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1. INFORMATION ON TRANSFORMERS, SHUNT REACTORS AND ASSOCIATED EQUIPMENT DESIGNATION

1.1. A transformer can be defined as a device that transforms electrical power from one circuit to another. These devices have a critical role at various phases of the electricity delivery process, as the voltage of electricity produced in power stations may not be suitable for transmission, whereas the voltage that is suitable for transmission may not be suitable for use by consumers. Table 1 categorises transformers in the classes.

Table 1: Classes of Transformers

Transformer Class	Power Rating, MVA (Range)	Voltage Rating, kV (Range)
Class 0	n.001 to 1	220V to 22
Class 1	1.25 to 160	11 to 132
Class 2	40 to 315	220 to 275
Class 3A	360 to 500	220 to 275
Class 3B	40 **to** 1000	320 to **400**
Class 4	40 to 2000	>420 to 800

1.2. Whereas Shunt reactors are electrical devices which are intended to consume reactive power measured in volt amperes (VArs) produced by an electrical power system which leads to an increase in the system's energy efficiency. Shunt reactors are commonly used for reactive power compensation in long high-voltage transmission lines and cable systems, as well as power distribution systems. Table 2 provides the classes of shunt reactors in Mega Volt Ampere reactive (MVAr) and voltage rating.

Table 2: Classes of Shunt Reactors

Shunt Reactor Class	Power Rating, MVAr (Range)	Voltage Rating, kV (Range)
Class 1	1= 80 MVAr	11 kV to 132 kV
Class 2	>80 MVAr	132kV to 275 kV
Class 3	100MVAr - 250 MVAr	>275kV — 420 kV
Class 4	>100MVar	>420kV — 765 kV

1.3. The classes are inclusive of transformers and shunt reactors.

1.4. The abovementioned components and activities which have been designated for local production and content must be included in bid invitations (noting that some of the electronic components are not manufactured locally). Table 3 provides the stipulated minimum threshold for local content and production for transformers, shunt reactors and associated equipment categorised by classes. To ensure that the minimum local content designated is discharged on manufacturing activities, the components and conversion activities in

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the manufacture of transformers, shunt reactors and associated equipment are further designated and must also be included in bid invitations.

Table 3: Minimum Local Content Threshold for fully built units
Table 3a: Minimum local content for class 0

Classes of Transformaer and Shunt Reactors	%Local Content
	From the effective date
Class 0	90%

Table 3b: Minimum local content for class 1 and 2

Classes of Transformaer and Shunt Reactors	%Local Content	
	From the effective date	01/01/2018
Class 1	70%	80%
Class 2	70%	80%

Table 3c: Minimum local content for class 3 and 4

Classes of Transformaer and Shunt Reactors	%Local Content		
	From the effective date	01/01/2018	01/01/2020
Class 3	45%	60%	80%
Class 4	10%	20%	20%

1.5. To ensure that the above minimum local content on the different classes is achieved on the actual manufacturing activities, it must be discharged against the following components and manufacturing processes:

Table 4: Components and Manufacturing Processes for Class 0

Components and Manufacturing Processes	%Local Content From the effective date
Fabrication of the tank[1] and parts	100%
Fabrication of the core[2]	100%
Manufacture[3] of windings and assembly	100%
Manufacture of bushings	100%
Off-circuit tap switch	100%
Oil (i.e. blending, processing and handling)	100%

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Accessories Category A: Radiators Fans Kiosks Oil conservator Breather canisters	100%
Accessories Category B: Valves Cables Cables	70% (by the valves instruction) 90% (by the cables instruction)
Assembly and Testing	100%

Table 5: Components and Manufacturing Processes for Class 1

Components and Manufacturing Processes	%Local Content From the effective date	%Local Content 01/01/2018
Fabrication of the tank and parts	100%	100%
Fabrication of the core	100%	100%
Manufacture of windings and assembly	50%	100% (conductors localised)
Oil (i.e. blending, processing and handling)	100%	100%
Accesories Category A: Radiators Fans Kiosks Oil conservator Breather canisters	100%	100%
Accessories Category B: Valves Cables Cables	70% (by the valves instruction) 90% (by the cables instruction)	
Assembly and Testing	100%	100%

[1]Fabrication of the tank includes cutting, welding, sand-blasting and painting processes.
[2]Fabrication of the core includes sizing, slitting, cutting, stacking and clamping processes.
[3]Manufacture of windings includes rolling, sizing and insulation.

