

ЈАВНО ПРЕДУЗЕЋЕ „ЕЛЕКТРОПРИВРЕДА СРБИЈЕ“ БЕОГРАД
ЕЛЕКТРОПРИВРЕДА СРБИЈЕ ЈП БЕОГРАД-ОГРАНАК ТЕНТ
Улица: Богољуба Урошевића- Црног број 44.

Место: Обреновац

Број: 03.01-45054/10-15
03-11-2015

(место и датум)

На основу члана 54. и 63. Закона о јавним набавкама („Службени гласник РС“, бр. 124/12, 14/15 и 68/15), Комисија за јавну набавку број 3000/1616/2015 (102161/2015), за набавку Услуге замене генератора блока Б2, на захтев заинтересованог лица, даје

ДОДАТНЕ ИНФОРМАЦИЈЕ ИЛИ ПОЈАШЊЕЊА
У ВЕЗИ СА ПРИПРЕМАЊЕМ ПОНУДЕ
Бр. 3000/1616/2015 (102161/2015)

Пет и више дана пре истека рока предвиђеног за подношење понуда, заинтересовано лице је у писаном облику од наручиоца тражило додатне информације односно појашњења а Наручилац у року од три дана од дана пријема захтева објављује на Порталу јавних набавки и интернет страници Наручиоца, следеће информације, односно појашњења:

У вези са припремом понуде по ЈН 3000/1616/2015 (102161/2015) "Набавка услуге замене генератора блока Б2" и обављеном обиласку локације неопходне су нам следеће информације:

ПИТАЊЕ 1:

Место за складиштење старог статора и демонтираног старог ротора;

ОДГОВОР 1:

Место складиштења старог генератора ће бити у кругу ТЕНТ Б на следећој локацији: Лево од шина испред роло-врата гледајући ка ГПО блока Б2 или у Машинској Сали испод отвора за Кран бр.1 на блоку Б1.

ПИТАЊЕ 2:

За демонтирани стари ротор нисмо пронашли никакву информацију у конкурсној документацији као нпр. начин складиштења и конзервације;

ОДГОВОР 2:

Складиштење старог ротора је у Машинској Сали, а конзервација је обавеза наручиоца.

ПИТАЊЕ 3:

У случају да место за складиштење старог статора буде ван машинске сале, неопходно је да нам се дају услови произвођача за дугорочно складиштење истог, који треба да се узму у обзир при изградњи објекта;

ОДГОВОР 3:

Услови складиштења старог статора дати су у прилогу и обавеза је извођача.

ПИТАЊЕ 4:

Место за привремено складиштење новог статора генератора;

ОДГОВОР 4:

Привремено складиштење новог статора је у Машинској Сали, на коти 0м, на шинама.

ПИТАЊЕ 5:

Димензије и тежине старог и новог статора и димензије места за вешање (шема за вешање);

ОДГОВОР 5:

И стари И нови статор имају транспортну тежину 315 тона (димензије И шема вешања су дате у прилогу). Габаритне димензије старог И новог статора су исте.

ПИТАЊЕ 6:

Димензије роло-врата за улазак статора у машинску салу;

ОДГОВОР 6:

Рорло врата: Висина x Ширина (4500x5050mm)

ПИТАЊЕ 7:

Чија обавеза је обезбеђивање тежине за испитавање греде и сајли као и механичко и електрично повезивање (удвајање) дизалица и њихова синхронизација?

ОДГОВОР 7:

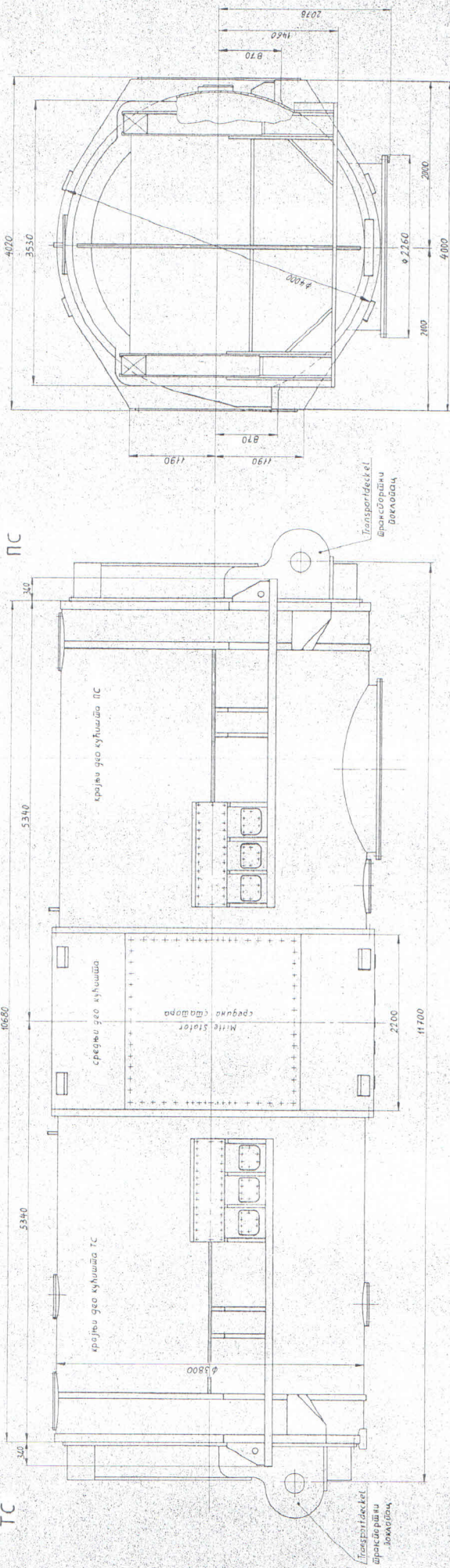
Атестације греде и сајли је обавеза извођача. Повезивање и синхронизација дизалица је обавеза наручиоца радова. Кранови су атестирани у 2015. Години.

