

Gamma Irradiation

GAMMA IRRADIATION IN
AN INDUSTRIAL FACILITY

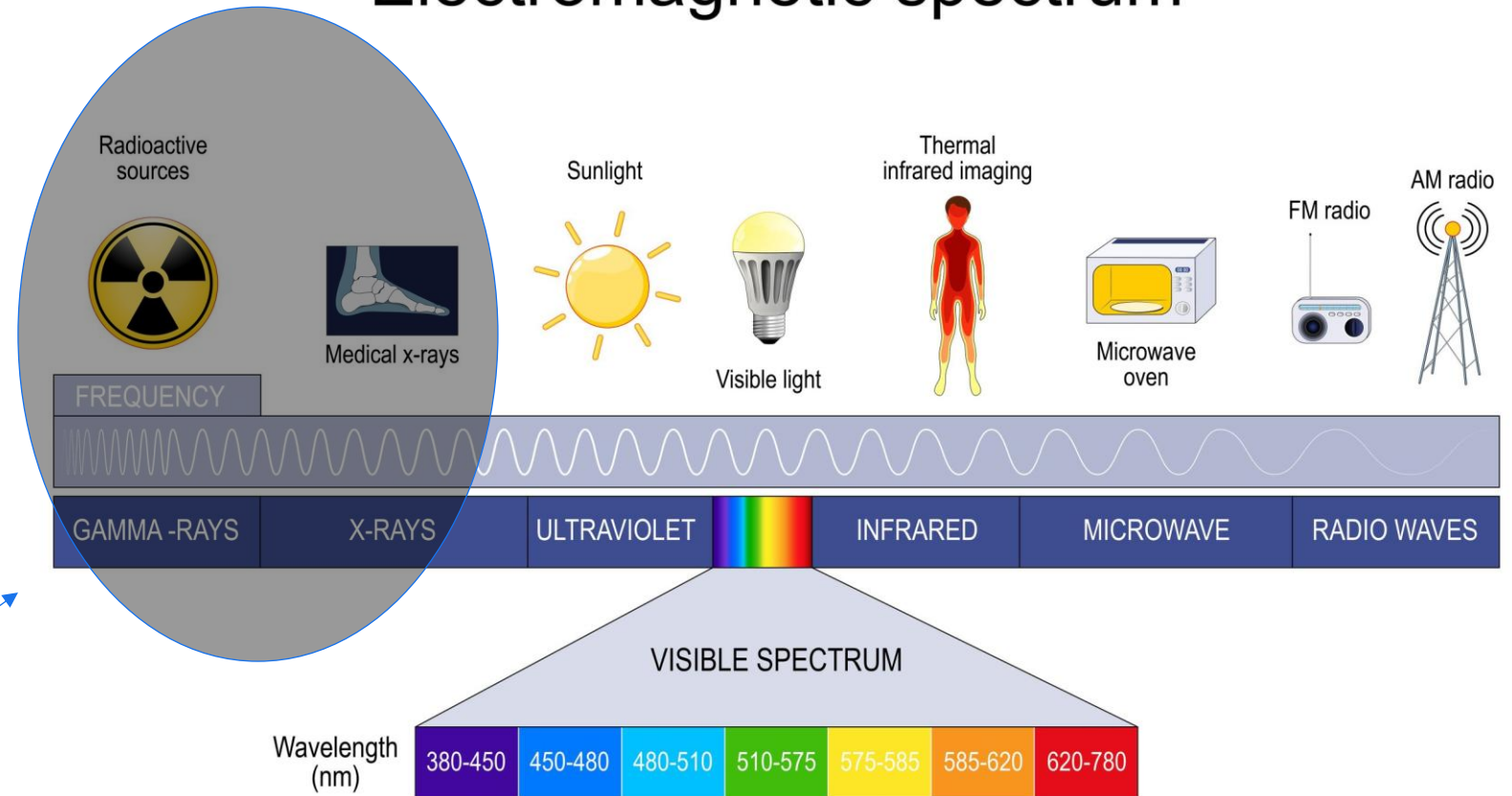


STERITECH

Protecting what matters

What is Gamma Radiation?

