



Illinois Emergency Management Agency
Division of Nuclear Safety

Rod R. Blagojevich, Governor
Andrew Velasquez III, Director
Joseph G. Klinger, Acting Assistant Director

May 21, 2007

Device Registry Number
IL-1266-D-101-G

Traci Kime
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
MS: T8F5
Rockville, MD 20852

Dear Ms. Kime:

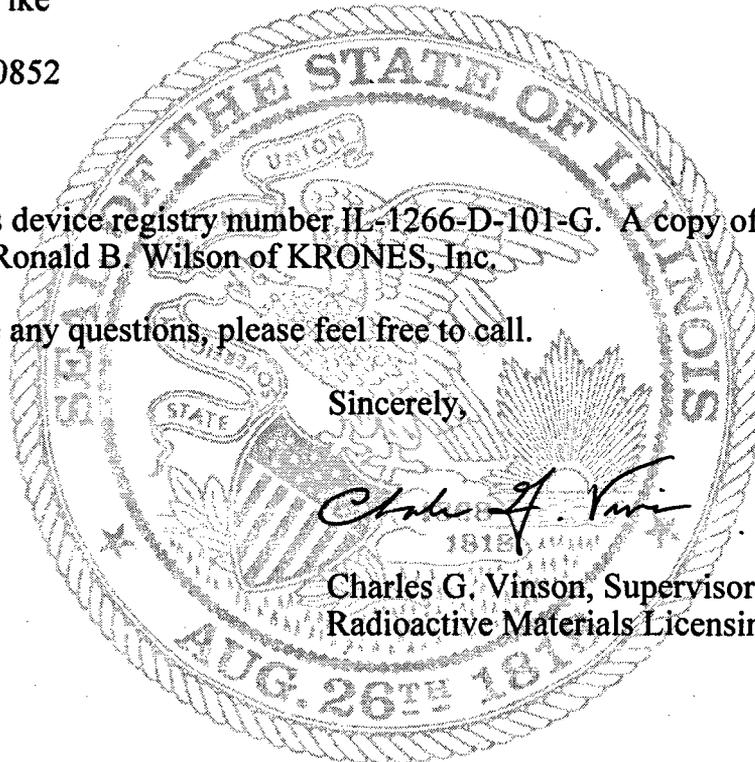
Enclosed is device registry number IL-1266-D-101-G. A copy of this has also been provided to Ronald B. Wilson of KRONES, Inc.

If you have any questions, please feel free to call.

Sincerely,



Charles G. Vinson, Supervisor
Radioactive Materials Licensing



CGV:MEB:kjc

Enclosure

cc: Ronald B. Wilson, RSO
Director Inspection Technology
KRONES, Inc.
6312 West Oakton Street
Morton Grove, IL 60053

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF RADIOACTIVE DEVICE

NO: IL-1266-D-101-G

DATE: May 21, 2007

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DEVICE TYPE: Gamma Fill Level Gauge

MODEL: Checkmat 700 Series

DISTRIBUTOR: KRONES, Inc.
6312 West Oakton Street
Morton Grove, IL 60053

MANUFACTURER: KRONES AG
Böhmerwaldstraße 5
Neutraubling D-93073
Germany

SEALED SOURCE MODEL DESIGNATION: QSA Global, Inc.
(formerly Amersham)
Model AMC.P1

ISOTOPE:

Am-241

MAXIMUM ACTIVITY:

1.665 GBq (45 mCi)

LEAK TEST FREQUENCY:

36 months

PRINCIPAL USE:

(D) Gamma Gauge

CUSTOM SOURCE:

YES

NO

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DEVICE TYPE: Gamma Fill Level Gauge

DESCRIPTION:

The Kronos Checkmat 700 series Fill Level Gauges are manufactured by Kronos AG in the Federal Republic of Germany. The Checkmat 700 Series use a 1.665 GBq (45 mCi) Americium 241 sealed source. The American National Standards Institute (ANSI) classification N43.6-1997 classification for the source is:

ANSI 97C64444

These gauges incorporate a collimated source and a scintillation detector in an inverted "U" shaped housing. The source is mounted in one leg of the U, producing a collimated beam that is aimed at the opposite leg where the detector intercepts the direct beam. A horizontal section joins the two vertical legs.

The Checkmat 700 series uses a source holder assembly consisting of a lead lined 304 stainless steel source plug that screws into a 304 stainless steel source holder body. The plug is safety wired to prevent removal. The source holder and a spring loaded solenoid actuated shutter are bolted to two 2 mm stainless steel plates, constituting the source holder assembly.

