

# APPROVAL ORDER



Food and Drug Administration  
9200 Corporate Boulevard  
Rockville MD 20850

Mr. Farzad Parsaie  
Vice President  
Regulatory Affairs and Quality Assurance  
Levitronix, LLC  
45 First Avenue  
Waltham, MA 02451

OCT 07 2008

Re: H070004  
HUD 06-0174  
Levitronix CentriMag® Right Ventricular Assist System (RVAS)  
Filed: April 30, 2007  
Amended: July 27, September 6, and October 10, 2007; January 23, March 5,  
and April 3, 2008  
Product Code: OJE – Right Ventricular Bypass (Assist) Device (“RVAD”)

Dear Mr. Parsaie:

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your humanitarian device exemption (HDE) application for the CentriMag® Right Ventricular Assist System (RVAS). This device is indicated for temporary circulatory support for up to 14 days for patients in cardiogenic shock due to acute right ventricular failure. CDRH is pleased to inform you that your HDE is approved subject to the enclosed "Conditions of Approval." You may begin commercial distribution of the device after you have submitted an amendment to this HDE with copies of the approved labeling in final printed form.

In addition to the postapproval requirements in the enclosure, the postapproval reports must include the following information:

You have agreed to implement a post-approval study to follow the first twenty-five (25) consecutive patients implanted with the CentriMag® RVAS for all causes of right ventricular failure, until thirty (30) days after device explant or hospital discharge, whichever is longer. The objective of this study will be to gather post-market data to evaluate rates of survival and serious adverse events when the device is used in actual post-market clinical practice.

A detailed protocol will be submitted to FDA in the form of an HDE supplement for review within 30 days from the date of this letter. This protocol will include, but is not necessarily limited to the basic study design, the study duration and evaluation of endpoints (demographic data, diagnoses, implant information, adverse events (including definitions), duration of support and patient outcomes, survival data), and proposed reporting interval (e.g., annually). At the completion of this post-approval study, CDRH may request that you amend your product labeling to reflect the results, by submitting an HDE supplement.

The sale, distribution, and use of this device are limited to prescription use in accordance with 21 CFR 801.109 within the meaning of section 520(e) of the Federal Food, Drug, and Cosmetic Act (the act) under the authority of section 515(d)(1)(B)(ii) of the act. In addition, in order to ensure the safe use of the device, FDA has further restricted the device within the meaning of section 520(e) of the act under the authority of section 515(d)(1)(B)(ii) of the act insofar as (1) the labeling shall specify the training requirements for practitioners who may use the device as approved in this order and (2) the sale, distribution, and use must not violate sections 502(q) and (r) of the act.

FDA wishes to remind you that failure to comply with any postapproval requirement constitutes a ground for withdrawal of the HDE. Commercial distribution of a device that is not in compliance with these conditions is a violation of the act.

CDRH will notify the public of its decision to approve your HDE by making available a summary of the safety and probable benefit of the device upon which the approval was based. The information can be found on the FDA CDRH Internet HomePage located at <http://www.fda.gov/cdrh/ode/hdeinfo.html>. Written requests for this information can also be made to the Dockets Management Branch (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852. The written request should include the HDE number or docket number. Within 30 days from the date that this information is placed on the Internet, any interested person may seek review of this decision by requesting an opportunity for administrative review, either through a hearing or review by an independent advisory committee, under section 515(g) of the act.

You are reminded that, as soon as possible and before commercial distribution of your device, you must submit an amendment to this HDE submission with copies of all approved labeling in final printed form. The labeling will not routinely be reviewed by FDA staff when HDE applicants include with their submission of the final printed labeling a cover letter stating that the final printed labeling is identical to the labeling approved in draft form. If the final printed labeling is not identical, any changes from the final draft labeling should be highlighted and explained in the amendment.

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Any information to be submitted to FDA regarding this HDE should be submitted in triplicate, unless otherwise specified, to the address below and should reference the above HDE number to facilitate processing:

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

If you have any questions concerning this approval order, please contact Kathryn O'Callaghan at (240) 276-4182.

Sincerely yours,

A handwritten signature in black ink, appearing to read "D. Tillman", written in a cursive style.

