(4)	(b)(4)	(b)(4)

080007

110

Analyst
Date Started
Worksheet
Comment
Methods

NESTOR
9:41 AM 1/24/03
MG012403RUN1
51.43
Mg

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: Mg Concentrate (Flame)

Element - Matrix: (b)(4)
Instrument Type:
Conc. Units:
Instrument Mode:
Sampling Mode:
Calibration Mode:
Measurement Mode:
Replicates Standard:
Replicates Sample:

Expansion Factor: (b)(4)
Minimum Reading:
Smoothing: -
Conc. Dec. Places:

Wavelength: (b)(4)
Slit Width:
Gain:
Lamp Current:
Lamp Position:
Background Correction: BC Off

STANDARD 1: (b)(4)
STANDARD 2:
STANDARD 3:
STANDARD 4:
STANDARD 5:
Reslope Rate:
Reslope Lower Limit:
Reslope Upper Limit:
Recalibration Rate:
Calibration Algorithm:
Cal. Lower Limit:
Cal. Upper Limit:
SIPS:

Measurement Time: (b)(4)
Pre-Read Delay:
Flame Type:
Air Flow:
Acetylene Flow:
Burner Height:
Probe Height:
Rinse Rate:
Rinse Time:
CAL ZEROPos:
STANDARD 1Pos:
STANDARD 2Pos:
STANDARD 3Pos:
STANDARD 4Pos:
STANDARD 5Pos:
CCVPos:

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111

RSD Limit:
RSD Test Min. Abs:
Cor. Coeff. Limit:
Inst. Detection Limit:
Reqd. Detection Limit:

(b)(4)

Sample ID Conc meq/L %RSD Mean Abs Weight Volume Readings

CAL ZERO	(b)(4)					
STANDARD 1						
STANDARD 2						
STANDARD 3						
STANDARD 4						
STANDARD 5						

Curve Fit (b)(4)
Characteristic Conc (b)(4)
r (b)(4)
Calculated Conc (b)(4)
Residuals
QC Test: CCV recovery 99.3%R - within limits

~CCV (b)(4)

3AT034-1						
3AT034-3						
3AT045-1						
3AT045-3						
3AT046-1						
3AT046-3						
3AT047-1						
3, 7-3						
2418 - TOP						
2418 - DRAIN						

QC Test: CCV recovery 100.7%R - within limits

~CCV (b)(4)

Solution	Conc	Flag	Test and Action
(b)(4)			

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BATCH TANK CHLORIDE ANALYSIS

PRODUCT DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE
FORMULA: 2418

SPECIFIC GRAVITY:

SAMPLE READING (b)(4) CORRECTION FACTOR: (b)(4)
SPECIFIC GRAVITY (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4) G

TITRATION PROCESS: TITRANT NORMALITY: (b)(4) N

TITRANT QUANT. (b)(4) MLS
BLANK (b)(4) MLS
NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

- V = MLS OF TITRANT
- N = NORMALITY OF TITRANT
- D = DENSITY (G/L) = SPECIFIC GRAVITY
- W = WEIGHTMENT OF SAMPLE

$$\frac{(b)(4)}{(b)(4)} (1000) = (b)(4) \text{ mEq/L CHLORIDE}$$

$$\frac{(b)(4)}{(b)(4)} \text{ mEq/L} - \frac{(b)(4)}{(b)(4)} \text{ mEq K}^+ - \frac{(b)(4)}{(b)(4)} \text{ mEq Ca}^{2+}/\text{Mg}^{++} \text{ TOTAL} = (b)(4)$$

COMPLETED BY: lw
DATE: 1-24-03

CHECKED BY: lw
DATE: 1/24/03

CONTROLLED

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113

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 2418

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY

(b)(4)

TITRANT QUANT

(b)(4)

MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

(b)(4)

25 MLS

(1000)

=

(b)(4)

MEQ/L

COMPLETED BY:

DATE:

12/24/03

CHECKED BY:

DATE:

11/24/03

080001

CONTROLLED

114

BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 2418

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = ((b)(4)) (10) = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	[/]	[]
COLORLESS TO LIGHT AMBER?	[/]	[]
CLEAR?	[/]	[]

COMPLETED BY: W
DATE: 1-24-03

CHECKED BY: W
DATE: 1-24-03

115

K012703RUN1
K meq/L

CA012703RUN1
Ca meq/L

MG012703RUN1
Mg meq/L

3006 -TOP
3006 -DRAIN

(b)(4)

COMPLETED BY: *kw*
DATE: *1-27-03*
REVIEWED BY: *kw*
DATE: *1-27-03*

000000

Analyst
Date Started
Worksheet
Comment
Methods

NES10K
12:03 PM 1/27/03
K012703RUN1
51.15
K

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: K Concentrate (Flame)

Element - Matrix: (b)(4)
Instrument Type:
Conc. Units:
Instrument Mode:
Sampling Mode:
Calibration Mode:
Measurement Mode:
Replicates Standard:
Replicates Sample:

Expansion Factor: (b)(4)
Minimum Reading:
Smoothing: -
Conc. Dec. Places:

Wavelength: (b)(4)
Slit Width:
Gain:
Lamp Current:
Lamp Position:
Background Correction:

STANDARD 1: (b)(4)
STANDARD 2:
STANDARD 3:
STANDARD 4:
STANDARD 5:
Reslope Rate:
Reslope Standard No.:
Reslope Lower Limit:
Reslope Upper Limit:
Recalibration Rate:
Calibration Algorithm:
Cal. Lower Limit:
Cal. Upper Limit:
SIPS:

Measurement Time: (b)(4)
Pre-Read Delay:
Flame Type:
Air Flow:
Acetylene Flow:
Burner Height:
Probe Height:
Rinse Rate:
Rinse Time:
CAL ZEROPos:
STANDARD 1Pos:
STANDARD 2Pos:
STANDARD 3Pos:
STANDARD 4Pos:
STANDARD 5Pos:

000000

118

CCVrus:

4

RSD Limit: (b)(4)
 RSD Test Min. Abs: (b)(4)
 Cor. Coeff. Limit: (b)(4)
 Inst. Detection Limit: (b)(4)
 Reqd. Detection Limit: (b)(4)

Sample ID	Conc mg/L	%RSD	Mean Abs	Weight	Volume	Readings
CAL ZERO	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)
STANDARD 1	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)
STANDARD 2	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)
STANDARD 3	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)
STANDARD 4	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)
STANDARD 5	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)	(b)(4)

Curve Fit (b)(4)
 Characteristic Conc (b)(4)
 r (b)(4)
 Calculated Conc = (b)(4)
 Residuals = (b)(4)
 QC Test: CCV recovery 101.0%R - within limits

~CCV (b)(4)

3AT048-1	(b)(4)
3AT048-3	(b)(4)
3AT050-1	(b)(4)
3AT050-3	(b)(4)
3AT067-1	(b)(4)
3AT067-3	(b)(4)
3 TOP	(b)(4)
3006-DRAIN	(b)(4)

QC Test: CCV recovery 100.2%R - within limits

~CCV (b)(4)

Solution	Conc	Flag	Test and Action
(b)(4)	(b)(4)	(b)(4)	(b)(4)

000000

119

Analyst
Date Started
Worksheet
Comment
Methods

TESTOR
10:37 AM 1/27/03
CA012703RUN1
31.19
Ca

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: Ca CONCENTRATE (Flame)

Element - Matrix: (b)(4)
Instrument Type: (b)(4)
Conc. Units: (b)(4)
Instrument Mode: (b)(4)
Sampling Mode: (b)(4)
Calibration Mode: (b)(4)
Measurement Mode: (b)(4)
Replicates Standard: (b)(4)
Replicates Sample: (b)(4)

Expansion Factor: (b)(4)
Minimum Reading: (b)(4)
Smoothing: - (b)(4)
Conc. Dec. Places: (b)(4)

Wavelength: (b)(4)
Slit Width: (b)(4)
Gain: (b)(4)
Lamp Current: (b)(4)
Lamp Position: (b)(4)
Background Correction: (b)(4)

STANDARD 1: (b)(4)
STANDARD 2: (b)(4)
STANDARD 3: (b)(4)
STANDARD 4: (b)(4)
STANDARD 5: (b)(4)
Reslope Rate: (b)(4)
Reslope Lower Limit: (b)(4)
Reslope Upper Limit: (b)(4)
Recalibration Rate: (b)(4)
Calibration Algorithm: (b)(4)
Cal. Lower Limit: (b)(4)
Cal. Upper Limit: (b)(4)
SIPS: (b)(4)

Measurement Time: (b)(4)
Pre-Read Delay: (b)(4)
Flame Type: (b)(4)
Air Flow: (b)(4)
Acetylene Flow: (b)(4)
Burner Height: (b)(4)
Probe Height: (b)(4)
Rinse Rate: (b)(4)
Rinse Time: (b)(4)
CAL ZEROPos: (b)(4)
STANDARD 1Pos: (b)(4)
STANDARD 2Pos: (b)(4)
STANDARD 3Pos: (b)(4)
STANDARD 4Pos: (b)(4)
STANDARD 5Pos: (b)(4)
CCVPos: (b)(4)

080037

120

RSD Limit: (b)(4)
 RSD Test Min. Abs: (b)(4)
 Cor. Coeff. Limit: (b)(4)
 Inst. Detection Limit: (b)(4)
 Reqd. Detection Limit: (b)(4)

Sample ID	Conc meq/L	%RSD	Mean Abs	Weight	Volume	Readings
CAL ZERO	(b)(4)					
STANDARD 1	(b)(4)					
STANDARD 2	(b)(4)					
STANDARD 3	(b)(4)					
STANDARD 4	(b)(4)					
STANDARD 5	(b)(4)					