КОМИСИЈА

1. Немања Бањалић, члан (име и презиме).....
Игор Дамјанац, заменик (име и презиме).....
2. Горан Лукић, члан- име и презиме).....
Мирослав Томашевић, заменик (име и презиме).....
3. Срђан Јанковић, члан -секретар((име и презиме).....
Наташа Матић, заменик (име и презиме).....
4. Атина Недељковић, члан(име и презиме).....
Вишња Лечић, заменик (име и презиме).....

AS
TC

NS
PS



Transportgewicht = 315t.

(inkl. 2 Transportdeckel
4 Anbaueinrichtungen)

Тежина шрансировки = 315t.

(са 2 транспортні докладки
і 4 устаткування за окучиш)

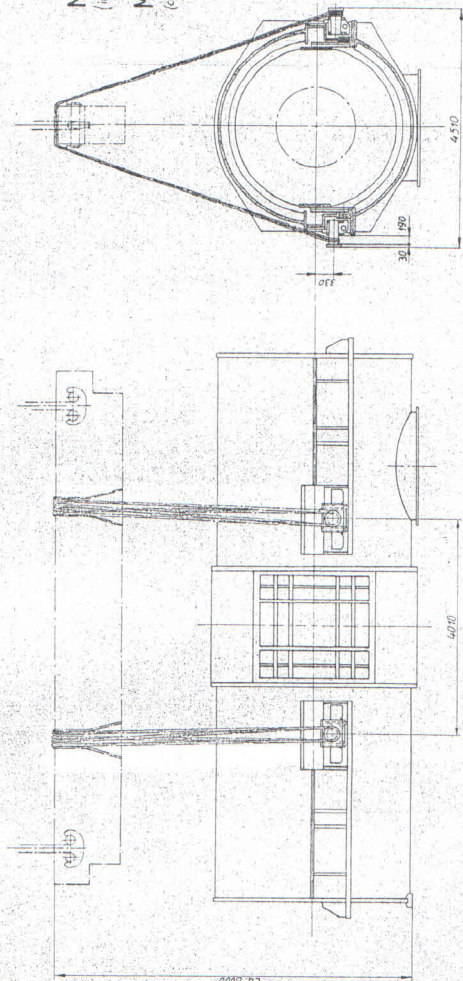
Montagegewicht = 300t.

(inkl. 4 Anbaueinrichtungen)

Моніажна іжежина = 300t.

(са 4 устаткування за окучиш)

ТС = шуринська сшрана
ПС = шуринська сшрана



HTGG 128172	HTGG 128172
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Mod. a2	Mod. a2
Mod. a3	Mod. a3
Mod. a4	Mod. a4
Mod. a5	Mod. a5
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Распорядок шрансировки
и монтажные сшшора

Transp. +
Montageanordnung

BBC
BRUNNEN BERLIN

HTGG 128172

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Mod. a35

1 SCOPE OF APPLICATION

This instruction describes the preservation, packing, transport, storage and unpacking of hydrogen-/water-cooled turbogenerator stators of type:

WT/WM

If the conditions specified on the following pages are fulfilled, the precautions ensure a preservation of the turbogenerator stator that includes the transport (continental and/or overseas) as well as stopovers when the means of transportation are changed (e.g. rail to ship) and intermediate storage periods (before and after transport). The preservation measures during the erection are not the subject of this specification.

This instruction considers a maximum combined transport and intermediate storage period of up to a total of 12 months. Additional requirements apply for a longer duration of storage, which are defined in appendix A of this document.