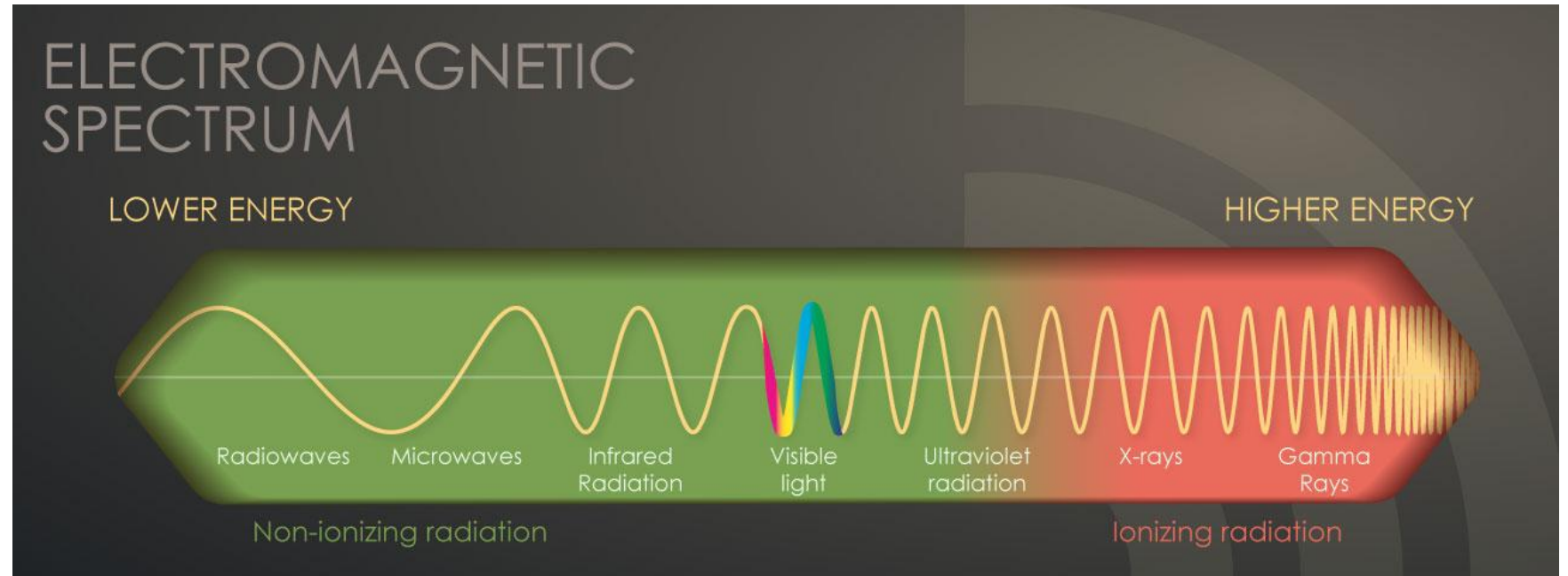
Electromagnetic spectrum



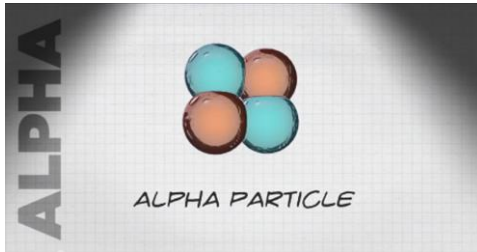
Ionizing Radiation

Removes electrons and ionizes atoms

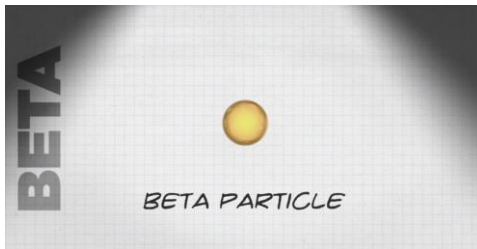
What is Gamma Radiation?



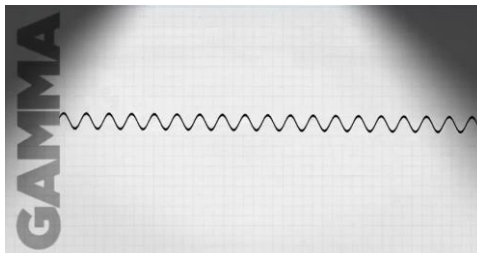
Types of Radioactivity



Alpha particles are large particles that travel up to an inch in the air.