Curve Fit = (b)(4)
 Characteristic Conc = (b)(4) L
 r = (b)(4)
 Calculated Conc = (b)(4) [redacted] [redacted]
 Residuals = (b)(4) [redacted] [redacted]
 QC Test: CCV recovery 98.4%R - within limits

~CCV (b)(4)

3AT048-1	(b)(4)
3AT048-3	(b)(4)
3AT050-1	(b)(4)
3AT050-3	(b)(4)
3AT067-1	(b)(4)
3AT067-3	(b)(4)
3006-TOP	(b)(4)
3C RAIN	(b)(4)

QC Test: CCV recovery 99.6%R - within limits

~CCV (b)(4)

Solution	Conc	Flag	Test and Action
(b)(4)	(b)(4)		

000003

Analyst
Date Started
Worksheet
Comment
Methods

NESTOR
8:01 AM 1/27/03
MG012703RUN1
51.43
Mg

Nominal Weight = 1.0000 Nominal Volume = 1.0000

Method: Mg Concentrate (Flame)

Element - Matrix: (b)(4)
Instrument Type:
Conc. Units:
Instrument Mode:
Sampling Mode:
Calibration Mode:
Measurement Mode:
Replicates Standard:
Replicates Sample:

Expansion Factor: (b)(4)
Minimum Reading:
Smoothing: -
Conc. Dec. Places:

Wavelength:
Slit Width:
Gain:
Lamp Current:
Lamp Position:
Background Correctio

STANDARD 1: (b)(4)
STANDARD 2:
STANDARD 3:
STANDARD 4:
STANDARD 5:
Reslope Rate:
Reslope Lower Limit:
Reslope Upper Limit:
Recalibration Rate:
Calibration Algorithm:
Cal. Lower Limit:
Cal. Upper Limit:
SIPS:

Measurement Time: (b)(4)
Pre-Read Delay:
Flame Type:
Air Flow:
Acetylene Flow:
Burner Height:
Probe Height:
Rinse Rate:
Rinse Time:
CAL ZEROPos:
STANDARD 1Pos:
STANDARD 2Pos:
STANDARD 3Pos:
STANDARD 4Pos:
STANDARD 5Pos:
CCVPos:

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122

RSD Limit: (b)(4)
 RSD Test Min. Abs: (b)(4)
 Cor. Coeff. Limit: (b)(4)
 Inst. Detection Limit: (b)(4)
 Reqd. Detection Limit: (b)(4)

Sample ID	Conc meq/L	%RSD	Mean Abs	Weight	Volume	Readings
CAL ZERO	(b)(4)					
STANDARD 1	(b)(4)					
STANDARD 2	(b)(4)					
STANDARD 3	(b)(4)					
STANDARD 4	(b)(4)					
STANDARD 5	(b)(4)					

Curve Fit = (b)(4)
 Characteristic Conc = (b)(4)
 r = (b)(4)
 Calculated Conc = (b)(4)
 Residuals = (b)(4)

QC Test: CCV recovery 100.1%R - within limits

~CCV (b)(4)

3AT048-1	(b)(4)
3AT048-3	(b)(4)
3AT050-1	(b)(4)
3AT050-3	(b)(4)
3AT067-1	(b)(4)
3AT067-3	(b)(4)
3006 -TOP	(b)(4)
3(DRAIN	(b)(4)

QC Test: CCV recovery 98.4%R - within limits

~CCV (b)(4)

Solution	Conc	Flag	Test and Action
(b)(4)	(b)(4)	(b)(4)	(b)(4)

000100

123

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

SPECIFIC GRAVITY:

FORMULA : 3006

SAMPLE READING: (b)(4) - CORRECTION FACTOR: (b)(4) =

SPECIFIC GRAVITY: (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4) G

TITRATION PROCESS: (b)(4) TITRANT NORMALITY (b)(4) N

TITRANT QUANT. (b)(4) MLS

BLANK (b)(4) MLS

NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V) (N) (D) (1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

D = DENSITY (G/L) = SPECIFIC GRAVITY

W = WEIGHTMENT OF SAMPLE

(b)(4) (1000) = (b)(4) mEq/L CHLORIDE

(b)(4)
(b)(4)
(b)(4)

COMPLETED BY: U

CHECKED BY: h m

DATE: 1.27.09

DATE: 1/27/03

CONTROLLED

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124

BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA: 3006

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = ((b)(4)) (10) = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COLORLESS TO LIGHT AMBER?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLEAR?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

COMPLETED BY: kw
DATE: 1-27-03

CHECKED BY: ham
DATE: 1-27-03

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
TOP SAMPLE

FORMULA : 3006

ACETIC ACID CONCENTRATION: QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS: TITRANT NORMALITY: (b)(4) N
TITRANT QUAN (b)(4) LS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

$$\frac{(b)(4)}{25 \text{ MLS}} (1000) = (b)(4)$$

COMPLETED BY: N
DATE: 1-27-03

CHECKED BY: mm
DATE: 1/27/03

CONTROLLED

000133
126

BATCH TANK CHLORIDE ANALYSIS

PRODUCT

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

SPECIFIC GRAVITY:

FORMULA : 3006

SAMPLE READING: (b)(4) - CORRECTION FACTOR: (b)(4)
SPECIFIC GRAVITY: (b)(4)

CHLORIDE CONCENTRATION: QCP1.8.1

WEIGHT: (b)(4) G

TITRATION PROCESS: TITRANT NORMALITY: (b)(4) N
TITRANT QUANT. (b)(4) MLS
BLANK (b)(4) MLS
NET (b)(4) MLS

CALCULATIONS:

$$\frac{(V)(N)(D)(1000)}{W} = \text{mEq/L CHLORIDE CONC.}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

D = DENSITY (G/L) = SPECIFIC GRAVITY

W = WEIGHTMENT OF SAMPLE

(b)(4) mEq/L CHLORIDE

(b)(4) CALCULATED mEq/L SODIUM

COMPLETED BY: N

CHECKED BY: ban

DATE: (b)(4)

DATE: 11/27/05

CONTROLLED

002101
127

BATCH TANK DEXTROSE ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 3006

DEXTROSE CONCENTRATION: QCP1.12

SAMPLE READING: (b)(4)
(MANUAL POLARIMETER ONLY)

READING EQUALS THE DEXTROSE CONCENTRATION IN G/100 ML

READING = ((b)(4)) (10) = (b)(4) G/L

QUALITATIVE CHARACTERISTICS:

QCP1.42

	YES	NO
TYPICAL ACETIC ACID ODOR?	[/]	[]
COLORLESS TO LIGHT AMBER?	[/]	[]
CLEAR?	[/]	[]

COMPLETED BY: W
DATE: 1-27-03

CHECKED BY: RAM
DATE: 112763

BATCH TANK ACETIC ACID ANALYSIS

DISSOLUTION STUDY SAMPLE
DRAIN SAMPLE

FORMULA: 3006

ACETIC ACID CONCENTRATION:

QCP1.20

SAMPLE PREPARATION:

PIPET 25 MLS OF CONCENTRATE INTO A 125 ML ERL. FLASK.

TITRATION PROCESS:

TITRANT NORMALITY

(b)(4)

N

TITRANT QUANT.

(b)(4)

MLS

CALCULATIONS:

$$\frac{(V)(N)(1000)}{25 \text{ MLS}} = \text{MEQ/L ACETIC ACID}$$

V = MLS OF TITRANT

N = NORMALITY OF TITRANT

(b)(4)

MEQ/L

25 MLS

COMPLETED BY:

W

DATE:

1-27-03

CHECKED BY:

mm

DATE:

1/27/03

CONTROLLED

Naturalyte® 10XX

GRANUFLO®

Dry Acid Concentrate
For Bicarbonate Dialysis

36.83X

NON-PYROGENIC

62.5 Liter Mix (16.5 gal)

WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:35.83. Use with other equipment may result in patient injury. **NOT FOR PARENTERAL USE.** For use only with Naturalyte™ 9000 Series Bicarbonate or equivalent (refer to label). Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.

**Ionic Contribution of
Acid Concentrate:**

(Nominal Dilution 1:35.83)

SODIUM	mEq/L
POTASSIUM	mEq/L
CALCIUM	mEq/L
MAGNESIUM	mEq/L
ACETATE	mEq/L
CHLORIDE	mEq/L
DEXTROSE	mg/dL

Chemical Composition

Total

	kg
NaCl	kg
KCl	kg
CaCl ₂ *2H ₂ O	kg
MgCl ₂ *6H ₂ O	kg
CH ₃ COONa – CH ₃ COOH	kg
C ₆ H ₁₂ O ₆ *H ₂ O	kg

DILUTION INSTRUCTIONS

(The contents may clump or harden which does not affect product chemical composition)

- 1) Use purified water that meets or exceeds current ANSI/AAMI hemodialysis water quality standards. Water temperature should be 20 ° – 30 °C to optimize dissolving.
- 2) Add approximately 10 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination (ANSI/AAMI).
IMPORTANT:
- 3) Use entire contents of each bag (3) within this box. Do not use unless all (3) bags are present. The contents of the bags are different. All bags must be used.
NOTE: Refer to Dissolution System Operator's Manual. Label tank with contents and date prepared.
- 4) Add additional water to dissolution tank final fill level.
- 5) Fully dissolved, this will make 62.5 liters (16.5 gal) of solution. Eight (8) cases of identical chemical composition produce 500 liters (132 gal).
- 6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.

CAUTION: Refer to instructions provided by the hemodialysis machine manufacturer.