2 REFERENCES

This instruction is based on the standard Packaging Manual HDST 4.15/I (RPDM folder HDST 415). The following instructions contained therein have to be considered in particular:

HDST601020	Desiccant Method
HDST601023	Calculation of the Desiccant Quantity
HDST601024	Regeneration of Desiccants
HDST601056	Graphic Symbols and Markings on Caution and Handling
HDST601070	Material Storage and Storage Inspections
HDST601072	Connecting and Operation of Dehumidifiers

Additionally required instructions

HDST601885	Test Certificate - Desiccant Preservation and End of Preservation Respectively
HDST602124	Test Certificate - Condition Monitoring during Transport
HTGG600030	Process Specification for Clean Conditions for Turbogenerator Erection
HTGG600647	Process Specification for Conservation of the Water Cooled Stator Windings
HTGG611261	Item Specification for Temperature/Humidity Data Logger
HTGG611265	Process Specification for the set-up of Temperature/Humidity Data Loggers

3 SCOPE

This work instruction defines the minimum requirements for the preservation and packing of turbogenerator stators for transport purposes including intermediate storage periods. It serves as the basis for the preparation of production documents. The applied packing and preservation must not fall below the standards that are defined herein.

4 CONDITIONS AND DEFINITION OF TERMS

The degree of preservation is agreed between the responsible Turbogenerator R&D design and the Transport Logistics engineering department according to the nature of the product.

Turbogenerator R&D design is responsible for specifying the preservation conditions (temperature, humidity, nitrogen pressure etc.); Transport Logistics is responsible for ensuring the requirements are met during the transport and intermediate storage periods.

Dept	Document No	Type	Rev	Released	Log	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

4.1 DEFINITION OF TERMS

Maximum combined transport and intermediate storage period of up to a total of 12 months

The 12-month period, which is the scope of this instruction, starts with the contractual ex-works date. The fitting of desiccant in the stator and closing/sealing the transport/protection covers prior to shipping has to be aligned with the ex-works date.

Transport period

Refers to when the turbogenerator stator is being actively transported. The level of condition monitoring (temperature, humidity etc.) during such periods is limited to interface points only, e.g. change from one mode of transport to another.

Stopover

Refers to short duration storage periods of up to 1 week when the turbogenerator stator is awaiting the next transport phase. Condition monitoring and recording can be done at regular intervals. Periods longer than 1 week must be considered as intermediate storage.

Intermediate storage

Refers to a storage period either at the manufacturing location or a defined storage location (e.g. for stock turbogenerator stators). Condition monitoring and recording must be done on a regular basis and environmental controls may have to be applied.

Site storage

Refers to storage at site whilst awaiting unpacking and lifting onto the turbine block. Condition monitoring and recording must be done on a regular basis and environmental controls may have to be applied.

Long-term storage

Refers to storage for a period in excess of the 12-month period allowed for transport and intermediate storage. The requirements for long-term storage are defined in appendix A.

Stator

Refers to hydrogen-/water-cooled turbogenerator stators within the context of this instruction.

Dept	Document No	Type	Rev	Released	Lang	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

5 MEASURES

5.1 PRIMARY PRESERVATION

Responsible department

The preservation of the stator's machined surfaces shall be carried out according to paragraph 6.2.

Product Eng.

5.2 SECONDARY PRESERVATION

5.2.1 Desiccant

The stator interior shall be preserved by means of desiccant method by default. To ensure that the stator interior is kept dry, all openings must be closed tightly. The air in the stator interior is under ambient pressure.

Product Eng.

5.2.2 Nitrogen Preservation

Stator bars of water-cooled stator windings (WT-E types) are preserved with nitrogen gas according to 6.3.1.

Product Eng.

5.3 FITTING OF INSTRUMENTS

5.3.1 Data Logger

Two data loggers as per HTGG611261 (one with a display showing current values and being readable from outside) are fitted to the instrument compartment on the NDE site (Figure 4). They face inwards and measure the interior air temperature and humidity of the stator.

Product Eng.

5.3.1.1 Record of Data Logger Setup

The setup of the data logger shall be done according to HTGG611265 and recorded in the test certificate HDST601885.

Manufacturing/
Packing Dept.

5.3.2 Measuring Terminal

The following measuring terminals (gas-tight bushings) are fitted in the instrument compartment on the NDE-side of the transport/protection cover:

Product Eng.

Instrument leads inside the stator housing according to documentation:

- 3 leads connected from the instrument terminals U, V, W (or T₁, T₂, T₃) on the cover to the corresponding stator phases (e.g. at the phase ring/terminal connections).
- 1 lead connected from the ground terminal of the instrument compartment (\perp) to the stator core or housing (e.g. NDE-Press Plate).

Instrument leads outside the stator housing:

- 3 leads between all 4 correctly marked terminals U, V, W (or T₁, T₂, T₃) and ground terminal (\perp).

Cable cross-section of all instrument leads $\geq 16 \text{ mm}^2$.

The instrument compartment must be sealed with a transparent, watertight protective cover during the transportation. It must be possible to read the data-logger during the transport period without removing the protection cover.

Dept.	Document No.	Type	Rev.	Released	Eng.	Status
1350	HDST600566	DC	G	2014-01-08	EN	Approved

5.3.3 Manometer

1 Manometer shall be fitted at the stator winding water outlet flange at the NDE (WT-E types, Figure 5):

Pressure scale: 0 to 1000 mbar

Product Eng.

