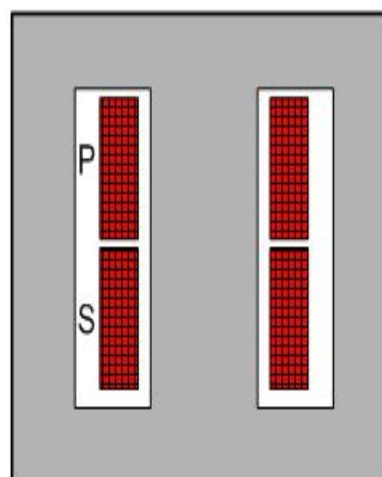
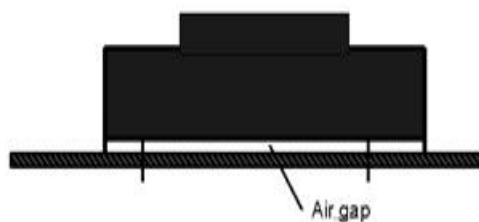


Topic1 / Design2

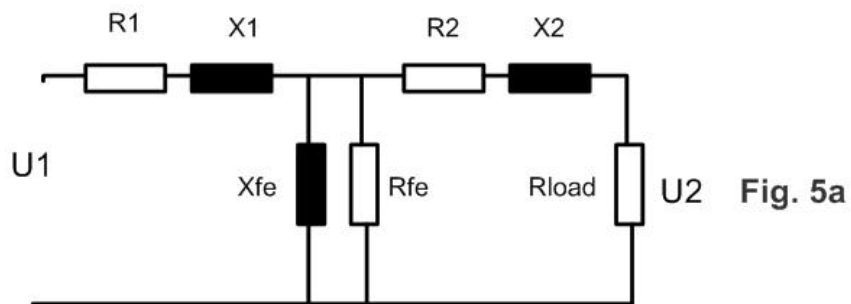
Designing inherently current limited, potted safety transformers 10V, 5A in accordance with UL 1585 Class 2

Input parameters

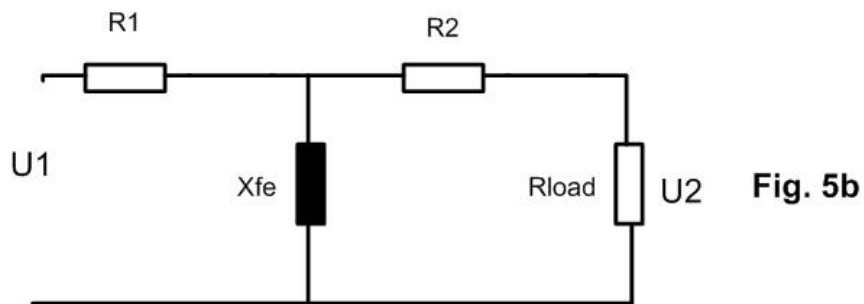
Primary	Voltage	120V +-10%, 60Hz, sine wave
	Wire	Cu, round, single insulated
	Layer insulation	No
	Final insulation	No, due to the potting
Secondary	Nominal and no-load output rms voltage	10V on load, 15V no-load
	Nominal and max. short-circuit rms output current	5A @ 2 Ohm and <8A @ 0.03 Ohm after 60 sec in short-circuit operation mode
	Wire	Cu, round, single insulated
	Layer insulation	No
	Final insulation	No, due to the potting
Core	Size	EE 125/2 with 2 E parts from core EI 125
	Steel	M45, alternate stacking, not annealed
Bobbin	Size	2 EI 125/2 single section bobbins
Case	Size	This transformer is designed without case. With the case the temperature rise will be lower.
Design	Insulation class	B, max. operating temperature 120C, max. short-circuit temperature 175C
	Ambient temperature	40C
	Regulation	50%, in order to limit the no-load output voltage (<15Vrms)
	Induction	<0.3T, to limit the short-circuit current (<8A) and losses with a very high leaking reactance



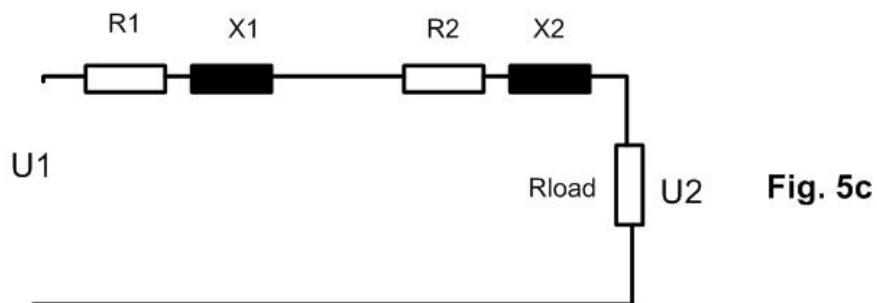
#*0	DIAGNOSE	Page 0
Name	:1 X EIL 125/(2)-5/7	
Steel	-:M45 Gauge 24 / 0.0250"	
Number of Sections	-:2	
max.Cu-Fill Factor	∴84.1	
max. parallel Wires	:1	
Induction on Load	T:0.243	
Max. Induction	T:0.312	
Max.Cu-Temp.rise on load	°K:25.9	
Max.Cu-Temp.rise no-load	°K:3.8	
Regulation	∴52.7	
I [^] Inrush/I [^] nom-Factor	*:.	
Input Current No-Load	∴2.6	