Federal Law (USA) restricts this device to sale by or on order of a physician

**AVOID EXCESSIVE TEMPERATURE. STORE IN DRY LOCATION.
DO NOT USE IF PACKAGE IS OPEN OR DAMAGED**



Manufactured By:
Fresenius Medical Care
95 Hayden Avenue
Lexington, MA 02420
1-800-323-5188



Cat. No. **XX-10XX-X**



Lot No. **PMMNNN**

Mfg. Date:

Naturalyte[®] 30XX

GRANUFLO[®]

Dry Acid Concentrate
For Bicarbonate Dialysis

35X

NON-PYROGENIC

62.5 Liter Mix (16.5 gal)

WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:34. Use with other equipment may result in patient injury. **NOT FOR PARENTERAL USE.** For use only with Naturalyte[®] 6000 Series Bicarbonate or equivalent (refer to label). **Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.**

Ionic Contribution of Acid Concentrate:

(Nominal Dilution 1:34)

SODIUM	mEq/L
POTASSIUM	mEq/L
CALCIUM	mEq/L
MAGNESIUM	mEq/L
ACETATE	mEq/L
CHLORIDE	mEq/L
DEXTROSE	mg/dL

Chemical Composition Total

	kg
NaCl	kg
KCl	kg
CaCl ₂ *2H ₂ O	kg
MgCl ₂ *6H ₂ O	kg
CH ₃ COONa – CH ₃ COOH	kg
C ₆ H ₁₂ O ₆ *H ₂ O	kg

DILUTION INSTRUCTIONS

(The contents may clump or harden which does not affect product chemical composition)

- 1) Use purified water that meets or exceeds current ANSI/AAMI hemodialysis water quality standards. Water temperature should be 20^o – 30^o C to optimize dissolving.
- 2) Add approximately 10 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination (ANSI/AAMI).
IMPORTANT:
- 3) Use entire contents of each bag (3) within this box. Do not use unless all (3) bags are present. The contents of the bags are different. All bags must be used.
NOTE: Refer to Dissolution System Operator's Manual. Label tank with contents and date prepared.
- 4) Add additional water to dissolution tank final fill level.
- 5) Fully dissolved, this will make 62.5 liters (16.5 gal) of solution. Eight (8) cases of identical chemical composition produce 500 liters (132 gal).
- 6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.

CAUTION: Refer to instructions provided by the hemodialysis machine manufacturer.
Federal Law (USA) restricts this device to sale by or on order of a physician

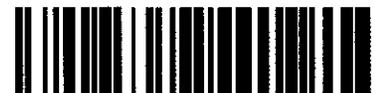
**AVOID EXCESSIVE TEMPERATURE.
DO NOT USE IF PACKAGE IS OPEN OR DAMAGED**



Manufactured By:
Fresenius Medical Care
95 Hayden Avenue
Lexington, MA 02420
1-800-323-5188



Cat. No. **XX-30XX-X**



Mfg. Date:

Lot No. **PMMNNN**

Naturalyte® 24XX

GRANUFLO®

Dry Acid Concentrate
For Bicarbonate Dialysis



62.5 Liter Mix (16.5 gal)

NON-PYROGENIC

WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:44. Use with other equipment may result in patient injury. **NOT FOR PARENTERAL USE.** For use only with Naturalyte™ 4000 Series Bicarbonate or equivalent (refer to label). **Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.**

**Ionic Contribution of
Acid Concentrate:**

(Nominal Dilution 1:44)

SODIUM	mEq/L
POTASSIUM	mEq/L
CALCIUM	mEq/L
MAGNESIUM	mEq/L
ACETATE	mEq/L
CHLORIDE	mEq/L
DEXTROSE	mg/dL

**Chemical Composition
Total**

	kg	
NaCl		kg
KCl		kg
CaCl ₂ *2H ₂ O		kg
MgCl ₂ *6H ₂ O		kg
CH ₃ COONa – CH ₃ COOH		kg
C ₆ H ₁₂ O ₆ *H ₂ O		kg

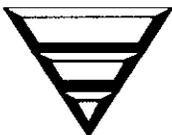
DILUTION INSTRUCTIONS

(The contents may clump or harden which does not affect product chemical composition)

- 1) Use purified water that meets or exceeds current ANSI/AAMI hemodialysis water quality standards. Water temperature should be 20° – 30° C to optimize dissolving.
- 2) Add approximately 20 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination (ANSI/AAMI).
IMPORTANT:
- 3) Use entire contents of each bag (3) within this box. Do not use unless all (3) bags are present. The contents of the bags are different. All bags must be used.
NOTE: Refer to Dissolution System Operator's Manual. Label tank with contents and date prepared.
- 4) Add additional water to dissolution tank final fill level.
- 5) Fully dissolved, this will make 62.5 liters (16.5 gal) of solution. Eight (8) cases of identical chemical composition produce 500 liters (132 gal).
- 6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.

CAUTION: Refer to instructions provided by the hemodialysis machine manufacturer.
Federal Law (USA) restricts this device to sale by or on order of a physician

**AVOID EXCESSIVE TEMPERATURE.
DO NOT USE IF PACKAGE IS OPEN OR DAMAGED**



Manufactured By:
Fresenius Medical Care
95 Hayden Avenue
Lexington, MA 02420
1-800-323-5188



Cat. No. **XX-24XX-X**



Lot No. **PMMNNN**

Mfg. Date:

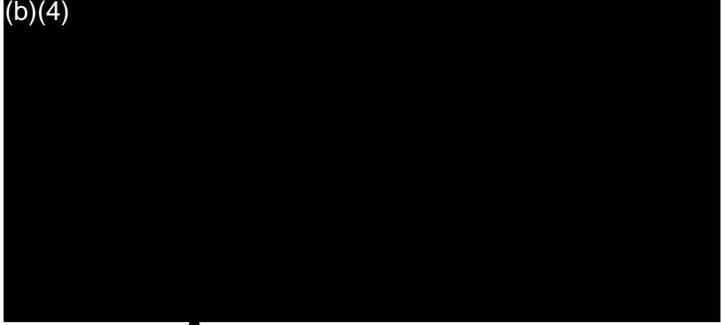
(b)(4)

DRY ACID PROCESS

(b)(4)

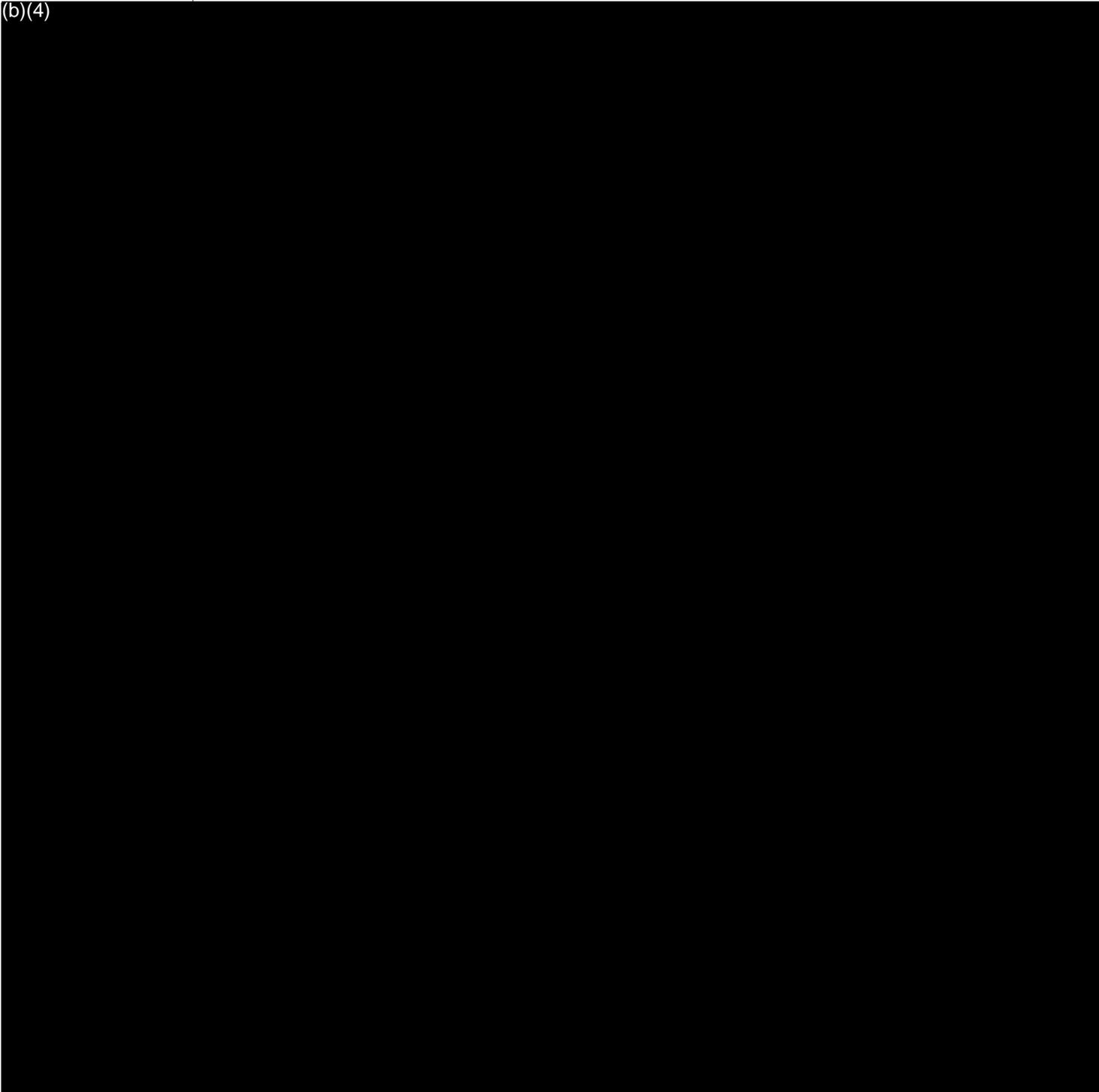


(b)(4)



