

## PART 864 HEMATOLOGY AND PATHOLOGY DEVICES

### 目录

PART 864 HEMATOLOGY AND PATHOLOGY DEVICES.....	1
Subpart A--General Provisions.....	5
Sec. 864.1 Scope.....	5
Sec. 864.3 Effective dates of requirement for premarket approval.....	5
Sec. 864.9 Limitations of exemptions from section 510(k) of the Federal Food, Drug, and Cosmetic Act (the act).....	7
Subpart B--Biological Stains.....	8
Sec. 864.1850 Dye and chemical solution stains.....	8
Sec. 864.1860 Immunohistochemistry reagents and kits.....	9
Sec. 864.1870 Early growth response 1 (EGR1) gene fluorescence in-situ hybridization (FISH) test system for specimen characterization.....	10
Subpart C--Cell And Tissue Culture Products.....	13
Sec. 864.2220 Synthetic cell and tissue culture media and components.....	13
Sec. 864.2240 Cell and tissue culture supplies and equipment.....	13
Sec. 864.2260 Chromosome culture kit.....	14
Sec. 864.2280 Cultured animal and human cells.....	14
Sec. 864.2360 Mycoplasma detection media and components.....	16
Sec. 864.2800 Animal and human sera.....	16
Sec. 864.2875 Balanced salt solutions or formulations.....	16
Subpart D--Pathology Instrumentation and Accessories.....	17
Sec. 864.3010 Tissue processing equipment.....	17
Sec. 864.3250 Specimen transport and storage container.....	17
Sec. 864.3260 OTC test sample collection systems for drugs of abuse testing.....	18
Sec. 864.3300 Cytocentrifuge.....	19
Sec. 864.3400 Device for sealing microsections.....	19
Sec. 864.3600 Microscopes and accessories.....	19
Sec. 864.3800 Automated slide stainer.....	20
Sec. 864.3875 Automated tissue processor.....	20
Subpart E--Specimen Preparation Reagents.....	22
Sec. 864.4010 General purpose reagent.....	22
Sec. 864.4020 Analyte specific reagents.....	23
Sec. 864.4400 Enzyme preparations.....	24
Subpart F--Automated and Semi-Automated Hematology Devices.....	25
Sec. 864.5200 Automated cell counter.....	25
Sec. 864.5220 Automated differential cell counter.....	26
Sec. 864.5240 Automated blood cell diluting apparatus.....	26
Sec. 864.5260 Automated cell-locating device.....	26
Sec. 864.5300 Red cell indices device.....	27

Sec. 864.5350 Microsedimentation centrifuge.....	27
Sec. 864.5400 Coagulation instrument.....	27
Sec. 864.5425 Multipurpose system for in vitro coagulation studies.....	28
Sec. 864.5600 Automated hematocrit instrument.....	28
Sec. 864.5620 Automated hemoglobin system.....	28
Sec. 864.5680 Automated heparin analyzer.....	29
Sec. 864.5700 Automated platelet aggregation system.....	29
Sec. 864.5800 Automated sedimentation rate device.....	29
Sec. 864.5850 Automated slide spinner.....	30
Sec. 864.5950 Blood volume measuring device.....	30
Subpart G--Manual Hematology Devices.....	31
Sec. 864.6100 Bleeding time device.....	31
Sec. 864.6150 Capillary blood collection tube.....	31
Sec. 864.6160 Manual blood cell counting device.....	31
Sec. 864.6400 Hematocrit measuring device.....	32
Sec. 864.6550 Occult blood test.....	32
Sec. 864.6600 Osmotic fragility test.....	32
Sec. 864.6650 Platelet adhesion test.....	33
Sec. 864.6675 Platelet aggregometer.....	33
Sec. 864.6700 Erythrocyte sedimentation rate test.....	33
Subpart H--Hematology Kits and Packages.....	34
Sec. 864.7040 Adenosine triphosphate release assay.....	34
Sec. 864.7060 Antithrombin III assay.....	34
Sec. 864.7100 Red blood cell enzyme assay.....	36
Sec. 864.7140 Activated whole blood clotting time tests.....	36
Sec. 864.7250 Erythropoietin assay.....	36
Sec. 864.7275 Euglobulin lysis time tests.....	37
Sec. 864.7280 Factor V Leiden DNA mutation detection systems.....	37
Sec. 864.7290 Factor deficiency test.....	37
Sec. 864.7300 Fibrin monomer paracoagulation test.....	38
Sec. 864.7320 Fibrinogen/fibrin degradation products assay.....	38
Sec. 864.7340 Fibrinogen determination system.....	39
Sec. 864.7360 Erythrocytic glucose-6-phosphate dehydrogenase assay.....	39
Sec. 864.7375 Glutathione reductase assay.....	39
Sec. 864.7400 Hemoglobin A[bdi2] assay.....	40
Sec. 864.7415 Abnormal hemoglobin assay.....	40
Sec. 864.7425 Carboxyhemoglobin assay.....	40
Sec. 864.7440 Electrophoretic hemoglobin analysis system.....	41
Sec. 864.7455 Fetal hemoglobin assay.....	41
Sec. 864.7470 Glycosylated hemoglobin assay.....	42
Sec. 864.7490 Sulfhemoglobin assay.....	42
Sec. 864.7500 Whole blood hemoglobin assays.....	42

Sec. 864.7525 Heparin assay.....	43
Sec. 864.7660 Leukocyte alkaline phosphatase test.....	43
Sec. 864.7675 Leukocyte peroxidase test.....	44
Sec. 864.7695 Platelet factor 4 radioimmunoassay.....	44
Sec. 864.7720 Prothrombin consumption test.....	44
Sec. 864.7735 Prothrombin-proconvertin test and thrombotest.....	45
Sec. 864.7750 Prothrombin time test.....	45
Sec. 864.7825 Sickle cell test.....	46
Sec. 864.7875 Thrombin time test.....	47
Sec. 864.7900 Thromboplastin generation test.....	47
Sec. 864.7925 Partial thromboplastin time tests.....	47
Subpart I--Hematology Reagents.....	47
Sec. 864.8100 Bothrops atrox reagent.....	48
Sec. 864.8150 Calibrator for cell indices.....	48
Sec. 864.8165 Calibrator for hemoglobin or hematocrit measurement.....	48
Sec. 864.8175 Calibrator for platelet counting.....	49
Sec. 864.8185 Calibrator for red cell and white cell counting.....	49
Sec. 864.8200 Blood cell diluent.....	49
Sec. 864.8500 Lymphocyte separation medium.....	50
Sec. 864.8540 Red cell lysing reagent.....	50
Sec. 864.8625 Hematology quality control mixture.....	50
Sec. 864.8950 Russell viper venom reagent.....	51
Subpart J--Products Used In Establishments That Manufacture Blood and Blood Products..	51
Sec. 864.9050 Blood bank supplies.....	51
Sec. 864.9100 Empty container for the collection and processing of blood and blood components.....	52
Sec. 864.9125 Vacuum-assisted blood collection system.....	52
Sec. 864.9145 Processing system for frozen blood.....	52
Sec. 864.9160 Blood group substances of nonhuman origin for in vitro diagnostic use.....	53
Sec. 864.9175 Automated blood grouping and antibody test system.....	53
Sec. 864.9185 Blood grouping view box.....	53
Sec. 864.9195 Blood mixing devices and blood weighing devices.....	55
Sec. 864.9205 Blood and plasma warming device.....	55
Sec. 864.9225 Cell-freezing apparatus and reagents for in vitro diagnostic use.....	56
Sec. 864.9245 Automated blood cell separator.....	56
Sec. 864.9275 Blood bank centrifuge for in vitro diagnostic use.....	56
Sec. 864.9285 Automated cell-washing centrifuge for immuno-hematology.....	57
Sec. 864.9300 Automated Coombs test systems.....	57
Sec. 864.9320 Copper sulfate solution for specific gravity determinations.....	57
Sec. 864.9400 Stabilized enzyme solution.....	58
Sec. 864.9550 Lectins and protectins.....	58
Sec. 864.9575 Environmental chamber for storage of platelet concentrate.....	58

Sec. 864.9600 Potentiating media for in vitro diagnostic use.....	59
Sec. 864.9650 Quality control kit for blood banking reagents.....	59
Sec. 864.9700 Blood storage refrigerator and blood storage freezer.....	59
Sec. 864.9750 Heat-sealing device.....	60
Sec. 864.9875 Transfer set.....	60
Subpart K--Products Used In Establishments That Manufacture Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps).....	61
Sec. 864.9900 Cord blood processing system and storage container.....	61

## Subpart A--General Provisions

### Sec. 864.1 Scope.

(a) This part sets forth the classification of hematology and pathology devices intended for human use that are in commercial distribution.

