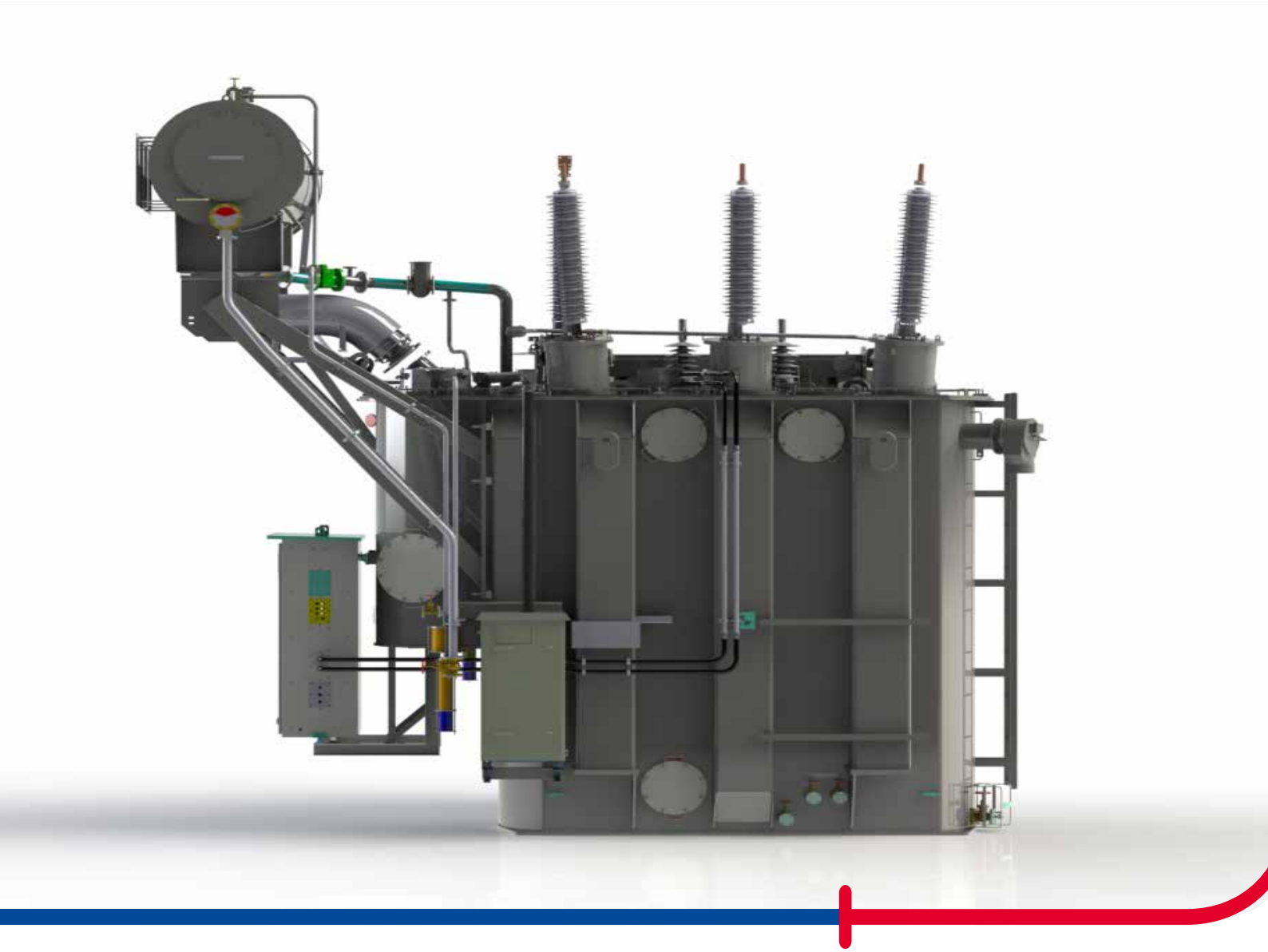
SGB-SMIT POWER MATLA

Your dedicated partner
of the SGB-SMIT Group

TRANSFORMER DESIGN AND MANUFACTURING TRAINING



SGB-SMIT AT A GLANCE

Combined, more than

450

YEARS OF EXPERIENCE

Basis for know-how and for know-why

More than

3,500

EMPLOYEES

take care of your project

In more than

80

COUNTRIES

satisfied customers

READY FOR YOUR MARKET

The SGB-SMIT Group manufactures transformers for applications worldwide. Sales and service centers on all continents ensure optimum processes.