**PREDICATE
GRANUFLO PROCESS**

(b)(4)



**Current Granuflo® Dry Acid
Concentrate Label
(Complies to ANSI/AAMI Standards)**

GRANUFLO®			
CAT. NO.	Dry Acid Concentrate For Bicarbonate Dialysis		(36.83X)
OFD1029 - NP			
NON-PYROGENIC	125 LITER MIX (33 GAL)		
WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:35.83. Use with other equipment may result in patient injury. NOT FOR PARENTERAL USE. For use only with Naturalyte® 9000 Series bicarbonate or equivalent (refer to label). Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and approximate pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.			
IONIC CONTRIBUTION OF ACID CONCENTRATE	CHEMICAL COMPOSITION TOTAL 35.2 Kg		
Nominal Dilution 1:35.83 (mEq/l)			
SODIUM 81	MAGNESIUM 1.0	NaCl 20.7	MgCl2*6H2O 0.47
POTASSIUM 2.0	CHLORIDE 82.5	KCl 0.69	CaH12O6 2.6
CALCIUM 2.5	ACETATE 8.0	CaCl2*2H2O 0.85	C6H12O6*H2O 7.1
DEXTROSE 200mg/dL	CH3COONa - CH3COOH 2.6		
DILUTION INSTRUCTIONS			
1) Use purified water that meets or exceeds AAMI hemodialysis water quality standards (RD5). Water temperature should be 20° - 30° C to optimize dissolving. 2) Add approximately 20 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination. (AAMI RD5) IMPORTANT: 3) Use entire contents of each bag (5) within this box. Do not use unless all 6 bags are present. The contents of the bags are different. All bags must be used. NOTE: Refer to Dissolution System Operator's manual. Label tank with contents and date prepared. 4) Add additional water to dissolution tank final fill level. 5) Fully dissolved, this will make 125 liters (33 gal) of solution. Four containers of identical chemical composition produce 600 liters (132 gal). 6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.			
CAUTION: Refer to instructions provided by hemodialysis machine manufacturer. Federal law (USA) restricts this device to sale by or on order of a physician.			
AVOID EXCESSIVE TEMPERATURE DO NOT USE IF PACKAGE IS OPEN OR DAMAGED.			
 Fresenius Medical Care 95 HAYDEN AVE. LEWINGTON, MA 02460		88-276-81 REV 3/01 Lot No.: 2APZZZZ Mfg. Date: 22/72	

PREDICATE

88-276-01 Rev 2/01

080212

135

**Current Granuflo® Dry Acid
Concentrate Label
(Complies to ANSI/AAMI Standards)**

GRANUFLO®			
CAT. NO.	Dry Acid Concentrate		
OFD2401 - NP	For Bicarbonate Dialysis		
NON-PYROGENIC	125 LITER MIX (33 GAL)		
<p>WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:44. Use with other equipment may result in patient injury. NOT FOR PARENTERAL USE. For use only with Naturalyx® 4000 Series bicarbonate or equivalent (refer to label). Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and approximate pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.</p>			
IONIC CONTRIBUTION OF ACID CONCENTRATE		CHEMICAL COMPOSITION TOTAL	
Nominal Dilution 1:44 (mEq/l)		49.1 Kg	
SODIUM 100	MAGNESIUM 0.75	NaCl 31.6	MgCl2·6H2O 0.43
POTASSIUM 2.0	CHLORIDE 101.76	KCl 0.84	CaH2O6 5.6
CALCIUM 3.0	ACETATE 6.0	CaCl2·2H2O 1.24	C6H12O6·H2O 6.2
DEXTROSE 200mg/dL		CH3COONa-CH3COOH 3.2	
DILUTION INSTRUCTIONS			
<p>1) Use purified water that meets or exceeds AAMI hemodialysis water quality standards (RDS). Water temperature should be 20° - 30° C to optimize dissolving.</p> <p>2) Add approximately 20 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination. (AAMI RDS)</p> <p>IMPORTANT:</p> <p>3) Use entire contents of each bag (6) within this box. Do not use unless all 6 bags are present. The contents of the bags are different. All bags must be used.</p> <p>NOTE: Refer to Dissolution System Operator's manual. Label tank with contents and date prepared.</p> <p>4) Add additional water to dissolution tank final fill level.</p> <p>5) Fully dissolved, this will make 125 liters (33 gal) of solution. Four containers of identical chemical composition produce 600 liters (152 gal).</p> <p>6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.</p>			
<p>CAUTION: Refer to instructions provided by hemodialysis machine manufacturer. Federal law (USA) restricts this device to sale by or on order of a physician.</p>			
<p>AVOID EXCESSIVE TEMPERATURE. DO NOT USE IF PACKAGE IS OPEN OR DAMAGED.</p>			
 Fresenius Medical Care <small>85 HAYDEN AVE. LEXINGTON, MA 02420</small>		<p>05-276-05 REV 3/81</p> <p>Lot No.: ZAPZZZ</p> <p>Mfg. Date: ZZZZ</p>	

PREDICATE

002210
136

**Current Granuflo® Dry Acid
Concentrate Label
(Complies to ANSI/AAMI Standards)**

GRANUFLO®			
CAT. NO.	Dry Acid Concentrate	35X	
OFD3006 - NP	For Bicarbonate Dialysis		
NON-PYROGENIC	125 LITER MIX (33 GAL)		
<p>WARNING: Acid concentrate is formulated to be used in a three-stream hemodialysis machine calibrated to an acid concentrate dilution of 1:34. Use with other equipment may result in patient injury. NOT FOR PARENTERAL USE. For use only with Naturalyte® 6000 Series bicarbonate or equivalent (refer to label). Use of this Acid Concentrate without associated bicarbonate concentrate may cause patient injury or death. Check conductivity and approximate pH of dialysate just prior to dialysis treatment and each time new concentrate is supplied to the machine.</p>			
IONIC CONTRIBUTION OF ACID CONCENTRATE	CHEMICAL COMPOSITION TOTAL		
Nominal Dilution 1:34 (mEq/l)	39.0 Kg		
SODIUM 103	MAGNESIUM 1.0	NaCl 25.6	MgCl2*6H2O 0.44
POTASSIUM 2.0	CHLORIDE 106.6	KCl 0.66	C6H12O6 2.6
CALCIUM 3.5	ACETATE 6.0	CaCl2*2H2O 1.19	C6H12O6*H2O 6.7
DEXTROSE 200mg/dL	CH3COONa - CH3COOH 1.86		
DILUTION INSTRUCTIONS			
<p>1) Use purified water that meets or exceeds AAMI hemodialysis water quality standards (RDS). Water temperature should be 20° - 30° C to optimize dissolving.</p> <p>2) Add approximately 20 gallons of purified water to mixing container. Purified water and feed line must be free of bacterial and chemical contamination. (AAMI RDS)</p> <p>IMPORTANT:</p> <p>3) Use entire contents of each bag (6) within this box. Do not use unless all 6 bags are present. The contents of the bags are different. All bags must be used.</p> <p>NOTE: Refer to Dissolution System Operator's manual. Label tank with contents and date prepared.</p> <p>4) Add additional water to dissolution tank final fill level.</p> <p>5) Fully dissolved, this will make 125 liters (33 gal) of solution. Four containers of identical chemical composition produce 500 liters (132 gal).</p> <p>6) Mix solution until completely dissolved. Filter with 1.2 micron filter or finer before use. Keep container sealed. Label and date all storage containers.</p>			
<p>CAUTION: Refer to instructions provided by hemodialysis machine manufacturer. Federal law (USA) restricts this device to sale by or on order of a physician.</p>			
<p>AVOID EXCESSIVE TEMPERATURE. DO NOT USE IF PACKAGE IS OPEN OR DAMAGED.</p>			
 Fresenius Medical Care 95 HAYDEN AVE. LEBINGTON, MA 02430		89-276-89 REV 3/01 Lot No.: 2APZZZZ Mfg. Date: 7/77	

PREDICATE

Label provided in the Granulyte™
Acid Concentrate predicate 510k

GRANULYTE

380001

1 of 15 Bags
For 500 Liter Batch

Acid Concentrate

For Bicarbonate Dialysis

Part A

36.83

For use only with Granulyte Concentrate Mixing System for dissolution.
EMPTY ENTIRE CONTENTS OF THIS BAG INTO MIXING TANK.
Refer To Operator's Manual For Complete Instructions

Caution: Federal (USA) law restricts sale of this device by, or on order of a physician.
Not for Parenteral Use

Final Dialysate Concentration		Dialysate
Part A/Part B/Water	Part A	(1 : 35.83)
1 : 1.83 : 34	Chemical Concentrations	
Total mEq/Liter		Gm/L Gm/L
Sodium.....139.0 mEq/L	Sodium Chloride.....NaCl	167.9.....4.58
Calcium.....3.5 mEq/L	Calcium Chloride.....CaCl ₂ • 2H ₂ O	9.5......26
Potassium.....2.0 mEq/L	Potassium Chloride.....KCl	5.5......15
Magnesium.....1.0 mEq/L	Magnesium Chloride.....MgCl ₂ • 6H ₂ O	3.7......10
Chloride.....104.5 mEq/L	Dextrose.....C ₆ H ₁₂ O ₆	73.7.....2.0
Acid.....4.0 mEq/L		
Bicarbonate.....35.0 mEq/L		
Dextrose.....200 mg/dL		

FN: 000122

Fresenius USA

Concord, CA. 94520



Lot #:

Formula #:

Exp. Date:

PREDICATE

000215

138

**Label provided in the Granulyte™
Acid Concentrate predicate 510k**

GRANULYTE™

047-80007 **Acid Concentrate**
For Bicarbonate dialysis
PART A-1

35X

For use only with Granulyte Concentrate Mixing System for dissolution.
EMPTY ENTIRE CONTENTS OF TWENTY (20) PART A-1 BAGS AND
ONE (1) PART A-2 BAG INTO MIXING TANK FOR 500 LITER BATCH.
Refer to Operator's Manual For Complete Instructions.