Low Frequency Scheme of a Transformer



Low Frequency, Low Power (<5VA)
Scheme of a Transformer



Low Frequency, > 5VA Power, Low Induction (< 1T)
Scheme of a Double-Section Transformer

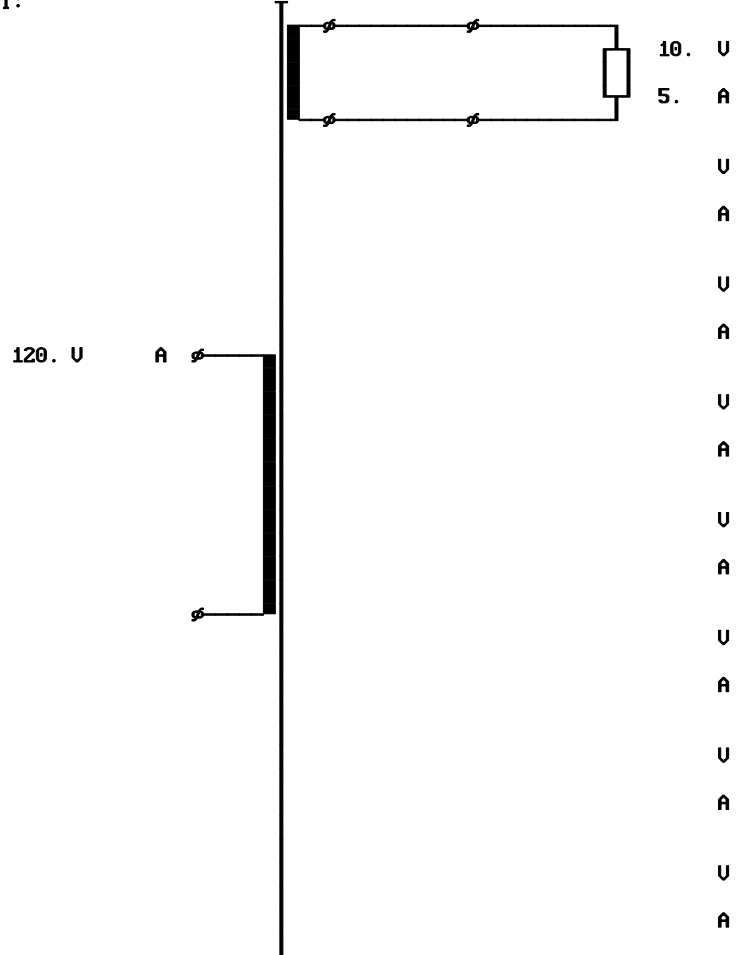
Fig. 5

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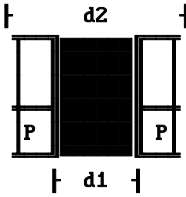
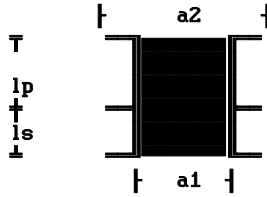
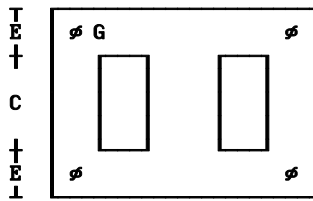
PRIMARY	U(U) I(A)	SECOND.	1---	2---	3---	4---	5---	6---	7---	8---
Circuit--:1	120.	Circuit--:11								
Overvlt*:1.00	.	Volta. U:10.								
Wire :0.0	.	Curre. A:5.								
I/L. mil:0.	.	Wire :0								
I/E. mil:0.	.	I/L mil:0.0								
Formfac.:1.11	.	I/E mil:0.0								
Fre.Hz:60	.									
dI/Io :100	.									

Regulat. %:50.0	Steel -:17	Cooling *:1.00	Bobbin -:2
Udiode U:0.8	Induction T:0.24	Force ft/s:0.00	P/S-Order -:2
dUdiode U:.1	Remanence *:0.35	Bracket -:0	Rac/Rdc *:1.05
Ripple %:5.	W/kg *:1.00	Radiator -:0	Space *:2.00
Tmp. Amb. °C:25	UAr/kg *:1.00	Chassis -:1.00	Vertical -:1
Tmp.rise °K:20	Gap *:1.00	Channel in:0.00	Horizontal -:1
Time 1 Min:1.0	Annealed -:0	Cu-Surface*:1.00	Impregnat. -:2
Load 1 *:1.0	Stacking *:1.00	Rth-uarni.*:1.00	Spread %:0
Time 2 Min:999.0	Hole -:1	Rth-comp. *:2.00	Selection -:2
Load 2 *:1.0	Assembly -:1	Case -:0	Criterion -:1