A 304 stainless steel shutter covers the beam port in the "off" position. The fail-safe shutter is spring-loaded and is opened when the electromagnetic solenoid is energized. When power is removed, the shutter is closed by the spring. A transport safety bolt secures the shutter in the off position during transportation. The shutter cannot be secured in the on position. The gauge housing has mechanical and electrical indicators of the shutter position. A red flag on a signed plate, fastened to the shutter, is visible through an observation window in the instrument housing. Microswitches, activated by the shutter position, control power to light emitting diodes indicating the shutter position. The source holder is similar in design to the previously registered KRONES Checkmat 150, IL-8058-D-801-G. The major changes are that all parts are stainless steel and the shutter is a thick section rather than the thin brass shutter of the Checkmat 150.

The radiation source holder is housed in a 2 mm thick stainless steel instrument housing. Security fasteners require special tools for access to the source holder.

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DEVICE TYPE: Gamma Fill Level Gauge

DIAGRAMS:

See Attachments 1 through 5.

LABELING:

Each source housing will bear labeling containing the symbol described in 32 Ill. Adm. Code and the following information:

KRONES, Inc.
6312 West Oakton Street
Morton Grove, IL 60053

CAUTION-RADIOACTIVE MATERIAL

The receipt, possession, use and transfer of this device Model 7nn (n is an integer), Serial No. nnnnn, containing an AEA Technology AMC.P1 source, 45 mCi Am-241 on MM/DD/YY, Source Serial No. nnnnaa, are subject to a General License or the equivalent and the regulations of the Agency, the U.S. NRC or an Agreement State.

This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

Installation, relocation, maintenance, repair and initial radiation survey of this device shall be performed only by the manufacturer or another person specifically authorized by the Agency, the U.S. NRC or an Agreement State.

The device shall be tested for proper operation of the on-off mechanism and indicator and the integrity of the sealed source at intervals not to exceed three years. These tests shall be performed only by the manufacturer or another person holding a specific license issued by the Agency, the U.S. NRC or an Agreement State.

The ANSI classification for this gauge is ANSI-23-985-985-R2.

The label is 120 mm x 65 mm and it is riveted to the device. The label has a yellow background with black printed details.

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DEVICE TYPE: Gamma Fill Level Gauge

CONDITIONS OF NORMAL USE:

The Checkmat 700 series devices are fixed fill level gauges that are designed to be safely operated by persons not having training in radiological protection. The source holder described in this application is common to all system models. The models differ in the dimensions of the external housings and the electronic control circuitry. The anticipated environmental conditions in which the Checkmat 700 series will be used including relative humidity ranging from 0% to 100% and temperatures ranging from 0°C to 50°C. The source housing is sealed with a gasket to render the source housing water resistant. The most likely condition of use is at room temperature, 20°C. The typical users will be workers on product filling lines in the vicinity of the Checkmat 700 series. The Checkmat 700 series devices are used to control automated equipment and are not operated directly by the filling line worker.

Under these ordinary conditions of use and ordinary conditions of handling and storage byproduct material contained in the device cannot be removed without the use of special tools by a knowledgeable individual. It is very unlikely that the byproduct material, in the form of a fused ceramic encapsulated in stainless steel, could be released under ordinary conditions of handling, storage and use of the gauge.

The manufacturer estimates the working life of this device to be 25 years.

PROTOTYPE TESTING:

The device has been prototype tested to ANSI N43.8-2001 standards. The device meets the ANSI N43.8-2001 classification of 23-985-985-R2. The tested device was manufactured in the same manner and from the same materials as the final registered product. The Checkmat 700 series device has been used worldwide, not including the United States, for 10 years without a safety related failure. Kronos, Inc. reports that 400 devices have been distributed worldwide with a small number of problems with the system related components and electronics which did not affect the source, source holder or housing.