Caution: Federal (USA) law restricts sale of this device by, or on order of a physician.
Water for dissolution must meet or exceed ANSI/AAMI requirements.
AVOID EXCESSIVE TEMPERATURE. DO NOT USE IF PACKAGE IS OPEN OR DAMAGED.
Not for Parenteral Use.

<p>Dialysate composition when Part A-1 is properly mixed with part A-2 (047-80020, Sodium Diacetate) and proportioned with Part B (8.4% Sodium Bicarbonate) and water. (1 PART A : 1.23 PART B : 32.77 WATER)</p> <table border="0" style="width: 100%;"> <tr><td>Sodium.....</td><td>141.5 mEq/l</td></tr> <tr><td>Calcium.....</td><td>3.0 mEq/l</td></tr> <tr><td>Potassium.....</td><td>2.0 mEq/l</td></tr> <tr><td>Magnesium.....</td><td>1.0 mEq/l</td></tr> <tr><td>Chloride.....</td><td>109.5 mEq/l</td></tr> <tr><td>Acetate.....</td><td>6.0 mEq/l</td></tr> <tr><td>Bicarbonate.....</td><td>32.0 mEq/l</td></tr> <tr><td>Dextrose.....</td><td>200.0 mg/dl</td></tr> </table>	Sodium.....	141.5 mEq/l	Calcium.....	3.0 mEq/l	Potassium.....	2.0 mEq/l	Magnesium.....	1.0 mEq/l	Chloride.....	109.5 mEq/l	Acetate.....	6.0 mEq/l	Bicarbonate.....	32.0 mEq/l	Dextrose.....	200.0 mg/dl	<p>Concentrate composition when entire contents of twenty (20) Part A-1 packages and one (1) Part A-2 package are diluted to 500 liters.</p> <table border="0" style="width: 100%;"> <tr><td>Sodium Chloride.....</td><td>NaCl</td><td>211.7</td></tr> <tr><td>Calcium Chloride.....</td><td>CaCl₂·2H₂O</td><td>7.7</td></tr> <tr><td>Potassium Chloride.....</td><td>KCl</td><td>5.2</td></tr> <tr><td>Magnesium Chloride.....</td><td>MgCl₂·6H₂O</td><td>3.6</td></tr> <tr><td>Dextrose.....</td><td>C₆H₁₂O₆</td><td>70.0</td></tr> <tr><td>Sodium Diacetate.....</td><td>CH₃COONa · CH₃COOH</td><td>14.9</td></tr> </table>	Sodium Chloride.....	NaCl	211.7	Calcium Chloride.....	CaCl ₂ ·2H ₂ O	7.7	Potassium Chloride.....	KCl	5.2	Magnesium Chloride.....	MgCl ₂ ·6H ₂ O	3.6	Dextrose.....	C ₆ H ₁₂ O ₆	70.0	Sodium Diacetate.....	CH ₃ COONa · CH ₃ COOH	14.9
Sodium.....	141.5 mEq/l																																		
Calcium.....	3.0 mEq/l																																		
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Potassium Chloride.....	KCl	5.2																																	
Magnesium Chloride.....	MgCl ₂ ·6H ₂ O	3.6																																	
Dextrose.....	C ₆ H ₁₂ O ₆	70.0																																	
Sodium Diacetate.....	CH ₃ COONa · CH ₃ COOH	14.9																																	

89-280-61 REV 12/91

Fresenius USA

Concord, CA 94520

Product Code: 047-80007
Lot #:
Exp.Date:

GRANULYTE™

047-80020 **Sodium Diacetate for**
Acid Concentrate
For Bicarbonate dialysis
PART A-2

35X

For use only with Granulyte Concentrate Mixing System for dissolution.
EMPTY ENTIRE CONTENTS OF TWENTY (20) PART A-1 BAGS AND
ONE (1) PART A-2 BAG INTO MIXING TANK FOR 500 LITER BATCH.
Refer to Operator's Manual For Complete Instructions.

Caution: Federal (USA) law restricts sale of this device by, or on order of a physician.
Water for dissolution must meet or exceed ANSI/AAMI requirements.
AVOID EXCESSIVE TEMPERATURE. DO NOT USE IF PACKAGE IS OPEN OR DAMAGED.
Not for Parenteral Use.

<p>Dialysate composition when Part A-1 is properly mixed with part A-2 (047-80020, Sodium Diacetate) and proportioned with Part B (8.4% Sodium Bicarbonate) and water. (1 PART A : 1.23 PART B : 32.77 WATER)</p> <table border="0" style="width: 100%;"> <tr><td>Sodium.....</td><td>141.5 mEq/l</td></tr> <tr><td>Calcium.....</td><td>3.0 mEq/l</td></tr> <tr><td>Potassium.....</td><td>2.0 mEq/l</td></tr> <tr><td>Magnesium.....</td><td>1.0 mEq/l</td></tr> <tr><td>Chloride.....</td><td>109.5 mEq/l</td></tr> <tr><td>Acetate.....</td><td>6.0 mEq/l</td></tr> <tr><td>Bicarbonate.....</td><td>32.0 mEq/l</td></tr> <tr><td>Dextrose.....</td><td>200.0 mg/dl</td></tr> </table>	Sodium.....	141.5 mEq/l	Calcium.....	3.0 mEq/l	Potassium.....	2.0 mEq/l	Magnesium.....	1.0 mEq/l	Chloride.....	109.5 mEq/l	Acetate.....	6.0 mEq/l	Bicarbonate.....	32.0 mEq/l	Dextrose.....	200.0 mg/dl	<p>Concentrate composition when entire contents of twenty (20) Part A-1 packages and one (1) Part A-2 package are diluted to 500 liters.</p> <table border="0" style="width: 100%;"> <tr><td>Sodium Chloride.....</td><td>NaCl</td><td>211.7</td></tr> <tr><td>Calcium Chloride.....</td><td>CaCl₂·2H₂O</td><td>7.7</td></tr> <tr><td>Potassium Chloride.....</td><td>KCl</td><td>5.2</td></tr> <tr><td>Magnesium Chloride.....</td><td>MgCl₂·6H₂O</td><td>3.6</td></tr> <tr><td>Dextrose.....</td><td>C₆H₁₂O₆</td><td>70.0</td></tr> <tr><td>Sodium Diacetate.....</td><td>CH₃COONa · CH₃COOH</td><td>14.9</td></tr> </table>	Sodium Chloride.....	NaCl	211.7	Calcium Chloride.....	CaCl ₂ ·2H ₂ O	7.7	Potassium Chloride.....	KCl	5.2	Magnesium Chloride.....	MgCl ₂ ·6H ₂ O	3.6	Dextrose.....	C ₆ H ₁₂ O ₆	70.0	Sodium Diacetate.....	CH ₃ COONa · CH ₃ COOH	14.9
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89-280-62 REV 12/91

Fresenius USA

Concord, CA 94520

Product Code: 047-80020
Lot #:
Exp.Date:

PREDICATE

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GranuFlo[®]
& DiaPure[™]

A Winning
Combination

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GranuFlo® & DiaPure™

GranuFlo® - Dry Acid Concentrate

GranuFlo® Dry Acid Concentrate uses a specially patented production process which creates essentially one powder with all constituents dispersed equally throughout. The result is small granules that dissolve easily in water for even distribution of concentrate components.

The process by which all the electrolytes are blended together into granules is so consistent, that amounts as small as 500ml can be mixed for testing purposes resulting in electrolyte levels which conform to our rigid specifications.

The Fresenius Automated Dissolution System, allows for the production of one hundred thirty-two gallons of GranuFlo® acid concentrate in 45 minutes with minimal staff involvement. Staff simply initiate the dissolution cycle; add GranuFlo® concentrate, and verify specific gravity through the use of a hydrometer.

DiaPure™ - Dry Bicarbonate Concentrate Purely The Best Choice.

Liquid bicarbonate, while convenient, can be a medium for bacterial growth. Because DiaPure™ Dry Bicarbonate Concentrate is constituted and immediately utilized, there is less chance of bacterial contamination.

DiaPure™ bicarbonate comes in a single treatment bag and is constituted with treated water from the Fresenius 2008H Dialysis Machine saving valuable technician time.

The opportunity to mix DiaPure™ bicarbonate for multiple machines with a single DiaPure™ dissolution unit is another way in which DiaPure™ can help reduce labor costs.



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Improved Patient Outcomes

Making The Most Of Storage Space.

Space requirements for storage are significantly reduced with GranuFlo® Dry Acid Concentrate. Consider that one pallet of liquid acid consists of four 55-gallon drums and equals 220 gallons versus one pallet of GranuFlo consisting of 30 cases which equals 990 gallons. That is a ratio of 4.5:1. Quite a savings in storage costs alone.

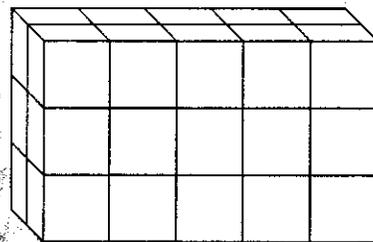
As with GranuFlo®, storage is not a concern with DiaPure™. Space requirements are reduced and employee safety is improved.

Comparison of Storage Space For GranuFlo® and Liquid Acid



Liquid Acid

1 Pallet = Four 55-gallon drums or 220 gallons.



GranuFlo®

1 Pallet = 30 Cases or 990 Gallons

Reducing Employee Injury.

