

# Catching up with the Metric System

by C.F. "Chubb" Michaud

Ever since mankind began trading one thing of value for another, there has been a need for a standard of measurement. In ancient times, body measurements provided the standards for length and what man or beast could lift became the standards for weight. Volume standards were jars or containers of a certain style, but not size. The earliest known standard was the Egyptian cubit (3000 BC). It was a unit of length of the arm measured from the elbow to the tips of the extended fingers and it varied greatly. Nonetheless, when recorded and duplicated, the royal cubit (about 20.62 inches, 524 mm) was used to build the Great Pyramid of Giza which varies no more than 4 ½ inches from side to side (755 feet). This is + 0.05%.

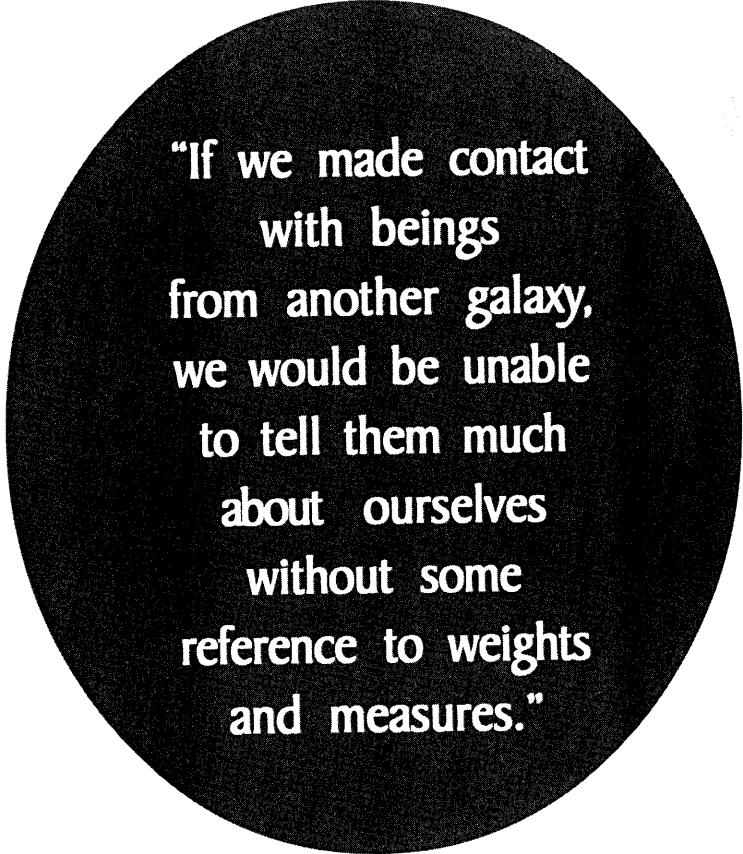
Each civilization had its own standards and the different tradesmen within that civilization each had their own standards as well, frequently with the same names as those from other trades. The Greeks, Romans, Egyptians, Babylonians, Hebrews, Hittites, Assyrians, Phoenicians, etc.,

each with their craftsmen, each with their wandering armies, contributed thousands of "standards" and tons (tonnes) of confusion. This was complicated even further when conquering militias forced changes in the language. It's no wonder that armies were used to settle border disputes rather than surveyors.

Much of this confusion remains with us today. We have liquid ounces, avoirdupois ounces, troy ounces and apothecary ounces. We have long tons and short tons, U.S. gallons and Imperial gallons. Even a U.S. liquid

quart (57.75 cubic inches) and a U.S. dry measure quart (67.20 cubic inches) differ, as does the British Imperial quart of 69.35 cubic inches.

As early as the mid 1600's, European scientists had discussed the desirability of a new, rational, and uniform system to replace the national and regional variants that made scientific communications difficult. After years of trial and error and debate, the metric system was born in France in June 1799 with the meter, the gram and the liter becoming standard units of length, weight and volume. The metric



"If we made contact with beings from another galaxy, we would be unable to tell them much about ourselves without some reference to weights and measures."