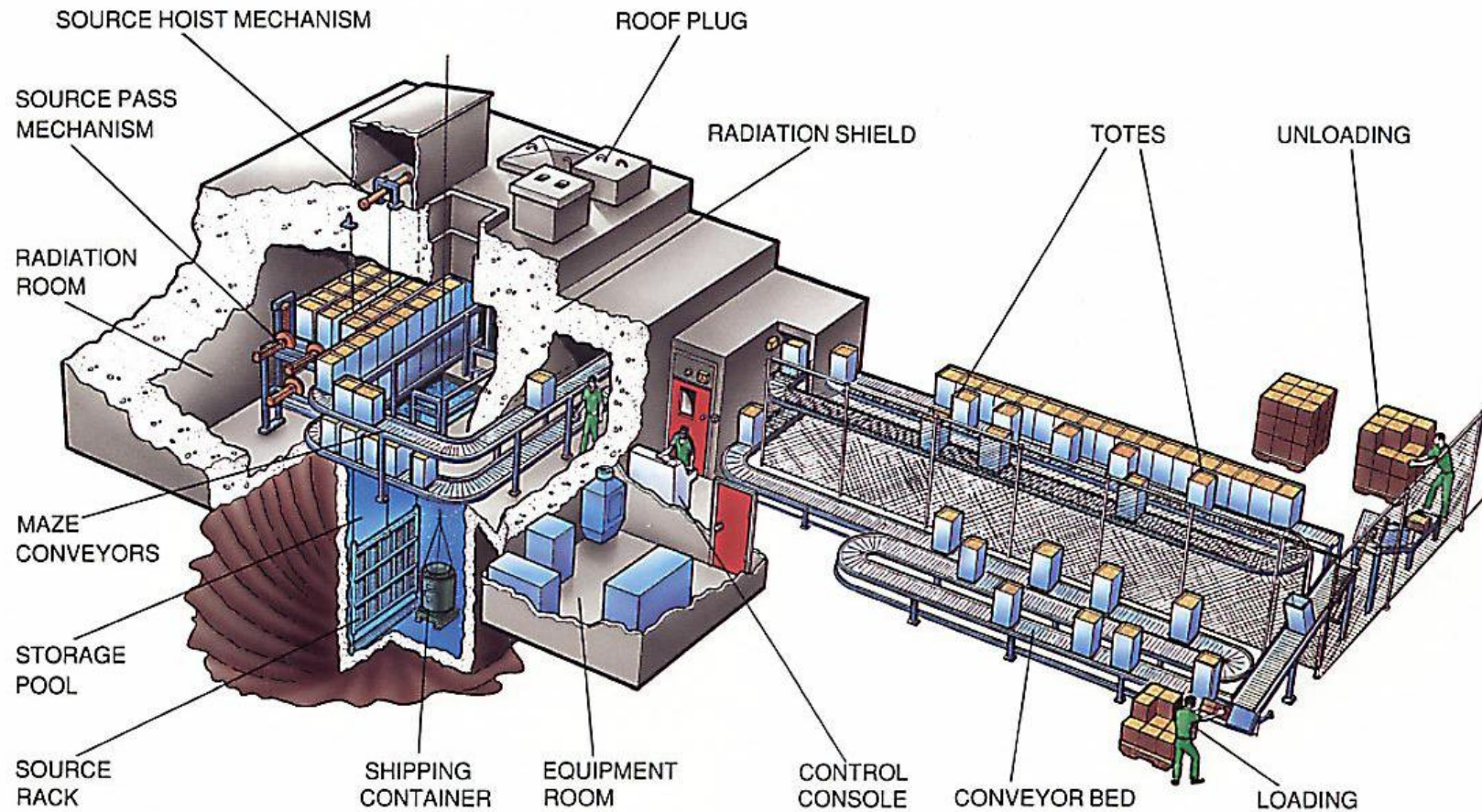


Beta particles are smaller particles that travel several feet in air.



Gamma rays can travel many metres in air.

