

Definitions of the soil texture classes -- Soil Survey Manual

Sands.—More than 85 percent sand, the percentage of silt plus 1.5 times the percentage of clay is less than 15.

Coarse sand. A total of 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.

Sand. A total of 25 percent or more very coarse, coarse, and medium sand, a total of less than 25 percent very coarse and coarse sand, and less than 50 percent fine sand and less than 50 percent very fine sand.

Fine sand. 50 percent or more fine sand; or a total of less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.

Very fine sand. 50 percent or more very fine sand.

Loamy sands.—Between 70 and 91 percent sand and the percentage of silt plus 1.5 times the percentage of clay is 15 or more; and the percentage of silt plus twice the percentage of clay is less than 30.

Loamy coarse sand. A total of 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.

Loamy sand. A total of 25 percent or more very coarse, coarse, and medium sand and a total of less than 25 percent very coarse and coarse sand, and less than 50 percent fine sand and less than 50 percent very fine sand.

Loamy fine sand. 50 percent or more fine sand; or less than 50 percent very fine sand and a total of less than 25 percent very coarse, coarse, and medium sand.

Loamy very fine sand. 50 percent or more very fine sand.

Sandy loams.—7 to 20 percent clay, more than 52 percent sand, and the percentage of silt plus twice the percentage of clay is 30 or more; or less than 7 percent clay, less than 50 percent silt, and more than 43 percent sand.

Coarse sandy loam. A total of 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.

Sandy loam. A total of 30 percent or more very coarse, coarse, and medium sand, but a total of less than 25 percent very coarse and coarse sand and less than 30 percent fine sand and less than 30 percent very fine sand; or a total of 15 percent or less very coarse, coarse, and medium sand, less than 30 percent fine sand and less than 30 percent very fine sand with a total of 40 percent or less fine and very fine sand.

Fine sandy loam. 30 percent or more fine sand and less than 30 percent very fine sand; or a total of 15 to 30 percent very coarse, coarse, and medium sand; or a total of more than 40 percent fine and very fine sand, one half or more of which is fine sand, and a total of 15 percent or less very coarse, coarse, and medium sand.

Very fine sandy loam. 30 percent or more very fine sand and a total of less than 15 percent very coarse, coarse, and medium sand; or more than 40 percent fine and very fine sand, more than one half of which is very fine sand, and total of less than 15 percent very coarse, coarse, and medium sand.

Loam.—7 to 27 percent clay, 28 to 50 percent silt, and 52 percent or less sand.

Silt loam. 50 percent or more silt and 12 to 27 percent clay, or 50 to 80 percent silt and less than 12 percent clay.

Silt. 80 percent or more silt and less than 12 percent clay.

Sandy clay loam. 20 to 35 percent clay, less than 28 percent silt, and more than 45 percent sand.

Clay loam. 27 to 40 percent clay and more than 20 to 46 percent sand.

Silty clay loam. 27 to 40 percent clay and 20 percent or less sand.

Sandy clay. 35 percent or more clay and 45 percent or more sand.

Silty clay. 40 percent or more clay and 40 percent or more silt.

Clay. 40 percent or more clay, 45 percent or less sand, and less than 40 percent silt.

The texture triangle is used to resolve problems related to word definitions, which are somewhat complicated. The eight distinctions in the sand and loamy sand groups provide refinement greater than can be consistently determined by field techniques. Only those distinctions that are significant to use and management and that can be consistently made in the field should be applied.

(SOIL) TEXTURE

This is the numerical proportion (percent by weight) of sand, silt, and clay in a soil. Sand, silt, and clay content is estimated in the field by hand (or quantitatively measured in the office/lab by hydrometer or pipette) and then placed within the texture triangle to determine **Texture Class**. Estimate the **Texture Class**; e.g., *sandy loam*; or **Subclass**; e.g., *fine sandy loam* of the fine earth (≤ 2 mm) fraction, or choose a **Term in Lieu of Texture**; e.g., *gravel*. If appropriate, use a **Textural Class Modifier**; e.g., *gravelly silt loam*.

