DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Memorandum

Date FEB 11 1997

From

Director, Office of Device Evaluation (HFZ-400)
Center for Devices and Radiological Health (CDRH)

Subject

Premarket Approval of Depuy Inc. Depuy 1 Bone Cement - ACTION

To

The Director, CDRH
ORA _____

ISSUE. Publication of a notice announcing approval of the subject PMA.

FACTS. Tab A contains a FEDERAL REGISTER notice announcing:

(1) a premarket approval order for the above referenced medical device (Tab B); and

(2) the availability of a summary of safety and effectiveness data for the device (Tab C).

RECOMMENDATION. I recommend that the notice be signed and published.

Susan Alpert, Ph.D., M.D.

Attachments
Tab A - Notice
Tab B - Order
Tab C - S & E Summary

DECISION

Approved _____ Disapproved _____ Date _____

Prepared by Hany Demian, CDRH, HFZ-410, February 11, 1997, 594-2036

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DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food And Drug Administration

[DOCKET NO. _____]

DePuy Inc.; PREMARKET APPROVAL OF DePuy 1 Bone Cement

AGENCY: Food and Drug Administration, HHS.

ACTION: Notice.

SUMMARY: The Food and Drug Administration (FDA) is announcing its approval of the application by DePuy Inc., Warsaw, IN, for premarket approval, under the Federal Food, Drug, and Cosmetic Act (the act), of DePuy 1 Bone Cement. FDA's Center for Devices and Radiological Health (CDRH) notified the applicant, by letter of February 11, 1997, of the approval of the application.

DATES: Petitions for administrative review by (insert date 30 days after date of publication in the FEDERAL REGISTER).

ADDRESSES: Written requests for copies of the summary of safety and effectiveness data and petitions for administrative review, to the Dockets Management Branch (HFA-305), Food and Drug Administration, 12420 Parklawn Dr., rm. 1-23, Rockville, MD 20857.

FOR FURTHER INFORMATION CONTACT:

Mr. Hany W. Demian,

Center for Devices and Radiological Health (HFZ-410),

Food and Drug Administration,

9200 Corporate Blvd.,

Rockville, MD 20850,

301-594-2036.

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SUPPLEMENTARY INFORMATION: On January 11, 1996, DePuy Inc., Warsaw, Indiana, 46581-0988, (formerly owned by DePuy International Limited)), submitted to CDRH an application for premarket approval of DePuy 1 Bone Cement.

The device is an acrylic bone cement and is indicated for the fixation of prostheses to living bone in orthopedic musculoskeletal surgical procedures for rheumatoid arthritis, osteoarthritis, traumatic arthritis, osteoporosis, avascular necrosis, collagen disease, severe joint destruction secondary to trauma or other conditions and revision of previous arthroplasty.

In accordance with the provisions of section 515(c)(2) of the act as amended by the Safe Medical Devices Act of 1990, this PMA was not referred to the Orthopedic and Rehabilitation Devices Panel of the Medical Devices Advisory Committe, an FDA advisory committee, for review and recommendation because the information in the PMA substantially duplicates information previously reviewed by this panel.

On February 11, 1997, CDRH approved the application by a letter to the applicant from the Director of the Office of Device Evaluation, CDRH.

A summary of the safety and effectiveness data on which CDRH based its approval is on file in the Dockets Management Branch (address above) and is available from that office upon written request. Requests should be identified with the name of the device and the docket number found in brackets in the heading of this document.

Opportunity For Administrative Review

Section 515(d)(3) of the act, (21 U.S.C. 360e(d)(3)) authorizes any interested person to petition, under section 515(g) of the act, for administrative review of CDRH's decision to approve this application. A petitioner may request either a formal hearing under 21 CFR part 12 of FDA's administrative practices and procedures regulations or a review of the application and CDRH's action by an independent advisory committee of experts. A petition is to be in the form of a petition for reconsideration under 21 CFR 10.33(b). A petitioner shall identify the form of review requested (hearing or independent advisory committee) and shall submit with the petition supporting data and information showing that there is a genuine and substantial issue of material fact for resolution through administrative review. After reviewing the petition, FDA will decide whether to grant or deny the petition and will publish a notice of its decision in the FEDERAL REGISTER. If FDA grants the petition, the notice will state the issue to be reviewed, the form of the review to be used, the persons who may participate in the review, the time and place where the review will occur, and other details.

Petitioners may, at any time on or before (<u>insert date 30 days after date of publication in the FEDERAL REGISTER</u>), file with the Dockets Management Branch (address above) two copies of each petition and supporting data and information, identified with the name of the device and the docket number found in

brackets in the heading of this document. Received petitions may be seen in the office above between 9 a.m. and 4 p.m., Monday through Friday.

This notice is issued under the Federal Food, Drug, and Cosmetic Act (secs. 515(d), 520(h) (21 U.S.C. 360e(d), 360j(h))) and under authority delegated to the Commissioner of Food and Drugs (21 CFR 5.10) and redelegated to the Director, Center for Devices and Radiological Health (21 CFR 5.53).

Dated:_____.

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

FEB 11 1997

Ms. Cheryl Hastings
Manager, Clinical Affairs
DePuy Inc.
P.O. Box 988
700 Orthopedic Drive
Warsaw, Indiana 46581-0988

Re: P960001
DePuy 1 Bone Cement
Filed: January 11, 1996
Amended: February 29, March 1, May 9 and 28, June 13, July 18, and August 12 and 23, 1996 and January 6, 14 and 27, 1997

Dear Ms. Hastings:

The Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA) has completed its review of your premarket approval application (PMA) for the DePuy 1 Bone Cement. This device is indicated for the fixation of prostheses to living bone in orthopedic musculoskeletal surgical procedures for rheumatoid arthritis, osteoarthritis, traumatic arthritis, osteoporosis, avascular necrosis, collagen disease, severe joint destruction secondary to trauma or other conditions and revision of previous arthroplasty. We are pleased to inform you that the PMA is approved subject to the conditions described below and in the "Conditions of Approval" (enclosed). You may begin commercial distribution of the device upon receipt of this letter.

The sale, distribution, and use of this device are restricted to prescription use in accordance with 21 CFR 801.109 within the meaning of section 520(e) of the Federal Food, Drug, and Cosmetic Act (the act) under the authority of section 515(d)(1)(B)(ii) of the act. FDA has also determined that to ensure the safe and effective use of the device that the device is further restricted within the meaning of section

520(e) under the authority of section 515(d)(1)(B)(ii), (1) insofar as the labeling specify the requirements that apply to the training of practitioners who may use the device as approved in this order and (2) insofar as the sale, distribution, and use must not violate sections 502(q) and (r) of the act.

Expiration dating for DePuy 1 Bone Cement has been established and approved for 3 years when stored below 25 degrees Celsius and protected from light.

CDRH will publish a notice of its decision to approve your PMA in the FEDERAL REGISTER. The notice will state that a summary of the safety and effectiveness data upon which the approval is based is available to the public upon request. Within 30 days of publication of the notice of approval in the FEDERAL REGISTER, any interested person may seek review of this decision by requesting an opportunity for administrative review, either through a hearing or review by an independent advisory committee, under section 515(g) of the Federal Food, Drug, and Cosmetic Act (the act).

Failure to comply with the conditions of approval invalidates this approval order. Commercial distribution of a device that is not in compliance with these conditions is a violation of the act.

You are reminded that, as soon as possible and before commercial distribution of your device, you must submit an amendment to this PMA submission with copies of all approved labeling in final printed form.

All required documents should be submitted in triplicate, unless otherwise specified, to the address below and should reference the above PMA number to facilitate processing.

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

If you have any questions concerning this approval order, please contact Mr. Hany W. Demian at (301) 594-2036.