(b) The identification of a device in a regulation in this part is not a precise description of every device that is, or will be, subject to the regulation. A manufacturer who submits a premarket notification submission for a device under part 807 may not show merely that the device is accurately described by the section title and identification provisions of a regulation in this part, but shall state why the device is substantially equivalent to other devices, as required by 807.87.

(c) References in this part to regulatory sections of the Code of Federal Regulations are to chapter I of title 21, unless otherwise noted.

(d) Guidance documents referenced in this part are available on the Internet at  
<http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/default.htm>.

### Sec. 864.3 Effective dates of requirement for premarket approval.

A device included in this part that is classified into class III (premarket approval) shall not be commercially distributed after the date shown in the regulation classifying the device unless the manufacturer has an approval under section 515 of the act (unless an exemption has been granted under section 520(g)(2) of the act). An approval under section 515 of the act consists of FDA's issuance

of an order approving an application for premarket approval (PMA) for the device or declaring completed a product development protocol (PDP) for the device.

(a) Before FDA requires that a device commercially distributed before the enactment date of the amendments, or a device that has been found substantially equivalent to such a device, has an approval under section 515 of the act FDA must promulgate a regulation under section 515(b) of the act requiring such approval, except as provided in paragraph (b) of this section. Such a regulation under section 515(b) of the act shall not be effective during the grace period ending on the 90th day after its promulgation or on the last day of the 30th full calendar month after the regulation that classifies the device into class III is effective, whichever is later. See section 501(f)(2)(B) of the act. Accordingly, unless an effective date of the requirement for premarket approval is shown in the regulation for a device classified into class III in this part, the device may be commercially distributed without FDA's issuance of an order approving a PMA or declaring completed a PDP for the device. If FDA promulgates a regulation under section 515(b) of the act requiring premarket approval for a device, section 501(f)(1)(A) of the act applies to the device.

(b) Any new, not substantially equivalent, device introduced into commercial distribution on or after May 28, 1976, including a device formerly marketed that has been substantially altered, is classified by statute (section 513(f) of the act) into class III without any grace period and FDA must have issued an order approving a PMA or declaring completed a PDP for the device before the device is commercially distributed unless it is reclassified. If FDA knows that a device being commercially distributed may be a "new" device as defined in this section because of any new intended use or other reasons, FDA may codify the statutory classification of the device into class III for such new use. Accordingly, the regulation for such a class III device states that as of the enactment date of the amendments, May 28, 1976, the device must have an approval under section 515 of the act before commercial distribution.

**Sec. 864.9 Limitations of exemptions from section 510(k) of the Federal Food, Drug, and Cosmetic Act (the act).**

The exemption from the requirement of premarket notification (section 510(k) of the act) for a generic type of class I or II device is only to the extent that the device has existing or reasonably foreseeable characteristics of commercially distributed devices within that generic type or, in the case of in vitro diagnostic devices, only to the extent that misdiagnosis as a result of using the device would not be associated with high morbidity or mortality. Accordingly, manufacturers of any commercially distributed class I or II device for which FDA has granted an exemption from the requirement of premarket notification must still submit a premarket notification to FDA before introducing or delivering for introduction into interstate commerce for commercial distribution the device when:

(a) The device is intended for a use different from the intended use of a legally marketed device in that generic type of device; e.g., the device is intended for a different medical purpose, or the device is intended for lay use where the former intended use was by health care professionals only;

(b) The modified device operates using a different fundamental scientific technology than a legally marketed device in that generic type of device; e.g., a surgical instrument cuts tissue with a laser beam rather than with a sharpened metal blade, or an in vitro diagnostic device detects or identifies infectious agents by using deoxyribonucleic acid (DNA) probe or nucleic acid hybridization technology rather than culture or immunoassay technology; or

(c) The device is an in vitro device that is intended:

(1) For use in the diagnosis, monitoring, or screening of neoplastic diseases with the exception of immunohistochemical devices;

(2) For use in screening or diagnosis of familial or acquired

genetic disorders, including inborn errors of metabolism;

(3) For measuring an analyte that serves as a surrogate marker for screening, diagnosis, or monitoring life-threatening diseases such as acquired immune deficiency syndrome (AIDS), chronic or active hepatitis, tuberculosis, or myocardial infarction or to monitor therapy;

(4) For assessing the risk of cardiovascular diseases;

(5) For use in diabetes management;

(6) For identifying or inferring the identity of a microorganism directly from clinical material;

(7) For detection of antibodies to microorganisms other than immunoglobulin G (IgG) or IgG assays when the results are not qualitative, or are used to determine immunity, or the assay is intended for use in matrices other than serum or plasma;

(8) For noninvasive testing as defined in 812.3(k) of this chapter; and

(9) For near patient testing (point of care).

## Subpart B--Biological Stains

### Sec. 864.1850 Dye and chemical solution stains.

(a) *Identification.* Dye and chemical solution stains for medical purposes are mixtures of synthetic or natural dyes or nondye chemicals in solutions used in staining cells and tissues for diagnostic histopathology, cytopathology, or hematology.

(b) *Classification.* Class I (general controls). These devices are



exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9. These devices are also exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180, with respect to general requirements concerning records, and 820.198, with respect to complaint files.

#### **Sec. 864.1860 Immunohistochemistry reagents and kits.**

(a) *Identification.* Immunohistochemistry test systems (IHC's) are in vitro diagnostic devices consisting of polyclonal or monoclonal antibodies labeled with directions for use and performance claims, which may be packaged with ancillary reagents in kits. Their intended use is to identify, by immunological techniques, antigens in tissues or cytologic specimens. Similar devices intended for use with flow cytometry devices are not considered IHC's.

(b) *Classification of immunohistochemistry devices.* (1) Class I (general controls). Except as described in paragraphs (b) (2) and (b) (3) of this section, these devices are exempt from the premarket notification requirements in part 807, subpart E of this chapter. This exemption applies to IHC's that provide the pathologist with adjunctive diagnostic information that may be incorporated into the pathologist's report, but that is not ordinarily reported to the clinician as an independent finding. These IHC's are used after the primary diagnosis of tumor (neoplasm) has been made by conventional histopathology using nonimmunologic histochemical stains, such as hematoxylin and eosin. Examples of class I IHC's are differentiation markers that are used as adjunctive tests to subclassify tumors, such as keratin.

(2) Class II (special control, guidance document: "FDA Guidance for Submission of Immunohistochemistry Applications to the FDA," Center for Devices and Radiologic Health, 1998). These IHC's are intended for the detection and/or measurement of certain target analytes in order to provide prognostic or predictive data that are not directly

confirmed by routine histopathologic internal and external control specimens. These IHC's provide the pathologist with information that is ordinarily reported as independent diagnostic information to the ordering clinician, and the claims associated with these data are widely accepted and supported by valid scientific evidence. Examples of class II IHC's are those intended for semiquantitative measurement of an analyte, such as hormone receptors in breast cancer.

(3) Class III (premarket approval). IHC's intended for any use not described in paragraphs (b)(1) or (b)(2) of this section.

(c) *Date of PMA or notice of completion of a PDP is required.* As of May 28, 1976, an approval under section 515 of the Federal Food, Drug, and Cosmetic Act is required for any device described in paragraph (b)(3) of this section before this device may be commercially distributed. See 864.3.