Our products meet the requirements in accordance with the applicable national standards.

PRODUCTS

- large power transformers
- medium power transformers
- large liquid-cooled distribution transformers
- liquid-cooled distribution transformers
- cast resin transformers
- shunt reactors
- series reactors
- phase shifters
- Lahmeyer-Compactstationen®

Transformers from 50 kVA up to incl. 1,200 MVA in the voltage range up to 765 kV.

QUALITY MANAGEMENT

The SGB-SMIT Group is certified in accordance with:

- DIN ISO 9001
- DIN ISO 14001
- DIN ISO 50001
- OHSAS 18001

TECHNOLOGIES

Technologies for conventional and renewable energy.

Status: December 2019

SGB POWER MATLA: A MEMBER OF THE SGB-SMIT GROUP

SGB-SMIT POWER MATLA has over 70 years experience in successful design, manufacturing, testing, installation and commissioning of a full range of power and distribution transformers which include large power transformers of voltages up to 800MVA.

SGB-SMIT POWER MATLA

SGB-SMIT POWER MATLA (Pty) Ltd is owned by SGB-SMIT (GmbH) and Power Matla (Pty) Ltd.

SGB-SMIT, is the largest independent and pure-play transformer manufacturer in the world, with headquarters in Regensburg, Germany. They are represented on 3 continents in 8 countries with plants in Germany, the Netherlands, USA, Romania, Malaysia, India, China and the Czech Republic. With transformer expertise since 1913 they produce transformers ranging from 50 kVA up to 1,200 MVA.

Power Matla (Pty) Ltd is a locally owned black empowered company with investments in various portfolios within the renewable energy, ICT, mining and power utilities markets providing good shareholder value and solid returns.

The company consists of Large Power Transformers in Pretoria and Distribution Transformers in Cape Town and supplies a full range of transformers, from generator step-up to transmission and distribution transformers. The range includes three-phase and single-phase units, auto-transformers, arc-furnace, locomotive and traction transformers, miniature sub-stations, NECRT's as well as shunt reactors.

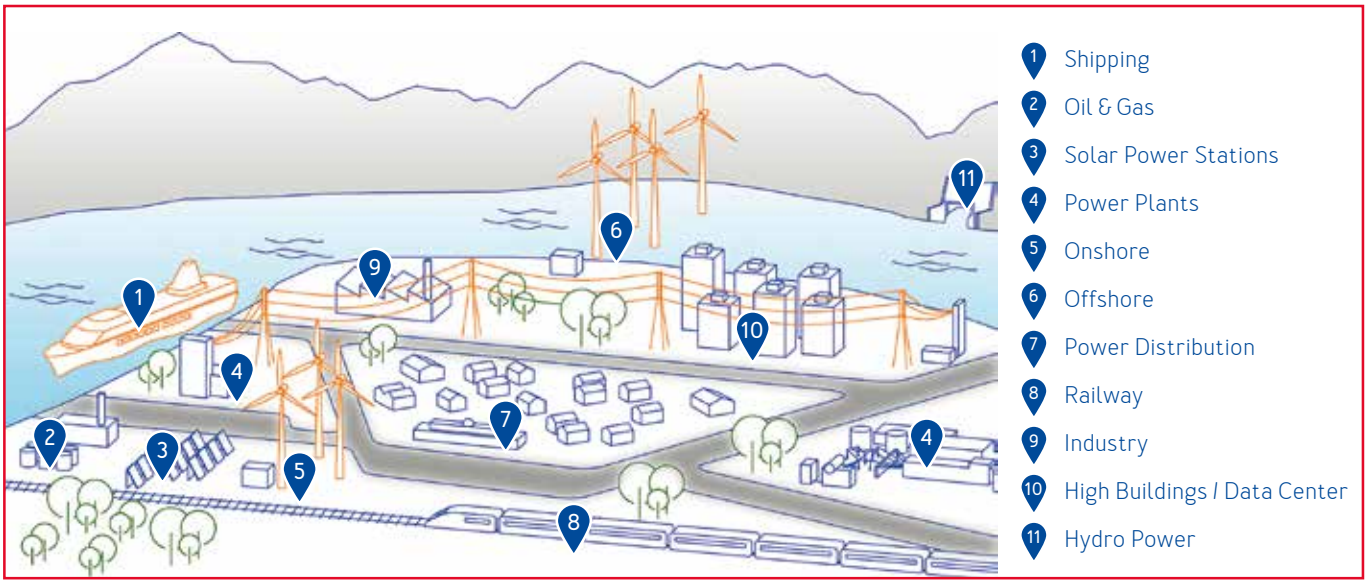
"CUSTOM DESIGNED"