Sincerely yours,

Susan Alpert, Ph.D., M.D.
Director
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure

CONDITIONS OF APPROVAL

APPROVED LABELING. As soon as possible, and before commercial distribution of your device, submit three copies of an amendment to this PMA submission with copies of all approved labeling in final printed form to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration (FDA), 9200 Corporate Blvd., Rockville, Maryland 20850.

ADVERTISEMENT. No advertisement or other descriptive printed material issued by the applicant or private label distributor with respect to this device shall recommend or imply that the device may be used for any use that is not included in the FDA approved labeling for the device. If the FDA approval order has restricted the sale, distribution and use of the device to prescription use in accordance with 21 CFR 801.109 and specified that this restriction is being imposed in accordance with the provisions of section 520(e) of the act under the authority of section 515(d)(1)(B)(ii) of the act, all advertisements and other descriptive printed material issued by the applicant or distributor with respect to the device shall include a brief statement of the intended uses of the device and relevant warnings, precautions, side effects and contraindications.

PREMARKET APPROVAL APPLICATION (PMA) SUPPLEMENT. Before making any change affecting the safety or effectiveness of the device, submit a PMA supplement for review and approval by FDA unless the change is of a type for which a "Special PMA Supplement-Changes Being Effected" is permitted under 21 CFR 814.39(d) or an alternate submission is permitted in accordance with 21 CFR 814.39(e). A PMA supplement or alternate submission shall comply with applicable requirements under 21 CFR 814.39 of the final rule for Premarket Approval of Medical Devices.

All situations which require a PMA supplement cannot be briefly summarized, please consult the PMA regulation for further guidance. The guidance provided below is only for several key instances.

A PMA supplement must be submitted when unanticipated adverse effects, increases in the incidence of anticipated adverse effects, or device failures necessitate a labeling, manufacturing, or device modification.

A PMA supplement must be submitted if the device is to be modified and the modified device should be subjected to animal or laboratory or clinical testing designed to determine if the modified device remains safe and effective.

A "Special PMA Supplement - Changes Being Effected" is limited to tl labeling, quality control and manufacturing process changes specifi under 21 CFR 814.39(d)(2). It allows for the addition of, but not t replacement of previously approved, quality control specifications a test methods. These changes may be implemented before FDA approval upon acknowledgment by FDA that the submission is being processed as "Special PMA Supplement - Changes Being Effected." This acknowledgm is in addition to that issued by the PMA Document Mail Center for al PMA supplements submitted. This procedure is not applicable to chan in device design, composition, specifications, circuitry, software o energy source.

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

POSTAPPROVAL REPORTS. Continued approval of this PMA is contingent upon the submission of postapproval reports required under 21 CFR 814.84 at intervals of 1 year from the date of approval of the origi PMA. Postapproval reports for supplements approved under the origin PMA, if applicable, are to be included in the next and subsequent annual reports for the original PMA unless specified otherwise in tl approval order for the PMA supplement. Two copies identified as "Annual Report" and bearing the applicable PMA reference number are be submitted to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850. The postapproval repor shall indicate the beginning and ending date of the period covered b the report and shall include the following information required by 2 CFR 814.84:

(1) Identification of changes described in 21 CFR 814.39(a) an changes required to be reported to FDA under 21 CFR 814.39(b).

(2) Bibliography and summary of the following information not previously submitted as part of the PMA and that is known or reasonably should be known to the applicant:

(a) unpublished reports of data from any clinical investigations or nonclinical laboratory studies involving the device or related devices ("related" devices include devices which are the same or substantially similar to the applicant's device); and

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(b) reports in the scientific literature concerning the device.

If, after reviewing the bibliography and summary, FDA concludes that agency review of one or more of the above reports is required, the applicant shall submit two copies of each identified report when so notified by FDA.

ADVERSE REACTION AND DEVICE DEFECT REPORTING. As provided by 21 CFR 814.82(a)(9), FDA has determined that in order to provide continued reasonable assurance of the safety and effectiveness of the device, the applicant shall submit 3 copies of a written report identified, as applicable, as an "Adverse Reaction Report" or "Device Defect Report" to the PMA Document Mail Center (HFZ-401), Center for Devices and Radiological Health, Food and Drug Administration, 9200 Corporate Blvd., Rockville, Maryland 20850 within 10 days after the applicant receives or has knowledge of information concerning:

(1) A mixup of the device or its labeling with another article.

(2) Any adverse reaction, side effect, injury, toxicity, or sensitivity reaction that is attributable to the device and

(a) has not been addressed by the device's labeling or

(b) has been addressed by the device's labeling, but is occurring with unexpected severity or frequency.

(3) Any significant chemical, physical or other change or deterioration in the device or any failure of the device to meet the specifications established in the approved PMA that could not cause or contribute to death or serious injury but are not correctable by adjustments or other maintenance procedures described in the approved labeling. The report shall include a discussion of the applicant's assessment of the change, deterioration or failure and any proposed or implemented corrective action by the applicant. When such events are correctable by adjustments or other maintenance procedures described in the approved labeling, all such events known to the applicant shall be included in the Annual Report described under "Postapproval Reports" above unless specified otherwise in the conditions of approval to this PMA. This postapproval report shall appropriately categorize these events and include the number of reported and otherwise known instances of each category during the reporting period. Additional information regarding the events discussed above shall be submitted by the applicant when determined by FDA to be necessary to provide continued reasonable assurance of the safety and effectiveness of the device for its intended use.

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REPORTING UNDER THE MEDICAL DEVICE REPORTING (MDR) REGULATION. The Medical Device Reporting (MDR) Regulation became effective on December 13, 1984, and requires that all manufacturers and importers of medical devices, including in vitro diagnostic devices, report to FDA whenever they receive or otherwise became aware of information that reasonably suggests that one of its marketed devices

(1) may have caused or contributed to a death or serious injury or

(2) has malfunctioned and that the device or any other device marketed by the manufacturer or importer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur.

The same events subject to reporting under the MDR Regulation may also be subject to the above "Adverse Reaction and Device Defect Reporting" requirements in the "Conditions of Approval" for this PMA. FDA has determined that such duplicative reporting is unnecessary. Whenever an event involving a device is subject to reporting under both the MDR Regulation and the "Conditions of Approval" for this PMA, you shall submit the appropriate reports required by the MDR Regulation and identified with the PMA reference number to the following office:

Division of Surveillance Systems (HFZ-531)
Center for Devices and Radiological Health
Food and Drug Administration
1350 Piccard Drive, 340
Rockville, Maryland 20850
Telephone (301) 594-2735

Events included in periodic reports to the PMA that have also been reported under the MDR Regulation must be so identified in the periodic report to the PMA to prevent duplicative entry into FDA information systems.

Copies of the MDR Regulation and an FDA publication entitled, "An Overview of the Medical Device Reporting Regulation," are available by written request to the address below or by telephoning 1-800-638-2041.

Division of Small Manufacturers Assistance (HFZ-220)
Center for Devices and Radiological Health
Food and Drug Administration
5600 Fishers Lane
Rockville, Maryland 20857

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C

SUMMARY OF SAFETY AND EFFECTIVENESS DATA

DEPUY 1 BONE CEMENT

I. GENERAL INFORMATION

DEVICE GENERIC NAME:	Orthopedic Bone Cement
DEVICE TRADE NAME:	DePuy 1 Bone Cement
APPLICANT NAME:	DePuy Inc. P.O. Box 988 700 Orthopaedic Drive Warsaw, IN 46581-0988
PREMARKET APPROVAL (PMA) APPLICATION NO:	P960001
DATE OF NOTICE OF APPROVAL TO THE APPLICANT:	February 11, 1997

II. INDICATIONS FOR USE

DePuy 1 Bone Cement is indicated for the fixation of prostheses to living bone in orthopedic musculoskeletal surgical procedures for rheumatoid arthritis, osteoarthritis, traumatic arthritis, osteoporosis, avascular necrosis, collagen disease, severe joint destruction secondary to trauma or other conditions, and revision of previous arthroplasty.