NOTE: Soil Texture encompasses only the fine earth fraction (≤ 2 mm). **Particle Size Distribution (PSD)** encompasses the whole soil, including both the fine earth fraction (≤ 2 mm; weight %) and rock fragments (> 2 mm; volume %).

TEXTURE CLASS

Texture Class or Subclass	Code	
	Conv.	NASIS
Coarse Sand	cos	COS
Sand	s	S
Fine Sand	fs	FS
Very Fine Sand	vfs	VFS
Loamy Coarse Sand	lcos	LCOS
Loamy Sand	ls	LS
Loamy Fine Sand	lfs	LFS
Loamy Very Fine Sand	lvfs	LVFS
Coarse Sandy Loam	cosl	COSL
Sandy Loam	sl	SL
Fine Sandy Loam	fsl	FSL
Very Fine Sandy Loam	vfsl	VFSL
Loam	l	L
Silt Loam	sil	SIL
Silt	si	SI
Sandy Clay Loam	scl	SCL
Clay Loam	cl	CL
Silty Clay Loam	sicl	SICL
Sandy Clay	sc	SC
Silty Clay	sic	SIC
Clay	c	C

Tips on USDA Texture Identification

The common field method of determining the class name of the soil is by its feel. Much can be judged by the texture and hence the class name of a soil by rubbing it between the thumb and fingers as by any other means other than laboratory analysis. It is helpful to wet the sample to estimate plasticity and stickiness more accurately. The way a wet soil "slicks out" gives a good idea as to the amount of clay present. Sand particles are gritty, whereas silt has a flowery or talcum powder-like feel when dry, and a buttery feel when wet. Clay particles feel sticky when wet. Determining soil texture in the field requires skill and experience, but good accuracy can be obtained if frequent checks are made against laboratory results or reference samples.

The soil must be well moistened and rubbed between the fingers for proper determination of the textural class by feel. The following guidelines are provided for the determination of:

- 1) Texture in general terms and
- 2) The basic USDA Textural Classes.

1. SAND

- a. Very gritty
- b. Does not form a ball
- c. Does not stain the fingers

2. LOAMY SAND

- a. Very gritty
- b. Forms easily broken ball
- c. Stain the fingers slightly

3. SANDY LOAM

- a. Moderately gritty
- b. Forms fairly firm ball that is easily broken
- c. Definitely stain the fingers

4. LOAM

- a. Neither very gritty nor smooth
- b. Forms firm ball
- c. Stain the fingers but does not ribbon

5. SILT LOAM

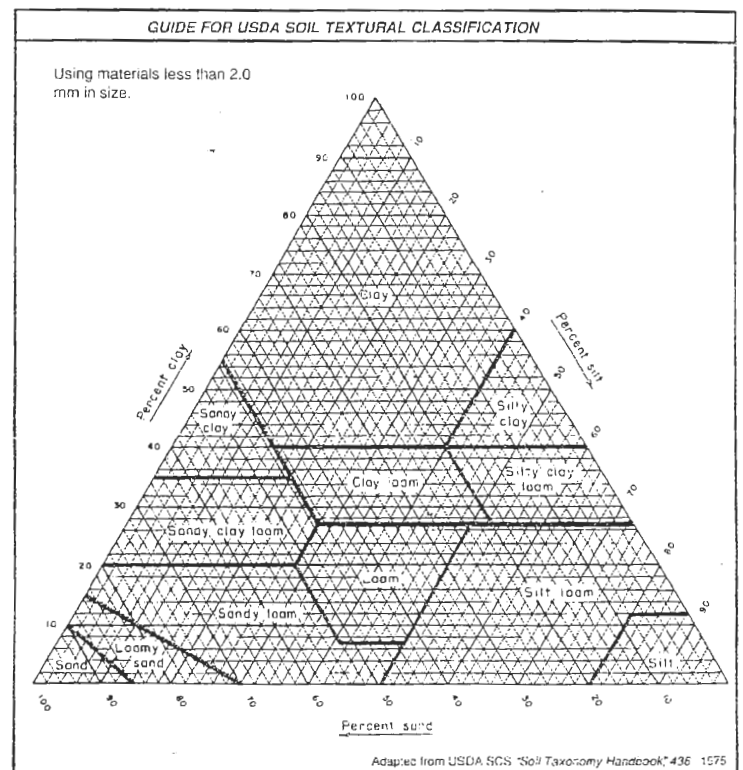
- a. Smooth or slick "buttery" feel
- b. Forms firm ball
- c. Stain the fingers and has a slight tendency to ribbon with flaky surface