Every SGB-SMIT POWER MATLA unit is custom-made from standardised design elements and using uniform manufacturing operations. This flexible, but well co-ordinated approach ensures the highest quality of design and construction for all our transformers and makes the best possible use of the valuable knowledge and experience gained over the years and best practices developed in our factory.

The Large Power Transformer factory in Pretoria is a well-equipped factory and is amongst the biggest and most sophisticated transformer manufacturing plants within the Southern Hemisphere and one of two large manufacturers within sub-Saharan Africa.

The Distribution Transformers factory in Cape Town has been manufacturing distribution transformers and miniature substations for more than 60 years.

SMALL, MEDUM AND LARGE POWER TRANSFORMERS ALL OVER THE WORLD



OVERVIEW

SGB-SMIT POWER MATLA have many years of experience in the design, manufacturing, installation and commissioning of small, medium and large power transformers for various applications.

A transformer is a static device with two or more windings that are linked to each other by means of a strong magnetic field.

Transformers are designed for specific purposes. The design requirements of transformers depend on the application.

Large power stations where the electric energy is generated are often situated far away from the numerous places where the energy is consumed. Therefore it is vitally important that proper maintenance and checks are done on transformers to ensure that they are operating correctly.

It is recommended that during the first year of operation the checks should be carried out frequently. Considerations whether the transformer must be isolated, energized or loaded during maintenance must also be taken into account.

SGB-SMIT POWER MATLA offers a transformer design and manufacturing training course which covers various elements of power transformers over a five day period.

The course covers design processes, both electrical and mechanical; fabrication; insulation; paper-lapping; core-cutting; core stacking, winding manufacture; winding assembly; quality assurance and control; factory testing; active part assembly; oil processing and tanking; protection components, first line maintenance and transport and dispatch of the transformers.




TRANSFORMER DESIGN AND MANUFACTURE - DAY 1

COURSE FORMAT

The format of the training course is both practical and classroom training.

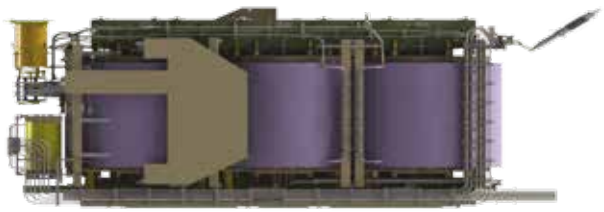
The course content will be covered over five full days at our factory in Pretoria, Gauteng.

Competent trainers will be covering the relevant topics mentioned in the course content.

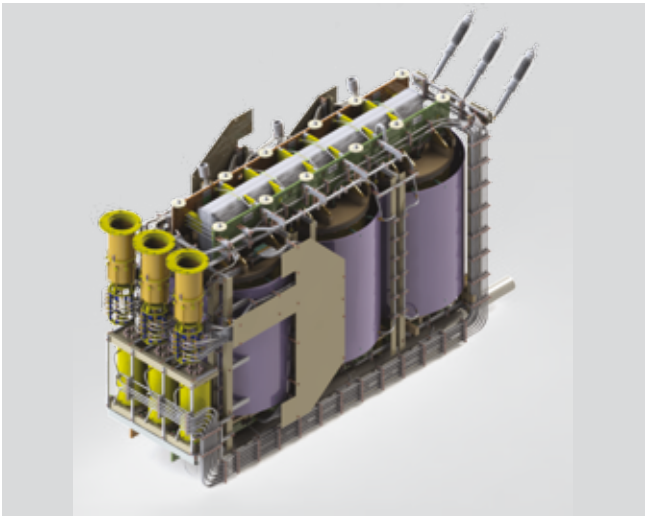
The course is accredited with the SAIEE—ref: SAIEE-2414-RV2 and 4 CPD (Continuous Professional Development) points may be claimed.