The advantage of not having to move heavy drums around also helps reduce the risk of employee injury. Instead of maneuvering a liquid drum weighing over 570 pounds, the GranuFlo® individual bag weight is only 19 pounds. This decreased weight may reduce the frequency of employee injuries and costly worker compensation claims.

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A Space-Saving Solution

GranuFlo™ and DiaPure™

To find out more about how GranuFlo™ and DiaPure™ Dry-Bicarbonate Concentrate can help your dialysis center run smoother and more efficiently at Fresenius, contact your local Fresenius Sales Representative or the Customer Service Department at 1-800-828-8888. No other products save time and space and improve patient care like Fresenius GranuFlo™ and DiaPure™.

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Your Clinical Solution

The Clinical Advantage.

Normalization of uremic acidosis in hemodialysis patients has been shown to improve patient outcomes.* Dialysis patients using GranuFlo® receive additional buffer provided by the product's sodium diacetate component. An improvement in pre and post-dialysis serum CO₂ levels in patients utilizing GranuFlo® has been demonstrated by the following report:

*Oettinger, C, et al, "Normalization Of Uremic Acidosis In Hemodialysis Patients With A High Bicarbonate Dialysate," J Am Soc Nephrol, 1993; 3:1804-1807.

Comparison of Pre and Post-Dialysis Electrolytes Before and After Conversion to GranuFlo® (65 Chronic Patients)

Electrolytes (averaged) for Entire Patient Population over three months prior to GranuFlo® Conversion

	Na, mEq/L		K, mEq/L		Ca, mEq/L		CO ₂ , mEq/L	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean	137	139.8	5.1	3.4	9.4	10.5	22.7	28.1
1 SD	2.5	1.7	0.6	0.4	0.9	0.6	2.9	1.7

Electrolytes (averaged) for Entire Patient Population over three months after GranuFlo® Conversion

	Na, mEq/L		K, mEq/L		Ca, mEq/L		CO ₂ , mEq/L	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean	137.1	140.2	5.2	3.4	9.4	10.6	25.9	31.4
1 SD	2.7	1.6	0.6	0.4	0.7	0.5	2.7	1.7

Marcia L. Keen, MS 7/1993



A Healthy Choice For Patients.

The specially-designed DiaPure™ bag prevents the loss of CO₂ during the constitution process, maximizing the dialysate bicarbonate levels delivered to the patient during treatment. Improved serum bicarbonate levels have been shown to result in reduced morbidity. DiaPure™ is mixed on-line, just prior to treatment, reducing the potential for bacterial growth. All this makes DiaPure™ the optimal choice for patient care.

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"SUBSTANTIAL EQUIVALENCE" (SE) DECISION MAKING DOCUMENTATION

Date: May 16, 2003

Subject: K030497

Reviewer: Barbara McCool, RN, MS
DRARD/GRDB, HFZ-470

Name: Fresenius Medical Care North America

Address: 95 Hayden Ave
Lexington, MA 02420

Phone: (781) 402-9068

Fax: (781) 402-9082

Contact Person: Arthur Eilinsfeld, Regulatory Affairs Manager

Trade Name: Fresenius Naturalyte® Granuflo® Dry Acid Concentrate

Common Name: Dialysate concentrate for hemodialysis (liquid or powder)

Classification: 21 CFR §876.5820 Class II

Device Product Code: Procode 78 KPO

Product To Which Compared: K911459 & K922005

The predicate devices for the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate are:

1. Granulyte Powder Dialysate Concentrates. and Mixer; (K911459)
2. Granulyte Dialysate Concentrate; (K922005)

	YES	NO	
1. IS PRODUCT A DEVICE?	✓		IF NO STOP
2. DEVICE SUBJECT TO 510(K)?	✓		IF NO STOP
3. SAME INDICATION STATEMENT?	✓		IF YES GO TO 5
4.* DO DIFFERENCES ALTER THE EFFECT OR RAISE NEW ISSUES OF SAFETY OR EFFECTIVENESS?			IF YES STOP - NE
5. SAME TECHNOLOGICAL CHARACTERISTICS?	✓		IF YES GO TO 7
6.* COULD THE NEW CHARACTERISTICS AFFECT SAFETY OR EFFECTIVENESS?			IF YES GO TO 8
7. DESCRIPTIVE CHARACTERISTICS PRECISE ENOUGH?	✓		IF NO GO TO 10 IF YES STOP - SE
8.* NEW TYPES OF SAFETY OR EFFECTIVENESS QUESTIONS?			IF YES STOP - NE
9. ACCEPTED SCIENTIFIC METHODS EXIST?			IF NO STOP - NE
10. PERFORMANCE DATA AVAILABLE?			IF NO REQUEST DATA
11.*DATA DEMONSTRATE EQUIVALENCE?			

Indications for Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrate reconstitution.

Device Description:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is designed to be a direct product replacement for the current Granulyte® Concentrate (Series 1000, 2400, and 3000). The new concentrate product will be available in a non-granulated formula & the bags and cases will be rearranged to create lighter product. It is used only during hemodialysis. It is manufactured using the same raw materials & chemical composition of the following compounds: Calcium Chloride

Dihydrate, Magnesium Chloride Hexahydrate, Sodium Diacetate, Sodium Chloride, Potassium Chloride, and Dextrose. It is for single use only. It is supplied non-sterile and non-pyrogenic.

This new version will be packaged in a low density polyethylene bags and will be shipped in a lighter case (the new case will weigh only 45lbs as compared to the current weight of 85lbs). Since the cases will be lighter, it will take double the amount of bags. Once reconstituted the product and formulation are identical. In compliance with the SMDA of 1990, the sponsor has included a summary of safety and effectiveness information.

Safety Summary:

The sponsor states that the Fresenius will be thoroughly tested and required to meet all final release specifications prior to distribution.

Life-supporting or life sustaining:	NO
Implant (short or long term):	NO
Software driven:	NO
Sterile:	NO
Patient Contacting Device:	YES
Single Use:	YES
Home Use:	YES
Prescription Use:	YES
Drug or Biological Product:	NO
Kit	NO

Recommendation:

I recommend that the proposed device be found substantially equivalent to other legally marketed devices as described in 21 CFR §876.5620 Class II, Procode 78 KPO, 78.


Barbara McCool, RN, MS

Date: 5/16/03

C. Newland
5/19/03

MEMORANDUM

Date: May 16, 2003

To: RECORD

From: Barbara McCool, RN, MS
DRARD/GRDB, HFZ-470

Subject: Fresenius Naturalyte® Granuflo® Dry Acid Concentrate
K030497

Background:

This is my first review of this submission. Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is designed as a direct replacement for the current Granuflo® Dry Acid Concentrates. The new product will be marketed as a non-granulated product. The sponsor explains there "is a slight change in the manufacturing processes which packages various raw material powders to create dry acid concentrate. The raw materials used in both processes are identical. The final products from either process are the same; therefore, upon dissolution both products are equally identical in analytes and chemical concentration as liquid acid concentrate". In order to switch to a continuous powder metering system, the bag design will be modified to create a larger bag neck, making it easier to pour product into the mixer.

On May 5, 2003 I called the firm to clarify why they felt that these minor changes in the processing needed a 510(k). They explained that they "just wanted to be safe". I advised them in the future if they were unsure if their changes to a device needed a new submission, that they should call us first.

(b)(4)

(b)(4). They plan to reduce the amount of bags per case from six to three and have forty cases per pallet verses twenty per pallet.

Both the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate and the Fresenius Granuflo® Dry Acid Concentrates (Series 1000, 2400, and 3000) have the following features:

- Manufactured from the same USP grade raw material
- Used during hemodialysis as dialysate;
- Identical Indications for Use;
- Complies with the ANSI/AAMI RD6I 2000 standard;
- Same chemical composition;
- Equivalent dilution ratios;
- Non-pyrogenic labeling;
- Single use only; and
- Non-sterile.

Predicate Device(s): Granulyte Powder Dialysate Concentrates, and Mixer; (K911459)
 Granulyte Dialysate Concentrate; (K922005)

Intended Use:

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is indicated in the treatment of acute and chronic renal failure during the hemodialysis procedure. This concentrate is formulated to be used with a three-stream hemodialysis machine which is calibrated for acid and bicarbonate concentrates

Device Description

The Fresenius Naturalyte® Granuflo® Dry Acid Concentrate is designed to be a direct product replacement for the current Granulyte® Concentrate (Series 1000, 2400, and 3000). The new concentrate product will be available in a non-granulated formula & the bags and cases will be rearranged to create a lighter product. It is used only during hemodialysis. It is manufactured using the same raw materials & chemical composition of the following compounds: Calcium Chloride Dihydrate, Magnesium Chloride Hexahydrate, Sodium Diacetate, Sodium Chloride, Potassium Chloride, and Dextrose. It is for single use only. It is supplied non-sterile and non-pyrogenic.

This new version will be packaged in a low density polyethylene bags and will be shipped in a lighter case (the new case will weigh only 45lbs as compared to the current weight of 85lbs). Since the cases will be lighter, it will take double the amount of bags. Once reconstituted the product and formulation are identical.