6. SILTY CLAY LOAM

- a. Moderately sticky and very smooth
- b. Stain the fingers
- c. Will ribbon out with some flaking on ribbon surface

7. SILTY CLAY

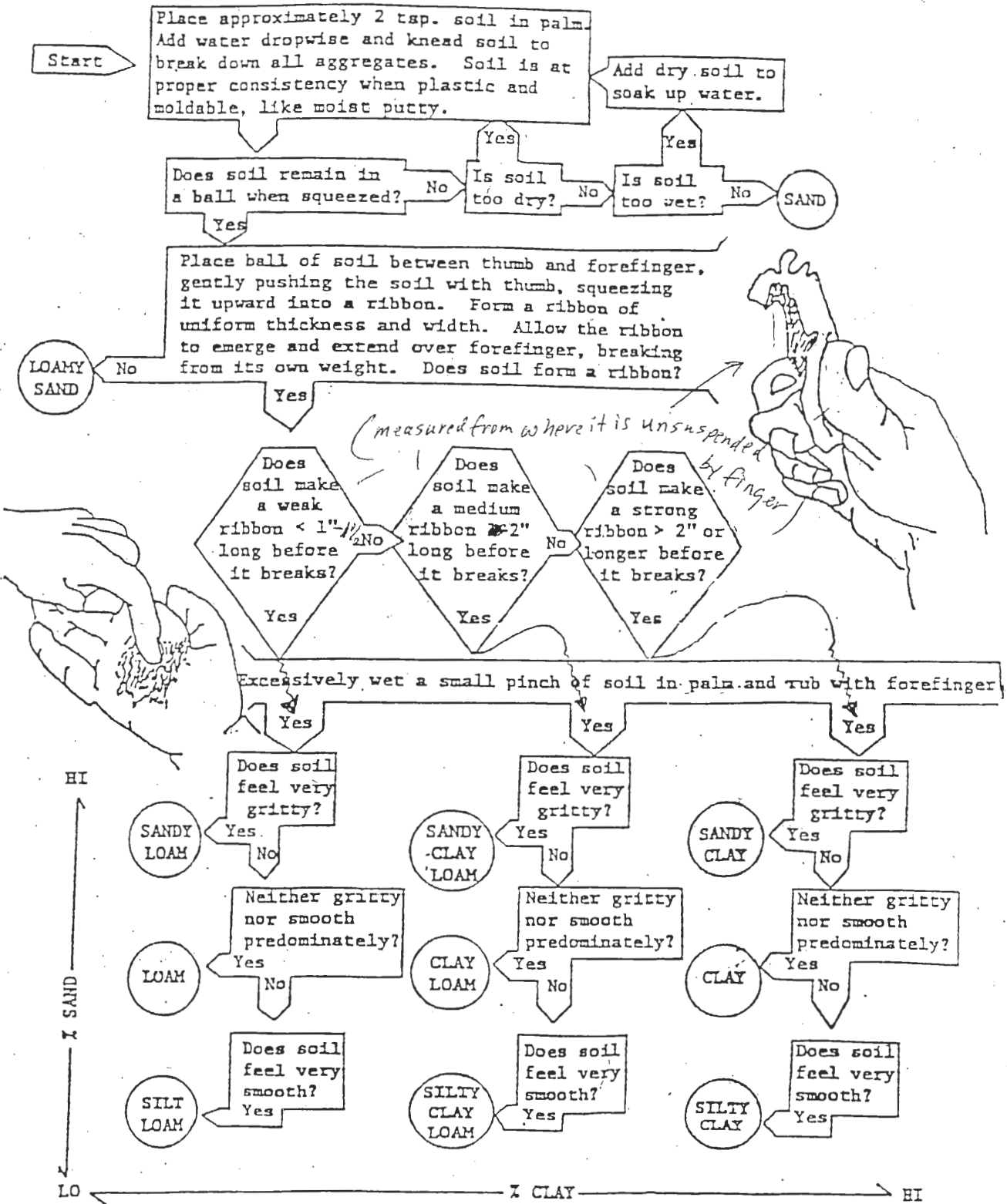
- a. Sticky feel
- b. Forms ball that when dry cannot be crushed with the fingers
- c. Stain the fingers
- d. Forms a long ribbon