5.4 MECHANICAL PROTECTION / PACKING VARIANTS

There are two types of covers, which can be fitted to the generator end flanges according to the method of transport (refer to 12). These covers may need to be exchanged during the transport period depending upon the route and transport equipment availability.

Transport Logis-
tics**5.4.1 Variant „Transport Covers“**

The end openings DE and NDE of the stator are closed with transport covers. With this variant, the self-supporting stator can be transported by railway using a specially designed railway transporter (Schnabel car). When not fitted to the railway transporter, the stator can be set down on the provided crossbeams (Figure 2).

Transport Logis-
tics

The fasteners of the transport cover carry the full load of the stator weight and therefore must always be assembled using new bolts.

5.4.2 Variant „Protection Covers“

The end openings DE and NDE of the stator are closed with protection covers. The stator is mounted in transport frames fitted on its base plates. A polyethylene foil must be put between the base plates and the wooden supports to avoid contact corrosion.

Transport Logis-
tics**5.5 CAUTION- AND HANDLING MARKS**

The centre of gravity must be clearly marked with symbol no. 7 (ISO 780/HDST601056) at its effective location on all 4 sides. All lifting points must be marked with the chain-symbol no. 16 (ISO 780/HDST601056).

Manufacturing/
Packing Dept.

A label according to section 14 shall be attached outside wherever desiccant has been inserted to the stator.

For orientation at installation, the letters “DE” and “NDE” must be marked on the stator (not on the transport devices) at the respective end.

6 REALISATION

6.1 DOCUMENTATION

Responsible department

The stator must be prepared for transport according to the following project/type specific documentation: Product Eng.

Relevant documents for shipping issued by Product Engineering:

- Stator ready to ship drawing HTGG... (type dependent)
- Stator transport dimension drawing HTGG... (type dependent)
- I+T Plan Stator ready to ship (type dependent)

Relevant documents for shipping issued by Transport Engineering:

Transport Eng.

Variant "Protection Covers"

- Packing drawing HDST... (type dependent)
- Transport drawing HDST... (type dependent)

Variant "Transport Covers"

- Packing drawing HDST... (type dependent)
- Transport drawing HDST... (type dependent)

Universal documents

- Test Certificate HDST601885

6.2 PRIMARY PRESERVATION

6.2.1 Stator Housing Surfaces

If not stated otherwise in the part list, all bare, metallic surfaces must be protected with corrosion protection 17 (trade name Cortec VpCI-369, product description HIME450529) and a layer thickness $\geq 50 \mu\text{m}$. Manufacturing/
Packing Dept.

6.3 SECONDARY PRESERVATION

6.3.1 Water-Cooled Stator Windings (Type WT-E)

All connections of the stator winding cooling circuit must be closed using gastight seals or gaskets. Manufacturing/
Packing Dept.

Connections must be provided to the inlet and outlet manifold of the stator winding cooling circuit which are accessible from outside the stator housing.

For transport and storage, the stator winding is filled with nitrogen gas (N_2) to an overpressure in the stator winding of:

$$p_e = 0.5 \pm 0.2 \text{ bar.}$$

Before filling with gas, the winding must be evacuated and purged as per instruction HTGG600647 to dry it so that the dew point temperature of the N_2 -gas in stator winding is less than -30°C .

It is important to note, that any double-wall expansion joints of steel and Teflon (PTFE) must be removed, because a vacuum of $p_{\text{abs}} \leq 0.05 \text{ bar}$ is applied during the purging/drying procedure creating the danger of collapse/implosion of the Teflon lining.

6.3.2 Desiccant Preservation

6.3.2.1 Desiccant Quantity

For calculation of the desiccant quantity, a preservation period of 12 months is taken into consideration. The quantity of the desiccant bags (according to HDST601023) is specified in the part list of the particular packing drawing.

Transport Eng.

6.3.2.2 Desiccant Data

Cobalt-free desiccant bags as defined in HDST601020 containing 32 desiccant units (DU) of alumina, active clay or similar shall preferably be used (see DIN 55473-A, MIL-D-3464E, NFH00321).

Manufacturing/
Packing Dept.

6.3.2.3 Location in the Stator Housing

The desiccant bags must be distributed in the DE-side transport/protection cover in the provided basket. The desiccant bags shall be placed in such a manner that they cannot change their position due to vibration, and cannot be ripped open. To achieve best effects, the bags shall be distributed over as large an area as possible.

Manufacturing/
Packing Dept.

6.3.2.4 Record of Desiccant Fitting

The amount and size of inserted desiccant bags must be recorded in the Test Certificate HDST601885 (entry at start of preservation).

Manufacturing/
Packing Dept.

6.3.2.5 Distribution of the Test Certificate

The filled report must be distributed as follows:

- To ensure the complete removal of desiccant bags by erection personnel, a copy wrapped in a plastic envelope shall be attached by adhesive tape outside the stator at a clearly visible location.
- The original certificate must be added to the set of inspection and test plans of the product.

Manufacturing/
Packing Dept.