Comparison of the Fresenius Naturalyte® Granuflo® Dry Acid Concentrate and the Fresenius Granuflo® Dry Acid Concentrates (Series 1000, 2400, and 3000) are listed below:

Comparison Table			
	Subject Device	Predicate Device #1	Predicate Device #2
Features	Fresenius Naturalyte® Granuflo® Dry Acid Concentrate	Granulyte® Concentrate #K911459 (now called Granuflo®)	Granulyte® Concentrate #K922005 (now called Granuflo®)
Indications for Use	Identical	Identical	Identical
Granulated	No	Yes	Yes
Upon Reconstitution	Identical Homogeneity	Identical Homogeneity	Identical Homogeneity
Dilution Ratios	Series 3000 – 1:34 Series 1000 – 1:35.83 Series 2400 – 1:44	Series 3000 – 1:34 Series 1000 – 1:35.83 Series 2400 – 1:44	Series 3000 – 1:34 Series 1000 – 1:35.83 Series 2400 – 1:44
Chemically Equivalent	Yes	Yes	Yes
Raw materials Used	(b)(4)		

Tolerances of Final Concentrate	(b)(4)		
Instructions for Use	Identical	Identical	Identical
Amount Produced	500 liters	500 liters	500 liters
Single Use	Yes	Yes	Yes
Non-Pyrogenic	Yes	Yes	Yes
Sterilization	None	None	None
Packaging			
Case Weight	45 lbs	85 lbs	85 lbs
Cases in Batch	8 cases	4 cases	4 cases
Bags per case	3 bags	6 bags	6 bags
Bag material	Polyethylene	Polyethylene	Polyethylene

Sterilization /Pyrogenicity:

The product is non-sterile. The USP LAL method will be used to determination pyrogenicity (sensitivity is 0.06 EU/mL).

Safety Summary:

The sponsor states that the Fresenius will be thoroughly tested and required to meet all final release specifications prior to distribution. Their safety and effectiveness is supported in the comparison chart of materials, device description, and enclosed performance testing.

Labeling:

The labels are colored red to indicate this is an acid concentrate. The chemical concentrations and chemical composition of the product are listed, as is a statement that the devices are restricted to sale by or on the order of a physician. They are labeled as non- pyrogenic/non-sterile & for single use only.

Manufacturing Process:

Fresenius states that although the new will be provided in a non-granulated formulation, the manufacturing process will be very similar. (b)(4)

(b)(4)

(b)(4)

Dissolution Testing

The three formulations of Fresenius Naturalyte® Granuflo® Dry Acid Concentrate were tested for proper dissolution. Each formula selected, the required chemical ingredients were weighed to

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produce 24-bags of product. The 24 bags of the subject device were then reconstituted to produce liquid acid concentrate. The liquid acid concentrate was tested for its chemical solute concentrations of Magnesium, Calcium, Potassium, Dextrose, Sodium, and Acetate (as Acetic Acid). Tests results were then compared to the equivalent Granuflo formula product specifications to verify that all chemical specifications are met for that formula. The firm claims to ensure that their solute chemical concentration is equivalent to their predicate, the test samples will be pulled from the "top" and "bottom" of the dissolution tank.

Conclusion:

The sponsor has provided the necessary information to be considered safe and effective for its intended use and should be considered Substantially Equivalent (SE) to their identified predicate devices.

Recommendation:

I recommend that the proposed device be found substantially equivalent to other legally marketed devices as described in 21 CFR §876.5820 Class II, ProCode 78 KPO, 78.

This concludes my review of this submission.

Barbara McCool
Barbara McCool, RN, MS

Date: 5/19/03

C. Neuland
Concur: Carolyn Neuland PhD

Date 5/19/03

SCREENING CHECKLIST
FOR ALL PREMARKET NOTIFICATION [510(k)] SUBMISSIONS

510(k) Number: K030497

The cover letter clearly identifies the type of 510(k) submission as (Check the appropriate box):

- Special 510(k) - Do Sections 1 and 2
- Abbreviated 510(k) - Do Sections 1, 3 and 4
- Traditional 510(k) or no identification provided - Do Sections 1 and 4

Section 1: Required Elements for All Types of 510(k) submissions:

	Present or Adequate	Missing or Inadequate
Cover letter, containing the elements listed on page 3-2 of the Premarket Notification [510] Manual.	✓	
Table of Contents.	✓	
Truthful and Accurate Statement.	✓	
Device's Trade Name, Device's Classification Name and Establishment Registration Number.	✓	
Device Classification Regulation Number and Regulatory Status (Class I, Class II, Class III or Unclassified).	✓	
Proposed Labeling including the material listed on page 3-4 of the Premarket Notification [510] Manual.	✓	
Statement of Indications for Use that is on a separate page in the premarket submission.	✓	
Substantial Equivalence Comparison, including comparisons of the new device with the predicate in areas that are listed on page 3-4 of the Premarket Notification [510] Manual.	✓	
510(k) Summary or 510(k) Statement.	✓	
Description of the device (or modification of the device) including diagrams, engineering drawings, photographs or service manuals.	✓	
Identification of legally marketed predicate device. *	✓	
Compliance with performance standards. * [See Section 514 of the Act and 21 CFR 807.87 (d).]	✓	
Class III Certification and Summary. **	N/A	
Financial Certification or Disclosure Statement for 510(k) notifications with a clinical study. * [See 21 CFR 807.87 (i)]	↓	
510(k) Kit Certification ***	✓	

* - May not be applicable for Special 510(k)s.

** - Required for Class III devices, only.

*** - See pages 3-12 and 3-13 in the Premarket Notification [510] Manual and the Convenience Kits Interim Regulatory Guidance.

Section 2: Required Elements for a SPECIAL 510(k) submission:

	Present	Inadequate or Missing
Name and 510(k) number of the submitter's own, unmodified predicate device.		
A description of the modified device and a comparison to the sponsor's predicate device.		
A statement that the intended use(s) and indications of the modified device, as described in its labeling are the same as the intended uses and indications for the submitter's unmodified predicate device.		
Reviewer's confirmation that the modification has not altered the fundamental scientific technology of the submitter's predicate device.		
A Design Control Activities Summary that includes the following elements (a-c):		
a. Identification of Risk Analysis method(s) used to assess the impact of the modification on the device and its components, and the results of the analysis.		
b. Based on the Risk Analysis, an identification of the required verification and validation activities, including the methods or tests used and the acceptance criteria to be applied.		
c. A Declaration of Conformity with design controls that includes the following statements:		
A statement that, as required by the risk analysis, all verification and validation activities were performed by the designated individual(s) and the results of the activities demonstrated that the predetermined acceptance criteria were met. This statement is signed by the individual responsible for those particular activities.		
A statement that the manufacturing facility is in conformance with the design control procedure requirements as specified in 21 CFR 820.30 and the records are available for review. This statement is signed by the individual responsible for those particular activities.		

Section 3: Required Elements for an ABBREVIATED 510(k)* submission:

	Present	Inadequate or Missing
For a submission, which relies on a guidance document and/or special control(s), a summary report that describes how the guidance and/or special control(s) was used to address the risks associated with the particular device type. (If a manufacturer elects to use an alternate approach to address a particular risk, sufficient detail should be provided to justify that approach.)		
For a submission, which relies on a recognized standard, a declaration of conformity [For a listing of the required elements of a declaration of conformity, SEE Required Elements for a Declaration of Conformity to a Recognized Standard, which		

is posted with the 510(k) boilers on the H drive.] For a submission, which relies on a recognized standard without a declaration of conformity, a statement that the manufacturer intends to conform to a recognized standard and that supporting data will be available before marketing the device.		
For a submission, which relies on a non-recognized standard that has been historically accepted by FDA, a statement that the manufacturer intends to conform to a recognized standard and that supporting data will be available before marketing the device.		
For a submission, which relies on a non-recognized standard that has <u>not</u> been historically accepted by FDA, a statement that the manufacturer intends to conform to a recognized standard and that supporting data will be available before marketing the device and any additional information requested by the reviewer in order to determine substantial equivalence.		
Any additional information, which is not covered by the guidance document, special control, recognized standard and/or non-recognized standard, in order to determine substantial equivalence.		

- * - When completing the review of an abbreviated 510(k), please fill out an Abbreviated Standards Data Form (located on the H drive) and list all the guidance documents, special controls, recognized standards and/or non-recognized standards, which were noted by the sponsor.

Section 4: Additional Requirements for ABBREVIATED and TRADITIONAL 510(k) submissions (If Applicable):

	Present	Inadequate or Missing
a) Biocompatibility data for all patient-contacting materials, OR certification of identical material/formulation:	✓	
b) Sterilization and expiration dating information:	N/A	
i) sterilization process	↓	
ii) validation method of sterilization process		
iii) SAL		
iv) packaging		
v) specify pyrogen free		
vi) ETO residues		
vii) radiation dose		
viii) Traditional Method or Non-Traditional Method		
c) Software Documentation:	✓	

Items with checks in the "Present or Adequate" column do not require e additional information from the sponsor. Items with checks in the "Missing or Inadequate" column must be submitted before substantive review of the document.

Passed Screening Yes No

Reviewer: P. W. Coak 3/1/03

Concurrence by Review Branch: C. Neubard

15'

Date:

5/19/03

The deficiencies identified above represent the issues that we believe need to be resolved before our review of your 510(k) submission can be successfully completed. In developing the deficiencies, we carefully considered the statutory criteria as defined in Section 513(i) of the Federal Food, Drug, and Cosmetic Act for determining substantial equivalence of your device. We also considered the burden that may be incurred in your attempt to respond to the deficiencies. We believe that we have considered the least burdensome approach to resolving these issues. If, however, you believe that information is being requested that is not relevant to the regulatory decision or that there is a less burdensome way to resolve the issues, you should follow the procedures outlined in the "A Suggested Approach to Resolving Least Burdensome Issues" document. It is available on our Center web page at: <http://www.fda.gov/cdrh/modact/leastburdensome.html>

REVISED: 3/14/95

THE 510(K) DOCUMENTATION FORMS ARE AVAILABLE ON THE LAN UNDER 510(K) BOILERPLATES TITLED "DOCUMENTATION" AND MUST BE FILLED OUT WITH EVERY FINAL DECISION (SE, NSE, NOT A DEVICE, ETC.).

