

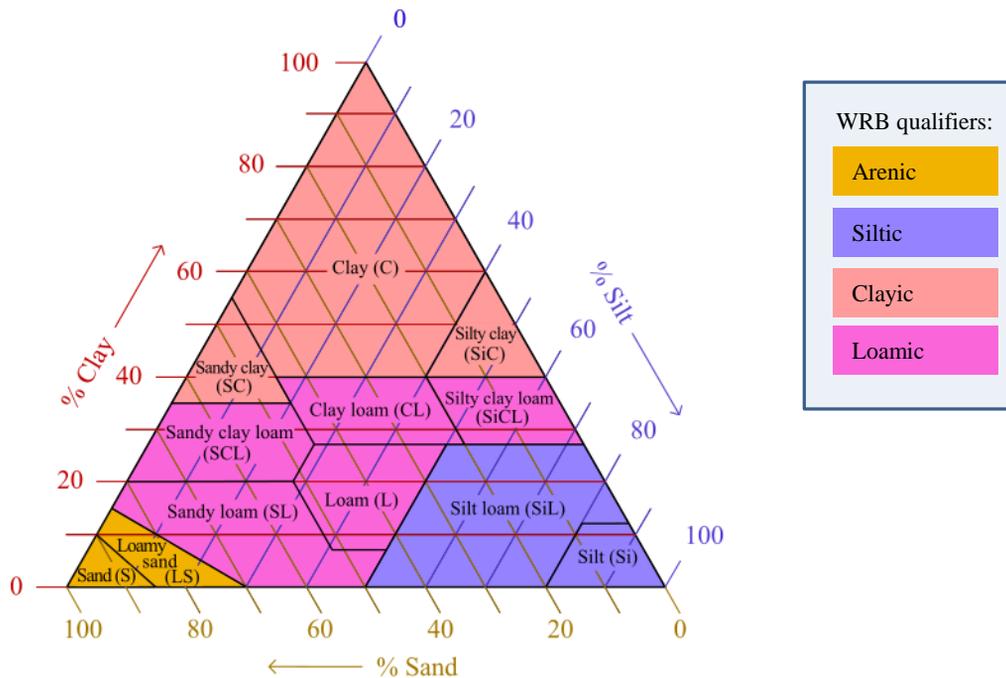
The Ultimate Soil Texture Flow Chart (USTF)

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18 September 2020

This flow chart only provides an estimation of the texture. Especially around the limits between the classes, the results might be not absolutely precise.

Particle-size classes, according to ISO 11277:2009

Particle-size class	Diameter of particles
Fine earth	all particles ≤ 2 mm
Sand	$> 63 \mu\text{m} - \leq 2$ mm
Very coarse sand	$> 1250 \mu\text{m} - \leq 2$ mm
Coarse sand	$> 630 \mu\text{m} - \leq 1250 \mu\text{m}$
Medium sand	$> 200 \mu\text{m} - \leq 630 \mu\text{m}$
Fine sand	$> 125 \mu\text{m} - \leq 200 \mu\text{m}$
Very fine sand	$> 63 \mu\text{m} - < 125 \mu\text{m}$
Silt	$> 2 \mu\text{m} - \leq 63 \mu\text{m}$
Clay	$\leq 2 \mu\text{m}$



Texture classes triangle, from Blum et al. (2018), Figure 28, modified

Texture classes, according to NRCS Soil Survey Manual (2017)

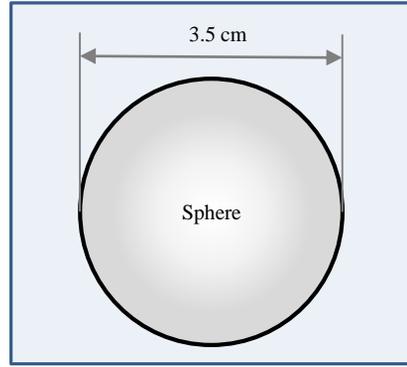
Texture class	% sand	% silt	% clay	Additional criteria
Sand (S)	> 85	< 15	< 10	$(\% \text{silt} + 1.5 \times \% \text{clay}) < 15$
Loamy sand (LS)	> 70 to ≤ 90	< 30	< 15	$(\% \text{silt} + 1.5 \times \% \text{clay}) \geq 15$ and $(\% \text{silt} + 2 \times \% \text{clay}) < 30$
Silt (Si)	≤ 20	≥ 80	< 12	
Silt loam (SiL)	≤ 50	≥ 50 to < 80	< 27	
	≤ 8	≥ 80 to ≤ 88	≥ 12 to ≤ 20	
Sandy loam (SL)	> 52 to ≤ 85	≤ 48	< 20	$(\% \text{silt} + 2 \times \% \text{clay}) \geq 30$
	> 43 to ≤ 52	≥ 41 to < 50	< 7	
Loam (L)	> 23 to ≤ 52	≥ 28 to < 50	≥ 7 to < 27	
Sandy clay loam (SCL)	> 45 to ≤ 80	< 28	≥ 20 to < 35	
Silty clay loam (SiCL)	≤ 20	> 40 to ≤ 73	≥ 27 to < 40	
Clay loam (CL)	> 20 to ≤ 45	> 15 to < 53	≥ 27 to < 40	
Sandy clay (SC)	> 45 to ≤ 65	< 20	≥ 35 to < 55	
Silty clay (SiC)	≤ 20	≥ 40 to ≤ 60	≥ 40 to ≤ 60	
Clay (C)	≤ 45	< 40	≥ 40	

Prepare a soil sample:

1. Take a sample of approx. 25 g of bulk soil.
2. Remove all coarse fragments (> 2 mm) and roots.
3. Add water slowly and destroy all aggregates thoroughly. For kaolinitic soils, take extra care to destroy pseudosand structure by prolonged squeezing.
4. Sample (except if very sandy) is at the proper consistency when plastic.
5. Form a sphere with a diameter of approx. 3.5 cm by rolling soil between both palms.

Yes
No

Add dry soil for optimum consistency.



Can you easily roll a sphere?

Is soil too dry?

Is soil too wet?

Does soil stain fingers and/or remain in finger rills?

SAND (S)

LOAMY SAND (LS)

Squeeze the sphere between thumb and forefinger. Is it deformable with low forces?

Place a piece of soil in your palm and rub it with the thumb of your other hand. Does soil form flakes and/or feel floury?

Does soil feel very gritty?

Squeeze the sphere between thumb and forefinger. Is soil shapeable and/or adheres to the fingers and/or has grains to feel?

SANDY LOAM (SL)

LOAM (L)

SILT LOAM (SiL)

SILT (Si)

Note: The 'floury' feeling of silt may also be described as 'soapy' or 'silky'.

Place a piece of soil in your palm and rub it with the thumb of your other hand. Does soil smear but not take a polish and does soil not feel very sticky?

Does soil feel very gritty?

Does soil form flakes and/or feel floury?

None of the former predominates.

SANDY CLAY LOAM (SCL)

SILTY CLAY LOAM (SiCL)

CLAY LOAM (CL)

Soil takes a polish and feels very sticky, like plasticine or moist putty.

Does soil feel very gritty?

Does soil form flakes and/or feel floury?

None of the former predominates.

SANDY CLAY (SC)

SILTY CLAY (SiC)

CLAY (C)

WRB qualifiers:

- Arenic
- Siltic
- Clayic
- Loamic

Flow Chart, ideas adapted from
 - Natural England Technical Information Note TIN037 (2008)
 - S.J. Thien, A flow diagram for teaching texture by feel analysis, Journal of Agronomic Education, 8:54-55 (1979), downloaded from NRCS