III. DEVICE DESCRIPTION

DePuy 1 Bone Cement is a self-curing cement used for securing metal or polymeric prostheses to living bone in arthroplasty procedures. Bone cements have no intrinsic adhesive properties, but instead rely on close mechanical interlock between the irregular bone surface and prosthesis.

DePuy CMW Laboratories, Lancashire, England, manufactures both DePuy 1 and CMW1 bone cements, which have identical formulations as provided by publicly available information.

The polymer powder component of DePuy 1 Bone Cement contains polymethyl methacrylate (88.85% w/w), barium sulfate (9.1% w/w) and benzoyl peroxide (2.05% w/w). The powder is white. Benzoyl peroxide initiates polymerization when the powder and liquid components are mixed. Barium sulfate is present as a radio-opacifying agent.

The monomer liquid component of DePuy 1 Bone Cement contains methyl methacrylate (98.215% w/w), N,N-dimethyl-p-toluidine (0.816% w/w), ethanol (0.945% w/w), ascorbic acid (0.022% w/w) and hydroquinone (0.002% w/w). The bone cement liquid is a colorless, flammable liquid with a distinctive odor. Its major component is methyl methacrylate. Hydroquinone and ascorbic acid are added as stabilizers to prevent premature polymerization which may occur under conditions such as heat or light. N,N-dimethyl-p-toluidine is added to promote polymerization following the mixing of the liquid and powder components.

DePuy 1 Bone Cement is a single use device. It is available in both 20 gram and 40 gram powder unit packs. The powder is contained in a polyethylene bag within a peelable pouch and a protective non-sterile foil pouch. The polyethylene bag and its contents are sterilized by gamma irradiation at a minimum dose of 25 kGy. The liquid component is contained in a glass ampule within a blister pack. The liquid is sterilized by membrane filtration and glass ampule by dry heat. The interiors of the ampule blister pack is sterilized by ethylene oxide.

DePuy 1 Bone Cement is a standard (medium) viscosity cement. It has a curing profile suitable for use with traditional digital techniques, i. e., finger packing of the bone cavities and surfaces.

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A dose of cement is prepared by hand mixing the powder and liquid components together with a spatula in a container intended for mixing bone cement. Appropriate containers would be made of inert materials such as glass, ceramic, stainless steel, or non-reactive plastics. After mixing, the bone cement achieves a doughy consistency in about 1 to 2 minutes. This time will be affected by the ambient temperature and humidity of the room and, if different, the temperature of the mixing bowl. When the cement no longer adheres to the gloved hand, it can be introduced into the prepared cavity and the prosthetic component inserted. The prosthetic component is held firmly in its desired position until the cement has set. Excess bone cement must be removed before it has completely hardened, which ordinarily occurs about 5 to 6 minutes after insertion of the cement into bone.

IV. CONTRAINDICATIONS, WARNINGS, PRECAUTIONS, AND ADVERSE EVENTS

A. Contraindications

DePuy 1 Bone Cement is contraindicated in the presence of active or incompletely treated infection which could involve the site where the cement is to be applied.

B. Warnings

Adverse patient reactions affecting the cardiovascular system have been associated with the use of bone cements[1]. Hypotensive reactions have occurred between 10 and 165 seconds following application of bone cement; they have lasted from 30 seconds to 5 or more minutes. Some have progressed to cardiac arrest. For this reason, patients should be monitored carefully for any change in blood pressure during and immediately following the application of the cement.

The surgeon should, by specific training and experience, be thoroughly familiar with the properties, handling characteristics and application of bone cements. Because the handling and curing characteristics of this cement vary with temperature and mixing technique, they are best determined by the surgeon's actual experience.

Because the liquid monomer is highly volatile and flammable, the operating room should be adequately ventilated to eliminate as much monomer vapor as possible. Ignition of monomer fumes caused by use of electrocautery devices in surgical sites near freshly implanted bone cements has been reported.

Caution should be exercised during the mixing of the two components to prevent excessive exposure to the concentrated vapors of the monomer, which may produce irritation of the respiratory tract, eyes, and possibly the liver. Personnel wearing contact lenses should not be near or involved in mixing this bone cement.

C. Precautions

The liquid component has caused contact dermatitis[2] in those handling and mixing them. Strict adherence to the instructions for mixing the powder and liquid components may reduce the incidence of this complication.

The liquid component is a powerful lipid solvent. This liquid component should not be allowed to come into contact with rubber or latex gloves. Wearing of a second pair of gloves and strict adherence to the mixing instructions may diminish the possibility of hypersensitivity reactions. The mixed bone cement should not make contact with the gloved hand until the cement has acquired the consistency of dough. This usually occurs between one and two minutes after the liquid and powder components have been mixed.

Inadequate fixation or unanticipated postoperative events may affect the cement-bone interface and lead to micromotion of cement against bone surface. Under these circumstances, a fibrous tissue layer may develop between the cement and the bone, and loosening of the prosthesis may occur. For this reason, long-term follow-up is advised for all patients on a regularly scheduled basis.

Polymerization of the bone cement is an exothermic reaction which occurs while the cement is hardening *in situ*. The released heat may damage bone or other tissues surrounding the implant.

Extrusion of the bone cement beyond the region of its intended application may occur.

The safety of the bone cement in pregnant women or in children has not been established.

The product should not be used after the expiration date printed on the package.

The polymer component may be disposed in a landfill. The liquid component can be evaporated under a well-ventilated hood or absorbed by an inert material and transferred in a suitable container for deposition in a landfill.

D. Adverse Events

Serious adverse events, some with fatal outcome, associated with the use of acrylic bone cements include myocardial infarction, cardiac arrest, cerebrovascular accident, pulmonary embolism.

The most frequent adverse reactions reported with acrylic bone cements are transitory fall in blood pressure, thrombophlebitis, hemorrhage and hematoma, loosening or displacement of the prosthesis, superficial or deep wound infection, trochanteric bursitis, short-term cardiac conduction irregularities.

Other adverse reactions include heterotopic new bone formation and trochanteric separation.

Other potential adverse events reported for acrylic bone cements include: pyrexia due to an allergy to the bone cement; hematuria, dysuria, bladder fistula, and delayed sciatic nerve entrapment due to extrusion of the bone cement beyond the region of its intended application; and adhesions and stricture of the ileum due to the heat released during polymerization.

V. ALTERNATE PRACTICES AND PROCEDURES

The use of acrylic bone cement is well established in total joint replacement procedures for securing a prosthesis to living bone. Alternatives to the use of this product include:

1) use of another commercially available bone cement;
2) the use of a cementless procedure, where fixation is achieved by impaction;
3) the use of porous coated devices, where fixation is achieved by tissue ingrowth; and
4) the use of mechanical anchors such as screws, nails, wires, and other fasteners.

VI. MARKETING HISTORY

DePuy 1 Bone Cement is distributed and marketed in Canada, Europe, the Middle East, Africa, Asia, Latin America and Australia. To date, this product has not been withdrawn from any market for any reason related to the safety or effectiveness of the device.

VII. SUMMARY OF PRECLINICAL STUDIES

A. Physical and Static Mechanical Properties:

The physical and static mechanical properties of DePuy 1 Bone Cement were determined in accordance with consensus standards for acrylic bone cements (ASTM F451:95 and ISO 5833:92). The results are summarized in Table 2. The results show that the DePuy 1 average cement properties are within the specifications given for all bone cements as per ASTM F451:95 and ISO 5833:92.