6.4 EXCHANGE OF DESSICANT

The desiccant bags are accessible from the outside, after removing the DE-side manhole cover. When exchanging desiccant due to saturation (section 7.2.2), the interior of the stator shall be dried by a dehumidifier system to a relative humidity of $\leq 20\%RH$ before new bags are added and the stator housing is re-sealed (see section 6.5).

Packing Dept.

6.4.1 Record of Desiccant Exchange

The amount of removed desiccant bags must be recorded in the Test Certificate HDST601885 (entry at end of preservation).

Packing Dept.

For the new added desiccant bags, another Test Certificate (entry at start of preservation) must be filled in. Both documents for the old and new preservation must be distributed as per section 6.3.2.5.

6.5 USE OF A DEHUMIDIFIER SYSTEM

6.5.1 Application

A dehumidifier shall be used to re-establish the low humidity level inside the stator when the humidity needs to be reduced more quickly than can be achieved using desiccant, e.g.

- after exchange of the transport/protection covers;
- if the humidity during storage has reached unacceptable levels and needs to be reduced quickly; or
- when exchanging desiccant due to saturation.

Transport Logistics/
Packing Dept.

6.5.2 Setup

At the DE- and NDE-side transport/protection covers include connections for a dehumidifier system (boreholes diameter 200 mm for flanges, Figure 1). During transport, these openings must be closed using airtight seals/gaskets and blind flanges.

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When used for connecting a dehumidifier system, the capacity of the dehumidifier and the connections must be according to instruction HDST601072.

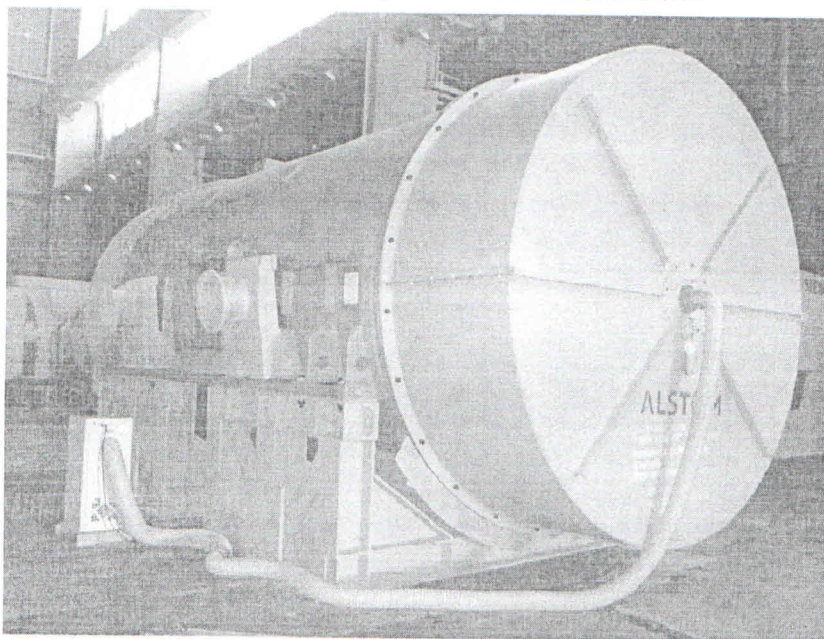


Figure 1: Turbogenerator attached to dehumidifier

The dehumidifier must be connected in closed loop arrangement such that the dry air enters the generator at the DE and leaves at the NDE (section 13), otherwise a poor air flow distribution within the stator could result. This is due to the inner fan guides fitted at the NDE of some turbogenerator types.

7 STORAGE

The storage / intermediate storage of the stator may take place on the following occasions:

- Storage at the manufacturing location before transportation
- Storage at an external, intermediate location (including stopovers)
- Storage on site before the start of erection

7.1 STORAGE INSTRUCTION

7.1.1 Storage Conditions

In its packed condition, the stator must be stored according to Storage Category „C“ as defined in HDST601070. This requires storage in a covered building, which provides protection against direct weather influences such as rain, snow etc. This shall be strictly applied when the intermediate storage period (including the transport period) is expected to exceed 12 months.

For intermediate storage periods of up to 12 months (including transport and stop-over periods), due to practical considerations, the lower storage category „D“ (HDST601070) is acceptable. This requires at least a tarpaulin over the complete stator, which protects from effects of the weather, dirt, and aggressive substances. Collection of water must be prevented by taking appropriate steps.

Due to the lower storage category the temperature and humidity limits and monitoring schedule given below may vary from those required for long-term storage.

The stored stator must not be subjected to vibrations.

7.1.2 State of Stator during Intermediate Storage

The transparent cover of the NDE-side instrument compartment must be removed during the storage period to allow easy access to the instrumentation terminals.

7.2 MONITORING DURING INTERMEDIATE STORAGE AND COUNTER-MEASURES

All results and measurements must be protocolled by the warehouse keeper. At the end of the storage, all reports must be delivered to the responsible transport logistics department.