Donna-Bea Tillman, Ph.D., M.P.A.  
Director  
Office of Device Evaluation  
Center for Devices and  
Radiological Health

Enclosure  
"Conditions of Approval"

## CONDITIONS OF APPROVAL FOR AN HDE

### **I. APPROVED LABELING**

As soon as possible and before commercial distribution of the device, the holder of an HDE should submit three copies of the approved labeling in final printed form as an amendment (if submitted prior to HDE approval) or supplement (if submitted after HDE approval) to the HDE. The amendment/supplement should be submitted to the Document Mail Center (HFZ-401), Office of Device Evaluation, Center for Devices and Radiological Health, Food and Drug Administration (FDA), 9200 Corporate Blvd., Rockville, Maryland 20850.

### **II. ADVERTISEMENTS**

Advertisements and other descriptive printed materials issued by the HDE holder or private label distributor with respect to this device should not recommend or imply that the device may be used for any use that is not included in the FDA approved labeling for the device. If the FDA approval order has restricted the sale, distribution and use of the device to prescription use in accordance with 21 CFR 801.109 and specified that this restriction is being imposed in accordance with the provisions of section 520(e) of the Federal Food, Drug, and Cosmetic Act (the act) (21 U.S.C. 360j(e)) under the authority of section 515(d)(1)(B)(ii) of the act (21 U.S.C. 360e(d)(1)(B)(ii)), all advertisements and other descriptive printed material issued by the holder or distributor with respect to the device shall include a brief statement of the intended uses of the device and relevant warnings, precautions, side effects, and contraindications.

### **III. HDE SUPPLEMENTS**

Before making any change affecting the safety or probable benefit of the device, the HDE holder should submit a supplement for review and approval by FDA unless a "Special HDE Supplement" is permitted as described under 21 CFR 814.39(d)(2) or an alternate submission is permitted as described under 21 CFR 814.39(e). All HDE supplements or alternate submissions must comply with the applicable requirements under 21 CFR 814.39 of the Premarket Approval (PMA) regulation and under 21 CFR 814.108 of the Humanitarian Device Exemption regulation. The review timeframe for HDE supplements is 75 days except for those submitted under 21 CFR 814.39(e).

Since all situations which require an HDE supplement cannot be briefly summarized, please consult the HDE regulation for further guidance. The guidance provided below is only for several key instances. In general, an HDE supplement must be submitted:

- 1) When unanticipated adverse effects, increases in the incidence of anticipated adverse effects, or device failures necessitate a labeling, manufacturing, or device modification; or
- 2) If the device is to be modified, and animal/laboratory or clinical testing is needed to determine if the modified device remains safe and continues to provide probable benefit.

HDE supplements submitted under 21 CFR 814.39(d)(2) "Special HDE Supplement - Changes Being Effected" are limited to the labeling, quality control, and manufacturing process changes as specified under this section of the regulation. This provision allows for the addition of, but not the

replacement of previously approved, quality control specifications and test methods. These changes may be implemented upon acknowledgment by FDA that the submission is being processed as a "Special HDE Supplement - Changes Being Effected." Please note that this acknowledgment is in addition to that issued by the Document Mail Center for all HDE supplements submitted. This procedure is not applicable to changes in device design, composition, specifications, circuitry, software, or energy source.

Alternate submissions permitted under 21 CFR 814.39(e) apply to changes that otherwise require approval of an HDE supplement before implementation and include the use of a *30-day HDE supplement* or *periodic postapproval report*. FDA must have previously indicated in an advisory opinion to the affected industry or in correspondence to the HDE holder that the alternate submission is permitted for the change. Before this can occur, FDA and the HDE holder must agree upon any needed testing, the testing protocol, the test results, the reporting format, the information to be reported, and the alternate submission to be used.

Please note that unlike the PMA process, a supplement may not be submitted for a new indication for use for a humanitarian use device (HUD). An HDE holder seeking a new indication for use for an HUD approved under the provisions of Subpart H of 21 CFR 814, must obtain a new designation of HUD status for the new indication for use and submit an original HDE application in accordance with §814.104. The application for the new indication for use may incorporate by reference any information or data previously submitted to the agency.

#### **IV. POSTAPPROVAL RECORD KEEPING REQUIREMENTS**

An HDE holder is required to maintain records of the names and addresses of the facilities to which the HUD has been shipped, correspondence with reviewing institutional review boards (IRBs), as well as any other information requested by a reviewing IRB or FDA.