Table 1 - Physical and Static Mechanical Properties of DePuy 1 Bone Cement*

Physical and Mechanical Properties	Specifications	DePuy 1 Bone Cement (S.D.)
Dough Time ASTM 451	5.0 max.	1 minute 16 seconds (0.12 minutes)
Setting Time Range ASTM 451	5.0 to 15 minutes, min.	8 minutes 33 seconds (0.2 minutes)
Exotherm ASTM 451	90°C max.	70.6°C (3.85°C)
Intrusion ASTM 451	2 mm min.	6.3 mm (1.62mm)
Compressive Strength ASTM 451	70 MPa min.	91.1 MPa (10.7 MPa)
Indentation ASTM 451	0.14 max.	0.10 mm (0.01mm)
Recovery ASTM 451	60% min.	64.3 % (3.0%)
Flexural Strength ISO 5833	50 min.	70.3 MPa (9.3 MPa)
Flexural Modulus ISO 5833	1,800 MPa min.	2611 MPa (214 MPa)

* Seventy eight batches of DePuy 1 bone cement were examined.

B. Dynamic Mechanical Properties:

Fatigue testing (2 Hz) was conducted using dumbbell DePuy 1 Bone Cement specimens machined from cylindrical rods of cured bone cement (hand mixed at 23°C and then stored in 37°C water for 6 days). All specimens with pores greater than 1 mm in diameter, or which exhibited more than five smaller pores within the final gauge length or specimen run out areas were discarded. The remaining specimens were subjected to cyclical axial compressive and tensile loading at 15 MPa.

Table 2 - Mean Fatigue Life

Bone Cement	Mean Fatigue Life (cycles to failure ± SD)
DePuy 1 Bone cement	6949±5594 (n=10)
Zimmer Regular*	879 cycles (± 493 cycles) (n=16)
Zimmer Low Viscosity Cement*	2,575 cycles (± 1,375 cycles) (n=17)

* Davies et al.[3]

Although other factors may contribute to the observed variation in standard deviation, the most important cause was found to be porosity within the bone cement specimens. The variation

observed for DePuy 1 Bone Cement was comparable in magnitude to other bone cements as reported by Davies et al.[3] Using the same test specimen parameters, loading conditions, and stress level, Davies et al. reported the above cycles to failure for Zimmer regular and Zimmer low viscosity bone cement in table 2.

In comparison to the above similar hand mixed commercially available bone cements, the fatigue results for DePuy 1 Bone Cement are considered adequate.

C. Stability Testing:

DePuy CMW Laboratories has conducted stability testing on this cement to determine the effect of storage on bone cement properties. The batches of powder together with their accompanying ampules were stored at 25°C. The following physical and chemical characteristics were studied: 1) physical - setting time, intrusion, dimensional change, free monomer and compressive strength; 2) chemical - amount of benzoyl peroxide and N,N-Dimethyl-p-toludine. The results are presented in the following table.

Table 3 - DePuy 1 Bone Cement Stability Data

Physical and Chemical Properties	Times (months) 0	6	12	18	24	30	36
Setting Time minutes ('), seconds (")	8'40"	9'10"	7'56"	7'51"	7'55"	8'45"	8'10"
Intrusion (mm)	6.4	3.4	4.6	6.5	3.9	6.3	5.9
Compressive Strength (MPa)	115	109	103	110	117	119	111
Dimensional Change (%)	-2.33	-0.70	-0.73	-1.15	-0.36	-0.84	-0.62
Free Monomer (% w/w)	2.13	2.28	2.02	1.34	2.13	1.97	1.86
N,N- Dimethyl-p-Toluidine (% w/w)	0.37	0.34	0.36	0.38	0.36	0.36	0.38
Benzoyl Peroxide (% w/w)	2.33	2.24	2.15	2.13	2.13	2.15	2.15

The above stability data supports a shelf life of 3 years for DePuy 1 Bone Cement when stored below 25°C and protected from light.

D. Sterility

DePuy 1 Bone Cement is supplied as a sterile product consisting of two components, a sterile powder and a sterile liquid. The powder component is sterilized by gamma irradiation using a validated irradiation cycle to ensure a sterility assurance level of 10^{-6}. The liquid is sterilized by membrane filtration and the outer glass ampule by dry heat using a validated method to ensure a sterility assurance level of 10^{-6}. The blister pack for the liquid ampule is sterilized by ethylene oxide using a validated method to ensure a sterility assurance level of 10^{-6}.

VIII. SUMMARY OF CLINICAL INVESTIGATIONS

The clinical data base which supports this premarket approval application consists of two large registry data bases, the Norwegian Arthroplasty Registry[4] the Swedish National Hip Arthroplasty Registry[5]. Additional evidence is provided by published reports on the clinical use of acrylic bone cements.

The Norwegian registry[4] of 8578 patients contains information on 2786 patients who were treated with CMW 1 Bone Cement, which once again is identical in composition to DePuy 1 Bone Cement. These patients were 31% male, and their mean age was 71. The median duration of follow-up was 3.2 years. The survival until revision due to aseptic loosening of their total hip arthroplasty is provided in the following table.

Table 4 - Cumulative Survival (until Revision due to Aseptic Loosening) of Components with Respect to the Different Brands of Bone Cement, According to the Kaplan-Meier Analyses[4]

	no. of hips	no. of revisions	cumulative survival at 5.5 years	95% confidence interval
All Femoral Components				
Brand of Cement				
CMW1*	2309	34	97.4%	96.3 to 98.4%
Palacos	1037	10	98.0%	96.4 to 99.6%
Simplex	435	3	98.3%	96.2 to 100%
All Acetabular Components				
Brand of Cement				
CMW1*	2786	15	99.0%	98.4 to 99.6%
Palacos	1268	5	99.4%	99.0 to 100%
Simplex	434	1	99.7%	99.2 to 100%

[4] data presented in Norwegian Registry[4] ; * identical in formulation to DePuy 1 Bone Cement

The data presented in the above table indicates that CMW1 Bone Cement has a 97.4% cumulative survival rate at 5.5 years with a 95% confidence interval from 96.3 to 98.4% is safe and effective. In addition, this data indicate that a bone cement with components identical to those in DePuy 1 Bone Cement is comparable to other bone cements in commercial use.

The Swedish registry[5], which was established in 1979, contains data on 134,056 primary total hip arthroplasties. The average age of the patients in this registry is 70; 38% are male. Currently, follow-up information is provided through 14 years after surgery. The registry has sufficient information on a sufficient number of subjects to permit multivariate exploratory analyses of factors associated with revisions due to all causes, and revisions due to aseptic loosening and osteoarthritis, for several types of bone cement. One of the types studied is CMW 1 Bone Cement, the cement which is identical in composition to DePuy 1 Bone Cement.

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The risk factors calculated in the Swedish registry compare the risk of an outcome in patients who were treated with a given bone cement to patients in whom all other factors are equal except the type of bone cement used. The results were as follows:

Table 5 - Risk Ratio for Several Brands of Bone Cement[h]

Type of Cement	All Revision		Aseptic Loosening and Osteoarthrosis	
	Risk Ratio	95% conf. limits	Risk Ratio	95% conf. limits
Simplex P	0.57	0.51-0.63	0.48	0.42-0.54
CMW 1*	0.58	0.53-0.63	0.54	0.48-0.59
Palacos	0.51	0.47-0.57	0.46	0.41-0.52
Sulfix 6	0.86	0.73-1.00	0.87	0.73-1.04

[h] data presented in Swedish Registry[5]; * identical in formulation to DePuy 1 Bone Cement

These results indicate that a bone cement with components identical to those in DePuy 1 Bone Cement is comparable to other bone cements in commercial use (Sulfix-6 is not in commercial use in the U.S.).