The transport logistics department has to be informed immediately, if the permitted temperature; humidity, or nitrogen pressure values are exceeded or fallen below during storage (section 11).

7.2.1 Measurement of Air Temperature in Stator Interior

The measurement of the air temperature in the stator interior has to be done with the build-in data loggers.

To download collected data from the logger will usually require that the logger is accessed using a computer equipped with the logger specific software and connected using the USB socket.

Allowable range of air temperature within the stator housing: $T_{\text{allow}} > 0^{\circ}\text{C}$

Checking interval: Monthly, if outside air temperatures stay permanently above 0°C .

Bi-weekly, if outside air temperatures fall below 0°C .

If the minimum allowable temperature cannot be maintained, the Alstom Turbogenerator Project Management shall be contacted for advice.

Dept	Document No	Type	Rev	Released	Eng	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

7.2.2 Measurement of Relative Humidity in the Internal Spaces of the Stator

The measurement of the relative humidity has to be done with the build-in data loggers. Relative humidity $\leq 20\%RH$ corresponds to normal conditions after 7th day of closing the sealing.

To download collected data from the logger will usually require that the logger is accessed using a computer equipped with the logger specific software and connected using the USB socket.

Display	Meaning
< 30%RH	Preservation in good condition
≥ 30%RH < 40%RH	Warning! Attach dehumidifier
≥ 40%RH < 50%RH	Exchange desiccant
≥ 50%RH	Inspect content for corrosion Exchange desiccant Check sealing for leakage if reading occurred within the planned preservation period

Table 1: Interpretation of humidity values

Checking interval: Monthly

Note that manipulations such as inspections, the connection of the turbogenerator to a dehumidifier, the exchange of covers or the exchange of desiccants may result in acceptable short termed humidity peaks.

See section 6.4 regarding exchange of desiccant.

After re-establishing the required humidity level, the covers shall be re-sealed. Additionally all cover plate joints should be visually inspected for visible signs of possible air leakage and re-sealed (e.g. by taping over cover joints with flash banding if facilities are not available to remove and re-seal large covers).

If it is difficult to achieve the required humidity levels, then a dehumidifier system will need to be used (see section 6.5).

7.2.3 Measurement of the N₂-gas Pressure in the Stator Winding (Type WT-E)

Measured with: Manometer provided at the water outlet flange NDE

Overpressure in stator windings:

$$P_p = 0.5 \pm 0.2 \text{ bar}$$

If the value is less than the 0.3 bar limit, the N₂-gas filled stator winding must be attached to a gas station according to section 13 and filled with dry nitrogen (dew point temperature lower than -30°C). The time span between opening the stator winding and connecting the N₂-gas station must not exceed 5 minutes to avoid the ingress of humid air into the stator winding.

Checking interval: Monthly

7.3 TRANSPORT READINESS

At the end of the intermediate storage, but before transport (if the stator has not been stored at its erection location) the transport logistics department shall check the preservation records to ensure that the stator is in good condition for onward transport.

8 TRANSPORT

8.1 TEMPERATURE LIMITS

During the transportation, the air temperature in the stator interior must not fall below -10°C . This limit is imposed to prevent damage to the insulated components within the stator.

If, due to logistical reasons and time constraints, it is expected that temperatures below -10°C could occur, then special precautions will be necessary. In such cases, the Alstom Turbogenerator Project Management shall be contacted for advice.

8.2 ACCELERATION STANDARD

The maximum dynamic transport acceleration values as per Table 2 must be considered during transport. As a rule the highest values must be used when establishing a transport concept or for generic design purposes. The values for road and rail transportation may only be used for specific and limited design purposes.

Mode of transport	Longitudinal (x)	Transverse (y)	Vertical (z)
Sea	0.8g	0.8g	0.8g
Road	1.0g	0.5g	0.3g
Rail	1.0g	0.5g	0.3g

Table 2: Dynamic transport accelerations

Any horizontal acceleration values have to be combined with the static gravity force and the dynamic vertical acceleration.

There is no distinction between forward/aft acceleration as the direction of travel is typically not defined at design stage. There is no distinction between longitudinal and transverse accelerations as the cargo orientation in ocean going vessels is typically not defined at design stage.

8.3 SEA TRANSPORT

On overseas shipments, only „BELOW DECK“ transport is permitted.

8.4 CONDITION MONITORING DURING TRANSPORT

For practical reasons it is not feasible to regularly check the condition of the stator in transit. However checks of inner temperature, humidity and N_2 pressure may be carried out at defined interface points, e.g. when the mode of transport is changed.

Transport Logistic Department shall define the exact points at which readings and records shall be carried out on a project specific basis. Typical interface points are stopovers and:

- arrival at port of export (after road or rail transport), and again prior to loading onto the ship if the time period between arrival and loading exceeds 3 days;
- arrival at the destination port after unloading from the ship, and again prior to departure by road/rail if the time period between unloading and departure exceeds 3 days;
- arrival at site or other storage location prior to erection / start of intermediate storage;
- at the end of an intermediate storage period; and
- before and after exchange of transport /protection covers.