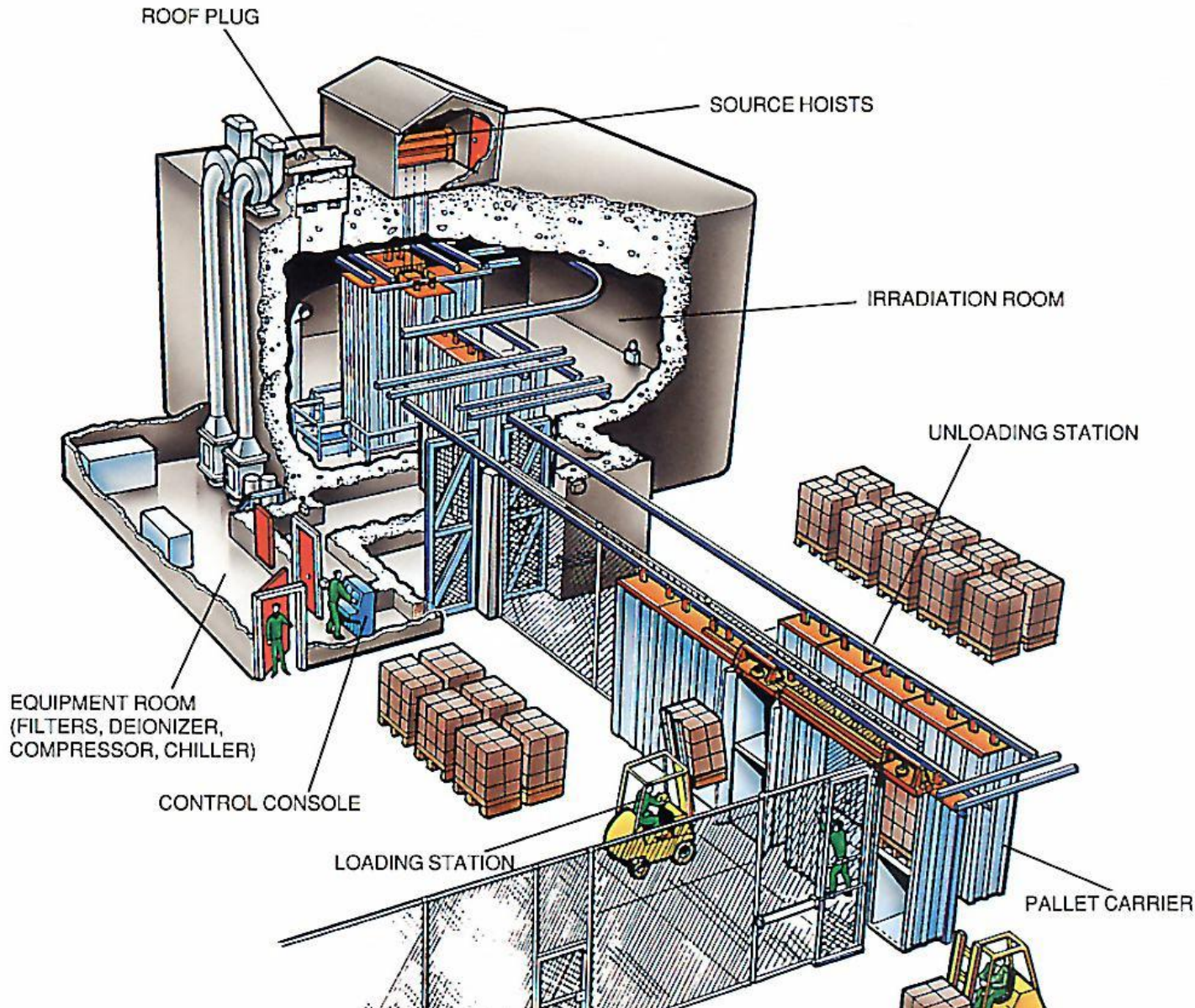
TOTE BOX IRRADIATOR - AUTOMATIC



Industrial Irradiation

- Steritech has a number of different design Irradiators
- IR – 058 Dandenong, VIC