Several published articles support the conclusions from the Registry series that DePuy 1 Bone Cement is safe and effective for its intended purpose. Wroblewski et al.[6] describe 57 total hip arthroplasties in their 54 patients who had had continuous 19- to 25-year follow-up in their practice and who had survived for at least 19 years. All had been treated with CMW1 Bone Cement. This is a highly selected series. The one conclusion that can be drawn from it is that 19- to 25-year survival of a prosthetic hip is possible in cases where CMW Bone Cement is used. This observation supports, and to some extent extends, the expected duration of benefit to patients treated with CMW1 (or DePuy 1) bone cement.

Older[7] describes the first 217 arthroplasties performed in 184 consecutive patients by Charnley at 10- to 12-year follow-up. All had been treated with CMW 1 Bone Cement. Only 8 of 184 patients required revision during the follow-up period. This series is non-comparative, but it is unselected; for this reason it expands the support given by the Wroblewski et al.[6] article to the observations made in the Norwegian[4] and Swedish[5] series.

Hierton et al.[8] retrospectively reviewed 237 consecutive total hip arthroplasties performed by 12 surgeons at one institution. These authors focused on factors associated with loosening of the prosthesis. While choice of bone cement was not randomized, patients who were treated with CMW 1 Bone Cement had a significantly lower revision rate than other patients in the series. This observation supports the observations in the Norwegian[4] and Swedish[5] series that CMW 1 (and thus DePuy 1) Bone Cement is comparable to other commercially available bone cements.

Newmann et al.[9] retrospectively studied the first 240 Charnley total hip arthroplasties performed at one institution. Because most arthroplasties are performed in patients over the age of 55, they

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compared outcomes of their 52 patients who were less than or equal to 55 years of age at the time of operation (the youngest of whom was 34) to the outcomes of their 188 older patients. The mean follow-up was 17 years for the younger patients and 18 years for the older patients. The cement used in these procedures was CMW1. The results were equivalent in the two groups.

Table 6 - Results After a Mean of 17 years of Follow-up[h]

	all patients	age 34 to 55	age over 55
total number of hips	240	52	188
number of revisions	20 (8%)	5 (10%)	15 (8%)
aseptic loosening	8 (3%)	3 (6%)	5 (3%)
primary infection	1 (0.4%)	0	1 (0.5%)
late infection	4 (2%)	0	4 (2%)
fracture of femoral stem	5 (2%)	1 (2%)	4 (2%)
traumatic loosening	1 (0.4%)	1 (2%)	0
stem in wrong position	1 (0.4%)	0	1 (0.5%)
radiographic evidence of loosening			
number of available hips	103	35	68
migration of stem	30 (29%)	10 (29%)	20 (29%)
migration of cup	5 (5%)	3 (9%)	2 (3%)
fracture of femoral cement*	12 (12%)	7 (20%)	5 (7%)
≥2 of these signs	36 (35%)	13 (37%)	23 (34%)

[h] data presented by Newmann et al.[9]; * fracture of the cement occurred around the distal tip of the femoral stem

Cupic[10] reported on 409 of the 920 low friction arthroplasties performed by Charnley and his group between November, 1962 and December, 1965. Five hundred and eleven were excluded because they were not cemented, because CMW1 bone cement was not used, or because they were lost to follow-up. The average follow-up time was 11.5 years. The complication rates they observed in a series of 409 patients were as follows:

- Ten postoperative deaths (2.4%)
- Seventeen infections (4.1%), 15 being late infections
- Mechanical loosening in 4 cases: 3 cases (0.7%) of loose acetabular components, and 1 case (0.2%) of loose femoral prosthesis
- Cavity formation in the acetabulum in 1 patient (0.2%)
- Fracture of the femoral prosthesis in 1 patient (0.2%)
- Recurrent dislocation in 1 patient (0.2%)

Total failure rates were analyzed as follows:

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Table 7 - Total Failure Rates[9]

	original 409 cases	222 cases still followed
death	6 fatal pulmonary emboli 1.4% 4 other post-operative 1.0%	
mechanical loosening	3 loose socket 0.7% 1 loose femoral comp. 0.2%	1.8%
sepsis	2 early 0.5% 15 late 3.6%	1 early 0.4% 13 late 5.9%
unexplained pain	0.5%	0.9%
cavity formation of the acetabulum	0.2%	0.4%
fractured femoral stem	0.2%	0.4%
recurrent dislocation	0.2%	0.2%
totals	8.5%	10.2%

[9] data presented by Cupic[10]

Other reports pertaining to the safety of acrylic bone cements, not necessarily DePuy 1 Bone Cement include the following. Kirwan et al.[11] reported that a patient who had bilateral cemented total hip replacement, the second procedure being done six weeks after the first, developed unexplained pyrexia after each procedure. The author suggested that the pyrexia might be due to an allergy to the bone cement, since the pyrexia responded to treatment with intravenous hydrocortisone.

Greenspan and Norman[12] reported 4 patients with gross hematuria and dysuria following intrusion of methyl methacrylate into the pelvic cavity after total hip replacement. They state that this was a rare, benign complication which generally occurs 7-14 days after surgery and subsides promptly with symptomatic treatment.

Elliot[13] reported that an autopsy of an elderly woman, performed four weeks after she had undergone a cemented hip replacement, revealed a massive intestinal obstruction that originated from a stricture of the ileum which lay deep within the pelvis. The author suggested that trauma from an acetabular perforation or the heat generated by the polymerization had induced the formation of adhesions and stricture of the ileum.

Casagrande and Danahy[14] reported a case of delayed sciatic nerve entrapment secondary to the use of acrylic bone cement in a total hip arthroplasty procedure. Exploratory surgery 9 months after the hip replacement revealed a dense fibrous reaction in and around the nerve as it passed between the ischial tuberosity and a 2 cm by 2 cm mass of acrylic bone cement which was continuous with the posterior part of the acetabular component.

Lowell et al.[15] reported a case of a bladder fistula following total hip replacement using self-curing cement. At a cystotomy, the fistula was found to be firmly adherent to a projecting mass of bone cement which had extruded through a small hole in the superior pubic ramus.

In summary, the Norwegian[4] and Swedish[5] registries provide evidence from clinical practice for the long term safety and effectiveness of the formulation used in DePuy 1 Bone Cement, and the literature cited above supports the conclusions drawn from these large registries.

IX. PANEL RECOMMENDATION

In accordance with the provisions of section 515(c)(2) of the act as amended by the Safe Medical Devices Act of 1990, this PMA was not referred to the Orthopedic and Rehabilitation Device Panel, an FDA advisory committee, for review and recommendation because the information in the PMA substantially duplicates information previously reviewed by this panel.

In a past recommendation (May 26, 1981) of a bone cement by the Orthopedic and Rehabilitation Device Panel, the panel recommended that the indications for use of a bone cement should be expanded to include fixation of prosthetic devices to all joints and not be limited only to hip and knee joints where the cement had been evaluated clinically.

X. CDRH DECISION

Published reports of significant human experience with the marketed device is sufficient under 21 CFR 860.7 for the purposes of determining safety and effectiveness. Therefore, it is reasonable to conclude that the benefits of use of the device for the target population outweigh the risk of illness or injury when used as indicated in accordance with the directions for use.

FDA inspections completed May 13, 21, and 24, 1996, determined the manufacturing facilities to be in compliance with Good Manufacturing Practices (GMP) regulations.

CDRH issued an approval order on February 11, 1997.

XI. APPROVAL SPECIFICATIONS

Directions for Use: See labeling.

Hazards to Health from the Use of the Device: See indications, contraindications, warnings, precautions, and adverse events in the labeling.

Post-approval Requirements and Restrictions: See approval order.