CIRCUIT:



Name : 1XEIL 125/(2)-5/7
 Steel : M45 Gauge 24 / 0.0250"

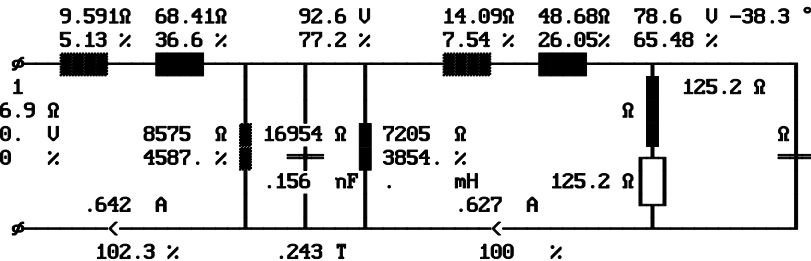


Weight lb: 7.74 / 25.59
 Gap total in: 0.000
 A-Limb in: 1.25
 B-Width in: 0.63
 C-Height in: 3.75
 D-Stack in: 2.01
 E-Yoke 1 in: 0.63
 F-Yoke 2 in: 0.63
 G-Hole in: 0.219
 Radiator Fin : 0
 Radiator Chan. : 0
 a1 cm: 1.39
 a2 cm: 2.46
 d1 cm: 2.24
 d2 cm: 3.50
 l cm:
 lp cm: 1.45
 ls cm: 2.04
 Margin cm: 0.08

X- Length 1 in:
 Y- Width 1 in:
 Z- Height 1 in:
 x- Length 2 in:
 y- Width 2 in:
 z- Height 2 in:
 w- Thickness in:
 Material :
 Potted :

	Typ	Windun	MTI	DN	DN	Par	D/φ mil	B/φ mil	W/L	L	I/L mil	I/E mil	Weight lb	RWH %
1	1	910.	C00	21.0	21.0	1	28.5	28.5	65	13.	.	.	1.596	82.
2														
3														
4														
5														
6														
7														
8														
1	11	115.0	C00	13.5	13.5	1	67.9	67.9	19	5.9	.	.	1.148	84.
2														
3														
4														
5														
6														
7														
8														
TOTAL													2.743	84.

NOMINAL OPERATION at Temperature °C 50.1 and Overvoltage 1.00
 Output Power on Load W:49.3 Output Power of Transform. W:49.3
 Cu Losses W:9.5 Fe-Losses active W:1.
 Short-Circuit-Volt. cold %:63.15 Regulation %:52.72
 Instantaneous pow. .5/958 W:28.6 Efficiency of Transformer %:82.44
 dT Fe average Surface °K:21.4 dT primary °K:24.4
 dT Case aver. Surface °K:. dT secondary °K:25.9



DUTY CYCLE OPERATION at Amb. Temperature °C 25. and Overvoltage 1.00
 dT Fe average Surface °K:21.4 dT primary °K:24.4
 dT Gehäuse av. Surface °K:. dT secondary °K:25.9

NO LOAD OPERATION at Amb. Temperature °C 25. and Overvoltage 1.00
 Losses active W:1.45 Losses reactive UAr:1.4
 Current factor %:2.62 Induction T: .312
 dT Fe average Surface °K:4. dT primary °K:3.8
 dT Gehäuse av. Surface °K:. Rezonance frequency kHz:2.9

SHORT-CIRCUIT OPERATION at Amb. Temperature °C 25. and Overvoltage 1.00
 Losses active W:21.01 Losses reactive UAr:120.1
 Current factor cold %:158.4 Induction T: .132
 dT Fe average Surface °K:44.2 dT primary °K:52.5
 dT Gehäuse av. Surface °K:. dT secondary °K:56.3

PRIMARY (Tap:1) 1---- 2---- 3---- 4---- 5---- 6---- 7---- 8----

Voltage Input/Output U:120.
 Out. Voltage no load U:
 Current Input/Output A:0.642
 Load on output Ω:
 Power factor of load :
 Current in segment A:0.642
 Current density A/in²:1006.
 Icc-Current cold A:1.02
 Io -Current A:0.017
 Inrush Current peak ^A:0.
 Inrush Current rms A:0.
 Cu-Losses W:4.
 Resistance cold Ω:8.502
 Reactance Ω:68.41
 Eddy-Current Factor :1.01

SECONDARY 1---- 2---- 3---- 4---- 5---- 6---- 7---- 8----

Output Voltage U:9.93
 Output Current A:4.965
 Out. Voltage no load U:15.05
 Sec. Voltage U:9.93
 Sec. Current A:4.965
 Current density A/in²:1371.
 Sec. Voltage cold U:10.1
 Load on output Ω:2.
 Power factor of load :1.000
 Icc cold A:7.91
 Cu-Losses warm W:5.55
 Resistance cold Ω:.1897
 Reactance Ω:.7776
 Eddy-Current Factor :1.06
 Capacitor mF:.