PALLET IRRADIATOR - AUTOMATIC

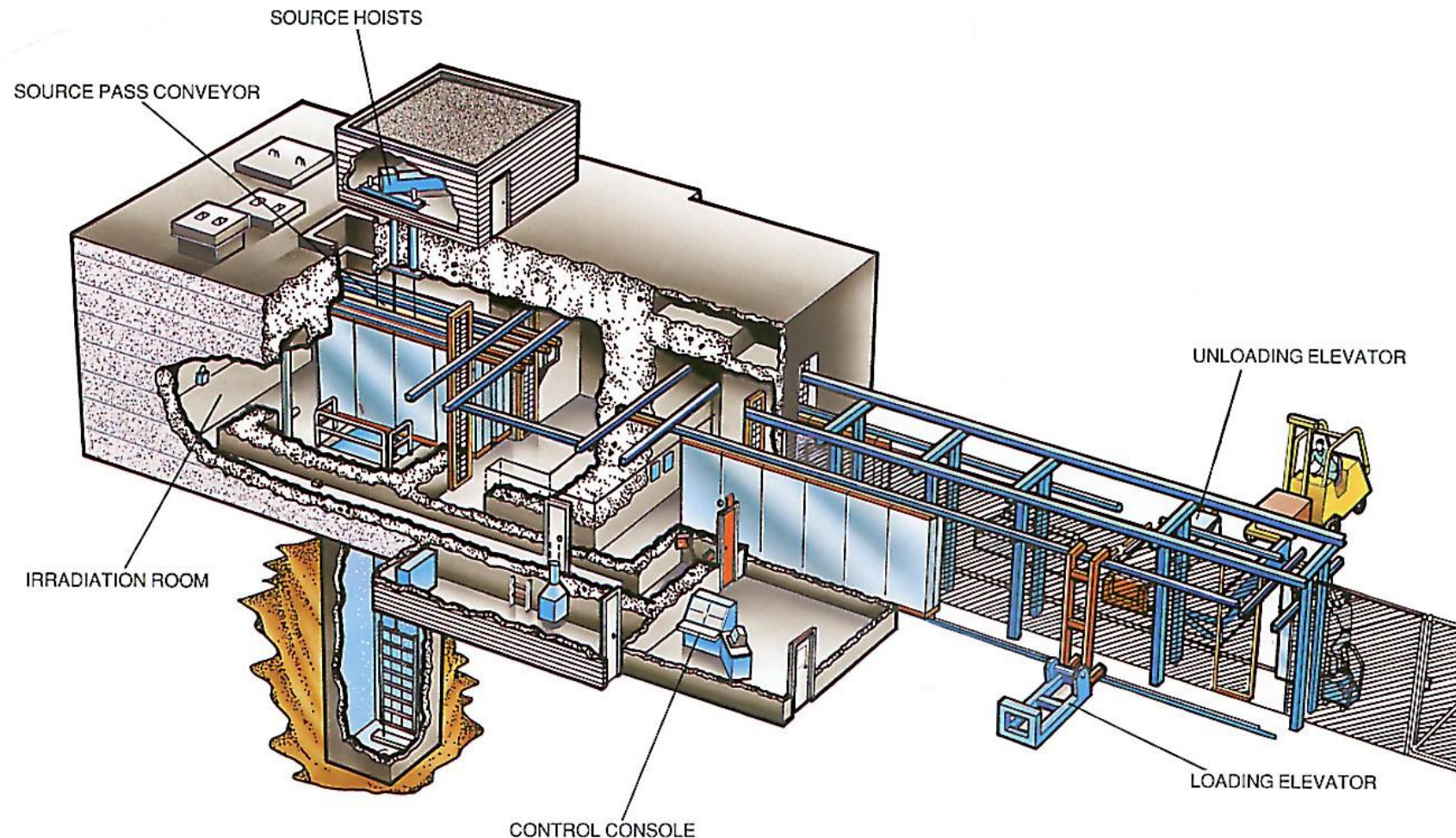


Industrial Irradiation

- Steritech has a number of different design Irradiators

- IR-258 Nerangba, QLD

CARRIER IRRADIATOR - AUTOMATIC



Industrial Irradiation

- Steritech has a number of different design Irradiators

- IR – 141 Wetherill Park, NSW

Cobalt 60 Source

Radioactive Decay: Co-60 decays into stable nickel-60, emitting beta particles and gamma rays.

Half-life: 5.27 years.

Appearance: It's a hard, gray-blue metal.

Chemical Properties: It's a metallic solid that can be magnetically charged.



How do we dose?

Steritech Pty Ltd

Cobalt Activity List

Load Activity 1146801 On 1/12/2022 Activity Date 6/08/2025 Activity at Date (curies) 806163