XII. REFERENCES

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Labeling

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DEPUY 1 BONE CEMENT

Standard Viscosity Bone Cement

Package Insert

CAUTION

Federal Law (USA) restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

DEVICE DESCRIPTION

DePuy 1 Bone Cement is a self-curing cement used for securing metal or polymeric prostheses to living bone in arthroplasty procedures. Bone cements have no intrinsic adhesive properties, but instead rely on close mechanical interlock between the irregular bone surface and prosthesis.

DePuy 1 Bone Cement consists of a two component system and is available in both 20 gram and 40 gram powder unit packs. The bone cement liquid is contained in a sterile ampoule within a blister pack. The bone cement powder is contained in a sterile polyethylene bag within a peelable pouch and a protective non-sterile laminated foil pouch. The interiors of the blister pack and peelable pouch are sterile.

Liquid Component

Bone cement liquid is a colorless flammable liquid with a distinctive odor. Its major component is methyl methacrylate, which has the formula:

$$CH_2 = C\text{-}COOCH_3$$

$$CH_3$$

(Methyl Methacrylate)

Hydroquinone and ascorbic acid are added as stabilizers to prevent premature polymerization which may occur under conditions such as heat or light.
N, N-Dimethyl-p-toluidine is added to promote polymerization following mixing of the liquid and powder components.

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Liquid Composition

Methyl Methacrylate	98.215% w/w
N,N-Dimethyl-p-toluidine (max)	0.816% w/w
Ethanol	0.945% w/w
Ascorbic Acid	0.022% w/w
Hydroquinone	0.002% w/w

Powder Component

Bone cement powder is a white, finely divided powder. It's major component is polymethyl methacrylate, which has the general formula:

$$\text{---- } CH_2 - \underset{COOCH_3}{\overset{CH_3}{C}} - CH_2 - \underset{COOCH_3}{\overset{CH_3}{C}} - CH_2 \text{ ----}_{n}$$

(Polymethyl Methacrylate)

The polymethyl methacrylate contains benzoyl peroxide which initiates polymerization when the powder and liquid components are mixed. The barium sulfate is present as a radiopaque agent.

Powder Composition:

Polymethyl methacrylate	88.85% w/w
Benzoyl Peroxide	2.05% w/w
Barium Sulfate	9.10% w/w

INDICATIONS

DePuy 1 Bone Cement is indicated for the fixation of prostheses to living bone in orthopaedic musculoskeletal surgical procedures for rheumatoid arthritis, osteoarthritis, traumatic arthritis, osteoporosis, avascular necrosis, collagen disease, severe joint destruction secondary to trauma or other conditions, and revision of previous arthroplasty.

CONTRAINDICATIONS

DePuy 1 Bone Cement is contraindicated in the presence of active or incompletely treated infection which could involve the site where the cement is applied.

WARNINGS

Adverse patient reactions affecting the cardiovascular system have been associated with the use of bone cements. Hypotensive reactions have occurred between 10 and 165 seconds following application of bone cement; they have lasted from 30 seconds to 5 or more minutes. Some have progressed to cardiac arrest. For this reason, patients should be monitored carefully for any change in blood pressure during and immediately following the application of the cement.

The surgeon should, by specific training and experience, be thoroughly familiar with the properties, handling characteristics and application of bone cements. Because the handling and curing characteristics of this cement vary with temperature and mixing technique, they are best determined by the surgeon's actual experience.

Because the liquid monomer is highly volatile and flammable, the operating room should be adequately ventilated to eliminate as much monomer vapor as possible. Ignition of monomer fumes caused by use of electrocautery devices in surgical sites near freshly implanted bone cements has been reported.

Caution should be exercised during the mixing of the two components to prevent excessive exposure to the concentrated vapors of the monomer, which may produce irritation of the respiratory tract, eyes, and possibly the liver. Personnel wearing contact lenses should not be near or involved in mixing this bone cement.

PRECAUTIONS

The liquid component of bone cements has caused contact dermatitis in those handling and mixing them. Strict adherence to the instructions for mixing the powder and liquid components may reduce the incidence of this complication.

The liquid component is a powerful lipid solvent. This liquid component should not be allowed to come into contact with rubber or latex gloves. Wearing of a second pair of gloves and strict adherence to the mixing instructions may diminish the possibility of hypersensitivity reactions. The mixed bone cement should not make contact with the gloved hand until the cement has acquired the consistency of dough. This usually occurs between 1 and 2 minutes after the liquid and powder components have been mixed.

Inadequate fixation or unanticipated postoperative events may affect the cement-bone interface and lead to micromotion of cement against bone surface. Under these circumstances, a fibrous tissue layer may develop between the cement and the bone, and loosening of the prosthesis may occur. For this reason, long-term follow-up is advised for all patients on a regularly scheduled basis.

Polymerization of the bone cement is an exothermic reaction which occurs while the cement is hardening *in situ*. The released heat may damage bone or other tissue surrounding the implant.

Extrusion of the bone cement beyond the region of its intended application may occur.

The safety of bone cement in pregnant women or in children has not been established.

The product should not be used after the expiration date printed on the package.

The polymer component may be disposed in a landfill. The liquid component can be evaporated under a well ventilated hood or absorbed by an inert material and transferred in a suitable container for deposition in a landfill.

ADVERSE EVENTS

Serious adverse events, some with fatal outcome, associated with the use of acrylic bone cements include myocardial infarction, cardiac arrest, cerebrovascular accident and pulmonary embolism.

The most frequent adverse reactions reported with acrylic bone cements are transitory fall in blood pressure, thrombophlebitis, hemorrhage and hematoma, loosening or displacement of the prosthesis, superficial or deep wound infection, trochanteric bursitis, short-term cardiac conduction irregularities.

Other adverse reactions include heterotopic new bone formation and trochanteric separation.

Other potential adverse events reported for acrylic bone cements include: pyrexia due to an allergy to the bone cement; hematuria, dysuria, bladder fistula, and delayed sciatic nerve entrapment due to extrusion of the bone cement beyond the region of its intended application; and adhesions and stricture of the ileum due to the heat released during polymerization.

DIRECTIONS FOR USE

Preparation

Bone cements are heat sensitive. Any increase in temperature, either ambient, or of the cement components and mixing equipment above 23°C, will result in shorter doughing, working and setting times than those stated in this leaflet. Conversely, lower temperatures will increase the doughing, working and setting times.

The protective pouch, the peelable pouch and blister pack are opened by a circulating nurse. The sterile powder bag and sterile ampoule of the same batch are aseptically transferred into the sterile operative area.

The powder bag is opened with sterile scissors and the entire contents emptied into a container intended for mixing bone cement. Appropriate containers would be made of inert materials such as glass, ceramic, stainless steel,or non-reactive plastics.

The ampoule of bone cement liquid is opened and the entire contents are emptied evenly onto the powder in the mixing container.

A dose is prepared by mixing the entire contents of the ampoule with the entire contents of the bone cement powder bag using a spatula. The amount of mixed material required is determined by the clinical judgement of the surgeon in each individual case.

Mixing and Digital Application

The cement is mixed carefully to minimize the entrapment of air for approximately 1¼ minutes. When a dough is formed (1½ minutes maximum from the start of mixing), the cement is taken into gloved hands and kneaded. The kneading process should continue for a further ¼ - 1 minute. When the cement no longer adheres to the gloved hand, it can be introduced into the prepared cavity. The timing of insertion is determined by the surgeon. It should occur approximately 1 - 1½ minutes after the cement has doughed, and before it is too viscous.

The prosthesis is inserted and held firmly in position until the cement has set. Excess bone cement must be removed before the cement has completely hardened. The final hardening time of the cement is dependent upon temperature, humidity and handling. Under controlled laboratory conditions the hardening time is 8-9 minutes for DePuy 1 Bone Cement.