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Table 6: Components and Manufacturing Processes for Class 2

Components and Manufacturing Processes	%Local Content From the effective date	%Local Content 01/01/2018
Fabrication of the tank and parts	100%	100%
Fabrication of the core	100%	100%
Manufacture of windings and assembly	50%	100% (conductors localised)
Oil (i.e. blending, processing and handling)	100%	100%
Accesories Category A: Radiators Fans Kiosks Oil conservator Breather canisters	100%	100%
Accessories Category B: Valves Cables Cables	70% (by the valves instruction) 90% (by the cables instruction)	
Assembly and Testing	100%	100%

Table 7: Components and Manufacturing Processes for Class 3

Components and Manufacturing Processes	% Local Content From the effective date	%Local Content 01/01/2018	%Local Content 01/01/2020
Fabrication of the tank and parts	100%	100%	
Fabrication of the core	-	-	-
Windings processes	-	40% (conductors localised)	100% manufacture of windings and assembly inclusive of conductors localised)
Oil (i.e. blending, processing and handling)	100%	100%	100%
Accesories Category A: Radiators Fans Kiosks Oil conservator	100%	100%	100%

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Breather canisters			
Accessories Category B: Valves Cables Cables	70% (by the valves instruction) 90% (by the cables instruction)		
Assembly and Testing	100%	100%	100%

Table 8: Components and Manufacturing Processes for Class 3

Components and Manufacturing Processes	% Local Content From the effective date	%Local Content 01/01/2018	%Local Content 01/01/2020
Windings conductor	-	100%	100%
Oil (i.e. blending, processing and handling)	100%	100%	100%
Accesories Category A: Radiators Fans Kiosks Oil conservator Breather canisters	100%	100%	100%
Accessories Category B: Valves Cables Cables	70% (by the valves instruction) 90% (by the cables instruction)		

1.6. Table 3a, 3b and 3c must be read and applied in conjunction with Tables 4 to 8 to ensure that the local content requirements are discharged against the designated components and manufacturing processes.

1.7. All primary steel related products: flat products (plates and coils) and long products (angles, sections and wire related products) are included in this designation and must be manufactured and sourced locally. This is to support and sustain the existing local steelmaking capacity.

1.8. The following primary input materials used in the manufacture of transformers, shunt reactors and associated equipment are deemed as local in this designation:

- steel products (i.e. laminated sheets, grain-oriented electrical core, amorphous core);
- raw copper rod, sheets and twin enamelled epoxy conductor;
- paper and boards for insulation;
- aluminium billets and rod;
- porcelain insulators (used in shunt reactor cores);
- ceramics/porcelain; reinforced fibre glass and/or polymers; and
- un-blended transformer oil.

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These inputs should be imported in raw material form for further fabrication and processing in South Africa.

1.9. The imported input raw materials indicated in 3.8 used for the assembly and manufacture of transformers, shunt reactors and associated equipment will be deemed to have been sourced locally for the purposes of calculating local content.

1.10. The designated local content thresholds (on the components/conversion processes and on the overall) apply to new purchases; refurbishments, replacements and general overhauls.

1.11. For further information, bidders and procuring State Organs may contact the Metals Fabrication, Capital and Rail Transport Equipment Unit within the dtic at telephone 012 394 1356 or email localcontent@thedtic.gov.za.