DEFINITION OF PROPERTIES OF SEVERAL SOIL TEXTURE CLASSES
USEFUL FOR FIELD DETERMINATIONS

<u>TEXTURE CLASS</u>	<u>PROPERTIES</u>
Sand	A coarse-textured soil. A sand in a wet or moist state will form a cast which will crumble when touched. In a dry state sand is loose and single grained and will not form a cast.
Sandy Loam	Sand grains readily felt with enough silt and clay present to bind particles. Sandy loams when moist will form a cast which will withstand pressure. A dry cast will crumble and readily fall apart. When rubbed between fingers a sheen forms on the rubbed surface. Sandy loams will not ribbon.
Loam	A medium-textured soil. A loam has a relatively even mixture of sand, silt and clays. It is mellow, may feel somewhat gritty, slightly smooth and plastic. Dry casts will bear careful handling. Moist casts can withstand pressure.
Silt Loam	A medium-textured soil. A silt loam when dry has a floury or talcum powder feel and is slightly plastic when wet. When dry it appears cloddy and can be readily broken. Silt loam will ribbon slightly but will form cracks and have a broken appearance. Wet silt loam forms casts that will withstand rough handling.
Clay Loam	A fine-textured soil that forms hard lumps or clods when dry. Clay loam in a moist state will form a ribbon that will break readily, barely sustaining its own weight. When moist it is plastic and readily forms a cast. It has a smooth feel but some grittiness can be detected when rubbed between fingers.
Clay	A fine-textured soil that forms hard aggregates when dry. Clay in a moist state forms ribbons, is sticky, plastic and will exhibit a bright sheen when rubbed. No coarse fragments (sand), can be detected by rubbing between fingers or on the edge of teeth.

SOIL TEXTURE BY FEEL



Adapted from: Thien, Steve J. 1979. A flow diagram for teaching texture-by-feel analysis. Journal of Agronomic Education, 8:54-55.

Series or Component Name: _____ Classification: _____ Date: _____

Descriptor(s): _____ Location: _____

Pedon ID Info: Elevation: _____ Slope: _____ Aspect: _____ Slope Shape: (Up & Dn / Across) _____

Parent Material: Bedrock: _____ Drainage: _____ Flooding: _____ Ponding: _____ Soil Moisture Status: _____

Other Features: Surface Frag %:GR: _____ CB: _____ ST: _____ BD: _____ CN: _____ FL: _____ Diagnostic Horizons: _____

VEGETATION

SYMBOL _____ COMMON NAME _____ % GRND COVER _____

SOIL HORIZON INFORMATION										
Layer Number	Sampled (Yes/No)	Horizon Designation	Depth (cm) (top-bottom)	Lower Endry	Matrix Color Moist	Texture	Rock Frag % & Size (note all sizes)	Grade	Structure Size Type	Consistence Moist
1										
2										
3										
4										
5										
6										
7										
8										

Layer Number	Redoximorphic Features -1 % Size Contrast Color	Redoximorphic Features -2 % Size Contrast Color	Roots Quantity & Size (note all sizes)	pH	Other Features and Notes
1					
2					
3					
4					
5					
6					
7					
8					

MISCELLANEOUS FIELD NOTES / SKETCH