ADMISSION REQUIREMENTS

Personnel from utilities, consulting engineers, etc. including Test Technicians and maintenance personnel



TRANSFORMER DESIGN AND MANUFACTURE - DAY 1



A power transformer mainly consists of windings arranged concentrically around a high grain magnetic core. The combination of the windings, core and associated harness structure is called the active part. The electrical designer is responsible for dimensioning of the active part by running various calculations and simulations.

TRANSFORMER DESIGN AND MANUFACTURE - DAY 1

INTRODUCTION

Once the active part design is completed, the mechanical designer will design the structural tank that contains the active part. The purpose of the tank is to contain the cooling and insulating medium for the active part. The tank also structurally protects the active part against the environmental conditions the power transformer will be exposed to.

The active part and associated tank sizing is based on the voltage level and the transformer power rating. The higher the voltage level of the transformer the larger the internal and external clearances must be. The larger the power rating the higher the requirement would be for the cooling of the active part. All the electrical and mechanical design concepts are discussed during the presentation of the design concepts.

SGB-SMIT POWER MATLA's training modules cover power transformers only.

COURSE CONTENT

Day 1 of the course covers the following:

Manufacturing of power transformers

The topic involves all aspects of the overall manufacture of power transformers

Design and processing of power transformers

This topic comprises the importance of writing standardized specifications as well as technical schedules. Also covered is the basic layout of a transformer and the design processes, both electrical and mechanical and the importance of external design reviews.

Manufacture of windings for different applications

This topic comprises the different types of windings which can be designed for various applications. The selection and arrangement of windings required are also covered in the course.

Mechanical fabrication

This is the last module covered in Day 1 and encompasses all aspects of the transformer tank which is primarily the container for the oil and a physical protection for the active part. It also serves as a support structure for the accessories and control equipment.

TRANSFORMER DESIGN AND MANUFACTURE - DAY 2

OVERVIEW

A power transformer consists of various parts that are manufactured for various purposes by SGB-SMIT POWER MATLA.

Transformer cores are built from thin sheets of special high grain magnetic steel metal. These sheets are manufactured specifically for use in transformers. There are various types of conductor material that may be used on the windings which are namely paper covered copper strip conductor, enamelled coated copper or continuously transposed cable (CTC) or aluminum. The choice of conductor material depends on design requirements, price and availability. Insulation material must be able to withstand the operating temperatures that occur in the transformer during its lifetime.

COURSE CONTENT

Day 2 of the course involves the following:

Insulation structures and cooling

This topic covers mechanical and dielectric strength of materials, oil impregnation and the specifications regarding moisture content.

Different types of cooling systems available i.e. ONAN, ONAF, OFAN, OFAF, OFWF as well as ODAF.

Mechanical design covers the following topics:

- Mechanical Design Process Flowchart
- Design Procedure
- Automated Design Tools
- Mechanical Design System (MDS)
- Active part, core, cleats and leads, tanking and design verification

A session in various parts of the factory is the final topic covered in Day 2. This session focuses on insulation, paper-lapping, core cutting, core stacking, winding manufacturing and winding assembly.

TRANSFORMER DESIGN AND MANUFACTURE - DAY 3

OVERVIEW

The functional reliability of transformer installations depends on the suitability and quality of the transformer, components and the processes employed. SGB-SMIT POWER MATLA adheres to the international standard of quality management systems, namely ISO 9001-2015.

COURSE CONTENT

Day 3 of the course covers the following:

Quality Assurance and Control

Quality control (QC) is a process by which the manufacturing quality of all factors involved in production is checked against set design requirements and manufacturing tolerances. Quality control focuses on in process testing of products to uncover defects and report to management.

Quality Assurance (QA) attempts to improve and stabilize production (and associated processes) to avoid, or at least minimize, issues which led to the defect(s) in the first place.

The focus from QA is on process improvement through trend analysis of reported defects.

Topics covered here include the following:

- Documented procedures and documentation development process.
- Internal audits.
- Incoming and on-the-job Inspections
- Customer complaints, NCR's, etc
- Testing of transformers

The purpose is to provide a guideline for customer representatives, as well as other interested parties, on routine and type tests. This covers test methods and sequences normally used.

