



## From the Standards Blog

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### #29 For Your Reference

One of the oldest functions of government (extending back to the dawn of recorded history) is the establishment, maintenance, and policing of weights and measures. So important is this role that the framers of both the original Articles of Confederation of the United States, as well as the Constitution that replaced it, included the right to “fix the standards of weights and measures” in the powers that the citizens of the new nation granted to their government (see article 1, section 8 of the latter document).

The antiquity and utility of weights and measures is in part attributable to the fact that they can be represented by physical objects. There is perhaps no more intuitively understandable standard than a reference weight in a balance scale: this much sugar in one pan of a scale is equal to the kilogram weight in the other pan.

Not only weight, but other qualities of goods, of course, are significant as well, such as purity, ductility, optical clarity, and composition (as in alloys) to name but a few. Governments regulate many of these properties for a variety of reasons, from concern over public safety to facilitating their own procurement activities. In each of these cases, carefully manufactured and measured physical examples of standards (referred to as “reference materials”) can be created and used in the same conceptual way as weights in a scale.

So it is that the United States government has developed reference materials for additional purposes beyond “fixing the standards” of common, everyday weights and measures. In fact, it has developed *a lot* of reference materials, including quite a few that might never occur to you. Take “Multi Drugs of Abuse in Urine,” for example (3 bottles; \$336.00).

These materials have been established by the National Institute of Science and Technology (NIST), and you can order them through NIST’s helpful website <<https://srmors.nist.gov/pricerpt.cfm>> (major credit cards welcome). But touring that Website, as with so many other locations on the Web, can be a somewhat surreal experience.

Most of the thousands of materials that you will find there are rather mundane chemicals, alloys and the like. But what should we make of Toxic Metals in Bovine Blood (set (4), \$455.00)? What, we might ask, is the purpose of that reference material? Or perhaps we’d rather not know.

A number of sets of materials are equally intriguing. One collection relates to pollutants: domestic, commercial and as they have spread in the natural world. Consider, for example, the pleasantly alliterative Priority Pollutant PAHs (set (5) \$296.00), or the enigmatic Urban Dust (2.5 g, \$324.00). Or, more ominously, River Sediment (Radioactivity) (85 g, \$398.00). Or my personal favorite: Domestic Sludge (40 g, \$371.00).

Trying to guess the rationales for specific selections is a mystery in itself. Why, for example, can one purchase New York/New Jersey River Sediment A (50 g, \$527.00), but there is no entry (for example) for “New Hampshire/Connecticut River Sediment B”? And what’s the deal with San Joaquin Soil (50 g, \$314.00), among all other soils?

Rocky Flats Soil #1 Powder (85g, TBD) may ring a bell, and is therefore easier to figure out, but only up to a point. After all, Rocky Flats is the site of a former nuclear weapons factory, and is the subject of a

massive cleanup effort. But once having made that connection, a different question arises: Are you allowed to be as radioactive, but not more so, than Rocky Flats soil? Perhaps the reference soil has already been remediated (or so I hope).

Some materials are simply pleasant to read. There are, for example, Waspaloy (disk, \$449.00) and Equal Atom Lead (1 g wire, \$278.00). Google them if you must, or just repeat them to yourself, like the cartoon-character Zippy (Equal Atom Lead! Equal Atom Lead!)

Others are a challenge to pronounce, such as Adipate and Phthalates in Methanol (5x1.2 mL, \$312.00). Or just plain intimidating. Take, for example, Non-Newtonian Polymer Solution for Rheology – Polyisobutylene Dissolved in 2, 6, 10, 14-Tetramethylpent (100 mL, &736.00).

Then there are a few that are perky and fun, such as High-Energy Charpy (set \$489.00), Scheelite Ore (100 g, \$220.00) and Sugarcane Bagasse (50 g, \$193.00). Who cares what they are used for?

For a bit of tranquility in the middle of an otherwise technical list, it's also good to know that there is a place on line where you can replenish your supply of Apple Leaves (50 g, \$348), albeit at the cost of a bit of sticker shock. Or perhaps a small supply of Peach Leaves (50 g, \$337) is just right for you today.

Tranquility might be in short supply after visiting the selection of radioactive materials that NIST is apparently happy to ship to you. How about a bit of Plutonium-238 Solution (5 mL, \$788.00)? Or, for the more cost-conscious, NIST is offering it's popular Curium-243 Solution (5.1 g, \$451.00).

If neither of those brings a warm glow, there are powders, solutions and other preparations of Cesium-137, Cobalt-57, Europium-152, Strontium-90, Barium-133, Uranium-232, Americium-241, Thorium-229, Plutonium-242, Radium-228, Neptunium-237, Thorium-230, Yttrium-169, to name only a sampling of NIST's impressive product line in this category. (*Sorry, though: Radioactive materials cannot be ordered online. Please fax your order to 301 948 3730.*)

Had enough? Don't go yet. You haven't visited the food pavilion!

If you're just starting out, perhaps the Typical Diet (set (2) \$675.00) is right for you. For the more sophisticated, Meat Homogenate (4x85, \$428.00) may be just the thing, or the popular Oyster Tissue (25 g, \$573.00), or perhaps Trace Elements in Spinach Leaves (60 g, \$425.00). (It would be best if you didn't mention the Organics in Whale Blubber (2x15 g, \$378.00) to Greenpeace, though).

Oh – on a diet? Perhaps a visit to the forensic section will take your mind away off junk food. Over here, for example, we have Ashed Bone (Radioactivity) (15 g, \$475.00), as well as Human Lung Powder (45 g, \$404.00). No, I don't want that Twinkie, either.

If its not forensics but law enforcement that turns you on, then you might want to outfit your home lab with Cocaine + Metab in Urine (Set (4), TBD), or perhaps the elegantly named Drugs of Abuse in Human Hair I (100 mg \$554.00). Use the state-of-the art e-commerce technology at the NIST site to add any of these (and much more!) to your shopping cart.

Maybe the environment is your game, and PCB's in Human Serum (set (3), TBD), or Respirable Alpha Quartz (5 g, \$404.00) is what you need. Watch out for the Toxic Metals in Freeze-Dried Urine (set (4) TBD) though; that one's nasty.

You may be all shopped out by now, but if you're still looking for something for the Man Who Has Everything, then the Artificial Flaw for Eddy Current (each, \$605.00) may be just what you need.

Time to go? Best to bookmark the page before you do. After all, the holiday season will be here before you know it.

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