

Radiation Shielding Material

For further
information on our
Radiation Shielding Material,
please contact:

Carley Pavelka
Office of
Technology Transfer
303.871.4230
cpavelka@du.edu



LOW-COST RADIATION SHIELDING MATERIAL

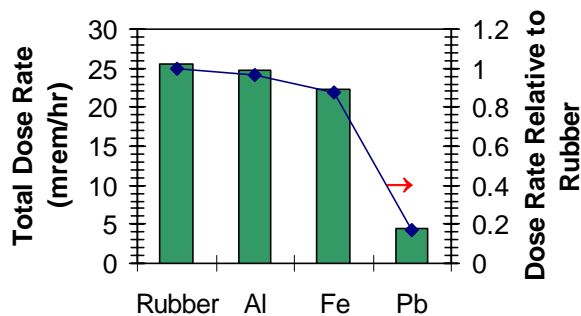
(tentatively referred to as RSM)



Office of Technology Transfer
2240 E. Buchtel Blvd., 4th Floor North
Denver, CO 80208
303.871.4230
cpavelka@du.edu



RSM is a very powerful low-cost radiation shielding material which utilizes recycling materials. RSM incorporates other desirable properties besides shielding, such as structural strength, resistance to radiation damage, resistance to chemical attack, and dual-purpose shielding capabilities for gammas, neutron and charged particles. RSM materials utilize vulcanized rubber similar to ground tire rubber which contains a high concentration of hydrogen and carbon, along with embedded granulated metal and suitable binder. Various granulated light and heavy metal can be considered for specific shielding and structural design applications such as aluminum, iron, lead, tungsten, depleted uranium and more. RSM material is also easily formable and molds into virtually any desired shape, with minimal labor costs, and ease for installation and removal. The RSM compound of materials can be easily designed for optimum spatial distribution of metal-to-rubber ratio by manufacturing various layers with different concentrations of the granular metal within the rubber. These layers can be stacked and bonded together for optimum space and weight target.

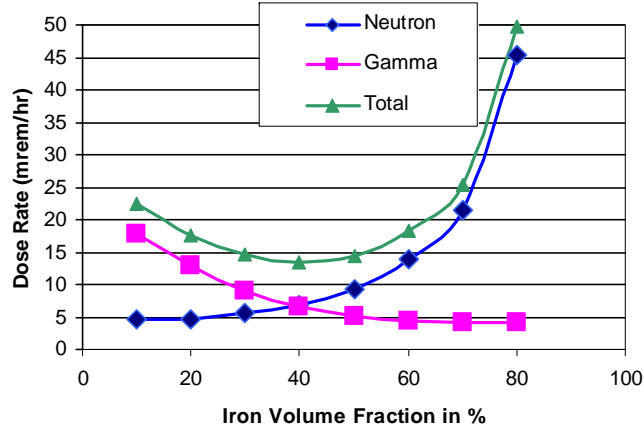


10% Volume Fraction of Metal Within the Rubber

Total Dose Rate for Various Granular Metal-Rubber Blends for the Transfer Cask Case Problem

Recycled Materials for Shielding

More Shielding, Less Material & Price



Maximum Radial External Surface Dose Rate on the Transfer Cask as a Function of Iron Volume Fraction Inside the Rubber (Example of optimization methodology)

Benefits of The RSM

- Low Cost
- Readily Available Recycled Materials
- Ease of Fabrication, Installation, and Removal
- Ability to Withstand Stress, Environment and Temperature Over Life Time (Heat Dissipation)
- Low Susceptibility to Chemical Attack and Corrosion
- Low Potential for Activation Under Neutron Bombardment
- Resistance to Radiation Damage (Low for Activation under Neutron Bombardment)
- Low Toxicity and Health Impact
- Reusable
- Good for Neutron, Gamma, and Charged Particle Moderation in a Single Material
- Multiple Use Consideration (e.g. Shield against Neutrons and Gammas, and Structural)
- Uniformity of Shielding Capability
- Very Flexible and Easily Adjustable to Various Irregular Shield Shapes and Configurations (esp. suitable for wrapping pipes used to transfer nuclear waste or radioactive materials)



Concrete storage casks at a U.S. nuclear power plant
(photo taken from Interim Storage of Spent Nuclear Fuel Report, June 2001)

Examples of The RSM Applications

- Nuclear Industries
- Nuclear Waste Stream (shipping and storage casks, pipes etc.)
- Protective Garments
- Space Missions
- Accelerators
- Medicine
- Decontamination and Decommissioning
- Food Industry (Sterilization)

Mechanical Properties Test Apparatus