**Sec. 864.1870 Early growth response 1 (EGR1) gene fluorescence in-situ hybridization (FISH) test system for specimen characterization.**

(a) *Identification.* An early growth response 1 (EGR1) gene fluorescence in-situ hybridization (FISH) test system for specimen characterization is a device intended to detect the EGR1 probe target on chromosome 5q in bone marrow specimens from patients with acute myeloid leukemia (AML) or myelodysplastic syndrome (MDS). The assay results are intended to be interpreted only by a qualified pathologist or cytogeneticist. These devices do not include automated systems that directly report results without review and interpretation by a qualified pathologist or cytogeneticist. These devices also do not include any device intended for use to select patient therapy, predict patient response to therapy, or to screen for disease as well as any device with a claim for a particular diagnosis, prognosis, monitoring, or risk assessment.

(b) *Classification.* Class II (special controls). The special

controls for this device are:

(1) Premarket notification submissions must also include the following information:

- (i) A detailed description of all probes included in the kit;
- (ii) Purpose of each probe;
- (iii) Probe molecular specificity;
- (iv) Probe specificity;
- (v) Probe limits;
- (vi) Probe sensitivity;
- (vii) Specification of required ancillary reagents, instrumentation, and equipment;
- (viii) Specification of the specimen collection, processing, storage and slide preparation methods;
- (ix) Specification of the assay procedure;
- (x) Specification of control elements that are incorporated into the recommended testing procedures;
- (xi) Specification of risk mitigation elements: Description of all additional procedures, methods, and practices incorporated into the directions for use that mitigate risks associated with testing;
- (xii) Specification of the criteria for test result interpretation and reporting;
- (xiii) Device analytical sensitivity data;
- (xiv) Device analytical specificity data;
- (xv) Device reference limit data;

(xvi) Device precision/reproducibility data;

(xvii) Device stability data to include:

(A) Real-time stability,

(B) Freeze-thaw stability,

(C) Transport and temperature stability,

(D) Post-hybridization signal stability,

(E) Photostability of probe, and

(xviii) Documentation that demonstrates the clinical validity of the device. The documentation must include data from clinical studies, a minimum of two peer-reviewed published literature references using the specific device seeking marketing clearance, or both. Documentation for the clinical studies and peer-reviewed published literature references cited must include the following elements:

(A) Documentation that the sponsor's probe was used in the literature reference,

(B) Number and type of specimens,

(C) Target population studied,

(D) Upper reference limit, and

(E) Range of positive probe results.

(2) Your 809.10(b)(12) of this chapter compliant labeling must include a statement summarizing the data identified in paragraphs (b)(1)(xiii) through (xviii) of this section and a description of the studies supporting the information, including the pre-specified acceptance criteria for these performance studies, justification for the pre-specified acceptance criteria, and whether the pre-specified acceptance criteria were met.

(3) Your 809.10 of this chapter compliant labeling must include:

(i) A warning that reads "The assay results are intended to be interpreted only by a qualified pathologist or cytogeneticist."

(ii) A warning that reads "This device is not for high-risk uses such as selecting therapy, predicting therapeutic response or disease screening."

(iii) A warning that reads "The use of this device for diagnosis, monitoring or risk assessment has not been established."

## Subpart C--Cell And Tissue Culture Products

### Sec. 864.2220 Synthetic cell and tissue culture media and components.

(a) *Identification.* Synthetic cell and tissue culture media and components are substances that are composed entirely of defined components (e.g., amino acids, vitamins, inorganic salts) that are essential for the survival and development of cell lines of humans and other animals. This does not include tissue culture media for human ex vivo tissue and cell culture processing applications as described in 876.5885 of this chapter.

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

### Sec. 864.2240 Cell and tissue culture supplies and equipment.

(a) *Identification.* Cell and tissue culture supplies and equipment

are devices that are used to examine, propagate, nourish, or grow cells and tissue cultures. These include such articles as slide culture chambers, perfusion and roller apparatus, cell culture suspension systems, and tissue culture flasks, disks, tubes, and roller bottles.

(b) *Classification*. Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9. If the devices are not labeled or otherwise represented as sterile, they are exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180, with respect to general requirements concerning records, and 820.198, with respect to complaint files.

#### **Sec. 864.2260 Chromosome culture kit.**

(a) *Identification*. A chromosome culture kit is a device containing the necessary ingredients (e.g., Minimum Essential Media (MEM) of McCoy's 5A culture media, phytohemagglutinin, fetal calf serum, antibiotics, and heparin) used to culture tissues for diagnosis of congenital chromosome abnormalities.

(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

#### **Sec. 864.2280 Cultured animal and human cells.**

(a) *Identification*. Cultured animal and human cells are in vitro cultivated cell lines from the tissue of humans or other animals

which are used in various diagnostic procedures, particularly diagnostic virology and cytogenetic studies.

(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.2360 Mycoplasma detection media and components.**

(a) *Identification.* Mycoplasma detection media and components are used to detect and isolate mycoplasma pleuropneumonia-like organisms (PPLO), a common microbial contaminant in cell cultures.

(b) *Classification.* Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.2800 Animal and human sera.**

(a) *Identification.* Animal and human sera are biological products, obtained from the blood of humans or other animals, that provide the necessary growth-promoting nutrients in a cell culture system.

(b) *Classification.* Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.2875 Balanced salt solutions or formulations.**

(a) *Identification.* A balanced salt solution or formulation is a defined mixture of salts and glucose in a simple medium. This device is included as a necessary component of most cell culture systems. This media component controls for pH, osmotic pressure, energy source, and inorganic ions.

(b) *Classification.* Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.



## Subpart D--Pathology Instrumentation and Accessories

### Sec. 864.3010 Tissue processing equipment.

(a) *Identification.* Tissue processing equipment consists of devices used to prepare human tissue specimens for diagnostic histological examination by processing specimens through the various stages of decalcifying, infiltrating, sectioning, and mounting on microscope slides.

(b) *Classification.* Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9. The devices are also exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180, with respect to general requirements concerning records, and 820.198, with respect to complaint files.

### Sec. 864.3250 Specimen transport and storage container.

(a) *Identification.* A specimen transport and storage container, which may be empty or prefilled, is a device intended to contain biological specimens, body waste, or body exudate during storage and transport in order that the matter contained therein can be destroyed or used effectively for diagnostic examination. If prefilled, the device contains a fixative solution or other general purpose reagent to preserve the condition of a biological specimen added to the container. This section does not apply to specimen transport and storage containers that are intended for use as part of an over-the-counter test sample collection system for drugs of abuse testing.

(b) *Classification.* Class I (general controls). The device is

exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9. If the device is not labeled or otherwise represented as sterile, it is exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180 of this chapter, with respect to general requirements concerning records, and 820.198 of this chapter, with respect to complaint files.

**Sec. 864.3260 OTC test sample collection systems for drugs of abuse testing.**

(a) *Identification.* An over-the-counter (OTC) test sample collection system for drugs of abuse testing is a device intended to: Collect biological specimens (such as hair, urine, sweat, or saliva), outside of a medical setting and not on order of a health care professional (e.g., in the home, insurance, sports, or workplace setting); maintain the integrity of such specimens during storage and transport in order that the matter contained therein can be tested in a laboratory for the presence of drugs of abuse or their metabolites; and provide access to test results and counseling. This section does not apply to collection, transport, or laboratory testing of biological specimens for the presence of drugs of abuse or their metabolites that is performed to develop evidence for law enforcement purposes.

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification requirements in part 807, subpart E of this chapter subject to the limitations in 864.9 if it is sold, distributed, and used in accordance with the restrictions set forth in 809.40 of this chapter. If the device is not labeled or otherwise represented as sterile, it is exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.198 of this chapter with respect to complaint files.

**Sec. 864.3300 Cytocentrifuge.**

(a) *Identification.* A cytocentrifuge is a centrifuge used to concentrate cells from biological cell suspensions (e.g., cerebrospinal fluid) and to deposit these cells on a glass microscope slide for cytological examination.