#### **V. POSTAPPROVAL REPORTING REQUIREMENTS** Continued approval of the HDE is contingent upon the submission of postapproval reports required under 21 CFR 814.84 and 21 CFR 814.126.

##### **A. ANNUAL REPORT**

Annual reports should be submitted at intervals of 1 year from the date of approval of the original HDE. Reports for supplements approved under the original HDE should be included in the next and subsequent periodic reports for the original HDE unless otherwise specified in the approval order for the HDE supplement. Three copies identified as "Annual Report" and bearing the applicable HDE reference number are to be submitted to the HDE Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850. Reports should indicate the beginning and ending date of the period covered by the report and include the following information required by 21 CFR 814.126(b)(1):

1. An update of the information required under §814.102(a) in a separately bound volume;

2. An update of the information required under §814.104(b)(2), (b)(3), and (b)(5);
3. The number of devices that have been shipped or sold and, if the number shipped or sold exceeds 4,000, an explanation and estimate of the number of devices used per patient. If a single device is used on multiple patients, an estimate of the number of patients treated or diagnosed using the device together with an explanation of the basis for the estimate;
4. Information describing the applicant's clinical experience with the device. This shall include safety information that is known or reasonably should be known to the applicant, a summary of medical device reports made pursuant to 21 CFR 803, any data generated from postmarketing studies, and information (whether published or unpublished) that is known or reasonably expected to be known by the applicant that may affect an evaluation of the safety of the device or that may affect the statement of contraindications, warnings, precautions, and adverse reactions in the device labeling; and
5. A summary of any changes made to the device in accordance with supplements submitted under §814.108 and any changes required to be reported to FDA under §814.39(b).

B. **ADVERSE REACTION AND DEVICE DEFECT REPORTING**

As provided by 21 CFR 814.82(a)(9), FDA has determined that in order to provide continued reasonable assurance of the safety and probable benefit of the device, the holder shall submit three copies of a written report identified, as applicable, as an "Adverse Reaction Report" or "Device Defect Report" to the Document Mail Center (HFZ-401), Office of Device Evaluation, Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850. Such reports should be submitted within 10 days after the HDE holder receives or has knowledge of information concerning:

- (1) A mixup of the device or its labeling with another article.
- (2) Any adverse reaction, side effect, injury, toxicity, or sensitivity reaction that is attributable to the device and
  - (a) has not been addressed by the device's labeling or
  - (b) has been addressed by the device's labeling, but is occurring with unexpected severity or frequency.
- (3) Any significant chemical, physical or other change or deterioration in the device or any failure of the device to meet the specifications established in the approved HDE that could not cause or contribute to death or serious injury but are not correctable by adjustments or other maintenance procedures described in the approved labeling. The report shall include a discussion of the HDE holder's assessment of the change, deterioration or failure and any proposed or implemented corrective action by the firm. When such events are correctable by adjustments or other maintenance procedures described in the approved labeling, all such events known to the holder shall be

included in the "Annual Report" described under "Postapproval Reports" above unless otherwise specified in the conditions of approval for this HDE. This postapproval report shall appropriately categorize these events and include the number of reported and otherwise known instances of occurrence for each category during the reporting period. Additional information regarding the events discussed above shall be submitted by the HDE holder when determined by FDA to be necessary to provide continued reasonable assurance of the safety and probable benefit of the device for its intended use.

**C. REPORTING UNDER THE MEDICAL DEVICE REPORTING REGULATION**

The Medical Device Reporting regulation (MDR) (21 CFR 803) became effective on July 31, 1996 and requires that all manufacturers and importers of medical devices, including in vitro diagnostic devices, report to FDA whenever they receive or otherwise become aware of information that reasonably suggests that one of its marketed devices:

- (1) may have caused or contributed to a death or serious injury; or
- (2) has malfunctioned and that the device or a similar device marketed by the manufacturer or importer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur.

