Draft Guidance for Industry and FDA Staff

Class II Special Controls Guidance Document: Tissue Expander

DRAFT GUIDANCE

This guidance document is being distributed for comment purposes only.
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Comments and suggestions regarding this draft document should be submitted within 90 days of publication in the *Federal Register* of the notice announcing the availability of the draft guidance. Submit written comments to the Division of Dockets Management (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Room 1061, Rockville, MD 20852. Alternatively, electronic comments may be submitted to http://www.fda.gov/dockets/ecomments. All comments should be identified with the docket number listed in the notice of availability that publishes in the *Federal Register*.

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U.S. Department of Health and Human Services
Food and Drug Administration
Center for Devices and Radiological Health

Plastic and Reconstructive Surgery Devices Branch
Division of General, Restorative, and Neurological Devices
Office of Device Evaluation

Preface

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Additional copies are available from the Internet at: http://www.fda.gov/cdrh/ode/guidance/1628.html. You may also send an e-mail request to dsmica@fda.hhs.gov to receive an electronic copy of the guidance or send a fax request to 240-276-3151 to receive a hard copy. Please use the document number (**1628**) to identify the guidance you are requesting.

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1. Introduction

This draft guidance document was developed as a special control guidance to support the classification of the tissue expander into class II (special controls). The device, as described in the proposed classification, is intended for temporary (less than 6 months) implantation to develop surgical flaps and additional tissue coverage in a variety of applications. This document does not apply to the eye sphere implant device (product code NFM), classified in 21 CFR 886.3320.[1] This draft guidance will be issued in conjunction with a *Federal Register* notice announcing the proposal to classify this device type. This guidance is issued for comment purposes only. If a final rule to classify this device type is not issued, this guidance document will not be issued as a special control.

Following the effective date of a final rule classifying the device, any firm submitting a 510(k) for a tissue expander will need to address the issues covered in the special controls guidance. However, the firm need only show that its device meets the recommendations of the guidance or in some other way provides equivalent assurances of safety and effectiveness.

The Least Burdensome Approach

This draft guidance document reflects our careful review of what we believe are the relevant issues related to the tissue expander device and what we believe would be the least burdensome way of addressing these issues. If you have comments on whether there is a less burdensome approach, however, please submit your comments as indicated on the cover of this document.

2. Background

FDA believes that special controls, when combined with the general controls, will be sufficient to provide reasonable assurance of the safety and effectiveness of the tissue expander. Thus, a manufacturer who intends to market a device of this generic type must (1) conform to the general

[1] For additional information, contact the Division of Ophthalmic and Ear, Nose, and Throat Devices.

controls of the Federal Food, Drug and Cosmetic Act (the Act), including the premarket notification requirements described in 21 CFR 807 Subpart E; (2) address the specific risks to health associated with the tissue expander identified in this draft guidance; and (3) obtain a substantial equivalence determination from FDA prior to marketing the device. (See also 21 CFR 807.85).

This special controls guidance document identifies the classification regulation and product code for the tissue expander (Please refer to **Section 4. Scope)**. In addition, other sections of this special controls guidance document list the risks to health identified by FDA and describe measures that, if followed by manufacturers and combined with the general controls, will generally address the risks associated with the tissue expander and lead to a timely 510(k) review. This document supplements other FDA documents regarding the specific content requirements of a 510(k) submission. You should also refer to 21 CFR 807.87, the guidance, **Format for Traditional and Abbreviated 510(k)s,**[2] and "Premarket Notification 510(k)**"** on CDRH Device Advice.[3]

As described in the guidance entitled, **The New 510(k) Paradigm - Alternate Approaches to Demonstrating Substantial Equivalence in Premarket Notifications**,[4] a manufacturer may submit a Traditional 510(k) or has the option of submitting either an Abbreviated 510(k) or a Special 510(k). FDA believes an Abbreviated 510(k) provides the least burdensome means of demonstrating substantial equivalence for a new device, particularly once FDA issues a class II special controls guidance document. Manufacturers considering certain modifications to their own cleared devices may lessen the regulatory burden by submitting a Special 510(k).

3. Scope

The scope of this document is limited to the following device as described in 21 CFR 878.3600, product code LCJ.

FDA is proposing the following identification and classification for the device.

§ 878.3600 Tissue Expander Device

Identification. A tissue expander is a device intended for temporary (less than 6 months) subdermal implantation to stretch the skin for surgical applications, specifically to develop surgical flaps and additional tissue coverage. It is made of an inflatable silicone elastomer shell filled with normal physiological saline (injection grade).

Classification. Class II (special controls). The special control for this device is FDA's "Class II Special Controls Guidance Document: Tissue Expander."