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.3400 Device for sealing microsections.**

(a) *Identification.* A device for sealing microsections is an automated instrument used to seal stained cells and microsections for histological and cytological examination.

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.3600 Microscopes and accessories.**

(a) *Identification.* Microscopes and accessories are optical instruments used to enlarge images of specimens, preparations, and cultures for medical purposes. Variations of microscopes and accessories (through a change in the light source) used for medical purposes include the following:

(1) Phase contrast microscopes, which permit visualization of unstained preparations by altering the phase relationship of light that passes around the object and through the object.

(2) Fluorescence microscopes, which permit examination of specimens stained with fluorochromes that fluoresce under ultraviolet light.

(3) Inverted stage microscopes, which permit examination of tissue cultures or other biological specimens contained in bottles or tubes with the light source mounted above the specimen.

(b) *Classification*. Class I (general controls). These devices are exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9. If the device is not labeled or otherwise represented as sterile, it is exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180, with respect to general requirements concerning records, and 820.198, with respect to complaint files.

#### **Sec. 864.3800 Automated slide stainer.**

(a) *Identification*. An automated slide stainer is a device used to stain histology, cytology, and hematology slides for diagnosis.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

#### **Sec. 864.3875 Automated tissue processor.**

(a) *Identification*. An automated tissue processor is an automated system used to process tissue specimens for examination through

fixation, dehydration, and infiltration.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

## Subpart E--Specimen Preparation Reagents

### Sec. 864.4010 General purpose reagent.

(a) A general purpose reagent is a chemical reagent that has general laboratory application, that is used to collect, prepare, and examine specimens from the human body for diagnostic purposes, and that is not labeled or otherwise intended for a specific diagnostic application. It may be either an individual substance, or multiple substances reformulated, which, when combined with or used in conjunction with an appropriate analyte specific reagent (ASR) and other general purpose reagents, is part of a diagnostic test procedure or system constituting a finished in vitro diagnostic (IVD) test. General purpose reagents are appropriate for combining with one or more than one ASR in producing such systems and include labware or disposable constituents of tests; but they do not include laboratory machinery, automated or powered systems. General purpose reagents include cytological preservatives, decalcifying reagents, fixative and adhesives, tissue processing reagents, isotonic solutions and pH buffers. Reagents used in tests for more than one individual chemical substance or ligand are general purpose reagents (e.g., *Thermus aquaticus* (TAQ) polymerase, substrates for enzyme immunoassay (EIA)).

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9. If the device is not labeled or otherwise represented as sterile, it is exempt from the current good manufacturing practice requirements of the quality system regulation in part 820 of this chapter, with the exception of 820.180, with respect to general requirements concerning records, and 820.198, with respect to complaint files.

**Sec. 864.4020 Analyte specific reagents.**

(a) *Identification.* Analyte specific reagents (ASR's) are antibodies, both polyclonal and monoclonal, specific receptor proteins, ligands, nucleic acid sequences, and similar reagents which, through specific binding or chemical reaction with substances in a specimen, are intended for use in a diagnostic application for identification and quantification of an individual chemical substance or ligand in biological specimens. ASR's that otherwise fall within this definition are not within the scope of subpart E of this part when they are sold to:

(1) In vitro diagnostic manufacturers; or

(2) Organizations that use the reagents to make tests for purposes other than providing diagnostic information to patients and practitioners, e.g., forensic, academic, research, and other nonclinical laboratories.

(b) *Classification.* (1) Class I (general controls). Except as described in paragraphs (b) (2) and (b) (3) of this section, these devices are exempt from the premarket notification requirements in part 807, subpart E of this chapter.

(2) Class II (special controls/guidance documents), when the analyte is used in blood banking tests that have been classified as class II devices (e.g., certain cytomegalovirus serological and treponema pallidum nontreponemal test reagents). Guidance Documents:

1. "Specifications for Immunological Testing for Infectious Disease; Approved Guideline," NCCLS Document I/LA18-A, December 1994.

2. "Assessment of the Clinical Accuracy of Laboratory Tests Using Receiver Operating Characteristic (ROC) Plots; Tentative Guideline," NCCLS Document KGP10-T, December 1993.

3. "Review Criteria for Assessment of In Vitro Diagnostic Devices

for Direct Detection of Mycobacterium spp," FDA, July 6, 1993, and its "Attachment 1," February 28, 1994.

4. "Draft Review Criteria for Nucleic Acid Amplification-Based In Vitro Diagnostic Devices for Direct Detection of Infectious Microorganisms," FDA, July 6, 1993.

5. The Center for Biologics Evaluation and Research, FDA, "Points to Consider in the Manufacture and Clinical Evaluation of In Vitro Tests to Detect Antibodies to the Human Immunodeficiency Virus, Type I" (54 FR 48943, November 28, 1989).

(3) Class III (premarket approval), when:

(i) The analyte is intended as a component in a test intended for use in the diagnosis of a contagious condition that is highly likely to result in a fatal outcome and prompt, accurate diagnosis offers the opportunity to mitigate the public health impact of the condition (e.g., human immunodeficiency virus (HIV/AIDS) or tuberculosis (TB)); or

(ii) The analyte is intended as a component in a test intended for use in donor screening for conditions for which FDA has recommended or required testing in order to safeguard the blood supply or establish the safe use of blood and blood products (e.g., tests for hepatitis or tests for identifying blood groups).

(c) *Date of 510(k), or date of PMA or notice of completion of a product development protocol is required.* (1) Preamendments ASR's; No effective date has been established for the requirement for premarket approval for the device described in paragraph (b) (3) of this section. See 864.3.

(2) For postamendments ASR's; November 23, 1998.

(d) *Restrictions.* Restrictions on the sale, distribution and use of ASR's are set forth in 809.30 of this chapter.

#### **Sec. 864.4400 Enzyme preparations.**



(a) *Identification*. Enzyme preparations are products that are used in the histopathology laboratory for the following purposes:

(1) To disaggregate tissues and cells already in established cultures for preparation into subsequent cultures (e.g., trypsin);

(2) To disaggregate fluid specimens for cytological examination (e.g., papain for gastric lavage or trypsin for sputum liquefaction);

(3) To aid in the selective staining of tissue specimens (e.g., diastase for glycogen determination).

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

## Subpart F--Automated and Semi-Automated Hematology Devices

### Sec. 864.5200 Automated cell counter.

(a) *Identification*. An automated cell counter is a fully-automated or semi-automated device used to count red blood cells, white blood cells, or blood platelets using a sample of the patient's peripheral blood (blood circulating in one of the body's extremities, such as the arm). These devices may also measure hemoglobin or hematocrit and may also calculate or measure one or more of the red cell indices (the erythrocyte mean corpuscular volume, the mean corpuscular hemoglobin, or the mean corpuscular hemoglobin concentration). These devices may use either an electronic particle counting method or an optical counting method.

(b) *Classification*. Class II (performance standards).

**Sec. 864.5220 Automated differential cell counter.**

(a) *Identification.* An automated differential cell counter is a device used to identify one or more of the formed elements of the blood. The device may also have the capability to flag, count, or classify immature or abnormal hematopoietic cells of the blood, bone marrow, or other body fluids. These devices may combine an electronic particle counting method, optical method, or a flow cytometric method utilizing monoclonal CD (cluster designation) markers. The device includes accessory CD markers.

(b) *Classification.* Class II (special controls). The special control for this device is the FDA document entitled "Class II Special Controls Guidance Document: Premarket Notifications for Automated Differential Cell Counters for Immature or Abnormal Blood Cells; Final Guidance for Industry and FDA."

**Sec. 864.5240 Automated blood cell diluting apparatus.**

(a) *Identification.* An automated blood cell diluting apparatus is a fully automated or semi-automated device used to make appropriate dilutions of a blood sample for further testing.