The final session of the day focuses on active part assembly, oil processing and tanking. This session is in the format of a practical session in the factory

TRANSFORMER DESIGN AND MANUFACTURE - DAY 4

OVERVIEW

The transport, installation and commissioning is an important part in the supply chain of a power transformer. After the Factory Acceptance Test (FAT), the transformer is disassembled and made ready for transporting. Depending on the weight and size of the transformer special transport is required and should be performed by experts in handling heavy goods.

COURSE CONTENT

Day 4 of the course involves the following:

Despatch of the power transformer from factory to site

Use of impact recorders during transport, external and internal inspections, dry air pressure system, packaging of all components, preliminary commissioning test and oil handling on site. Power system protection deals with the protection of electrical power systems from faults through the isolation of faulted parts from the rest of the electrical network. The objective of a protection scheme is to keep the power system stable by isolating only the components that are under fault, whilst leaving as much of the network as possible still in operation.

Thus, protection schemes must apply a very pragmatic and pessimistic approach to clearing system faults.

For this reason, the technology and philosophies utilised in protection schemes can often be old and well-established because they must be very reliable.

Protection on the transmission and distribution network serves two functions: Protection of plant and protection of the public (including employees). At a basic level, protection looks to disconnect equipment which experience an overload or a short to earth.

Protection components include the following:

- Bucholtz relay
- Pressure relief valve
- Rapid rise relay
- Bag leak detector
- Rubber bag
- Breathers
- Marshalling Kiosk
- Sudden flow stop valve
- Oil level indicator
- Temperature indicators

TRANSFORMER DESIGN AND MANUFACTURE - DAY 4

COURSE CONTENT CONTINUED

Commissioning tests covers when and under what circumstances transformers should be tested, the erminology as well as the recommended field tests that need to be performed and the reasoning behind the tests.

FIRST LINE MAINTENANCE

First Line Maintenance (FLM) is aimed at Operations Technicians with the purpose to train them in the basic maintenance tasks related to transformers in service. The training entails applicable product knowledge and the maintenance tasks that operators can perform themselves to proactively identify abnormal conditions and measure deterioration before it affects the transformer or leads to a failure.

The final topic of the day covers factory training in the test and despatch areas.

TRANSFORMER DESIGN AND MANUFACTURE - DAY 5

OVERVIEW

The SGB-SMIT POWER MATLA laboratory has been in existence since 1973. The main activities of the laboratory are testing of materials for transformers and calibration of instruments. The testing of transformer oil forms a large part of the testing activities, and this service is also offered to external companies. Calibration work is performed for our in-house customers.

Transformer oil testing

The testing of transformer oil is part of a preventative maintenance plan, also known as condition monitoring. The oil inside a transformer forms an integral part of the insulation system, but is unfortunately subject to quick deterioration if the preventative maintenance schedule is not adhered to. Adverse load conditions also affect the oil. It is therefore common practice to have the oil tested annually. Certain tests also give an indication of the condition of the transformer itself and, if interpreted correctly, and acted upon, can prevent catastrophic failure of a transformer.

The laboratory is well equipped to perform all the important tests related to condition monitoring, using some of the best equipment available on the market.

COURSE CONTENT

Day 5 of the course involves the following:

- Certifications and Accreditations
- Laboratory Services
- Calibration

The various laboratories which are available for:

- Material Testing
- Insulation
- Core Steel
- Winding Conductor
- Oil Testing
- Abbreviations used in Transformer Oil Testing
- Purpose of Transformer Oil in Transformers
- Shortening of the Transformer's life
- Enhancing the life expectancy of a transformer
- Pitfalls in Transformer Oil Testing
- Classification of Tests for Insulating Oils
- Classification of Transformers and Switchgear
- Oil Sampling
- Transformer Oil Tests - why, what and how
- Dissolved Gas Analysis
- Choosing a Laboratory
- Zero Tolerance
- Process Instrumentation
- Various types of Transformer Designs

TRANSFORMER DESIGN AND MANUFACTURE - DAY 5 CONTINUED

TRANSFORMER R&D WITHIN DESIGN

The development of cutting edge technology for transformers involves an in-depth understanding of the fundamental phenomena experienced by the transformer under normal, transient and fault conditions involving voltages and currents. These complex phenomena are extensively studied through the development of virtual prototype models and experiments (including FEM and 3D simulations). Essentially, the research teams continually assess the improvements of materials, test methods, manufacturing processes and design philosophies.

