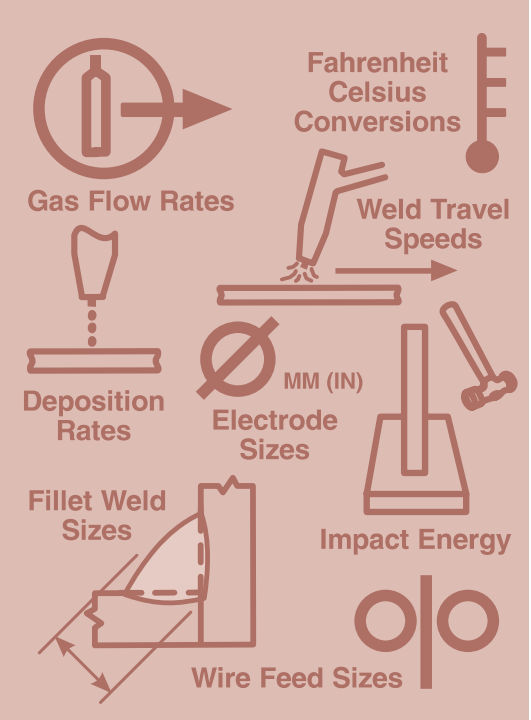

The Everyday Pocket Handbook on Metric Practices for the Welding Industry

Number 5 in a series

Compiled as a useful tool for on-the-job welding personnel by the AWS Product Development Committee

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Table of Contents

Why SI Units? 4
Table 1 SI Units 6
Table 2 Formulas for SI Derived Units 7
Table 3 Units Pertaining to Welding 8
Table 4 SI Prefixes 9
Table 5 Conversions for Common Welding Terms 10
Table 6 Length Conversions 13
Table 7 Electrode Sizes 15
Table 8 Fillet Weld Sizes 15
Table 9 Welding Travel and Wire Feed Speeds 16
Table 10 Deposition Rates 17
Table 11 Gas Flow Rates 18
Table 12 Impact Energy 19
Table 13 Pressure and Stress Equivalents 20
Table 14 Temperature Conversions 21
Table 15 Heat Input 22

Why SI Units?

This pocket handbook contains the accepted definition of the International System of Units (SI) as contained in the pertinent American National Standards Institute (ANSI) and International Standards Organization (ISO) documents.

The United States is one of the *very few countries* left using the U.S. customary measurement system. The world is now a global market. There will be many more conversions to SI units as U.S. companies compete in the world market.

SI is a modernized system of measurement. It was formally established in 1960 as the International System of Units, and is officially recognized by all industrial nations. It has features that make it superior to the U.S. customary system and to other metric systems. The advantages to be derived from these features require familiarity with the SI units to recognize the simplicity of their usage.

An absolute system has several advantages, the greatest of which is simplicity of calculation. For example, in SI units, a force of one newton gives a mass of one kilogram an acceleration of one meter per second squared. Confusion arises in the United States because the pound is used for either force or mass.

Coherence is the characteristic that relates any derived unit to any other, or to the base units from which it is formed, without the use of conversion factors. In SI units, a force of one newton applied through a distance of one meter does work equivalent to one joule, which equals

the work produced by one watt of power in one second.

Another desirable characteristic of SI is its use of only one unit for each physical quantity. The SI units of force, energy and power are the same regardless of whether the process is mechanical, electrical or thermal. Power, whether in engines or air conditioners, is measured in watts. By contrast, the U.S. customary system has nine commonly used units for area, twenty-five units for energy, twenty-six units for length, and so on.

SI is a decimal system, and thus, easier to use because it is easier to work in multiples of ten and in decimal notation than in the fractions and decimalized fraction equivalents common to the customary U.S. system.

The above combination of features makes SI an excellent system, suitable for all kinds of measurements. Though there remain areas that can and no doubt will be improved, SI is practical for universal application and is rapidly becoming the commonly used world measurement system.