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DEVICE TYPE: Gamma Fill Level Gauge

EXTERNAL RADIATION LEVELS:

Dose Rate (mrem/hr)

Shutter Closed - Device Off						Shutter Open - Device On				
Direction	At Surface	5 cm	14.2 cm	30 cm	100 cm	At Surface	5 cm	14.2 cm	30 cm	100 cm
1	0.06	0.02	0.02			2230*		49*		0.02
2	0.03	<0.03		0.02	0.02	0.03	<0.03		0.03	0.02
3	0.02	0.02		0.02	0.02	0.03	<0.03		0.03	0.02
4	0.03	<0.03		0.02	0.02	0.03	<0.03		0.03	0.02
5	0.1	<0.1		0.03	0.02	0.1	<0.1		0.03	0.02
6	0.06	<0.06		0.03	0.02	0.03	<0.03		0.03	0.02
7	0.02	0.02		0.02	0.02	0.04	<0.04		0.03	0.02
8	0.06	<0.06		0.02	0.02	0.03	<0.03		0.03	0.02
9	0.06	<0.06		0.03	0.02	0.03	<0.03		0.03	0.02
10	0.06	<0.06		0.03	0.02	0.03	<0.03		0.03	0.02

*Calculated dose rate in beam.

The acquired measurements were obtained from a 45 mCi QSA Global, Inc., Model AMC.P1, Am-241 source. Exposure rates were measured on by Ron Wilson and Eli Port on May 22, 2005 using a Ludlum Model 3, S/N 73021, with an Eberline HP-270 energy compensated probe calibrated on May 17, 2005.

Dose rates are numerically equivalent to the measured exposure rates.

QUALITY ASSURANCE AND CONTROL:

Krones, Inc. has supplied an adequate quality assurance and control program which is on file with the Illinois Emergency Management Agency. The Krones, Inc. U.S. office will perform a Quality Assurance audit that will include a review of shipping documents for conformance with the customer's order and with this device evaluation. Krones, Inc. will verify the inclusion of a leak test certificate and will review the leak test results. External dose rates will be verified to meet the requirements of 49 CFR 173.424(f). Krones, Inc. field technicians shall complete the review at the customer site and will confirm that the shipment meets the above specifications.

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DEVICE TYPE: Gamma Fill Level Gauge

LIMITATIONS AND OTHER CONSIDERATIONS OF USE:

- This device shall be distributed only to general licensees of the Agency, the U.S. Nuclear Regulatory Commission (NRC), an Agreement State or a licensing state.
- Any maintenance, source replacement, repair or disposal shall be performed by the manufacturer or persons specifically licensed by the Agency, the U.S. NRC, an Agreement State or a Licensing State.
- Handling, storage, use, transfer and disposal: To be determined by the licensing authority or, for general licensees, in accordance with 32 Ill. Adm. Code or equivalent regulations of the U.S. NRC, Agreement State or Licensing State.
- The device shall be leak tested at intervals not to exceed 36 months using techniques capable of detecting 0.005 μCi (185 Bq) of removable contamination.
- The registration sheet and the information contained within the references shall not be changed without the written consent of the Agency.

SAFETY ANALYSIS SUMMARY:

Krones, Inc. has provided sufficient information to provide reasonable assurance that:

- Under ordinary conditions of handling, storage and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the source housing, and it is unlikely that any person will receive in any period of one year a dose in excess of 10 percent of the limits specified in 32 Ill. Adm. Code 340.

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SAFETY EVALUATION OF RADIOACTIVE DEVICE

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DEVICE TYPE: Gamma Fill Level Gauge

SAFETY ANALYSIS SUMMARY: (continued)

- Under accident conditions associated with handling, storage and use of the devices, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

<u>PART OF BODY</u>	<u>DOSE</u>
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15 rem (0.15 Sv)
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200 rem (2.0 Sv)
Other organs	50 rem (0.50 Sv)

The licensee reports that 400 sources, in devices, have been distributed worldwide (not including the United States) for 10 years. A review of service records indicates that there have been no failures during the time period that Kronos, Inc. distributed the devices.

Based on review of the Checkmat 700 Series and the information and test data cited below, we conclude that these devices are acceptable for licensing purposes.

Furthermore, we conclude that these devices would be expected to maintain their containment integrity for normal conditions of use and likely accidental conditions, which might occur during uses specified in this certificate.

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DEVICE TYPE: Gamma Fill Level Gauge

REFERENCES:

- Applications dated August 25, 2006 and January 19, 2007 (attachment to letter dated January 23, 2007).
- Letter, with attachments, dated January 23, 2007.
- Electronic submission dated April 2, 2007.

