

Types of X-mtr

* Based on the type of Application in Power System

- a) Power x-mtr b) distribution x-mtr.

* Based on No. of Phases.

- a) 1- ϕ x-mtr b) 3- ϕ x-mtr.

* Based on the Core Construction.

- a) Core type b) Shell type ~~c) tertiary wdg~~

* Based on No. of wdg.

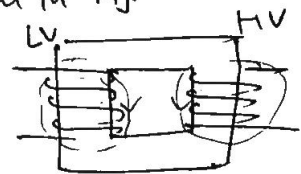
- a) 2-wdg x-mtr b) 3-wdg x-mtr
(tertiary wdg)

- c) one wdg x-mtr
(Auto x-mtr)

Leakage flux:- when the Primary is excited the flux flowing through the core due to exciting current leaks through the corner of the core. As shown in Fig.

It links with one wdg only

(either LV or HV).

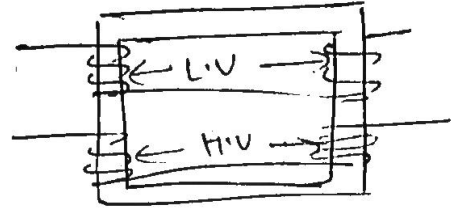


But the flux should link with both wdg. to take part in energy x-mtr. from one wdg to other. when the x-mtr is loaded the current increase in both windings. Consequently leakage flux also increase

leakage flux is directly proportion to load current.
(I_L)

If there is no leakage flux, the induced e.m.f. will be more, therefore there is a drop in a voltage which represent by reactance drop. known as leakage reactance

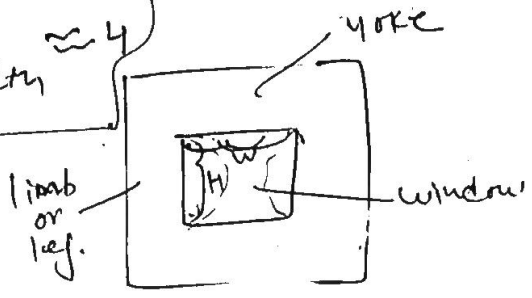
In order to reduce leakage flux, the ways are interlinked. L.V & H.V are ^{device} placed in sections & placed on the same limb.



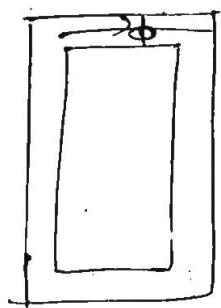
Therefore the leakage flux link with both wind, & it is no more called as leakage flux.

Window factor:

$$\frac{\text{height}}{\text{width}} \approx 4$$

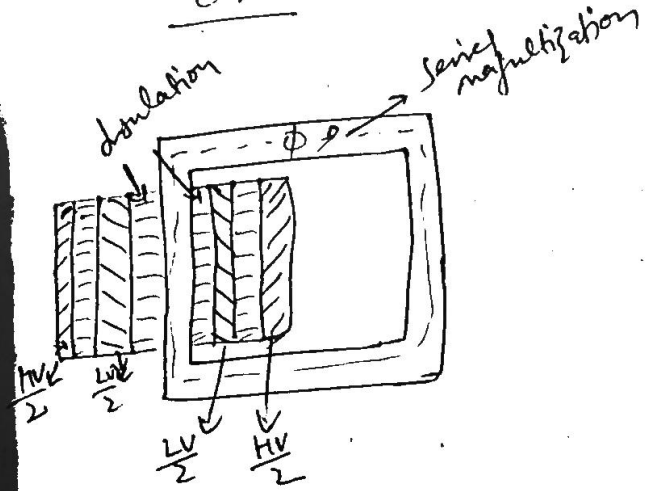


By increasing the H/W ratio, leakage flux can be reduced as the reluctance of leakage path increased.



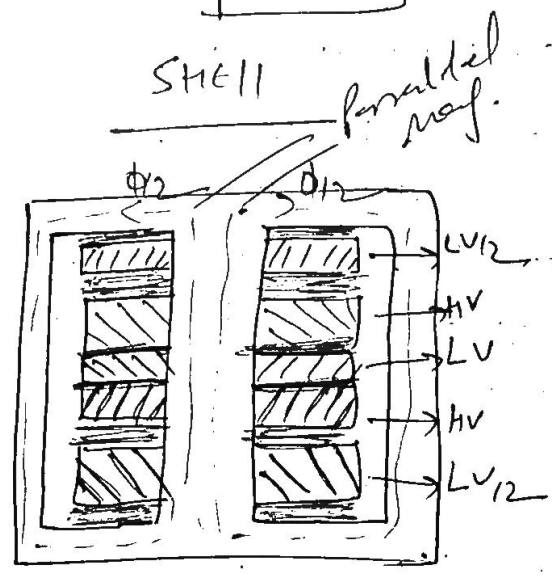
leakage flux have no saturation therefore they continuous with load.

CORE



Insulation require ↓

SHELL



naturally interlinked (insulation) Sandwich

Core: ① The way surrounds the core.

② The way are interleaved to reduce leakage flux.

③ Firstly placed L.V on the core. & H.V is placed on L.V. this reduces the insulation level. therefore less insulation required.

④ Core has uniform cross-section area through out its length due to same amount of flux flowing through it known as Series magnetization.

⑤ Suitable for E.H.V & H.V., with better heating X-mev's.

⑥ No mechanical protection offered by the core.

⑦ Visual inspection of windings is offered, design, maintenance, repair also easy.

therefore this is generally preferred & used in all sub station (E.H.V, H.V & distribution)

~~the core~~ Shell

① Core surround the way

② All way are placed on center limb only. therefore they are naturally interleaved also called as Sandwich way.

③ Comparatively more insulation required. the top & bottom layers are preferred L.V. to reduce insulation.

④ The center limb flux divides equally 2 half's & flows in the outer limbs. known as parallel magnetization therefore center limb cross sectional area is twice that of outer limb.

⑤ Low Vtg rating & low power ratings.

⑥ Core offers mechanical protection to way.

⑦ ~~No~~ No visual inspection, design, maintenance, repair is complicated. Preferred for specific applications.