Tools for computing the design parameters are being developed and verified using the virtual experimentation platforms based on numerical methods. The Technology Department participates in the development of international standards responsible for benchmarking the design of power transformers. This comes in a form of contributions to CIGRE and IEEE working groups.

The following disciplines are covered under the R&D section:

- Magnetostatic Core and Acoustic performance
- Dielectric Integrity
- Short Circuit Durability
- Thermal Stability

SPT TECHNICAL DATA SHEET

MVA	Nominal Voltage (kV rms)			Rating of tertiary (MVA)	Imped @Nom Tap(%)	Vector Group	Overall dimensions (m)							Transformer Mass (Ton)	
	Prim	Sec	Ter					A	B	C	D	E	F	With Oil	Without Oil
20	132	88	22	5	9	YNa0d1	min max	9.6 10.8	6.8 7.1	6.1 6.3	6.8 8.0	3.0 3.3	4.0 4.2	41 43	30 31
	132	66	22	5	10	YNa0d1	min max	9.2 10.2	6.7 7.0	5.9 6.1	6.4 7.4	2.9 3.2	3.8 4.0	40 42	27 28
	132	44	22	5	11	YNa0d1	min max	8.8 9.6	6.6 6.9	5.8 6.0	6.0 6.8	2.8 3.1	3.7 3.9	39 40	26 27
	132	33			11	YNd1	min max	8.5 9.2	6.5 6.8	5.6 5.8	5.7 6.4	2.7 3.0	3.5 3.7	37 39	26 28
	132	22			11	YNd1	min max	8.3 9.0	6.5 6.8	5.5 5.8	5.5 6.2	2.7 3.0	3.5 3.7	36 37	26 26
	132	11			11 22	YNd1	min max	8.2 8.7	6.5 6.8	5.4 5.7	5.4 5.9	2.7 3.0	3.4 3.6	35 36	25 27
	132	6.6			10 22	YNd1	min max	8.1 8.6	6.5 6.8	5.5 5.7	5.3 5.8	2.7 3.0	3.4 3.6	35 36	25 27
	88	44	22	5	9	YNa0d1	min max	8.6 9.4	6.7 7.0	5.7 5.9	6.2 7.0	2.9 3.2	4.0 4.2	38 40	28 30
	88	44			10	YNd1	min max	8.6 9.4	6.7 7.0	5.7 5.9	6.2 7.0	2.9 3.2	4.0 4.2	38 40	28 30
	88	33			11	YNd1	min max	7.9 8.6	6.5 6.8	5.5 5.7	5.5 6.2	2.7 3.0	3.8 4.0	34 36	26 27
	88	22			11	YNd1	min max	7.8 8.5	6.5 6.8	5.3 5.5	5.4 6.1	2.7 3.0	3.6 3.8	34 36	25 27
	88	11			11 22	YHd1	min max	7.7 8.3	6.5 6.8	5.1 5.3	5.3 5.9	2.7 3.0	3.4 3.6	33 36	25 26
	88	6.6			11 22	YNd1	min max	7.6 8.2	6.5 6.8	5.1 5.3	5.2 5.8	2.7 3.0	3.4 3.6	33 35	25 26
40	132	88	22	10	9	YNad1	min max	10.6 11.2	6.8 7.1	6.1 6.4	7.8 8.4	3.0 3.3	4.0 4.3	50 53	39 42
	132	66	22	10	10	YNa0d1	min max	10.3 11.0	6.7 7.0	6.0 6.3	7.5 8.2	2.9 3.2	3.9 4.2	49 52	39 41
	132	44	22	10	11	YNa0d1	min max	10.0 10.7	6.7 7.0	5.9 6.2	7.2 7.9	2.9 3.2	3.8 4.1	48 51	37 39
	132	33			11	YNd1	min max	9.7 10.5	6.6 6.9	5.7 6.0	6.9 7.7	2.8 3.1	3.6 3.9	47 49	35 37
	132	22			11	YNd1	min max	9.3 10.2	6.5 6.8	5.7 6.0	6.5 7.4	2.7 3.0	3.6 3.9	47 49	35 37
	132	11			11 22	YNd1	min max	9.1 10.1	6.5 6.8	5.5 6.0	6.3 7.3	2.7 3.0	3.5 3.9	46 49	35 36
	88	44	22	10	9	YNa0d1	min max	10.2 10.6	6.8 7.1	5.7 6.0	7.8 8.2	3.0 3.3	4.0 4.3	52 55	38 40
	88	44			10	YNd1	min max	10.2 10.6	6.8 7.1	5.7 6.0	7.8 8.2	3.0 3.3	4.0 4.3	52 55	38 40
	88	33			11	YNd1	min max	8.9 9.7	6.6 6.9	5.4 5.6	6.5 7.3	2.8 3.1	3.7 3.9	46 49	36 38
	88	22			11	YNd1	min max	8.4 9.2	6.5 6.8	5.3 5.5	6.0 6.8	2.7 3.0	3.6 3.8	46 48	35 37
	88	11			11 22	YNd1	min max	8.1 9.1	6.5 6.8	5.1 5.3	5.7 6.7	2.7 3.0	3.4 3.6	45 48	35 37
	88	6.6			11 22	YNd1	min max	8.0 8.9	6.5 6.8	5.1 5.3	5.6 6.5	2.7 3.0	3.4 3.6	45 47	34 36