HOW SUPPLIED

Each 40g Unit contains:

1. One sterile bag containing 40g sterile radiopaque bone cement powder.
2. One sterile ampoule containing 18.37g of sterile bone cement liquid.

Each 20g Unit contains:

1. One sterile bag containing 20g sterile radiopaque bone cement powder.
2. One sterile ampoule containing 9.19g of sterile bone cement liquid.

Sterilization of the bone cement liquid is achieved by membrane filtration, while the interior of the blister pack is sterilized by ethylene oxide. The bone cement powder, together with the interior of the peelable pouch is sterilized by gamma irradiation at a minimum dose of 25 kGy.

Limits of Usefulness

Current storage stability tests indicate that DePuy 1 Bone Cement has a shelf-life of 3 years when stored below 25° C and protected from light.

Manufacturer:

DePuy International Ltd.
T/A DePuy CMW
Cornford Road
Blackpool, Lancashire, FY4 4QQ, England

Distributed by:

DEPUY INC.
P.O. Box 988
Warsaw, IN 46581-0988
USA, (800-366-8143)

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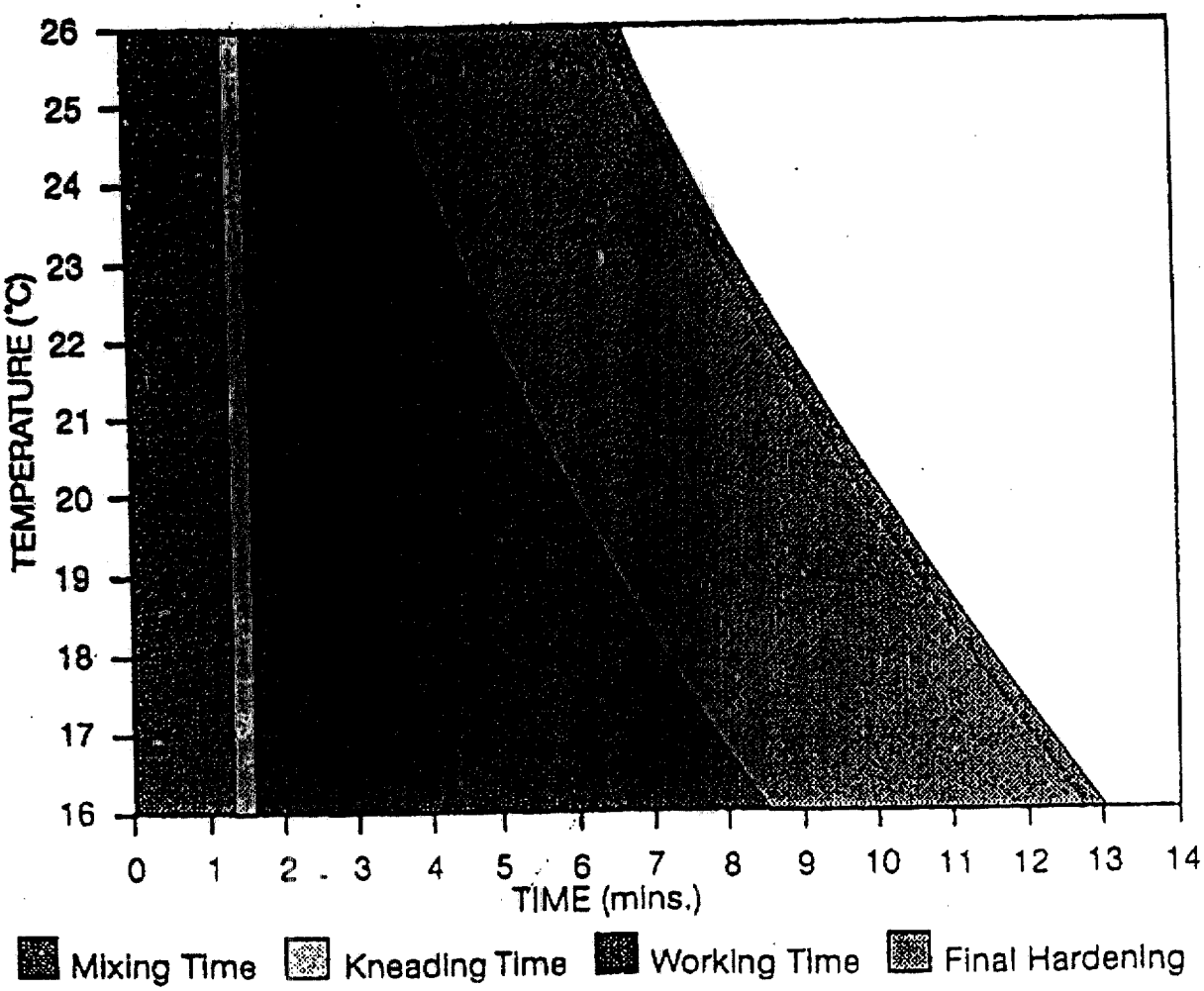
THE EFFECT OF TEMPERATURE ON THE HANDLING AND WORKING CHARACTERISTICS OF DEPUY 1 BONE CEMENT

(under controlled laboratory temperature and 50% relative humidity)

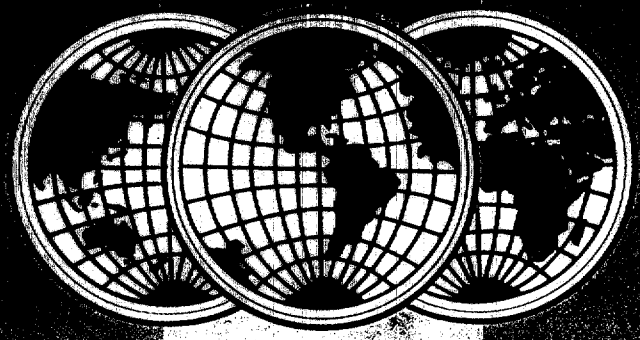


37

DePuy 1
Bone Cement

LOT

DePuy®



The First Name
in Orthopaedics

DePuy 1
Bone Cement

Standard Viscosity Bone Cement
Ciment osseux de viscosité normale
Knochenzement mit Standardviskositat
Cemento osseo a viscosità standard
Cemento óseo de viscosidad estándar

1 x 40g Unit. Standard Viscosity. 1 pack STERILE bone cement powder (40g) and 1 ampoule STERILE bone cement liquid (18.37g).

Unité de 1 x 40g. Viscosité normale. 1 sachet de ciment osseux STÉRILE en poudre (40g) et 1 ampoule de ciment osseux STÉRILE liquide (18,37g).

1 x 40g Packung. Normal viskös. 1 Beutel STERILES Knochenzementpulver (40g) und 1 Ampulle STERILE Knochenzementflüssigkeit (18,37g).

1 Unità x 40g. Viscosità standard. 1 confezione di cemento osseo STERILE in polvere (40g) e 1 fiala STERILE di cemento osseo liquido (18,37g).

Unidad de 40g. Viscosidad estándar. 1 paquete de cemento óseo en polvo ESTERILIZADO (40g) y 1 ampolla de liquido ESTERILIZADO para el cemento óseo (18,37g).

DePuy Inc
PO Box 988
700 Orthopaedic Drive
Warsaw, IN 46581-0988
USA
Tel: 1 800 366 8143

DePuy®

DePuy 1
Bone Cement

For introduction into the bone after preparation of the bone cement.
Une fois reconstitué, le cement osseux est introduit dans la cavité osseuse.
Zum Einbringen in den Knochen nach Herstellung des Knochenzementes.
Per introduzione nell'osso dopo la preparazione del cemento osseo.
Para introducir en el hueso una vez preparado.