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[2] http://www.fda.gov/cdrh/ode/guidance/1567.html
[3] http://www.fda.gov/cdrh/devadvice/314.html
[4] http://www.fda.gov/cdrh/ode/parad510.html

This document does not apply to the eye sphere implant device (product code NFM) classified in 21 CFR 886.3320. For additional information on eye implants, contact the Division of Ophthalmic and Ear, Nose, and Throat Devices.

This guidance document is not intended for a breast implant device. For information regarding breast implants, please refer to the guidance entitled **Saline, Silicone Gel, and Alternative Breast Implants**.[5]

4. Device Description

We recommend that you identify your device by the regulation and product code described in **Section 4. Scope** and provide the following device description information:

- a written description of each component of the tissue expander (e.g., shell, patch, injection port/valve);
- magnified drawings of each component;
- a table with the specific material and supplier for each component of the tissue expander;
- a description of the mechanism for filling the implant (e.g., magnetic port, injection dome), include magnified sketches of the implants depicting the placement/use of the connector systems, fill tubes, and injection domes; and
- a description of the sealing mechanism of the injection site(s).

As shown in the example below, we also recommend that you include a table with dimensional information on each model or style included in your submission.

Style	Shell Surface	Shape / Profile	Volume (cc)	Width (cm)	Height (cm)	Projection (cm)	Range Shell Thickness
XXXX	Smooth	Round, High	125-650	9-16	8.4-15	3.1-5.7	0.015”-0.25

Depending on the particular design of your tissue expander, additional descriptive information may be appropriate.

5. Risks to Health

In the table below, FDA has identified the risks to health generally associated with the use of the tissue expander device addressed in this document. The measures recommended to mitigate these identified risks are given in this guidance document, as shown in the table below. We recommend that you also conduct a risk analysis, before submitting your 510(k), to identify any other risks specific to your device and include the results of this analysis in your 510(k). If you elect to use an alternative approach to address a particular risk identified in this draft guidance

[5] http://www.fda.gov/cdrh/ode/guidance/1239.pdf.

document, or have identified risks additional to those in this draft guidance document, then you should provide sufficient detail to support the approach you have used to address that risk.

Identified Risk	Recommended Mitigation Measures
Skin trauma (e.g., necrosis, thinning, sloughing)	Section 11: Labeling
Device failure (e.g., rupture, injection site/port failure)	Section 7: Preclinical testing Section 11: Labeling
Infection	Section 8: Sterility
Adverse tissue reaction	Section 9: Biocompatibility
Pain	Section 11: Labeling

6. Preclinical Testing

This section describes the type of preclinical testing we recommend that you include in your submission. However, depending on the particular design of your tissue expander, FDA may recommend additional testing.

A. Material Property Testing of the Shell

We recommend that you provide complete reports of material property testing (e.g., tensile strength, percent elongation, tensile set, and joint testing) of your subject device compared to a predicate device. We recommend you perform all testing on components of the final, sterilized product. As part of the test report, provide a description of the test methods and state which tissue expanders were tested (i.e., model, size).

B. Injection Site Testing

We recommend that you provide preclinical testing to show that your tissue expander can be accurately accessed through the skin. For example, if your device has a magnetic port to locate the injection site, we recommend you provide data that show you can accurately access that site through the skin.

In addition, we recommend you provide preclinical testing to show how many punctures the injection site of your tissue expander can handle before compromising the material integrity of the site.

C. Valve Competency Testing

If your tissue expander includes a valve for postoperative filling, we recommend you provide valve competency testing to demonstrate that valve integrity is maintained at in vivo loads. FDA believes that ASTM F2051 is an appropriate test methodology for a tissue expander with a valve. ASTM F2051 states that there should be no leakage observable after a normally closed valve is subjected to a retrograde pressure equivalent to 30cm H_2O for 5 minutes and then to a retrograde pressure equivalent to 3cm H_2O for 5 minutes. FDA does not believe that

the load levels described in the ASTM F2051 methodology are clinically relevant; however, this methodology may provide useful information in terms of the valve response to varying pressures. For that reason, FDA recommends the destructive testing discussed below to simulate in vivo load conditions to collect data relevant to potential device failure. You should also provide the pass/fail results for leakage.

In addition to the testing above, you should perform destructive testing to address in vivo loading conditions. We recommend you gradually load the samples until valve failure occurs to define a maximum pressure for the device. We also recommend you provide the burst pressures, the failure modes (including whether the failed test valves reseal upon removal of the excess failure-inducing pressures), and the clinical rationale for the resulting burst pressures.

D. Self-Sealing Patch Testing

If your tissue expander has a self-sealing patch, we recommend you provide a complete report of preclinical testing that shows that a punctured patch can self-seal and maintain that self-seal for the entire duration of use.

7. Sterility

FDA recommends that you provide sterilization information described in **Updated 510(k) Sterility Review Guidance, K90-1**.[6] You should sterilize the device to a sterility assurance level (SAL) of 1×10^{-6}.

