

Engineering Support from Plan B / TATC 2019

Design Reviews

Phase Shifting Transformers

- 345 kV // 420 / 700 MVA // 30° Advance // 30° Retard OLTC ± 16 steps & DETC ± 345 kV 2x2.5% (The Netherlands) * (see notes – Remote DR)
- 3ph 67.2 / 89.6 / 112 MVA // 115 / 115kV // $\pm 60^\circ$ Symmetrical Single Core PST (South Korea)

Auto Transformers

- 3ph 400 / 400 / 40 MVA 230/115/13.2kV, OLTC LV, DETC HV (Brazil)
- 3ph 560 / 560 / 56 MVA 230/138/13.2kV, OLTC LV, DETC HV Brazil)
- 3ph 60 Hz 168/224/280 MVA // ONAN/ONAF/ONAF, 230/70.5kV YNd1 (South Korea)
- 3ph 60Hz 150/200/250//280MVA 230/70.5kV YD ONAN/ONAF1/ONAF2//ONAF2 (South Korea) (re-design after switching impulse failure during FAT, original DR not performed by PLANB-TATC)
- Single Phase Shell Form Autotransformer 373 MVA // $525 \pm 2 \times 2.5\% \pm 16 \times 0.625\%$ / 230 / 13.8 kV (Spain)
- Single Phase Core Form Autotransformer 373 MVA // $525 \pm 2 \times 2.5\% \pm 16 \times 0.625\%$ / 230 / 13.8 kV (Austria)
(different manufacturer and technology, but same technical data as above)

3-Winding transformer

- 3ph 60Hz 69/13.8kV 15/20/25MVA Dyn1 ONAN/ONAF/ONAF (South Korea)

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GSUs

- 1028 MVA // 245.29 $\pm 2 \times 1.25\%$ / 22.0 kV DETC (The Netherlands)
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Shunt Reactors

- Single Phase 66.67 (73.5) MVA_r 525/ $\sqrt{3}$ (575/ $\sqrt{3}$) kV (The Netherlands)
- Single Phase 33.33 (36.75) MVA_r 525/ $\sqrt{3}$ (575/ $\sqrt{3}$) kV (Austria)
(different manufacturer, but same type with lower rating)
 - * *Pre-Design Meetings online, Final Design Meeting in the factory*
 - * *First Design Review Meeting in customer's office*
 - * *Final Web Design Review Meeting only*

Inspections

Core and Coil:

- Single Phase 33.33 (36.75) MVA_r 525/ $\sqrt{3}$ (551.25/ $\sqrt{3}$) kV (7 Units) (Austria)
- Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV (Portugal)
- Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV (Japan)
- 3ph 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformer (Portugal)
- 3ph 275MVA SVC Transformers, 60 Hz, 230GrdY/132.79-43kV (2 units) (Poland)
- 320/426.6/533.3 MVA SINGLE PHASE AUTOTRANSFORMER Anticline #1 & #2 -
Inspection – Common, Series, & Tap windings (Japan)
- 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV / Single Phase Inspection – HV & LV Windings for Unit # 4 , Core for Unit # 3 and active part #2 (Japan)

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- 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV / Single Phase, Inspection – TV & LV Windings for Unit # 3 (Japan)
- 320/426.6/533.3 MVA Autotransformer / 60 Hz / Single Phase Inspection – TV and Tap windings (unit #7), Core (unit #5), CLX (unit #4) and Gas Collection Test (unit #2) (Japan)
- 320/426.6/533.3 MVA Autotransformer / 60 Hz-HV 525 kV / LV 230 KV / TV34.5 KV / Single Phase, Inspection – Core and Current Limiting Reactor - (Japan)

Active Part / Pre-tanking Inspections:

- Single Phase 33.33 (36.75) MVA_r 525/ $\sqrt{3}$ (551.25/ $\sqrt{3}$) kV (7 Units) (Austria)
- Single Phase 66.67 (73.5) MVA_r 525/ $\sqrt{3}$ (575/ $\sqrt{3}$) kV (The Netherlands)
- Unit#1 3ph 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformer (Portugal)
- Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV (Japan)
- CLR for Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 230 KV / TV34.5 KV (Japan)
- 25 MVA // 69 / 34.5 kV / 15 kV 3Ph / 60Hz / Rise 65K (USA, Alabama)
- Unit #2 3ph 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformer (Portugal)
- 3ph 275MVA SVC Transformers, 60 Hz, 230GrdY/132.79-43kV (2 units) (Poland)
- Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 345 KV / TV34.5 KV (Japan)
- THREE-PHASE AUTOTRANSFORM . 67.2 / 89.6 / 112 MVA - ONAN / ONAF1 / ONAF2 - 138 / 69 / 13.2 kV
Pre-Tanking Inspection, (Portugal)

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Factory Acceptance Test (FAT):

- Single Phase 66.67 (73.5) MVA_r 525/ $\sqrt{3}$ (575/ $\sqrt{3}$) kV (The Netherlands)
- Single Phase 33.33 (36.75) MVA_r 525/ $\sqrt{3}$ (575/ $\sqrt{3}$) kV (Austria)
- 3ph 60 Hz 28/37.3//41.8 MVA; 345 /13.8 kV Power TR (South Korea)
- 3ph 60 Hz 28/37.3//41.8 MVA; 345 /13.8 kV Power TR (Austria)
- 3ph GSU, 168/224/280 MVA; 142 DELTA +5% DETC / 34.5 / 13.8 KV (USA, Alabama)
- 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformers (Portugal)
- 161GrdY/92.95-69GrdY/39.84-12.47kV 90/120/150 MVA LTC Autotransformer (China)
- 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformers (Portugal)
- 3ph 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformer (Portugal)
- 3ph 90/120/134,4 MVA GSU; 60 Hz; 161GrdY/93,06 - 12,3 kV GSU (Poland)
- 3ph 275MVA SVC Transformers, 60 Hz, 230GrdY/132.79-43kV (2 units) (Poland)
- Single Phase 320/426.6/533.3 MVA Autotransformer / 60 Hz HV 525 kV / LV 345 KV / TV34.5 KV (Japan)
- 27/36/45 MVA – ONAN/ONAF/ONAF - 69 – 13.8 kV / Dyn1 - 3Ph / 60Hz / Rise 65K (Portugal)
- 27/36/45 MVA - KNAN/KNAF - 69 – 13.8 kV / Dyn1 - 3Ph / 60Hz / Rise 65K . (Austria)
- 27/36/45 MVA – ONAN/ONAF/ONAF - 69 – 13.8 kV / Dyn1 - 3Ph / 60Hz / Rise 65K (South Korea)
- 67.2 / 89.6 / 112 MVA - ONAN / ONAF1 / ONAF2 - 138 / 69 ± 8 * 0.625 % / 13.2 kV, THREE-PHASE AUTOTRANSFORMER (Portugal)

Pre-Shipment Inspections:

- 3ph 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA LTC Auto Transformer (Portugal)
- 3ph 275MVA SVC Transformers, 60 Hz, 230GrdY/132.79-43kV (2 units) (Poland)
- 161GrdY/92.95-69GrdY/39.84-13.8kV 75/100/125 MVA . LTC Auto Transformers Final Inspection Before Shipment , (Portugal)



PLAN **B** SOLUTIONS

Transatlantic Transformer Consulting