Notes:
Dimensions and masses in the above table are from typical designs completed in recent years and may vary from these values. Specific values might change based on specific customer requirements.
Contact SGB-SMIT POWER MATLA to verify dimensions for specific applications.
Designs and sizes are not limited to the transformer sizes listed in the table above.

MPT TECHNICAL DATA SHEET

MVA	Nominal Voltage (kV rms)			Rating of tertiary (MVA)	Imped @Nom Tap(%)	Vector Group	Overall dimensions (m)							Transformer Mass (Ton)	
	Prim	Sec	Ter					A	B	C	D	E	F	With Oil	Without Oil
40	220	66	22	10	Various	YNa0d1	min	11.5	7.0	7.1	8.0	3.2	4.2	65	48
							max	13.9	7.4	7.6	10.4	3.6	4.7	70	50
80	275	88	22	10	12.5	YNa0d1	min	12.3	7.0	7.8	8.3	3.2	4.2	88	63
							max	13.5	7.4	8.3	9.5	3.6	4.7	93	66
	220	132	22	10	Various	YNa0d1	min	11.5	6.9	7.0	8.0	3.1	4.1	78	56
							max	12.4	7.3	7.4	8.9	3.5	4.5	82	59
	132	88	22	10	Various	YNa0d1	min	10.6	6.8	6.2	7.8	3.0	4.1	72	48
							max	11.2	7.2	6.4	8.4	3.4	4.3	75	54
	132	66	22	10	9 to 11.7	YNa0d1	min	10.3	6.7	6.2	7.5	2.9	4.1	68	46
							max	11.1	7.0	6.3	8.3	3.2	4.2	71	48
	132	44	22	10	11.3	YNa0d1	min	10.0	6.6	6.1	7.2	2.8	4.0	61	43
							max	10.7	7.0	6.3	7.9	3.2	4.2	63	45
	132	33			11	YNd1	min	9.9	6.6	6.1	7.1	2.8	4.0	59	41
							max	10.4	6.9	6.3	7.6	3.1	4.2	61	44
	88	44	22	10	Various	YNa0d1	min	9.5	6.5	5.6	7.1	2.7	3.9	58	41
							max	9.9	6.9	5.8	7.5	3.1	4.1	61	43
	88	33			11	YNd1	min	9.4	6.5	5.6	7.0	2.7	3.9	53	38
							max	9.8	6.8	5.8	7.4	3.0	4.1	56	40
125	275	132	22	5	11.3	YNa0d1	min	12.3	7.7	8.4	8.3	3.9	4.8	108	77
							max	12.7	8.2	8.5	8.7	4.4	4.9	114	81
	220	132	22	20	Various	YNa0d1	min	11.5	7.6	7.5	8.0	3.8	4.6	103	74
							max	11.9	8.1	7.6	8.4	4.3	4.7	109	78
160	275	88	22	20	12.5	YNa0d1	min	12.3	7.6	8.3	8.3	3.8	4.7	119	76
							max	13.1	7.9	8.5	9.1	4.1	4.9	125	81
	220	66	22	20	Various	YNaod1	min	11.7	7.5	7.3	8.2	3.7	4.4	105	74
							max	12.4	7.8	7.4	8.9	4.0	4.5	111	78
	132	88	22	20	Various	YNaod1	min	10.8	7.5	6.3	8.0	3.7	4.2	103	71
							max	11.3	7.7	6.4	8.5	3.9	4.3	109	75
	132	66	22	20	9 to	YNa0d1	min	10.7	7.4	6.1	7.9	3.6	4.0	95	67
							max	11.0	7.7	6.3	8.2	3.9	4.2	100	70