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.5260 Automated cell-locating device.**

(a) *Identification*. An automated cell-locating device is a device used to locate blood cells on a peripheral blood smear, allowing the operator to identify and classify each cell according to type. (Peripheral blood is blood circulating in one of the body's extremities, such as the arm.)

(b) *Classification*. Class II (performance standards).

**Sec. 864.5300 Red cell indices device.**

(a) *Identification*. A red cell indices device, usually part of a larger system, calculates or directly measures the erythrocyte mean corpuscular volume (MCV), the mean corpuscular hemoglobin (MCH), and the mean corpuscular hemoglobin concentration (MCHC). The red cell indices are used for the differential diagnosis of anemias.

(b) *Classification*. Class II (performance standards).

**Sec. 864.5350 Microsedimentation centrifuge.**

(a) *Identification*. A microsedimentation centrifuge is a device used to sediment red cells for the microsedimentation rate test.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.5400 Coagulation instrument.**

(a) *Identification.* A coagulation instrument is an automated or semiautomated device used to determine the onset of clot formation for in vitro coagulation studies.

(b) *Classification.* Class II (performance standards).

**Sec. 864.5425 Multipurpose system for in vitro coagulation studies.**

(a) *Identification.* A multipurpose system for in vitro coagulation studies is a device consisting of one automated or semiautomated instrument and its associated reagents and controls. The system is used to perform a series of coagulation studies and coagulation factor assays.

(b) *Classification.* Class II (performance standards).

**Sec. 864.5600 Automated hematocrit instrument.**

(a) *Identification.* An automated hematocrit instrument is a fully automated or semi-automated device which may or may not be part of a larger system. This device measures the packed red cell volume of a blood sample to distinguish normal from abnormal states, such as anemia and erythrocytosis (an increase in the number of red cells).

(b) *Classification.* Class II (performance standards).

**Sec. 864.5620 Automated hemoglobin system.**

(a) *Identification*. An automated hemoglobin system is a fully automated or semi-automated device which may or may not be part of a larger system. The generic type of device consists of the reagents, calibrators, controls, and instrumentation used to determine the hemoglobin content of human blood.

(b) *Classification*. Class II (performance standards).

**Sec. 864.5680 Automated heparin analyzer.**

(a) *Identification*. An automated heparin analyzer is a device used to determine the heparin level in a blood sample by mixing the sample with protamine (a heparin-neutralizing substance) and determining photometrically the onset of air-activated clotting. The analyzer also determines the amount of protamine necessary to neutralize the heparin in the patient's circulation.

(b) *Classification*. Class II (special controls).

**Sec. 864.5700 Automated platelet aggregation system.**

(a) *Identification*. An automated platelet aggregation system is a device used to determine changes in platelet shape and platelet aggregation following the addition of an aggregating reagent to a platelet-rich plasma.

(b) *Classification*. Class II (performance standards).

**Sec. 864.5800 Automated sedimentation rate device.**

(a) *Identification*. An automated sedimentation rate device is an instrument that measures automatically the erythrocyte sedimentation rate in whole blood. Because an increased sedimentation rate indicates tissue damage or inflammation, the erythrocyte sedimentation rate device is useful in monitoring treatment of a disease.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.5850 Automated slide spinner.**

(a) *Identification*. An automated slide spinner is a device that prepares automatically a blood film on a microscope slide using a small amount of peripheral blood (blood circulating in one of the body's extremities, such as the arm).

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.5950 Blood volume measuring device.**

(a) *Identification*. A blood volume measuring device is a manual, semiautomated, or automated system that is used to calculate the red cell mass, plasma volume, and total blood volume.

(b) *Classification*. Class II (performance standards).

## Subpart G--Manual Hematology Devices

### Sec. 864.6100 Bleeding time device.

(a) *Identification.* A bleeding time device is a device, usually employing two spring-loaded blades, that produces two small incisions in the patient's skin. The length of time required for the bleeding to stop is a measure of the effectiveness of the coagulation system, primarily the platelets.

(b) *Classification.* Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

### Sec. 864.6150 Capillary blood collection tube.

(a) *Identification.* A capillary blood collection tube is a plain or heparinized glass tube of very small diameter used to collect blood by capillary action.

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

### Sec. 864.6160 Manual blood cell counting device.

(a) *Identification.* A manual blood cell counting device is a device used to count red blood cells, white blood cells, or blood platelets.

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of

**Sec. 864.6400 Hematocrit measuring device.**

part 807 of this chapter subject to the limitations in 864.9.

(a) *Identification.* A hematocrit measuring device is a system consisting of instruments, tubes, racks, and a sealer and a holder. The device is used to measure the packed red cell volume in blood to determine whether the patient's total red cell volume is normal or abnormal. Abnormal states include anemia (an abnormally low total red cell volume) and erythrocytosis (an abnormally high total red cell mass). The packed red cell volume is produced by centrifuging a given volume of blood.

(b) *Classification.* Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.6550 Occult blood test.**

(a) *Identification.* An occult blood test is a device used to detect occult blood in urine or feces. (Occult blood is blood present in such small quantities that it can be detected only by chemical tests of suspected material, or by microscopic or spectroscopic examination.)

(b) *Classification.* Class II (performance standards).

**Sec. 864.6600 Osmotic fragility test.**



(a) *Identification*. An osmotic fragility test is a device used to determine the resistance of red blood cells to hemolysis (destruction) in varying concentrations of hypotonic saline solutions.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.6650 Platelet adhesion test.**

(a) *Identification*. A platelet adhesion test is a device used to determine in vitro platelet function.

(b) *Classification*. Class II (performance standards).

**Sec. 864.6675 Platelet aggregometer.**

(a) *Identification*. A platelet aggregometer is a device, used to determine changes in platelet shape and platelet aggregation following the addition of an aggregating reagent to a platelet rich plasma.

(b) *Classification*. Class II (performance standards).

**Sec. 864.6700 Erythrocyte sedimentation rate test.**

(a) *Identification*. An erythrocyte sedimentation rate test is a device that measures the length of time required for the red cells in a blood sample to fall a specified distance or a device that measures the degree of sedimentation taking place in a given length of time. An increased rate indicates tissue damage or inflammation.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

## Subpart H--Hematology Kits and Packages

### Sec. 864.7040 Adenosine triphosphate release assay.

(a) *Identification*. An adenosine triphosphate release assay is a device that measures the release of adenosine triphosphate (ATP) from platelets following aggregation. This measurement is made on platelet-rich plasma using a photometer and a luminescent firefly extract. Simultaneous measurements of platelet aggregation and ATP release are used to evaluate platelet function disorders.

(b) *Classification*. Class I (general controls).

### Sec. 864.7060 Antithrombin III assay.

(a) *Identification*. An antithrombin III assay is a device that is used to determine the plasma level of antithrombin III (a substance which acts with the anticoagulant heparin to prevent coagulation). This determination is used to monitor the administration of heparin in the treatment of thrombosis. The determination may also be used in the diagnosis of thrombophilia (a congenital deficiency of

antithrombin III).

(b) *Classification*. Class II (performance standards).

**Sec. 864.7100 Red blood cell enzyme assay.**

(a) *Identification.* Red blood cell enzyme assay is a device used to measure the activity in red blood cells of clinically important enzymatic reactions and their products, such as pyruvate kinase or 2,3-diphosphoglycerate. A red blood cell enzyme assay is used to determine the enzyme defects responsible for a patient's hereditary hemolytic anemia.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7140 Activated whole blood clotting time tests.**

(a) *Identification.* An activated whole blood clotting time tests is a device, used to monitor heparin therapy for the treatment of venous thrombosis or pulmonary embolism by measuring the coagulation time of whole blood.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7250 Erythropoietin assay.**

(a) *Identification.* A erythropoietin assay is a device that measures the concentration of erythropoietin (an enzyme that regulates the production of red blood cells) in serum or urine. This assay provides diagnostic information for the evaluation of erythrocytosis (increased total red cell mass) and anemia.

(b) *Classification.* Class II. The special control for this device is FDA's "Document for Special Controls for Erythropoietin Assay Premarket Notification (510(k)s)".

