



## GammaMat® M

### Self-propelled Isotope Crawler for Pipeline Radiography

GammaMat M crawlers permit high quality cost-effective testing that keeps pace with pipeline production fabrication. In today's pipeline construction work, an exact radiography inspection of circumferential welds is required.

To obtain radiographs of sufficiently high resolution, the source material (Ir-192 or Se-75) must be accurately centered inside the circumferential weld. The completely self-contained GammaMat M Pipeline Crawler fully satisfies these requirements. In addition, it provides the advantages of a single shot inspection for each weld, leading to a tremendous increase in the inspection speed.

### Two Available Sizes

The GammaMat M Pipeline Crawler is available in two sizes:

- GammaMat M6 for pipe diameters of 6" to 18"
- GammaMat M18 for pipe diameters of 18" to 60"

### Externally-controlled Functions

An external radioscope control unit is used to control the following crawler functions:

Proceed – Retract – Stop – Expose

### Available Models

|                     | GammaMat M6      | GammaMat M18      |
|---------------------|------------------|-------------------|
| <b>Max Loading</b>  |                  |                   |
| Ir-192              | 2.20 TBq (60 Ci) | 3.70 TBq (100 Ci) |
| Se-75               | 3.00 TBq (80 Ci) | 3.00 TBq (80 Ci)  |
| <b>Total Weight</b> |                  |                   |
| Ir-192 head         | 36.0 kg (78 lb)  | 80.0 kg (178 lb)  |
| Se-75 head          | 20.0 kg (44 lb)  | 63.0 kg (138 lb)  |

### Fully-integrated Components

The design of the crawler combines all necessary components for drive, control, power supply and radiation shielding of the Ir-192 or Se-75 source, in one integrated unit.

### Unparalleled Safety

The source immediately returns to shielding in the event of a battery or electronic failure. In addition, an independent safety circuit ensures that every exposure period is terminated after 20 minutes. Using the maximum Ir-192 source strength, the dose rate at 10 m (11 yd) from the exposed weld is only 0.05 mSv/h.

Ten seconds after the exposure command has been given by a radiation pulse from the command isotope – enough time for the operator to leave the safety zone – the exposure is started automatically. During the exposure, which can be pre-selected up to a duration of 1,000 seconds, a visual and audible alarm is activated.

### Autonomous, Lightweight and Robust

The GammaMat M operates with low power consumption. A pipeline length of approximately 2 kilometers (1.25 miles) can be inspected without recharging the batteries. The crawler is equipped with two sets of batteries facilitating uninterrupted operations by the exchange of the depleted batteries. Optimised shielding design, advanced materials, and high technology electronics result in a lightweight and robust device. The device is capable of climbing a 45% grade.



## GammaMat® M Specifications and Accessories

| Crawler   | GammaMat M6                           | GammaMat M18                          |
|---|---------------------------------------|---------------------------------------|
| Range of pipe diameters   | 6"-18"                                | 18"-60"                               |
| Dimensions (overall length x O.D.)  | 1.25 m x 0.14 m                       | 1.35 m x 0.36 m                       |
| Total weight with:  |                                       |                                       |
| Ir-192 head   | ± 150 kg (331 lb)                     | ± 250 kg (551 lb)                     |
| Se-75 head  | ± 120 kg (265 lb)                     | ± 210 kg (463 lb)                     |
| Drive motor   | 24 V / 65 W                           | 24 V / 140W                           |
| Batteries (sealed)  | 24V / 7 Ah                            | 24 V / 24 Ah                          |
| Drive wheel diameter  | 80 mm (3.15")                         | 140 mm (5.51")                        |
| Max. pipeline length to be examined without battery recharge weld to weld distance 12 m (49 feet) | Approx. 2 km (1.25 mi)                | Approx. 2 km (1.25 mi)                |
| Crawler speed (horizontal)  | Approx. 14 m/min<br>Approx. 15 yd/min | Approx. 10 m/min<br>Approx. 11 yd/min |
| Maximum inclination (in dry steel pipe)   | 40%                                   | 40%                                   |
| Minimum radius of curvature   | Approx. 10 x D                        | Approx. 10 x D                        |
| Precision of alignment with weld position   | ± 5 mm (0.2")                         | ± 5 mm (0.2")                         |
| Shielding: depleted uranium, Max. activity for crawler  |                                       |                                       |
| Ir-192  | 60 Ci (2.20 TBq)                      | 100 Ci (3.70 TBq)                     |
| Se-75   | 80 Ci (3.00 TBq)                      | 80 Ci (3.00 TBq)                      |
| Opening angle of radial beam  | 60°                                   | 60°                                   |
| Delay time between exposure command and exposure start  | Approx. 10 sec                        | Approx. 10 sec                        |
| Time of exposure (continuously adjustable)  | 1-1000 sec.                           | 1-1000 sec.                           |

| Accessories  | GammaMat M6                | GammaMat M18                                    |
|--|----------------------------|---|
| <b>External Control Unit</b>   |                            |   |
| (Command modes: proceed, retract, stop, expose). Command signals are generated by weak gamma source, sufficient for wall thickness up to 25 mm (1") command isotope Cs-137 | Approx. 100 mCi (3.70 GBq) | Approx. 250 mCi (9.25 GBq) (max. 350 mCi/12.95) |
| Weight   | 6.0 kg (13 lb)             | 6.0 kg (13 lb)                                  |
| <b>Localising and warning device GammaLux M</b>  |                            |   |
| Batteries (sealed) 12 hours continuous operation   | 12 V / 2 Ah                | 12 V / 2 Ah                                     |
| Weight   | 4.0 kg (8.8 lb)            | 4.0 kg (8.8 lb)                                 |
| <b>Charger – with time control for charging (for the batteries of the crawler and the localising device)</b>   |                            |   |
| Connection voltage   | 220 V / 50 Hz              | 220 V 50 Hz                                     |
| Optional   | 110 V / 60 Hz              | 110 V / 60 Hz                                   |
| Charging current   | 0.7 A / 0.2A               | Max. 2 A / 0.2A                                 |
| Weight   | 4.0 kg (8.8 lb)            | 5.0 kg (11 lb)                                  |
| <b>Ir-192 head Type B(U)</b>   |                            |   |
| Weight   | ± 48 kg (106 lb)           | ± 52 kg (115 lb)                                |
| <b>Se-75 head Type A</b>   |                            |   |
| Weight   | ± 14 kg (31 lb)            | ± 14 kg (31 lb)                                 |

\*Shielding is sufficient to provide maximum dose rate of 0.25 mSv/h at 20 cm (8") distance from surface for maximum source strength.

### Precise Positioning for High Accuracy

The crawler allows accurate positioning of the Ir-192 or Se-75 source at the axis of the pipe, over the entire range of pipe sizes. The source is positioned exactly in the plane of the pipe weld by highly-collimated control beams. Any vertical deviation is automatically corrected.

### Easily Removed

Even if one of the control circuits fails, the electric control permits the crawler to be moved out of the pipe so that no cutting of the pipeline is required. Should the crawler come across an obstacle in the pipe, or if the humidity sensor reacts in any way, then it will change direction and come to rest approximately 4-5 m (4.4 – 5.5 yd), awaiting a further command.

### Easy Device Location Detection

An accompanying GammaLux M localizing device can be used to determine the position of the crawler in the pipeline at any time. A light signal on the GammaLux M indicates that the crawler is positioned and ready for exposure. In addition to this, the crawler emits a continuous acoustic signal. Five different signals constantly inform the operator about the working condition of the crawler.

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