



ANDEREN LIMITED



Registered in England number 4514202



Wherever in the world quality matters Pfefferkorn Plasticity Tester

Overview

A Pfefferkorn Clay Hardness Tester suitable for the evaluation of ceramic materials workability, plasticity and moisture content

Details

The Anderen Pfefferkorn Apparatus is based on the verification of the deformation of the sample as a result of the fall of the calibrated plate on the underlying test body shaped by means of the ancillary shaping tool.

Features

The apparatus has 2 reading scales: one measures the deformation in mm; the second one



determines the test body deformation according to the Pfefferkorn Theory

This measurement can be used to assess the plasticity of a clay body.

It is possible to get an approximation of moisture content of the clay body from the plasticity reading. To do that you need to create a graph of readings against moisture.

First make up a sample and check the moisture content using a balance and oven or a moisture balance. Then take a series of readings as the sample dries out. On each test also check moisture levels. From this data create a curve and this can then be used to simply assess moisture content

Includes a test body shaping tool

Dimensions: 250x370x480 mm

Weight: 24 kg

Product Code

Pfefferkorn Apparatus (inc shaping tool) PFEF

Spare Sample making tool PFEFTOOL

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Pfefferkorn Theory

Please note all examples are just to show a principle and do not suggest that these numbers are ideal or not

The Anderen Pfefferkorn apparatus is designed to give a repeatable test of an indication of the plasticity of a clay body. It is based on the Pfefferkorn theory of plasticity in clay based materials (not exclusively for manufacture of ceramics)

It does not give a direct reading for moisture content although it is possible to get a theoretical answer using a graph that the end user needs to create

It also does not say directly that one sample is better than another. This has to be established by experiment. However, once the experiment is done and figures are known for a workable material it offers a repeatable test to indicate if the clay is OK to use or not

The plasticity of clay is effected by the recipe used for the material and by the water content

A plastic clay body is usually made using a mixture of different types of clay and other materials. The end user needs to establish what this recipe is. The reason for different recipes is that different applications require the clay to have different properties. There is a lot of theory about this but it is outside the scope of a discussion about the Pfefferkorn equipment

Apart from the mixture of clay used, plasticity will also be effected by the amount of moisture present in the body.

In all cases, when a clay body is produced in quantity, it needs to be processed – mixed - and then goes through a pug mill to produce a clay “sausage”. In theory if you use exactly the same recipe every time you will get the same result, but things are not quite that simple.

The clay used originally could have a higher or lower moisture content – much of this can depend on environmental conditions.

So, say for example, you have 50 kg of one type of clay (A) and 30kg of another type of clay (B) in the mix. The plasticity would be different if the moisture content of (A) was higher or lower than normal – the same will apply to (B)

What we mean is that if your formula says 50kg A + 30kg B + 20litres water the actual total moisture content will be 20litres + water content of A + water content of B

Since moisture content of the raw materials is likely to be variable, the body that is produced will also have a variable water content, if a simple recipe is used

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Next, we need to consider what happens to the clay once it has been produced. If it is stored in a humid atmosphere it will absorb more water. If in a dry atmosphere it will lose water and so over storage time the plasticity can change.

The idea that you simply pug the clay and see if it cracks is far too simple and only considers the clay at the point of manufacture where in fact it is as important to check immediately before use.

Few technicians have the ability to assess the plasticity of the clay accurately by sight or by feel.

The requirement for certain plasticity of clay will very much depend on the application or what the clay will be used for. Different applications need different plasticity. This cannot be calculated from a measuring instrument but is by experimentation. Test a variety of clays of different types of recipe with different plasticity and find the ideal one for the job

Once an ideal recipe for the application has been established, the Anderen Pfefferkorn apparatus is a very useful instrument to test individual batches of clay to ensure that they meet the requirements of the application. Knowing this is helpful because it can show if a material is too wet to use (in which case it could be dried first or too dry – it could be moistened in this case but usually needs reworking

Do you need to know moisture content? - Two answers, yes and no

Let us go back to our original recipe. If you know how much water is in Clay A and Clay B you could adjust the amount of water you use in the recipe, adding more if it is too dry and less if it is too wet

And so if you have a simple apparatus that can give you that answer that is a useful tool

Do you need to know the moisture content of the prepared body – practically the answer can be NO. You need to know if the plasticity is correct or more importantly if the material is OK to use in the application. So as with many measurements you are really more interested in a “OK for use” or “not OK for use” answer.

What we mean by this is that if, for example, we know that if we have an answer from the Pfefferkorn apparatus of 30 and that is perfect and that if the answer is between 28 and 32 it is still workable we have established limits of acceptability. However, if we test the material and get an answer of below 28 or over 30 we know that the material is too wet or too dry – plasticity too high or too low

You cannot get this sort of information by simply pugging a clay recipe

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