Table 1  
Metric System Nomenclature

Multiplier	Factor	Prefix	Symbol
1 000 000 000 000 000 000	$10^{18}$	exa	E
1 000 000 000 000 000	$10^{15}$	peta	P
1 000 000 000 000	$10^{12}$	tera	T
1 000 000 000	$10^9$	giga	G
1 000 000	$10^6$	mega	M
1 000	$10^3$	kilo	k
100	$10^2$	hecto	h
10	$10^1$	deka	da
0.1	$10^{-1}$	deci	d
0.01	$10^{-2}$	centi	c
0.001	$10^{-3}$	milli	m
0.000 001	$10^{-6}$	micro	$\mu$
0.000 000 001	$10^{-9}$	nano	n
0.000 000 000 001	$10^{-12}$	pico	p
0.000 000 000 000 001	$10^{-15}$	femto	f
0.000 000 000 000 000 001	$10^{-18}$	atto	a

system, a decimal system, is used throughout the world today with the exception of the United States and a few lesser industrialized countries. Greek prefixes (See Table 1) express multiples and Latin prefixes express fractions.

WC&P first approached metric awareness in December 1994 with an informative article on the history of the continued and stalled attempts for the U.S.A. to go on the metric system (Grover & Ives, "Metric System Inches Ahead"). Believe it or not, the metric system was adopted as a standard system for the U.S. back in 1893. Conversion to it, however, was not mandated and remains a voluntary issue even today. Despite the United States' adherence to the old standard, even the yard, the pound and the gallon are currently defined in terms of metric measurement. To prod "volunteers", however, the U.S. Government, including the Department of Defense, has begun convert-

## Everybody wants to know why our stuff works!

"How come it's so effective at high temperatures when other products I've tried aren't?"

"You mean I can use this as pre-treatment for my R.O. instead of a softener?"

"It's not supposed to handle that much iron and manganese."

"I didn't think it would work well with silica."

"How does it remove existing scale?"

"Why does it last so long?"

"That's not possible!"

"No way!"

"Way!"

### The answer is that we are not just a phosphate!

That is why we call it *HYDROBLEND*<sup>TM</sup> - a special formulated composition blended to exhibit superior limescale prevention and corrosion control. Our specially designed media delivery head (MDH) requires no electricity or moving parts. Consistent feed rates and total volumes treated are guaranteed.

We could tell you more, but then we'd have to kill you.

**sfes**  
SOUTHEASTERN  
FILTRATION &  
EQUIPMENT  
SYSTEMS  
P.O. Box 1068  
Canton, GA  
30114

**TRY THE PROVEN SOLUTION**

(770) 720-2800  
FAX (770) 720-2900

PHOS - HW  
PHOS - CW  
PHOS - FE



Certified to  
ANSI/NSF 60

• Circle 32 on Reader Service Card •

From Aerators to Zeolite, our buying power and industry reputation assures dealers they get top quality name brand products at competitive wholesale prices. Alamo Water® is the ONLY wholesale source you need for consolidating orders parts, and need for consolidating for equipment, supplies.



# Alamo Water®

Alamo Water Refiners. Inc., San Antonio, Texas  
 RO's .... engineered systems 150 to 200,000 gpd  
 SOFTENERS .... standard up to 2,000,000 grains  
 FILTERS ..... standard up to 6" pipe, 96" tanks  
 DEIONIZERS ..... standard up to 75 gpm

**Alamo Brand®** ... means quality built

14,000, catalog items from these vendors and more:

Principal center:  
**TEXAS:**  
 13700 Hwy. 90 W.  
 San Antonio,  
 TX 78245  
 800-659-8400