The same events subject to reporting under the MDR Regulation may also be subject to the above "Adverse Reaction and Device Defect Reporting" requirements in the "Conditions of Approval" for this HDE. FDA has determined that such duplicative reporting is unnecessary. Whenever an event involving a device is subject to reporting under both the MDR Regulation and the "Conditions of Approval" for a HDE, the manufacturer shall submit the appropriate reports required by the MDR Regulation within the time frames as identified in 21 CFR 803.10(c) using FDA Form 3500A, i.e., 30 days after becoming aware of a reportable death, serious injury, or malfunction as described in 21 CFR 803.50 and 21 CFR 803.52 and 5 days after becoming aware that a reportable MDR event requires remedial action to prevent an unreasonable risk of substantial harm to the public health. The manufacturer is responsible for submitting a baseline report on FDA Form 3417 for a device when the device model is first reported under 21 CFR 803.50. This baseline report is to include the HDE reference number. Any written report and its envelope is to be specifically identified, e.g., "Manufacturer Report," "5-Day Report," "Baseline Report," etc.

Any written report is to be submitted to:  
 Food and Drug Administration  
 Center for Devices and Radiological Health  
 Medical Device Reporting  
 PO Box 3002  
 Rockville, Maryland 20847-3002

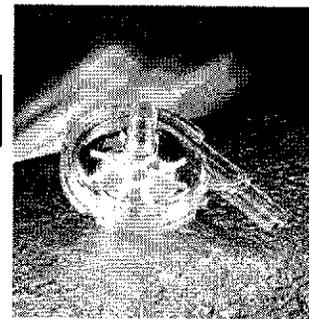
Additional information on MDR is available at <http://www.fda.gov/cdrh/devadvice/351.html>.

# CDRH Consumer Information



U.S. FOOD AND DRUG ADMINISTRATION

# New Device Approval



Levitronix CentriMag® Right Ventricular Assist System (RVAS)

*FDA approved this device under the Humanitarian Device Exemption (HDE) program <http://www.fda.gov/cdrh/ode/hdeinfo.html>. See the links below to the Summary of Safety and Probable Benefit (SSPB) and product labeling for more complete information on this product, its indications for use, and the basis for FDA's approval.*

**Product Name:** CentriMag® Right Ventricular Assist System (RVAS)

**Manufacturer:** Levitronix, LLC

**Address:** 45 First Avenue, Waltham, MA 02451

**Approval Date:** October 7, 2008

**Approval Letter:** [A link to web for the approval letter](#)

**What is it?** The CentriMag® Right Ventricular Assist System (RVAS) is a mechanical circulatory support system that is used to assist the right ventricle of critically ill patients with acute right ventricular (heart) failure.

**When is it used?** The CentriMag RVAS is used for up to 14 days in critically ill patients with acute right ventricular (heart) failure when standard therapies have failed. Although infrequent, right ventricular failure may occur due to a variety of causes including: right ventricular failure following surgery of the heart, a myocardial infarction, a heart transplantation, and right heart failure following implantation of a left heart assist device. The CentriMag RVAS is intended to keep the patient alive until the patient's heart recovers, the patient undergoes a heart transplant or receives a long-term ventricular assist system.

**How does it work?** The CentriMag RVAS is comprised of a single-use centrifugal blood pump, a motor, a primary drive console, flow probe, a back up drive console and cannulae. The CentriMag RVAS is unique compared to other devices in that it is designed to operate without mechanical bearings or seals. This is possible because the motor levitates the rotor (the spinning component of the device) magnetically. The system pumps blood from the heart's right atrium or ventricle to the pulmonary artery to assist the right heart in pumping blood to the lungs and ultimately throughout the rest of the body.

**What will it accomplish?** The CentriMag RVAS may help stabilize the hemodynamic condition of the patient and may improve the chance for survival in those patients who have not responded to standard heart failure therapies and no alternative treatment exists. The system may keep patients alive until their heart recovers or until they can receive a heart transplant or long-term ventricular assist system.

**When should it not be used?** Since anticoagulation is required while on the system, patients who are unable or unwilling to be treated with blood thinning drugs should not be treated with this device.

**Additional information:** Summary of Safety and Probable Benefit and labeling are available at: [TBD](#)

**Other:**

- National Institutes of Health, National Library of Medicine:  
<http://www.nlm.nih.gov/medlineplus/ency/article/007268.htm>
- General information about ventricular assist devices:  
<http://www.fda.gov/hearthealth/treatments/medicaldevices/vad.html>
- Overview of heart failure:  
<http://www.fda.gov/hearthealth/conditions/congestiveheartfailure.html>