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Depleted Uranium: A Versatile Heavy Metal

Starmet, a materials technology company in Concord, Massachusetts, is a world leader in the private commercial production of depleted uranium (DU).

What is Depleted Uranium?

Depleted uranium (DU) is a byproduct of the manufacture of enriched uranium. DU is a low level radioactive metal that has about half the radioactivity of uranium found in nature.

DU has the Material Advantage of:

- High density and strength
- Ease of fabrication and economy of cost compared to similar materials
- Can be conventionally heat treated, cast, extruded, and machined
- Abundantly available, structurally stable and safe
- An effective shielding against high level radiation

Useful Applications are in:

- Medical Shielding
- Transport of Nuclear Fuel
- Military Ordnance
- Counterweights for Aircraft

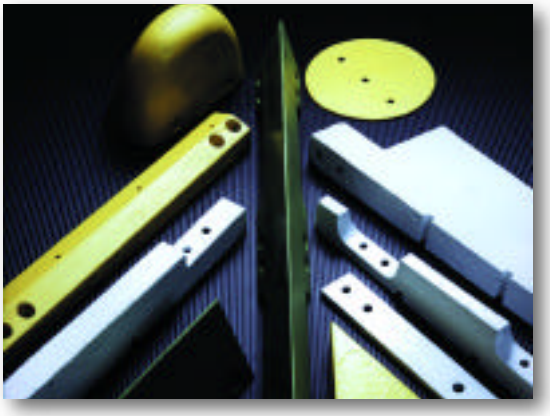
Typical Properties of Unalloyed Depleted Uranium

Density - 19.07 grams/cc or 0.689 lbs./in.^{3}
Melting Point - 2070^{0}F
Thermal Expansion - 10 x 10-^{6}/ ^{0}C (average)
Electrical Resistivity - Approx. 30 Microhm-cm at 273 ^{0}K

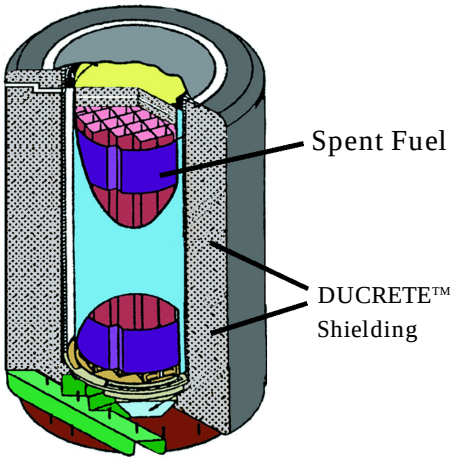
Mechanical Properties:

Ultimate Tensile Strength - 60,000 to 80,000 psi
Yield Strength (2% offset) - 25,000 to 45,000 psi
Elongation - 5% - 15%
Hardness - Rockwell B 65 to 90
Young's Modulus - Approx. 26 x 106 psi
Poisson's Ratio - .20

Starmet CMI, the Company's Barnwell South Carolina subsidiary, is the only Federal Aviation Administration certified repair / maintenance facility for DU counterweights serving both military and commercial aircraft.



DUCRETE™ Shielding for Storage and Disposal



Starmet has introduced DUCRETE™ shielding by converting DU to a highly efficient material with the shielding capability of steel and the cost-effective construction of poured concrete. DUCRETE™ shielding combines a rock-like aggregate made from DU oxide with cement and sand to provide a more effective barrier to radiation than concrete.

DUCRETE™ shielding is a superior structural material for nuclear shielding applications. Radiation levels from spent fuel and other radioactive wastes can be reduced to safe levels with thinner shield walls and lower weight casks with useful application for 560,000 metric tons of DOE owned depleted hexafluoride, (DUF_6).

Thickness Required to Reduce the Stated Unshielded Exposure Rate to 2.0 mR/HR

Photo (or Gamma Ray) Energy (MeV)	Unshielded Exposure Rate (mR/hr)	Iron (cm)	Tungsten (cm)	Lead (cm)	Uranium (cm)
0.50	1,000	13.70	2.68	3.78	1.86
1.00	1,000	18.50	5.98	9.15	4.92
2.00	1,000	25.20	9.11	14.70	8.31
4.00	1,000	30.50	10.00	16.10	9.15
6.00	1,000	32.20	9.47	15.20	8.64