The condition monitoring should be recorded using the standard control sheet HDST602124. All reports must be delivered to the responsible transport logistics department.

The Transport Logistics department has to be informed immediately, if the readings fall below the minimum acceptance values (temperature according section 8.1, humidity according section 7.2.2).

8.5 EXCHANGE OF TRANSPORT / PROTECTION COVERS

The following work must be carried out at the exchange of the transport covers / protection covers.



The instruction in the following section and the related packing drawings and associated documents are intended for qualified technical personnel only. The documents must be carefully read and understood before starting the work.

The use of personal safety equipment such as hard hat safety boots and gloves must be worn at all times.

1. Prepare environment and infrastructure as per clean condition requirements HTGG600030.
2. Check the condition of the covers to be attached. The flanges of transport covers must be clean, free of rust and mechanical damage. The flanges of protection covers must be clean, free of rust and paint damage and mechanical deformation. The evenness must not exceed 4mm.
3. Record the air temperature and humidity in the stator interior by means of the instrumentation provided (see 5.3).
4. Remove the measuring terminals from the NDE instrument compartment.
5. Remove all desiccant bags and record the quantity (see 6.4.1)
6. Remove transport covers or protection covers from the stator.
7. Check the rust protection on the stator flanges and if necessary coat again (see 6.2.1).
8. Check the sealing strips for damage and replace if necessary.
9. The transport covers must always be fitted using new screws due to the high level of mechanical loading – they must never be re-used.
10. Screws for protection covers may be re-used after cleaning and lubricating with MoS₂ lubricant (trade name MoS₂, product description HZN402174).
11. Mount the transport covers or protection covers.
12. WT-H only: To prevent any damage to the winding, the transport/protection cover must be centred with guide pins during assembly and removal. See relevant packing drawing.



When not securely bolted, the covers must be secured with a crane at all times.
The guide pins (WT-H only) are not designed to bear load.

13. Tighten the covers with screws. Refer to the relevant packing drawing for tightening torques.
14. Insert the desiccant bags in the basket of the DE end transport or protection cover (see 6.3.2.3) and record the quantity (6.4.1).
15. Attach the measuring leads to the terminals of the NDE end cover instrument compartment
16. After the installation of the transport or protection covers, the stator shall be dried with a dehumidifier to a relative humidity of $\leq 20\%RH$ (see section 6.5).
17. Refit the covers of the dehumidifier connections.
18. Record the air temperature and humidity in the stator interior by means of the instrumentation provided (see 5.3).

If the time between removing and re-fitting the transport/protection covers is expected to exceed 2 hours, then the stator housing flange (WT-E types) or stator end winding complete (WT-H types) should be sealed / protected with heavy gauge polythene sheeting or similar material to protect against the weather and ingress of dirt. Ensure that such sheeting is clean and free from dirt/debris before being applied

Dept.	Document No.	Type	Rev	Released	Lang	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

9 UNPACKING

Do not unpack the stator unless it is immediately used.

All provisional sealing, monitoring equipment and preservation measures must be removed. A visual check must be carried out in consideration of mechanical damages and corrosion of surfaces.

All desiccant bags must be removed according to the test certificate HDST601885 attached to the stator. The number of removed desiccant bags must be recorded in the test certificate (entry at end of preservation). The signed copy must be added to the set of inspection and test plans of product.

Damage, corrosion protection failure and other deviations must be reported by NCR (Non Conformance Report).

9.1 COVER REMOVAL

- The hand-over to the site erection team must be properly integrated to avoid exposure of the stator to humid ambient air. It should be considered if the protection covers could be left in place until the generator is installed on the turbine block and other preservation measures are in place. Clean conditions as per HTGG600030 must be established prior to any removal of covers.
- Before removing the transport/protection covers, ensure that the stator structure is at the same temperature as the ambient air. If the structure is colder than the ambient air then, depending on the dew point temperature, condensation could form on the stator components resulting in rust or low winding insulation resistance. If the stator has been moved from a colder environment to a warmer environment, e.g. from outside to inside the turbine hall, then time must be allowed for the stator temperature to stabilize to the ambient air temperature before removing the covers - this could take several days.
- Do not remove the covers if the stator internal air temperature is below the dew point of the external, ambient air.
- Remove one transport/protection cover at a time (NDE then DE), immediately replacing it by the temporary closure plates to be used during the erection period, i.e. do not have both ends of the stator open at the same time. This minimizes the exchange of the dry air within the stator with the ambient air.

10 MULTI-USABLE TRANSPORT DEVICES

Depending on the project, it is upon the transport department to designate transport devices for multiple uses. Should this be the case, the material is considered to be "sent on loan" and shall be returned immediately after use.