Notes:
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LPT TECHNICAL DATA SHEET

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	Prim	Sec	Ter					A	B	C	D	E	F	With Oil	Without Oil
	400	132	22	20	14	YNa0d1	min max	13.2 13.7	7.3 7.8	8.8 8.9	8.4 8.9	3.5 4.0	4.5 4.6	141 151	101 103
160	400	88	22	20	Various	YNa0d1	min max	13.3 13.8	7.5 8.1	9.1 9.3	8.5 9.0	3.7 4.3	4.8 5.0	181 195	130 140
250	400	132	22	40	14	YNa0d1	min max	13.6 14.8	7.9 8.5	9.5 9.7	8.8 10.0	4.1 4.7	5.2 5.4	288 310	140 149
	400	22			Various	YNd1	min max	13.4 14.3	7.7 8.3	9.3 9.6	8.6 9.5	3.9 4.5	5.0 5.3	279 300	199 2.7
	400	15			Various	YNd1	min max	13.0 14.2	7.5 8.2	9.1 9.5	8.2 9.4	3.7 4.4	4.8 5.2	233 250	166 180
	275	132	22	40	11.3	YNa0d1	min max	12.1 13.0	7.4 8.1	8.2 8.6	8.1 9.0	3.6 4.3	4.6 5.0	214 230	148 155
	220	132	22	40	Various	YNa0d1	min max	11.5 12.4	7.3 8.1	7.5 7.8	8.0 8.9	3.5 4.3	4.6 4.9	158 170	108 112
315	400	88	22	40	Various	YNd1	min max	13.8 15.9	7.7 8.3	9.3 9.4	9.0 11.1	3.9 4.5	5.0 5.1	300 323	213 224
	275	132	22	40	12.5	YNa0d1	min max	12.5 13.3	7.4 8.0	8.4 8.6	8.5 9.3	3.6 4.2	4.8 5.0	293 315	209 219
	132	88	22	40	Various	YNd1	min max	10.8 11.5	7.3 7.9	6.8 7.1	8.0 8.7	3.5 4.1	4.7 5.0	288 310	206 216
500	400	132	22	40	14	YNa0d1	min max	13.7 14.9	7.7 8.1	9.4 9.7	8.9 10.1	3.9 4.3	5.1 5.4	293 316	223 241
	400	22			Various	YNd1	min max	13.5 14.3	7.6 8.0	9.3 9.5	8.7 9.5	3.8 4.2	5.0 5.2	279 300	217 228
	400	11			Various	YNd1	min max	13.4 14.3	7.6 8.0	9.3 9.5	8.6 9.5	3.8 4.2	5.0 5.2	270 290	204 214
	275	132	22	40	11.3	YNa0d1	min max	12.5 13.3	7.5 7.8	8.5 8.7	8.5 9.3	3.7 4.0	4.9 5.1	262 282	200 209
	275	88	22	40	12.5	YNa0d1	min max	12.5 13.2	7.5 7.8	8.5 8.7	8.5 9.2	3.7 4.0	4.9 5.1	256 275	195 205
	220	132	22	40	Various	YNa0d1	min max	11.9 12.7	7.5 7.8	7.8 8.0	8.4 9.2	3.7 4.0	4.9 5.1	254 273	193 203
630	400	220	22	20	14	YNa0d1	min max								
800	765	400	33	40	Various	YNa0d1	min max								
	400	275	22	40	12.5	YNa0d1	min max								
	400	22			Various	YNd1	min max								
	400	11			Various	YNd1	min max								

Notes:
Dimensions and masses in the above table are from typical designs completed in recent years and may vary from these values. Specific values might change based on specific customer requirements.
Contact SGB-SMIT POWER MATLA to verify dimensions for specific applications.
Designs and sizes are not limited to the transformer sizes listed in the table above.

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