Store below 25°C and protect from light.
Stocker à moins de 25°C et à l'abri de al lumière.
Nicht über 25°C und vor Licht geschützt lagern.
Conservare ad una temperatura inferiore a 25°C e proteggere dalla luce.
Conservar a menos de 25°C y al abrigo de la luz

DePuy 1
Bone Cement

DI

DOCUM

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G142-798

DePuy®

The First Name in Orthopaedics

DePuy 1

Bone Cement

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Tel: 1 800 366 8143

DePuy 1

Bone Cement

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OG-OU

POWDER BAG

[redacted]

DePuy 1
Bone Cement

- 40g STERILE powder
- 40g de poudre STERILE
- 40g STERILES Pulver
- Polvere STERILE 40g
- 40g de polvos ESTERILIZADOS

- Mix with Bone Cement Liquid
- Mélanger avec le ciment osseux liquide
- Zum Vermischen mit Knochenzementflüssigkeit
- Mescolare con cemento osseo liquido
- Mezclar con el liquido para el cemento óseo

- Store below 25°C
- Stocker à moins de 25°C
- Nicht über 25°C lagern
- Conservare ad una temperatura inferiore a 25°C
- Conservar a menos de 25°C

STERILE R

DePuy®
DePuy Inc
PO Box 988, 700 Orthopaedic Drive,
Warsaw, IN 46581-0988, USA
Tel: 1 800 366 8143

LOT

G133-794

40

DISTRIBUTOR LABELS

+H441234234313

+$W098W0013

STERILE

DISTRIBUTED BY:

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(1 800 366 – 8143)

Caution: Federal Law (USA) restricts this device to sale by or on the order of a Physician

CAT NO	LOT NO	QTY.
5450 – 31 – 000	W098W	1

DEPUY 1 BONE CEMENT	40g

DISTRIBUTED BY:

DePuy®

STERILE

DEPBOX1

+H44134534516

+$W099W0016

STERILE

DISTRIBUTED BY:

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WARSAW, IN 46581 – 8988 U.S.A.
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CAT NO	LOT NO	QTY.
XXXXXXXXXXXX	W099W	1

DEPUY 1 BONE CEMENT	20g

DISTRIBUTED BY:

DePuy®

STERILE

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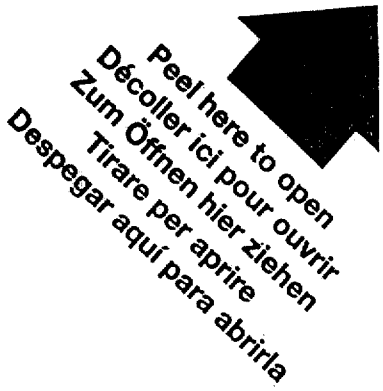
PEELABLE POUCH



CAUTION: The exterior of this peelable pouch is non-sterile.
ATTENTION: L'extérieur de cette poche pelable n'est pas stérile.
ACHTUNG: Die Außenseite dieses Aufziebheutels ist nicht steril.
ATTENZIONE: L'esterno di quest sacca con rivestimento staccabile non é sterile.
ATENCION: El exterior de esta bolsa peleable no està esterilizado.

- Contents sterile unless opened or damaged
- Contenu stérile, sauf si ouvert ou endommagé.
- Inhalt steril, wenn nicht geöffnet oder beschädigt.
- Il contenuto è sterile solo se la confezione è intatta.
- Contenido esterilizado a menos que esté abierta o estropeada.

0154-715

● TEAR OPEN ● DÉCHIRER ICI ● HIER ZIEHEN
● TIRARE QUI ● RASGAR POR AQUI

DO NOT CUT

CAUTION:	THIS PROTECTIVE PACK IS NON-STERILE
ATTENTION:	CET EMBALLAGE PROTECTEUR N'EST PAS STERILE
ACHTUNG:	DIESE SCHUTZVERPACKUNG IST NICHT STERIL
ATTENZIONE:	QUESTA CONFEZIONE PROTETTIVA NON E STERILE
ATENCION:	ESTE ENVASE PROTECTOR NO ESTÁ ESTERILIZADO

DePuy 1
Bone Cement

CONTENTS: 1 NON-STERILE pouch enclosing a STERILE polyethylene bag containing 40g STERILE powder.

CONTENU: 1 poche NON STERILE dans laquelle est inclus un sachet de polyéthylène STÉRILE qui renferme 40g de poudre STÉRILE.

INHALT: 1 NICHT STERILER Beutel enthält einen STERILEN Polyethylenbeutel mit 40g STERILEM Pulver.

CONTENUTO: 1 sacca NON STERILE contenente una sacca STERILE di polietilene di 40g di polvere STERILE.

CONTENIDO: 1 bolsa NO ESTERILIZADA que contiene una bolsa de polietileno ESTERILIZADA con 40g de polvo ESTERILIZADO.

- Mix with Bone Cement Liquid
- Mélanger avec le ciment osseux liquide
- Zum Vermischen mit Knochenzement-flüssigkeit
- Mescolare con cemento osseo liquido
- Mezclar con el liquido para el cemento óseo

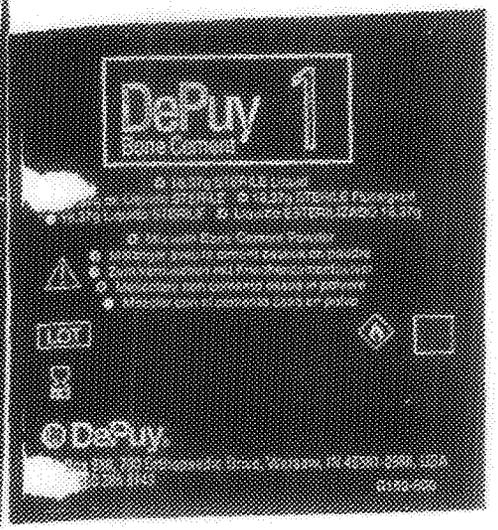
- Store below 25°C
- Stocker à moins de 25°C
- Nicht über 25°C lagern
- Conservare ad una temperatura inferiore a 25°C
- Conservar a menos de 25°C

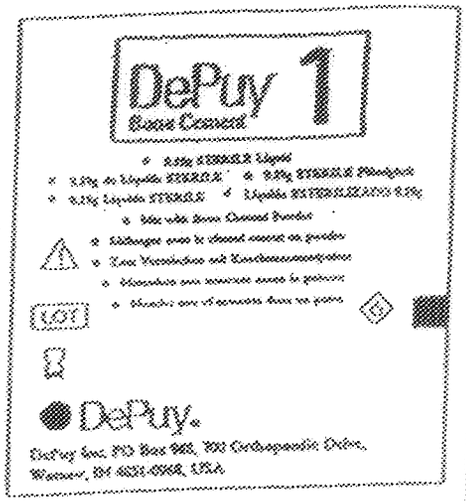
● DePuy®

DePuy Inc
PO Box 988, 700 Orthopaedic Drive,
Warsaw, IN 46581-0988, USA
Tel: 1 800 366 8143

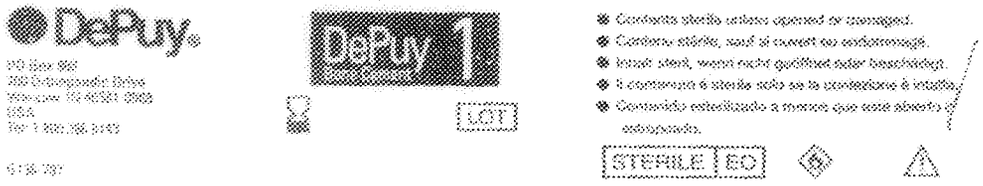
LOT

G154-799





BLISTER LID



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