**Sec. 864.7275 Euglobulin lysis time tests.**

(a) *Identification.* A euglobulin lysis time test is a device that measures the length of time required for the lysis (dissolution) of a clot formed from fibrinogen in the euglobulin fraction (that fraction of the plasma responsible for the formation of plasmin, a clot lysing enzyme). This test evaluates natural fibrinolysis (destruction of a blood clot after bleeding has been arrested). The test also will detect accelerated fibrinolysis.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7280 Factor V Leiden DNA mutation detection systems.**

(a) *Identification.* Factor V Leiden deoxyribonucleic acid (DNA) mutation detection systems are devices that consist of different reagents and instruments which include polymerase chain reaction (PCR) primers, hybridization matrices, thermal cyclers, imagers, and software packages. The detection of the Factor V Leiden mutation aids in the diagnosis of patients with suspected thrombophilia.

(b) *Classification.* Class II (special controls). The special control is FDA's guidance entitled "Class II Special Controls Guidance Document: Factor V Leiden DNA Mutation Detection Systems." (See 864.1(d) for the availability of this guidance document.)

**Sec. 864.7290 Factor deficiency test.**

(a) *Identification.* A factor deficiency test is a device used to diagnose specific coagulation defects, to monitor certain types of therapy, to detect coagulation inhibitors, and to detect a carrier state (a person carrying both a recessive gene for a coagulation factor deficiency such as hemophilia and the

corresponding normal gene).

(b) *Classification*. Class II (performance standards).

**Sec. 864.7300 Fibrin monomer paracoagulation test.**

(a) *Identification*. A fibrin monomer paracoagulation test is a device used to detect fibrin monomer in the diagnosis of disseminated intravascular coagulation (nonlocalized clotting within a blood vessel) or in the differential diagnosis between disseminated intravascular coagulation and primary fibrinolysis (dissolution of the fibrin in a blood clot).

(b) *Classification*. Class II. The special control for this device is FDA's "In Vitro Diagnostic Fibrin Monomer Paracoagulation Test."

**Sec. 864.7320 Fibrinogen/fibrin degradation products assay.**

(a) *Identification*. A fibrinogen/fibrin degradation products assay is a device used to detect and measure fibrinogen degradation products and fibrin degradation products (protein fragments produced by the enzymatic action of plasmin on fibrinogen and fibrin) as an aid in detecting the presence and degree of intravascular coagulation and fibrinolysis (the dissolution of the fibrin in a blood clot) and in monitoring therapy for disseminated intravascular coagulation (nonlocalized clotting in the blood vessels).

(b) *Classification*. Class II (performance standards).

**Sec. 864.7340 Fibrinogen determination system.**

(a) *Identification.* A fibrinogen determination system is a device that consists of the instruments, reagents, standards, and controls used to determine the fibrinogen levels in disseminated intravascular coagulation (nonlocalized clotting within the blood vessels) and primary fibrinolysis (the dissolution of fibrin in a blood clot).

(b) *Classification.* Class II (performance standards).

**Sec. 864.7360 Erythrocytic glucose-6-phosphate dehydrogenase assay.**

(a) *Identification.* An erythrocytic glucose-6-phosphate dehydrogenase assay is a device used to measure the activity of the enzyme glucose-6-phosphate dehydrogenase or of glucose-6-phosphate dehydrogenase isoenzymes. The results of this assay are used in the diagnosis and treatment of nonspherocytic congenital hemolytic anemia or drug-induced hemolytic anemia associated with a glucose-6-phosphate dehydrogenase deficiency. This generic device includes assays based on fluorescence, electrophoresis, methemoglobin reduction, catalase inhibition, and ultraviolet kinetics.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7375 Glutathione reductase assay.**

(a) *Identification.* A glutathione reductase assay is a device used to determine the activity of the enzyme glutathione reductase in serum, plasma, or erythrocytes by such techniques as fluorescence and photometry. The results of this assay are used in the diagnosis of liver disease, glutathione reductase deficiency, or riboflavin

deficiency.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7400 Hemoglobin A[bdi2] assay.**

(a) *Identification.* A hemoglobin A2 assay is a device used to determine the hemoglobin A2 content of human blood. The measurement of hemoglobin A2 is used in the diagnosis of the thalassemias (hereditary hemolytic anemias characterized by decreased synthesis of one or more types of hemoglobin polypeptide chains).

(b) *Classification.* Class II (performance standards).

**Sec. 864.7415 Abnormal hemoglobin assay.**

(a) *Identification.* An abnormal hemoglobin assay is a device consisting of the reagents, apparatus, instrumentation, and controls necessary to isolate and identify abnormal genetically determined hemoglobin types.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7425 Carboxyhemoglobin assay.**

(a) *Identification.* A carboxyhemoglobin assay is a device used to determine the carboxyhemoglobin (the compound formed when hemoglobin is exposed to carbon monoxide) content of human blood



as an aid in the diagnosis of carbon monoxide poisoning. This measurement may be made using methods such as spectroscopy, colorimetry, spectrophotometry, and gasometry.

(b) *Classification*. Class II (performance standards).

**Sec. 864.7440 Electrophoretic hemoglobin analysis system.**

(a) *Identification*. An electrophoretic hemoglobin analysis system is a device that electrophoretically separates and identifies normal and abnormal hemoglobin types as an aid in the diagnosis of anemia or erythrocytosis (increased total red cell mass) due to a hemoglobin abnormality.

(b) *Classification*. Class II (performance standards).

**Sec. 864.7455 Fetal hemoglobin assay.**

(a) *Identification*. A fetal hemoglobin assay is a device that is used to determine the presence and distribution of fetal hemoglobin (hemoglobin F) in red cells or to measure the amount of fetal hemoglobin present. The assay may be used to detect fetal red cells in the maternal circulation or to detect the elevated levels of fetal hemoglobin exhibited in cases of hemoglobin abnormalities such as thalassemia (a hereditary hemolytic anemia characterized by a decreased synthesis of one or more types of hemoglobin polypeptide chains). The hemoglobin determination may be made by methods such as electrophoresis, alkali denaturation, column chromatography, or radial immunodiffusion.

(b) *Classification*. Class II (performance standards).

**Sec. 864.7470 Glycosylated hemoglobin assay.**

(a) *Identification.* A glycosylated hemoglobin assay is a device used to measure the glycosylated hemoglobins (Ala, Alb, and A1c) in a patient's blood by a column chromatographic procedure. Measurement of glycosylated hemoglobin is used to assess the level of control of a patient's diabetes and to determine the proper insulin dosage for a patient. Elevated levels of glycosylated hemoglobin indicate uncontrolled diabetes in a patient.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7490 Sulfhemoglobin assay.**

(a) *Identification.* A sulfhemoglobin assay is a device consisting of the reagents, calibrators, controls, and instrumentation used to determine the sulfhemoglobin (a compound of sulfur and hemoglobin) content of human blood as an aid in the diagnosis of sulfhemoglobinemia (presence of sulfhemoglobin in the blood due to drug administration or exposure to a poison). This measurement may be made using methods such as spectroscopy, colorimetry, spectrophotometry, or gasometry.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7500 Whole blood hemoglobin assays.**

(a) *Identification.* A whole blood hemoglobin assay is a device consisting of reagents, calibrators, controls, or photometric or spectrophotometric instrumentation used to measure the hemoglobin content of whole blood for the detection of anemia. This generic device category does not include automated hemoglobin systems.

**Sec. 864.7525 Heparin assay.**

(b) *Classification.* Class II (performance standards).

(a) *Identification.* A heparin assay is a device used to determine the level of the anticoagulant heparin in the patient's circulation. These assays are quantitative clotting time procedures using the effect of heparin on activated coagulation factor X (Stuart factor) or procedures based on the neutralization of heparin by protamine sulfate (a protein that neutralizes heparin).

(b) *Classification.* Class II (performance standards).