Density gm/cc	kGy50	kGy35	kGy33	kGy30	kGy28	kGyBC	kGy25	kGy20	kGy15	kGy10	kGy05
0.00	00:49:30	00:34:39	00:32:40	00:29:42	00:27:43	00:26:14	00:24:45	00:19:48	00:14:51	00:09:54	00:04:57
0.02	00:50:22	00:35:15	00:33:15	00:30:13	00:28:12	00:26:42	00:25:11	00:20:09	00:15:07	00:10:04	00:05:02
0.04	00:51:30	00:36:03	00:33:59	00:30:54	00:28:50	00:27:18	00:25:45	00:20:36	00:15:27	00:10:18	00:05:09
0.06	00:52:38	00:36:51	00:34:44	00:31:35	00:29:28	00:27:54	00:26:19	00:21:03	00:15:47	00:10:32	00:05:16
0.08	00:53:46	00:37:38	00:35:29	00:32:16	00:30:07	00:28:30	00:26:53	00:21:30	00:16:08	00:10:45	00:05:23
0.10	00:55:28	00:38:50	00:36:36	00:33:17	00:31:04	00:29:24	00:27:44	00:22:11	00:16:38	00:11:06	00:05:33
0.12	00:57:12	00:40:02	00:37:45	00:34:19	00:32:02	00:30:19	00:28:36	00:22:53	00:17:10	00:11:26	00:05:43
0.14	00:58:54	00:41:14	00:38:52	00:35:20	00:32:59	00:31:13	00:29:27	00:23:34	00:17:40	00:11:47	00:05:53
0.16	01:00:54	00:42:38	00:40:12	00:36:32	00:34:06	00:32:17	00:30:27	00:24:22	00:18:16	00:12:11	00:06:05
0.18	01:03:10	00:44:13	00:41:41	00:37:54	00:35:22	00:33:29	00:31:35	00:25:16	00:18:57	00:12:38	00:06:19
0.20	01:05:26	00:45:48	00:43:11	00:39:16	00:36:39	00:34:41	00:32:43	00:26:10	00:19:38	00:13:05	00:06:33
0.22	01:07:42	00:47:23	00:44:41	00:40:37	00:37:55	00:35:53	00:33:51	00:27:05	00:20:19	00:13:32	00:06:46
0.24	01:10:16	00:49:11	00:46:23	00:42:10	00:39:21	00:37:14	00:35:08	00:28:06	00:21:05	00:14:03	00:07:02
0.26	01:12:50	00:50:59	00:48:04	00:43:42	00:40:47	00:38:36	00:36:25	00:29:08	00:21:51	00:14:34	00:07:17
0.28	01:15:40	00:52:58	00:49:56	00:45:24	00:42:22	00:40:06	00:37:50	00:30:16	00:22:42	00:15:08	00:07:34
0.30	01:18:32	00:54:58	00:51:50	00:47:07	00:43:59	00:41:37	00:39:16	00:31:25	00:23:34	00:15:42	00:07:51
0.32	01:21:40	00:57:10	00:53:54	00:49:00	00:45:44	00:43:17	00:40:50	00:32:40	00:24:30	00:16:20	00:08:10
0.34	01:24:48	00:59:22	00:55:58	00:50:53	00:47:29	00:44:57	00:42:24	00:33:55	00:25:26	00:16:58	00:08:29
0.36	01:28:28	01:01:56	00:58:23	00:53:05	00:49:32	00:46:53	00:44:14	00:35:23	00:26:32	00:17:42	00:08:51
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0.48	01:52:56	01:19:03	01:14:32	01:07:46	01:03:15	00:59:51	00:56:28	00:45:10	00:33:53	00:22:35	00:11:18
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0.58	02:19:58	01:37:59	01:32:23	01:23:59	01:18:23	01:14:11	01:09:59	00:55:59	00:41:59	00:28:00	00:14:00
0.60	02:26:14	01:42:22	01:36:31	01:27:44	01:21:53	01:17:30	01:13:07	00:58:30	00:43:52	00:29:15	00:14:37



How do we dose?



Attribute	Alanine Tape Tab Dosimeter	Red Perspex 4032 Dosimeter
Dosimeter Description	Alanine pellets containing alanine. For Tape Tab: Pellet is placed into a film package with a bar code, allowing full traceability of the dosimeter.	Polymethylmethacrylate (PMMA) moulded sheets cut to size and hermetically sealed in a film package containing a barcode. Dosimeter must be removed from it's packing to use.;
Measurement Instrumentation	Identification and measurement of the alanine-derived free radicals are performed by Electron Paramagnetic Resonance (EPR) spectrometer.	Spectrophotometer Micrometer
Influence Quantities	Temperature, pellet mass	Temperature, humidity, dose rate, post-irradiation response
Typical Dosimeter System Uncertainty	± 4%	± 6%
Typical Dose Range	0.1-100 kGy (0.1kGy to 100kGy may also be achieved)	5-50 kGy

What do we treat?

Biosecurity – Used to ensure no exotic pests enter the country

Medical Devices

Laboratory Supplies

Phytosanitary – Cannabis

Phytosanitary – Fruit

Food Safety



Emerging & Other Technologies

- X-Ray – the most suitable for Gamma Replacement – inefficient
- E-Beam – faster than gamma but with limitations
- ETO gas – Highly popular for Medical Devices
- Nitrogen Dioxide – Very New and low adoption
- Vapourized Hydrogen Peroxide – Limited



[illegible]