Tissue expanders are implanted devices and, therefore, we recommend you test the devices for pyrogenicity. We recommend you provide a:

- description of the method used to make the determination, e.g., limulus amebocyte lysate (LAL);
- identification of the testing endpoint reached and rationale for selecting that endpoint;
- description of the extraction technique used to obtain the test fluid from the test device, showing that all clinically relevant contact surfaces of the test device were assessed; and
- identification of the reference method used, e.g., United States Pharmacopeia (USP), ANSI/AAMI ST 72:2002, Bacterial endotoxins - Test methodologies, routine monitoring, and alternatives to batch testing or FDA guidance.

8. Biocompatibility

FDA recommends that you conduct biocompatibility testing as described in the document entitled **Use of International Standard ISO-10993, "Biological Evaluation of Medical Devices Part 1:**

[6] http://www.fda.gov/cdrh/ode/guidance/361.html

Evaluation and Testing[7] We recommend that you select biocompatibility tests appropriate for the duration and level of patient contact with your device. If identical materials and identical material processing are used in a predicate device with the same type and duration of patient contact, you may identify the predicate device in lieu of providing biocompatibility testing.

9. Clinical Studies

In accordance with the act, the agency will rely upon well-designed bench and/or animal testing rather than requiring clinical studies for new devices unless there is a specific justification for asking for clinical information to support a determination of substantial equivalence. While, in general, clinical studies will not be needed for most tissue expanders, FDA may recommend that you collect clinical data for a tissue expander with any one of the following:

- indications for use dissimilar from legally marketed devices of the same type
- designs dissimilar from legally marketed designs
- new technology (i.e., technology different from that used in legally marketed devices of the same type).

FDA will always consider alternatives to clinical testing when the proposed alternatives are supported by an adequate scientific rationale. Please contact the Plastic and Reconstructive Surgery Devices Branch to discuss any clinical testing before initiating studies.

If a clinical study is needed to demonstrate substantial equivalence (i.e., conducted prior to obtaining 510(k) clearance of the device), the study must be conducted under the Investigational Device Exemptions (IDE) regulation, 21 CFR Part 812. FDA believes the tissue expander device addressed by this guidance document is a significant risk device as defined in 21 CFR 812.3(m)(4).[8] In addition to the requirement of having an FDA-approved IDE, sponsors of such trials must comply with the regulations governing institutional review boards (21 CFR Part 56) and informed consent (21 CFR Part 50).

After FDA determines that the device is substantially equivalent, clinical studies conducted in accordance with the cleared indications reviewed in the 510(k), including clinical design validation studies conducted in accordance with the quality systems regulation, are generally exempt from the investigational device exemptions (IDE) requirements. However, such studies must be performed in conformance with 21 CFR Parts 56 and 50.

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[7] http://www.fda.gov/cdrh/g951.html

[8] See **Significant Risk and Nonsignificant Risk Medical Device Studies**, http://www.fda.gov/oc/ohrt/irbs/devices.html#risk.

10. Labeling

The premarket notification must include labeling in sufficient detail to satisfy the requirements of 21 CFR 807.87(e). The following suggestions are aimed at assisting you in preparing labeling that satisfies the requirements of 21 CFR Part 801.[9]

Directions for Use

Tissue Expanders are prescription devices under 21 CFR 801.109. As prescription devices, tissue expanders are exempt from having adequate directions for lay use. Labeling must, however, include adequate information for practitioner use of the device, including indications, effects, routes, methods, frequency and duration of administration and any relevant hazards, contraindications, side effects and precautions. 21 CFR 801.109(d).

Labeling in compliance with these requirements must include:

- device name and style;
- name and address of manufacturer, packer, or distributor;
- "Sterile," "Do not resterilize," and "Single use only" notations (or similar wording);
- expiration date;
- brief device description with material information;
- indications for use;
- any relevant contraindications (including patient groups in which the implant is contraindicated, surgical procedures that are contraindicated due to interference with implant integrity and/or performance);
- any relevant warnings (e.g., if device has a magnetic port, it should not be used in patients who have implanted devices that could be affected by a magnetic field);
- any relevant precautions (e.g., the physician should be aware that the underlying structures/tissues can be affected by the expansion process. This is a concern, especially in children, when the underlying structures can be deformed and in certain anatomical areas such as the head or neck where compression of adjacent structures can cause life threatening situations);
- list of potential complications;
- instructions for implantation, including surgical approach and device specific information (depends on type of tissue expander); and
- instructions for proper intraoperative and postoperative filling of the expander.

[9] Although final labeling is not required for 510(k) clearance, final labeling must comply with the requirements of 21 CFR Part 801 before a medical device is introduced into interstate commerce. In addition, final labeling for prescription medical devices must comply with 21 CFR 801.109. Labeling recommendations in this guidance are consistent with the requirements of Part 801.

Instructions should encourage local/institutional training programs designed to familiarize users with the features of the device and how to use it in a safe and effective manner.