**Sec. 864.7660 Leukocyte alkaline phosphatase test.**

(a) *Identification.* A leukocyte alkaline phosphatase test is a device used to identify the enzyme leukocyte alkaline phosphatase in neutrophilic granulocytes (granular leukocytes stainable by neutral dyes). The cytochemical identification of alkaline phosphatase depends on the formation of blue granules in cells containing alkaline phosphatase. The results of this test are used to differentiate chronic granulocytic leukemia (a malignant disease characterized by excessive overgrowth of granulocytes in the bone marrow) and reactions that resemble true leukemia, such as those occurring in severe infections and polycythemia (increased total red cell mass).

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.7675 Leukocyte peroxidase test.**

(a) *Identification.* A leukocyte peroxidase test is a device used to distinguish certain myeloid cells derived from the bone marrow, i.e., neutrophils, eosinophils, and monocytes, from lymphoid cells of the lymphatic system and erythroid cells of the red blood cell series on the basis of their peroxidase activity as evidenced by staining. The results of this test are used in the differential diagnosis of the leukemias.

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.7695 Platelet factor 4 radioimmunoassay.**

(a) *Identification.* A platelet factor 4 radioimmunoassay is a device used to measure the level of platelet factor 4, a protein released during platelet activation by radioimmunoassay. This device measures platelet activation, which may indicate a coagulation disorder, such as myocardial infarction or coronary artery disease.

(b) *Classification.* Class II (performance standards).

**Sec. 864.7720 Prothrombin consumption test.**

(a) *Identification.* A prothrombin consumption tests is a device

that measures the patient's capacity to generate thromboplastin in the coagulation process. The test also is an indirect indicator of qualitative or quantitative platelet abnormalities. It is a screening test for thrombocytopenia (decreased number of blood platelets) and hemophilia A and B.

(b) *Classification*. Class II (performance standards).

**Sec. 864.7735 Prothrombin-proconvertin test and thrombotest.**

(a) *Identification*. The prothrombin-proconvertin test and thrombotest are devices used in the regulation of coumarin therapy (administration of a coumarin anticoagulant such as sodium warfarin in the treatment of venous thrombosis and pulmonary embolism) and as a diagnostic test in conjunction with, or in place of, the Quick prothrombin time test to detect coagulation disorders.

(b) *Classification*. Class II (performance standards).

**Sec. 864.7750 Prothrombin time test.**

(a) *Identification*. A prothrombin time test is a device used as a general screening procedure for the detection of possible clotting factor deficiencies in the extrinsic coagulation pathway, which involves the reaction between coagulation factors III and VII, and to monitor patients receiving coumarin therapy (the administration of one of the coumarin anticoagulants in the treatment of venous thrombosis or pulmonary embolism).

(b) *Classification*. Class II (performance standards).

**Sec. 864.7825 Sickel cell test.**

(a) *Identification.* A sickel cell test is a device used to determine the sickel cell hemoglobin content of human blood to detect sickel cell trait or sickel cell diseases.

(b) *Classification.* Class II (performance standards).

#### **Sec. 864.7875 Thrombin time test.**

(a) *Identification.* A thrombin time test is a device used to measure fibrinogen concentration and detect fibrin or fibrinogen split products for the evaluation of bleeding disorders.

(b) *Classification.* Class II (performance standards).

#### **Sec. 864.7900 Thromboplastin generation test.**

(a) *Identification.* A thromboplastin generation test is a device used to detect and identify coagulation factor deficiencies and coagulation inhibitors.

(b) *Classification.* Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

#### **Sec. 864.7925 Partial thromboplastin time tests.**

(a) *Identification.* A partial thromboplastin time test is a device used for primary screening for coagulation abnormalities, for evaluation of the effect of therapy on procoagulant disorders, and as an assay for coagulation factor deficiencies of the intrinsic coagulation pathway.

(b) *Classification.* Class II (performance standards).

### **Subpart I--Hematology Reagents**

**Sec. 864.8100 Bothrops atrox reagent.**

(a) *Identification.* A Bothrops atrox reagent is a device made from snake venom and used to determine blood fibrinogen levels to aid in the evaluation of disseminated intravascular coagulation (nonlocalized clotting in the blood vessels) in patients receiving heparin therapy (the administration of the anticoagulant heparin in the treatment of thrombosis) or as an aid in the classification of dysfibrinogenemia (presence in the plasma of functionally defective fibrinogen).

(b) *Classification.* Class II (performance standards).

**Sec. 864.8150 Calibrator for cell indices.**

(a) *Identification.* A calibrator for cell indices is a device that approximates whole blood or certain blood cells and that is used to set an instrument intended to measure mean cell volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC), or other cell indices. It is a suspension of particles or cells whose size, shape, concentration, and other characteristics have been precisely and accurately determined.

(b) *Classification.* Class II (performance standards).

**Sec. 864.8165 Calibrator for hemoglobin or hematocrit measurement.**

(a) *Identification.* A calibrator for hemoglobin or hematocrit measurement is a device that approximates whole blood, red blood cells, or a hemoglobin derivative and that is used to set instruments intended to measure hemoglobin, the hematocrit, or both. It is a material whose characteristics have been precisely and accurately



determined.

(b) *Classification*. Class II (performance standards).

**Sec. 864.8175 Calibrator for platelet counting.**

(a) *Identification*. A calibrator for platelet counting is a device that resembles platelets in plasma or whole blood and that is used to set a platelet counting instrument. It is a suspension of particles or cells whose size, shape concentration, and other characteristics have been precisely and accurately determined.

(b) *Classification*. Class II (performance standards).

**Sec. 864.8185 Calibrator for red cell and white cell counting.**

(a) *Identification*. A calibrator for red cell and white cell counting is a device that resembles red or white blood cells and that is used to set instruments intended to count red cells, white cells, or both. It is a suspension of particles or cells whose size, shape, concentration, and other characteristics have been precisely and accurately determined.

(b) *Classification*. Class II (performance standards).

**Sec. 864.8200 Blood cell diluent.**

(a) *Identification*. A blood cell diluent is a device used to dilute

blood for further testing, such as blood cell counting.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.8500 Lymphocyte separation medium.**

(a) *Identification*. A lymphocyte separation medium is a device used to isolate lymphocytes from whole blood.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.8540 Red cell lysing reagent.**

(a) *Identification*. A red cell lysing reagent is a device used to lyse (destroy) red blood cells for hemoglobin determinations or aid in the counting of white blood cells.

(b) *Classification*. Class I (general controls). This device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to the limitations in 864.9.

**Sec. 864.8625 Hematology quality control mixture.**

(a) *Identification*. A hematology quality control mixture is a device used to ascertain the accuracy and precision of manual,

semiautomated, and automated determinations of cell parameters such as white cell count (WBC), red cell count (RBC), platelet count (PLT), hemoglobin, hematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC).

(b) *Classification*. Class II (performance standards).

#### **Sec. 864.8950 Russell viper venom reagent.**

(a) *Identification*. Russell viper venom reagent is a device used to determine the cause of an increase in the prothrombin time.

(b) *Classification*. Class I (general controls).

### **Subpart J--Products Used In Establishments That Manufacture Blood and Blood Products**

#### **Sec. 864.9050 Blood bank supplies.**

(a) *Identification*. Blood bank supplies are general purpose devices intended for in vitro use in blood banking. This generic type of device includes products such as blood bank pipettes, blood grouping slides, blood typing tubes, blood typing racks, and cold packs for antisera reagents. The device does not include articles that are licensed by the Center for Biologics Evaluation and Research of the Food and Drug Administration.

(b) *Classification*. Class I (general controls).

**Sec. 864.9100 Empty container for the collection and processing of blood and blood components.**

(a) *Identification.* An empty container for the collection and processing of blood and blood components is a device intended for medical purposes that is an empty plastic bag or plastic or glass bottle used to collect, store, or transfer blood and blood components for further processing.

(b) *Classification.* Class II (performance standards).