ISSUING AGENCY: Illinois Emergency Management Agency

DATE: 5-21-07 REVIEWED BY: Mary E. Burkhart
Mary E. Burkhart

DATE: 5/21/07 CONCURRENCE: Charles G. Vinson
Charles G. Vinson

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF RADIOACTIVE DEVICE

NO: IL-1266-D-101-G

DATE: May 21, 2007

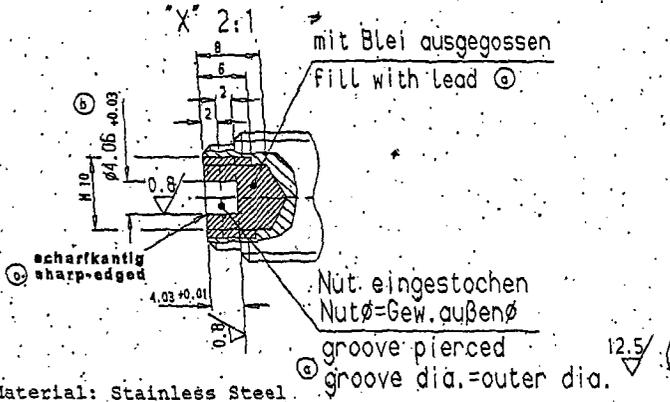
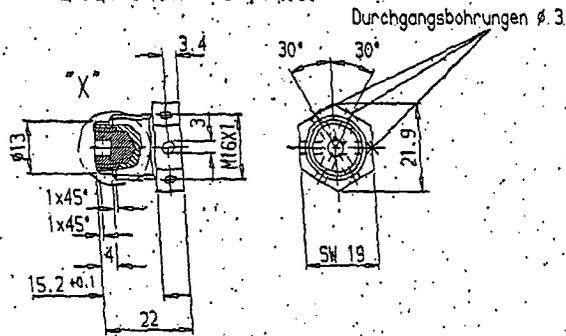
ATTACHMENT 2

DEVICE TYPE: Gamma Fill Level Gauge

All dimensions are in millimeters (mm)

Achtung: alle Maße unbedingt einhalten, da dieses Teil eine radioactive Kapsel verschließt!

Caution: All dimensions must be absolutely accurate, as this part is used to seal a radioactive capsule.



Material: Stainless Steel

Stück	Benennung	Pos	Sach-/Modellnummer	1.4301	Werkstoff
Zul. Abweichungen für Maße ohne Toleranzangaben nach ISO 2768 X mittel sehr grob					
Gezeichnet	16.11.01 L. Fischer M.	Tag	Name	Kapstab	
Gez.	13 JAN 1993	OTTE	1:1	KRONES	
Gepr.		LÖLL			
b	01/08199	16.11.2001	Verschlußschraube		1-707-80-002-0
a	01/03577	16.06.2001	screw plug		
Ausgabe	Änderung	Tag	Name		

KP/ot/KRONES, 28.07.04, 22:29 Zur Fertigung freigegeben: Groeller Andreas, 28.09.99

Stück	Benennung	Pos	Sach-/Modellnummer	1.4301	Werkstoff
Zul. Abweichungen für Maße ohne Toleranzangaben nach ISO 2768 X mittel sehr grob					
Gezeichnet	16.11.01 L. Fischer M.	Tag	Name	Kapstab	
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Gepr.		LÖLL			
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**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF RADIOACTIVE DEVICE**

