Core Form Comments

new definitions are confusing

The present definitions together have the advantage to clearly express the basic difference of core- and shell-form transformers. This is more difficult to see with the proposed changes.

The new core form definition does not make sense with two common yokes and one (or more) vertical leg – there cannot be two yokes and one leg - this is physically impossible and should be two or more leg

After studying definitions of the terminology used, I am still confused by the proposed definitions. For one thing, I do not understand how the two coils used in a typical core-type single phase transformer could be considered as being arranged concentrically. Perhaps figures like Figures 5 and 6 of IEEE C57.105-1978 and the simplified definitions in Sub-clause 3.1.5 of that standard would be advantageous.

Include some simple figures following the definition.

I don't think that the physical orientation of the transformer in space has any place in the definitions.

Remove any reference to direction of coil, since coils may be arranged in any direction.

I would not use the term is "vertical legs", just "legs" as many traction transformers are core-type, however in horizontal position.

Wording about yokes and "partially surrounded" is similar for both designs and makes more difficult distinguishing real difference vs common features.

Why do the legs of a core form have to be vertical?

Legs of a core form type are not limited to vertical.

Core-form definition does not specifically describe the coil winding's orientation is along the core legs.

Leave out "partially"

"partially surround" is not necessary

"partially surround the magnetic core "does not provide clear information for the construction.

Core form is not necessarily to limited to concentrically, and both proposal have the word " partially " need more clear and shorter definition.

In a number of core form transformers; such as those with outer limbs, the windings do not surround the magnetic circuit.

These definitions do not well define wound-core designs. they may be satisfactory for Class II power transformers but doubt that they adequately cover Class I or Distribution.

In wound core transformers, the windings are not concentric because they are not circular. Is the definition intended to apply to small wound core distribution transformers? Wound core Distribution transformers have a number of different core / winding arrangements.

A core type transformer has two magnetic circuits whereas the shell type transformer has one magnetic circuit.

For power transformers the windings are circular windings and the core has two or more vertical limbs.

In a number of core form transformers, such as those with side limbs, the windings do not surround the magnetic circuit.

For distribution transformers stacked the core shapes could be round, rectangular, two step oval or multistep oval. Also, for distribution transformer, wound core transformers, the core is not round. In consequence the windings are not concentric because they are not circular.

"concentric" word would confuse rectangular or wound core types which are "core – type".

Proposed Definitions – Core Form

Core form: A transformer in which the windings (coils) are arranged concentrically and partially surround the magnetic circuit (core) which has the form of one or more vertical legs with two common yokes.

Core form: A transformer in which the windings (coils) are arranged concentrically around nearly round vertical legs.

Core form: A transformer with windings (coils) arranged concentrically around vertical magnetic circuit (core) legs of the with two common yokes.

Core form: A transformer in which the windings (coils) are arranged concentrically and partially surround the magnetic circuit (core) which has the form of ~~one~~ two or more vertical ~~legs~~ limbs with two common yokes.

Core form: A transformer which has transformer steel core comprised of “legs”, surrounded with windings (coils), and “yokes” that connect the “legs” to form continues magnetic circuit.

Core form: A transformer in which the windings (coils) are arranged concentrically and partially surround the magnetic circuit (core) which has the form of ~~one~~ two or more vertical legs with two common yokes.

Core form: A transformer in which the windings (coils) are arranged concentrically around ~~and partially surround the magnetic circuit (core) which has the form of~~ one or more vertical legs between ~~with~~ two common yokes, with magnetic circuits shared by multiple phases.

Core form: has either an equal number of coils and legs or 2 legs and 1 coil. Examples could be a 3-phase transformer with 3 coils and a 3-legged core and a single-phase transformer with 1 or 2 coils and a 2-legged core.

Core form: A transformer in which the windings (coils) are arranged concentrically and partially surround the magnetic circuit (core) which has the form of one or more vertical legs with ~~two~~ common yokes. (*It could be a 4 or 5 legged core form with more than two yokes.)*

For power transformers only:

Core form: A transformer in which the windings (coils) are arranged concentrically and partially surround the magnetic circuit (core) which has the form of ~~one~~ two or more vertical ~~legs~~ main limbs with two common yokes

For power and distribution transformers

Core form: A transformer in which the windings (coils) are ~~arranged concentrically~~ wound on one or more main core limbs and partially surround the magnetic circuit (core) which has the form of one or more vertical ~~legs~~ main limbs and/or two or more vertical side limbs with two common yokes.

Refer to these sources:

G. Bertagnolli: Power Transformers and Short Circuit (ABB), sections 4.4 & 4.5
Kulkarni & Khaparde: Transformer Engineering (CRC Press).
Fernandez,Ertan & Turkovski: Transformers (CRC Press), Chapter 6

Westinghouse, Electrical Transmission and Distribution Reference Book (Second edition 1943), pg 408:

The core-form consists of a single-ring magnetic circuit encircled by windings.

Standard Handbook for Electrical Engineers, section 11 pg12:

When the magnetic circuit takes the form of a single ring encircled by two or more groups of primary and secondary windings distributed around the periphery of the ring, the transformer is termed a core-form transformer.

There is some wording and there are also figures in IEEE C57.105 for shell and core type construction of single-phase transformer core and coils. This info is also contained by reference in the book “Electrical Power Transformer Engineering. It seems that “already published” information could be incorporated in C57.12.80.

It is common to hear about wound-type transformers which design is not exactly a core or shell form. Maybe this group could also define such construction not even listed in the terminology of C57.12.80.

Need a formal definition of “yoke” that fits correctly with the above proposed definitions?