**Sec. 864.9125 Vacuum-assisted blood collection system.**

(a) *Identification.* A vacuum-assisted blood collection system is a device intended for medical purposes that uses a vacuum to draw blood for subsequent reinfusion.

(b) *Classification.* Class I (general controls). The manual device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9145 Processing system for frozen blood.**

(a) *Identification.* A processing system for frozen blood is a device used to glycerolize red blood cells prior to freezing to minimize hemolysis (disruption of the red cell membrane accompanied by the release of hemoglobin) due to freezing and thawing of red blood cells and to deglycerolize and wash thawed cells for subsequent

reinfusion.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9160 Blood group substances of nonhuman origin for in vitro diagnostic use.**

(a) *Identification*. Blood group substances of nonhuman origin for in vitro diagnostic use are materials, such as blood group specific substances prepared from nonhuman sources (e.g., pigs, cows, and horses) used to detect, identify, or neutralize antibodies to various human blood group antigens. This generic type of device does not include materials that are licensed by the Center for Biologics Evaluation and Research of the Food and Drug Administration.

(b) *Classification*. Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9175 Automated blood grouping and antibody test system.**

(a) *Identification*. An automated blood grouping and antibody test system is a device used to group erythrocytes (red blood cells) and to detect antibodies to blood group antigens.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9185 Blood grouping view box.**

(a) *Identification*. A blood grouping view box is a device with a glass or plastic viewing surface, which may be illuminated and heated, that is used to view cell reactions in antigen-antibody testing.

(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9195 Blood mixing devices and blood weighing devices.**

(a) *Identification*. A blood mixing device is a device intended for medical purposes that is used to mix blood or blood components by agitation. A blood weighing device is a device intended for medical purposes that is used to weigh blood or blood components as they are collected.

(b) *Classification*. Class I (general controls). The manual device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9205 Blood and plasma warming device.**

(a) *Nonelectromagnetic blood or plasma warming device --(1) Identification*. A nonelectromagnetic blood and plasma warming device is a device that warms blood or plasma, by means other than electromagnetic radiation, prior to administration.

(2) *Classification*. Class II (performance standards).

(b) *Electromagnetic blood and plasma warming device --(1) Identification*. An electromagnetic blood and plasma warming device is a device that employs electromagnetic radiation (radiowaves or microwaves) to warm a bag or bottle of blood or plasma prior to administration.

(2) *Classification*. Class III (premarket approval).

(c) *Date PMA or notice of completion of a PDP is required*. No effective date has been established of the requirement for premarket approval for the device described in paragraph (b) (1). See 864.3.

**Sec. 864.9225 Cell-freezing apparatus and reagents for in vitro diagnostic use.**

(a) *Identification.* Cell-freezing apparatus and reagents for in vitro diagnostic use are devices used to freeze human red blood cells for in vitro diagnostic use.

(b) *Classification.* Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9245 Automated blood cell separator.**

(a) *Identification.* An automated blood cell separator is a device that uses a centrifugal or filtration separation principle to automatically withdraw whole blood from a donor, separate the whole blood into blood components, collect one or more of the blood components, and return to the donor the remainder of the whole blood and blood components. The automated blood cell separator device is intended for routine collection of blood and blood components for transfusion or further manufacturing use.

(b) *Classification.* Class II (special controls). The special control for this device is a guidance for industry and FDA staff entitled "Class II Special Controls Guidance Document: Automated Blood Cell Separator Device Operating by Centrifugal or Filtration Separation Principle."

**Sec. 864.9275 Blood bank centrifuge for in vitro diagnostic use.**

(a) *Identification.* A blood bank centrifuge for in vitro diagnostic use is a device used only to separate blood cells for further diagnostic testing.



(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9285 Automated cell-washing centrifuge for immuno-hematology.**

(a) *Identification*. An automated cell-washing centrifuge for immuno-hematology is a device used to separate and prepare cells and sera for further in vitro diagnostic testing.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9300 Automated Coombs test systems.**

(a) *Identification*. An automated Coombs test system is a device used to detect and identify antibodies in patient sera or antibodies bound to red cells. The Coombs test is used for the diagnosis of hemolytic disease of the newborn, and autoimmune hemolytic anemia. The test is also used in crossmatching and in investigating transfusion reactions and drug-induced red cell sensitization.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9320 Copper sulfate solution for specific gravity determinations.**

(a) *Identification*. A copper sulfate solution for specific gravity determinations is a device used to determine whether the hemoglobin content of a potential donor's blood meets the required level (12.5

grams per 100 milliliters of blood for women and 13.5 grams per 100 milliliters of blood for men).

(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9400 Stabilized enzyme solution.**

(a) *Identification*. A stabilized enzyme solution is a reagent intended for medical purposes that is used to enhance the reactivity of red blood cells with certain antibodies, including antibodies that are not detectable by other techniques. These enzyme solutions include papain, bromelain, ficin, and trypsin.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9550 Lectins and protectins.**

(a) *Identification*. Lectins and protectins are proteins derived from plants and lower animals that cause cell agglutination in the presence of certain antigens. These substances are used to detect blood group antigens for in vitro diagnostic purposes.

(b) *Classification*. Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9575 Environmental chamber for storage of platelet concentrate.**

(a) *Identification*. An environmental chamber for storage of platelet concentrate is a device used to hold platelet-rich plasma within a preselected temperature range.

(b) *Classification*. Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9600 Potentiating media for in vitro diagnostic use.**

(a) *Identification*. Potentiating media for in vitro diagnostic use are media, such as bovine albumin, that are used to suspend red cells and to enhance cell reactions for antigen-antibody testing.

(b) *Classification*. Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9650 Quality control kit for blood banking reagents.**

(a) *Identification*. A quality control kit for blood banking reagents is a device that consists of sera, cells, buffers, and antibodies used to determine the specificity, potency, and reactivity of the cells and reagents used for blood banking.

(b) *Classification*. Class II (performance standards).

**Sec. 864.9700 Blood storage refrigerator and blood storage freezer.**

(a) *Identification*. A blood storage refrigerator and a blood storage freezer are devices intended for medical purposes that are used to preserve blood and blood products by storing them at cold or freezing temperatures.

(b) *Classification*. Class II (special controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9750 Heat-sealing device.**

(a) *Identification*. A heat-sealing device is a device intended for medical purposes that uses heat to seal plastic bags containing blood or blood components.

(b) *Classification*. Class I (general controls). The device is exempt from the premarket notification procedures in subpart E of part 807 of this chapter subject to 864.9.

**Sec. 864.9875 Transfer set.**

(a) *Identification*. A transfer set is a device intended for medical purposes that consists of a piece of tubing with suitable adaptors used to transfer blood or plasma from one container to another.

(b) *Classification*. Class II (performance standards).

## Subpart K--Products Used In Establishments That Manufacture Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps)

### Sec. 864.9900 Cord blood processing system and storage container.

(a) *Identification.* A cord blood processing system and storage container is a device intended for use in the processing and the storage of cord blood. This device is a functionally closed processing system that includes containers, other soft goods, and a centrifugation system for cord blood concentration, and a final container for the cryopreservation and the storage of a cord blood product.

(b) *Classification.* Class II (special controls). The special control for this device is FDA's guidance document entitled "Class II Special Controls Guidance Document: Cord Blood Processing System and Storage Container." For the availability of this guidance document, see 864.1(d).

Hlongmed

龙德

龙德医疗器械服务集团

专业领先的医疗器械法规合作伙伴

临床试验 CRO/CRA/SMO/CRC 合作组织

值得信赖的专业医疗器械行业整体解决方案服务商



电话: 0755-86664989



QQ: 2539440171



邮箱: consultant@hlongmed.com



**龙德医疗器械资讯**

丰富的医疗器械课程直播平台

专业的医疗器械服务平台

齐全的医疗器械交流社区



**医课汇**

专业的医疗器械医课课程平台

全面的医疗器械资讯平台

专业的医疗器械人才培养

专业带去价值, 服务赢来美誉!

邮箱: consultant@hlongmed.com

网址: www.hlongmed.com