"SUBSTANTIAL EQUIVALENCE" (SE) DECISION MAKING DOCUMENTATION

K _____

Reviewer: _____

Division/Branch: _____

Device Name: _____

Product To Which Compared (510(K) Number If Known): _____

	YES	NO	
1. Is Product A Device			If NO = Stop
2. Is Device Subject To 510(k)?			If NO = Stop
3. Same Indication Statement?			If YES = Go To 5
4. Do Differences Alter The Effect Or Raise New Issues of Safety Or Effectiveness?			If YES = Stop NE
5. Same Technological Characteristics?			If YES = Go To 7
6. Could The New Characteristics Affect Safety Or Effectiveness?			If YES = Go To 8
7. Descriptive Characteristics Precise Enough?			If NO = Go To 10 If YES = Stop SE
8. New Types Of Safety Or Effectiveness Questions?			If YES = Stop NE
9. Accepted Scientific Methods Exist?			If NO = Stop NE
10. Performance Data Available?			If NO = Request Data
11. Data Demonstrate Equivalence?			Final Decision:

Note: In addition to completing the form on the LAN, "yes" responses to questions 4, 6, 8, and 11, and every "no" response requires an explanation.

1. Intended Use:
2. Device Description: Provide a statement of how the device is either similar to and/or different from other marketed devices, plus data (if necessary) to support the statement. Is the device life-supporting or life sustaining? Is the device implanted (short-term or long-term)? Does the device design use software? Is the device sterile? Is the device for single use? Is the device over-the-counter or prescription use? Does the device contain drug or biological product as a component? Is this device a kit? Provide a summary about the devices design, materials, physical properties and toxicology profile if important.

EXPLANATIONS TO "YES" AND "NO" ANSWERS TO QUESTIONS ON PAGE 1 AS NEEDED

1. Explain why not a device:
2. Explain why not subject to 510(k):
3. How does the new indication differ from the predicate device's indication:
4. Explain why there is or is not a new effect or safety or effectiveness issue:
5. Describe the new technological characteristics:
6. Explain how new characteristics could or could not affect safety or effectiveness:
7. Explain how descriptive characteristics are not precise enough:
8. Explain new types of safety or effectiveness questions raised or why the questions are not new:
9. Explain why existing scientific methods can not be used:
10. Explain what performance data is needed:
11. Explain how the performance data demonstrates that the device is or is not substantially equivalent:

ATTACH ADDITIONAL SUPPORTING INFORMATION

Internal Administrative Form

K030497		
	YES	NO
1. Did the firm request expedited review?		✓
2. Did we grant expedited review?		N/A
3. Have you verified that the Document is labeled Class III for GMP purposes?		✓ N/A
4. If, not, has POS been notified?		
5. Is the product a device?	✓	
6. Is the device exempt from 510(k) by regulation or policy?		✓
7. Is the device subject to review by CDRH?	✓	
8. Are you aware that this device has been the subject of a previous NSE decision?		✓
9. If yes, does this new 510(k) address the NSE issue(s), (e.g., performance data)?		
10. Are you aware of the submitter being the subject of an integrity investigation?		✓
11. If, yes, consult the ODE Integrity Officer.		
12. Has the ODE Integrity Officer given permission to proceed with the review? (Blue Book Memo #191-2 and Federal Register 90N0332, September 10, 1991.		N/A

510(i) Additional Information
Daily Activity Log

Staff Name: _____ Today's Date _____

Submission Received Date: _____

"K" No./	Date Rec in DMC *	D/E	Closed	Mail Out	File Dist	Comm Code
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

* Only applies to items with different received dates than submission date above.

- Comment Codes:
- 01 - System Will Not Accept Log-In
 - 02 - Work on Older Submissions
 - 03 - Reprocessing
 - 04 - Equipment Failure
 - 05 - Other

Explanation of Comments _____

From: Reviewer(s) - Name(s) B. McCool B.M. Cool

Subject: 510(k) Number K030497

To: The Record - It is my recommendation that the subject 510(k) Notification:

- Refused to accept.
- Requires additional information (other than refuse to accept).
- Is substantially equivalent to marketed devices.
- NOT substantially equivalent to marketed devices.
- Other (e.g., exempt by regulation, not a device, duplicate, etc.)

- | | | |
|---|---|--|
| Is this device subject to Section 522 Postmarket Surveillance? | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Is this device subject to the Tracking Regulation? | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Was clinical data necessary to support the review of this 510(k)? | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Is this a prescription device? | <input checked="" type="checkbox"/> YES | <input type="checkbox"/> NO |
| Was this 510(k) reviewed by a Third Party? | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Special 510(k)? | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |
| Abbreviated 510(k)? Please fill out form on H Drive 510k/boilers | <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO |

- Truthful and Accurate Statement Requested Enclosed
- A 510(k) summary OR A 510(k) statement
- The required certification and summary for class III devices *NA*
- The indication for use form

Combination Product Category (Please see algorithm on H drive 510k/Boilers) N

Animal Tissue Source YES NO Material of Biological Origin YES NO *NA*

The submitter requests under 21 CFR 807.95 (doesn't apply for SEs):
 No Confidentiality Confidentiality for 90 days Continued Confidentiality exceeding 90 days

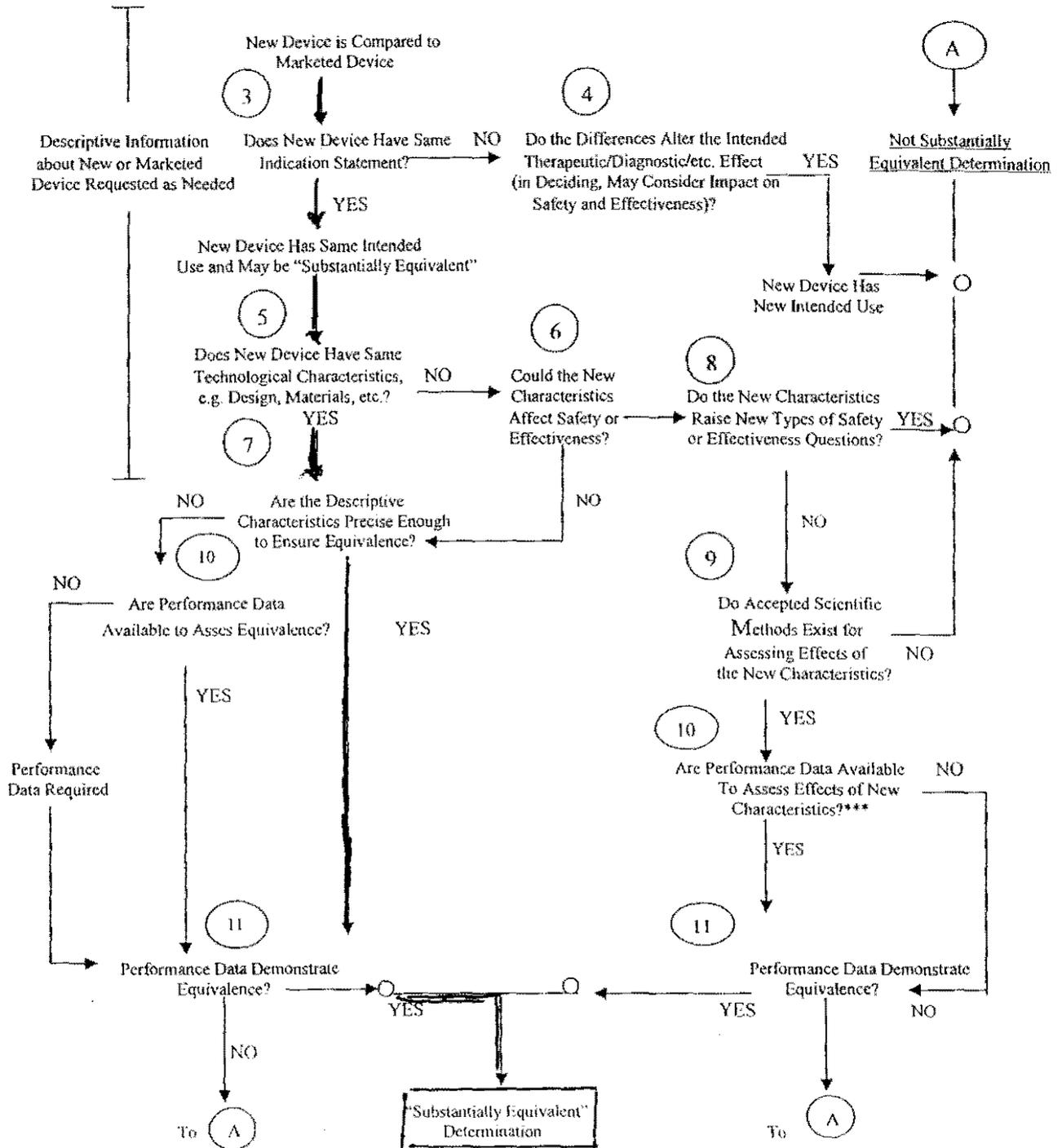
Predicate Product Code with class: Additional Product Code(s) with panel (optional):

876.5820 78 KPD Class II

Review: Cecily Y. Newland GRDB 5/19/03
(Branch Chief) (Branch Code) (Date)

Final Review: Nancy C Brogdon 5-20-03
(Division Director) (Date)

510(k) "SUBSTANTIAL EQUIVALENCE" DECISION-MAKING PROCESS



- ❖ 510(k) Submissions compare new devices to marketed devices. FDA requests additional information if the relationship between marketed and "predicate" (pre-Amendments or reclassified post-Amendments) devices is unclear.
- ❖❖ This decision is normally based on descriptive information alone, but limited testing information is sometimes required.
- ❖❖❖ Data maybe in the 510(k), other 510(k)s, the Center's classification files, or the literature.

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