**FLORIDA:**  
 13414 Byrd Drive  
 Odessa, FL 33556  
 800-743-5510

**PENNSYLVANIA:**  
 101 Mortensen Rd.  
 Greenville, PA 16125  
 800-949-5100

**NEW JERSEY:**  
 240 Wagner Street  
 Middlesex, NJ 08846  
 800-949-5100

**INTERNET**  
[http://www.  
 AlamoWater.com](http://www.AlamoWater.com)

- |                              |                    |
|------------------------------|--------------------|
| <b>AMETEK</b>                | CARTRIDGE FILTERS  |
| <b>AMTROL</b>                | PRESSURE SYSTEMS   |
| <b>AquaMatic®</b>            | CONTROL VALVES     |
| <b>ARGO SCIENTIFIC</b>       | RO CHEMICALS       |
| <b>ATOCHEM</b>               | DISINFECTANT UNITS |
| <b>Autotrol</b>              | ACTIVATED CARBON   |
| <b>Bayer</b>                 | CONTROL VALVES     |
| <b>BLUE WHITE INDUSTRIES</b> | (MILES) RESINS     |
| <b>DESAL</b>                 | PUMPS / METERS     |
| <b>Ete</b>                   | RO MEMBRANES       |
| <b>FLECK</b>                 | VALVES             |
| <b>Fluid Systems</b>         | CONTROL VALVES     |
| <b>Harmasco</b>              | RO MEMBRANES       |
| <b>KOF</b>                   | INDUSTRIAL FILTERS |
| <b>MYRON L COMPANY</b>       | MEDIA              |
| <b>PARK INTERNATIONAL</b>    | CONTROLLERS        |
| <b>PULSAFEEDER</b>           | TANKS              |
| <b>ROHM &amp; HAAS</b>       | PUMPS              |
| <b>STRUCTURAL</b>            | MEDIA              |
|                              | TANKS              |



Photo: Florida office and warehouse.

• Circle 34 on Reader Service Card •

world without a mandated metric adoption program.

The water treatment industry is forced into using both English and metric standards because the U.S. trades all over the world. Bidding on foreign jobs often requires converting metric specifications to English and then back again. Many errors are made because of the general lack of familiarity with the metric units. Table 2 lists some helpful conversion factors to tuck into your workbooks for translating from one system to another.

## Summary

If we made contact with beings from another galaxy today, we would be unable to tell them much about ourselves, our climate or our way of life without some references to weights and measures. Our size, our diets, our homes and the color of our sky are, to a large extent, quantitative. If they were unable to duplicate our system of standards, or we theirs, we would learn or teach very little. The metric system provides those standards as well as universality and it's ease of use.

We in the U.S.A. have long recognized the simplicity of a decimal system, having converted our currency to it over 200 years ago. The English standards are outdated, confusing and insufficiently detailed to enter the 21st century. Even the English have abandoned them.

Distances are now measured in millions of miles and millionths of an inch and time must divide even the lowly "second" into tinier parts. Nano, pico, mega and giga are an everyday part of our language as are micro, kilo and milli. The metric system no longer represents a quantum leap into the unknown in order to achieve change.

Some day we will have a universal monetary system. Try finding something better than the value of one gram of pure gold. "Worth" may well be the next metric standard.

## Conclusions

The metric system is a logical and exacting system of weights and measures that should be embraced by all who have the opportunity to use it. We should support our educational system to press for its teaching and universal use. Try incorporating metric terminology into your every day vocabulary. Here's a start:

- You missed by 1.60934 kilometers.
- 28.349523 grams of prevention is worth 0.45359237 kilograms of cure.
- 25.4 millimeters of one, 2.54 centimeters of another.
- I'll have a 113.39809 grammer with cheese, please. □

## About the Author

Chubb Michaud is president and founder of Systematix Company of Brea, CA. His firm provides filter media, ion exchange resins and systems design. Michaud has over 25 years of hands-on experience in solving water treatment problems. You can reach him at (714) 990-5599, FAX (714) 990-5885.