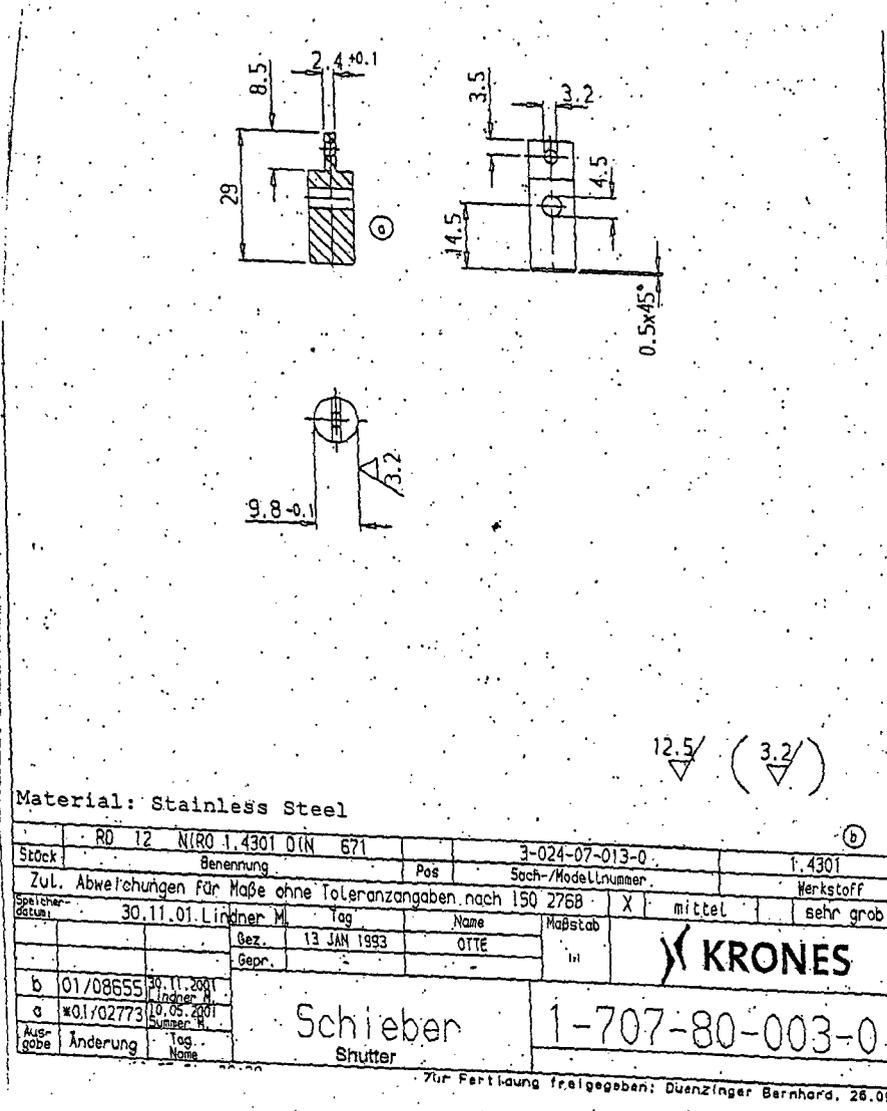
NO: IL-1266-D-101-G

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ATTACHMENT 3

DEVICE TYPE: Gamma Fill Level Gauge

All dimensions are in millimeters (mm)



Planung	Description	Material	Item/Model number	Material
	Allowed deviation for measurements from ISO 2768			
Standard	ISO 2768	10	50	120
X	ISO 2768 X	10	50	120
Y	ISO 2768 Y	10	50	120
Z	ISO 2768 Z	10	50	120
Gepr.	13 JAN 1993	OTTE		
Name		Drawing Number		
Schieber		1-707-80-003-0		

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF RADIOACTIVE DEVICE

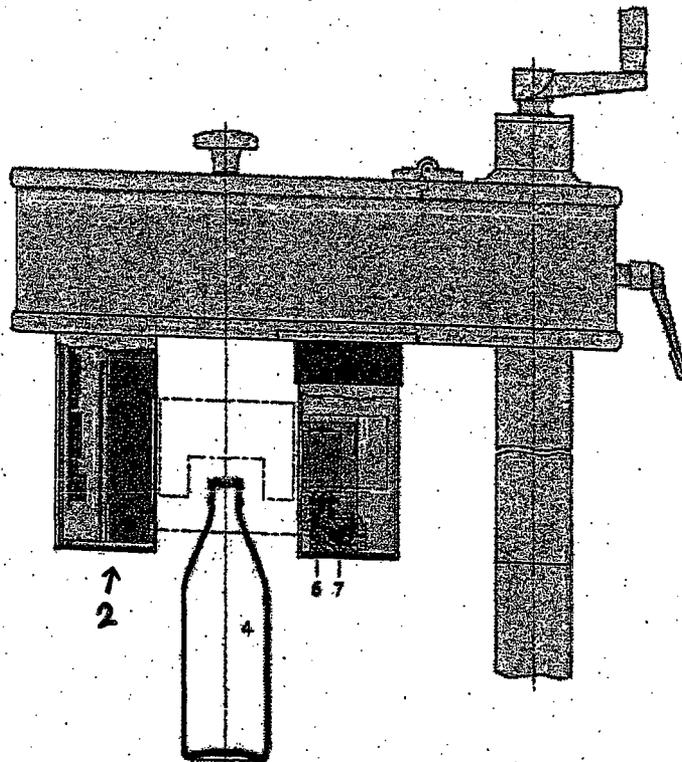
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ATTACHMENT 5

DEVICE TYPE: Gamma Fill Level Gauge

All dimensions are in millimeters (mm)



<u>Key</u>	
2.	Detector
4.	Product
6.	Shutter
7.	Source

Figure 1.