

SOIL CLASSIFICATION

The Soil Texture (85) System came into operation in the Autumn of 1985. This is a system introduced by ADAS which all interested parties have agreed to adopt. How to determine the texture of a soil, by hand, under this new system is described below.

Hand texturing

To determine the texture of a soil, first moisten it gradually until there is sufficient moisture to hold the particles together. Addition of water in excess of this moist state must be avoided until later in the assessment. Take a small amount of the moistened soil and knead it between fingers and thumb, working the soil down thoroughly to eliminate the effects of structure. The proportions of sand, silt and clay in the soil are estimated as follows:

The dominance of sand is related to the degree of grittiness in the sample, the dominance of silt is associated with a smooth, soapy or silky nature to the soil and the amount of silt plus clay is assessed by the ease with which the soil moulds into a coherent ball and the force required to deform this ball. The proportion of silt and clay in the soil is also related to the extent to which the thumb can induce smearing and polish.

Add more water to the moist soil until the point of maximum stickiness is reached. Stickiness is measured by the force required to separate forefinger and thumb - the greater the clay content, the more sticky the soil.

The feel of the soil is strongly affected by the organic matter content which usually makes the soil feel more silty. The presence of appreciable organic matter, additional to that normally found in topsoils, can in most cases be identified by the dark colour of the soil and the silty nature (silky soapy feel) it confers to the soil. Additional organic matter confers cohesion to sandy soils but reduces the cohesion of clays.

Using the keys

It is first necessary to decide if the soil is mineral (Key 1) or organic or peaty (Key 2). Most arable soils are mineral, with less than 6 to 10% organic matter. Organic soils are associated with a darker colour and smoother feel. Organic sands are generally better aggregated, and organic clays have weaker clods that produce a finer tilth. Dark coloured sandy topsoils over podzolic soils are usually mineral and not organic. The location of the soil gives some indication; poorly drained soils that have been permanent grassland may be organic, and soils occurring in fenland may be peaty

Key 1 - The identification of mineral soil textures by hand texturing

Take about a dessertspoonful of soil. If dry, wet up gradually, kneading thoroughly between finger and thumb until any aggregates are broken down. Enough moisture is needed to hold the soil together and for the soil to exhibit its maximum cohesion.

Answer each question in turn and depending on the answer, yes or no, go on to the next question until the texture is reached.

No.	Question	Answer	Go to
1	Does the soil feel or sound noticeably sandy?	Yes No	2 6
2	Does the soil lack all cohesion?	Yes No	Sand 3
3	Is it difficult to roll the soil into a ball?	Yes No	Loamy Sand 4
4	Does the soil feel smooth and silky as well as sandy?	Yes No	Sandy Silt Loam 5
5	Does the soil mould to form a strong ball which smears without taking a polish*?	Yes No	Sandy Clay Loam Sandy Loam
6	Does the soil mould to form an easily deformed ball and feel smooth and silky?	Yes No	Silt Loam 7
7	Does the soil mould to form a strong ball which smears without taking a polish*?	Yes No	8 10
8	Is the soil also sandy?	Yes No	Sandy Clay Loam 9
9	Is the soil also smooth and silky?	Yes No	Silty Clay Loam Clay Loam
10	Does the soil mould like plasticine, polish and feel very sticky when wetter?	Yes No	11 Start again, unless soil is organic. If so, use Key 2.
11	Is the soil also sandy?	Yes No	Sandy Clay 12
12	Is the soil also smooth and buttery?	Yes No	Silty Clay Clay

*Polish when rubbed the soil surface becomes smooth and shiny

Key 2 - The identification of Organic Soils by Hand Texturing

No.	Question	Answer	Go to
1	Is the soil very black, loose and with a low density?	Yes No	Peat 2
2	Is the soil grey to black; does it bind to form a ball which breaks readily? (soil may be granular)	Yes No	3 4
3	Is the soil also sandy?	Yes No	Sandy Peat Loamy Peat
4	Is the soil grey; does it bind to form a ball that holds together firmly and feels smooth?	Yes No	Peaty Loam 5
5	Is the soil dark coloured but the mineral component dominant?	Yes No	Add "organic" to the mineral soil texture. Start at mineral soil textures Key 1.

SOIL TEXTURE (85) SYSTEM

Textural Class	Symbol	Textural Group
Coarse sand Sandy Fine sand Loamy coarse sand	CS S FS LCS	Sands
Loamy sand Loamy fine sand Coarse sandy loam	LS LFS CSL	Very light soils
Sandy loam Fine loam Sandy silt loam Silt loam	SL FSL SZL ZL	Light soils
Sandy clay loam Clay loam Silty clay loam	SCL CL ZCL	Medium soils
Sandy clay Clay Silty clay	SC C ZC	Heavy soils

NOTES:

1. Adsorptive capacity for pesticides increases with soil organic matter content.
2. Organic matter content tends to increase with clay content. For example in arable areas of Midland and Southern England, clays generally contain 2.8 to 4.0% organic matter, compared with 1.0 to 1.5% in loamy sands.
3. For each textural group the organic matter content within a particular area will be lowest under continuous arable cropping and highest in ley-arable systems. Soil organic matter generally increases with annual rainfall and distance North and West.
4. The prefix 'organic' is applied to the above mineral texture classes if organic matter levels are relatively high. The 'sands' and loamy sands however appear organic when they only contain about 6% organic matter whereas 'clays' appear organic at about 10%. Organic matter levels between 1 and 10% cannot be detected by texture and must be determined by analysis.
5. The prefix 'peaty' is applied when organic matter levels are between 20% and 35%.
6. 'Peat soils' are those containing more than 35% of organic matter.
7. The organic matter percentages refer to the values determined by the chromic acid oxidation technique and not by the loss on ignition technique, which can produce considerably higher values.
8. The risk of herbicide leaching on stony or gravelly soils is greater and textural grouping for such soils may need to be modified. In 'stony soils', stone (particles greater than 2 mm) content is 5-15% by volume. In very stony soils stone content is more than 15%.
9. The prefix calcareous (Calc) is applied when soils contain more than 5% calcium carbonate.