

Part 450 – Technology

Part 480 – Metric System Use

NM480.1 Purpose

The purpose of this supplement is to provide policy and procedure for increasing use of the metric system of measurement within the Natural Resources Conservation Service.

NM480.2 Definitions

- a) Metric system means the International System of Units (or “Système International d’Unités,” abbreviated SI). It is further defined in the references cited in NM480.4(f).
- b) Inch-pound units means units of measurement in the English or conventional system now being used in the United States.

NM480.3 USDA Policy

Increasing use of the metric system within NRCS is to be accomplished in accordance with USDA Administrative Regulations issued September 27, 1977, which state, “The Department shall use the metric system in all its activities consistent with statutory, operation, economic, technical and safety considerations. When it is deemed not to be in the best interests of the Department to use the metric system, justification will be provided.... All new programs shall convert to the metric system....” These regulations follow the spirit and intent of the Metric Conversion Act of 1975 (P.L. 94-168).

NM480.4 NRCS Policy

The NRCS Metric Conversion Plan will be issued in coordination with the overall Federal plan now being drafted. In the meantime, it will be NRCS policy to:

- a) Increase awareness of all NRCS employees about the metric system and its use in the United States and elsewhere, and cooperate with USDA in awareness training and public information related to the metric system.
- b) Train NRCS employees as needed to furnish technical assistance in whatever system of measurement landowners and other cooperators need or used.
- c) Continue to increase the use of the metric system within NRCS. For example, whenever new technical material is developed for internal use, it should be written in metric units. Conversion factors should be shown for converting to inch-pound units. Dual units should be avoided.
- d) Record in metric units all technical parts of new soil surveys started October 1, 1979. A National Soils Handbook notice will give the necessary details.
- e) Establish metric coordinators.
 - 1) A national metric coordinator has been designated who will serve as chairperson of the National Office Metric Committee and represent NRCS in Departmentwide and Governmentwide actions on the subject.
 - 2) Each state conservationist and TSC director should name a staff member to serve as metric coordinator within the state or TSC area. Coordinators will monitor metric progress in the public and private sectors, relay employee or cooperator questions to the national metric coordinator, and coordinate metric conversion activities under the NRCS plan. The State Conservation Engineer is designated metric coordinator for New Mexico.

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NM480.4(f)

f) Make NRCS usage of metric units consistent with that of other USDA agencies and other Federal agencies, and consistent with policies of the U.S. Metric Board. The following references, in the order of authority, should be used:

1) 42 FR 56513 (dated October 26, 1977), “The Metric System of Measurement (SI).” This contains the interpretation and modification of the International System of Units for the United States.

2) ASTM E380-76, “Standard for Metric Practice” (or later edition).

g) Avoid duplication in written materials. TSC and state practice guides should not be issued. The references above contain the needed guides, method of rounding, pronunciation, and other information.

h) Use the preferred units in Subpart B of this instruction. This is a partial list of “Preferred Metric Units for General Use by the Federal Government,” adopted September 13, 1978, by the Metric Practice and preferred units Division of the Interagency Committee on Metric Policy. Some changes are expected as preferred units are coordinated between the public and private sectors.

PREFERRED METRIC UNITS

FOR GENERAL USE BY THE NATURAL RESOURCES CONSERVATION SERVICE (a)

Quantity	From	To	Multiply By (b)	
	Inch-Pound Units	Metric Units	Approximate	Exact
plane angle	0(degree)	rad	0.017	0.017 453 29
	0(degree)	o	1.0	*1.0
	1(minute)	1	1.0	*1.0
	"(second)	"	1.01	*1.0
length	in	cm	2.5	*2.54
	in	mm	25	*25.4
	ft (survey)	m	0.3	0.304 800 6 (c)
	yd	m	0.9	*0.9144
	mi	km	1.6	1.609 347 (c)
area	in ²	cm ²	6.5	*6.451 6
	in ²	mm ²	650	*645.16
	ft ²	m ²	0.093	*0.092 903 4
	Yd ²	m ²	0.84	0.836 127 4
	acre	hm	0.4	0.404 687 3 (c)
	acre	m ²	4000	4.046.873 (c)
	mi ² (survey)	km ²	2.6	2.589 998 (c)
volume	in ³	cm ³	16	16.387 06
	ft ³	L	28	28.316 85
	ft ³	m ³	0.028	0.028 316 85
	yd ³	m ³	0.76	0.764 554 9
	board foot	m ³	0.0024	0.002 359 737
	acre foot	m ³	1 200	1 233.489 (c)
	acre foot	dam ³	1.2	1.233 489 (c)
	pint (liq)	L	0.47	0.473 176 5
	quart (liq)	L	0.95	0.946 352 9
	gallon (liq)	L	3.8	3.785 412
	peck	L	8.8	8.809 768
	bushel	L	35	35.239 07
bushel	m ³	0.035	0.035 239 07	
time	d	d	1.0	*1.0
	h	d	1.0	*1.0
	min	m	1.0	*1.0
velocity	mi/h	km/h	1.6	*1.609 344
	ft/s	m/s	0.3	*0.304 8
acceleration	ft/s ²	m/s ²	0.3	*0.304 8
flow	ft ³ /s (formerly cfs)	m ³ /s	0.028	0.028 316 85
	gallon/min (formerly gpm)	L/s	0.063	0.063 090 20

Quantity	From	To	Multiply By (b)	
	Inch-Pound Units	Metric Units	Approximate	Exact
rates and yields	lb/acre	kg/ha	1.1	1.120 846 5
	bushels/acre	m ³ /ha	0.087	0.087 078 84
	tons/acre	t/ha	2.2	2.241 693
	in/h	mm/h	25	*25.4
	in/day	cm/d	2.5	*2.54
mass (weight)	oz (avdp)	g	28	28.349 52 (d)
	lb (avdp)	kg	0.45	*0.453 592 37 (d)
	ton (short)	t (metric ton)	0.0	*0.907 184 74 (d)
density	lb/ft ³	g/cm ³	0.016	0.016 018 46
	lb/ft ³	kg/m ³	16	16.018 46
force	lbf	N	4.4	4.448 222
pressure	atm (std)	kPa	100	*101.325
	lbf/in ² (formerly psi)	kPa	6.9	6.894 757
	ft H ₂ O	kPa	3.0	2.99
	in H ₂ O	kPa	0.25	0.249
stress	lbf/in ² (formerly psi)	kPa	6.9	6.894 757
	lbf/ft ² (formerly psi)	kPa	0.048	0.047 880 26
power	hp(550 ft-lbf/s)	kW	0.75	0.745 699 9
	hp (electric)	kW	0.75	*0.746
Celsius temperature	⁰ F	⁰ C	* ^t 0 _C = (^s 0 _F - 32)1.8	

a) The values shown in this table are from "Preferred Metric Units for General Use by The Federal Government," adopted September 13, 1978, by the Metric Practice and Preferred Units Division of the Interagency Committee on Metric Policy.

b) Two conversion factors are given. The "exact" factors are only when an asterisk is shown: otherwise they are accurate to seven significant digits. The "exact" values would be used in the laboratory or for work requiring a high degree of precision.

The approximate conversion factors are suggested for everyday work of NRCS and are within three percent of the "exact" factors. It is important in converting that the answer should not imply precision beyond that intended by the original value. For example, an 80-acre tract should be converted to 32 hectares, using the 0.4 conversion factor. To convert to a number using more significant digits would imply greater precision that actually exists.

c) The factors used in this table for survey mile, acre, acre foot, and square survey mile are based on the U.S. survey foot.

d) "Weight" is the commonly used term for "mass."