11 RESPONSIBLE DEPARTMENT FOR FURTHER INQUIRIES

The responsible departments for further inquiries:

Transport-Logistics Baden

Tel. +41 (0)56 205 62 97

Fax. +41 (0)56 205 62 39

Dept.	Document No.	Type	Rev	Released	Lang.	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

12 TRANSPORT VARIANTS AND PRESERVATION

12.1 TURBOGENERATOR WITH TRANSPORT COVERS

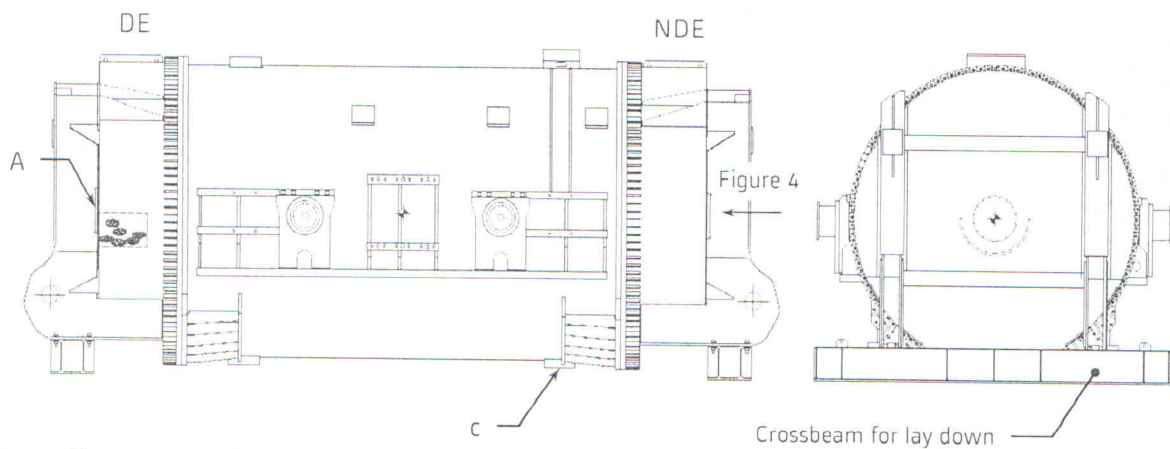


Figure 2: Turbogenerator with transport covers (mainly used for rail transport)

12.2 TURBOGENERATOR WITH PROTECTION COVERS

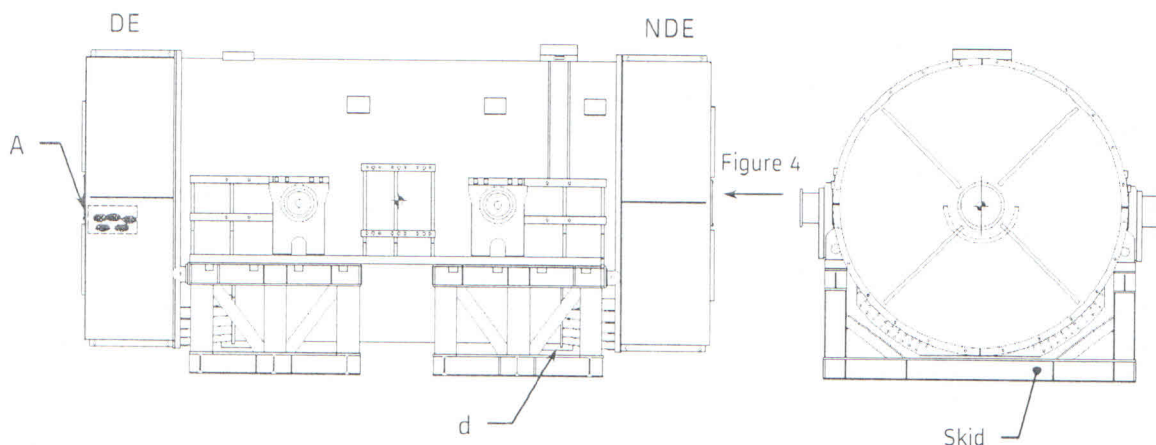


Figure 3: Turbogenerator with protection covers (mainly used for sea and road transport)

12.3 PRESERVATION SCHEME

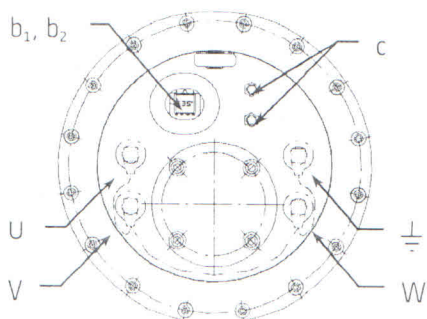


Figure 4: Instrument compartment

Legend of symbols used in Figure 2, 3 and 4

- A Desiccant bags (6.3.2.3)
- b₁ Data Loggers with display (OM-73)
- b₂ Data Loggers without display (OM-62)
- c USB Sockets for Data Loggers
- d Manometer (5.3.3, WT-E type only)
- U, V, W, \perp Measuring terminals (5.3.2)

Dept	Document No	Type	Rev	Released	Ing.	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

14 LABEL "ATTENTION DESICCANT INSIDE"

Yellow label with black print

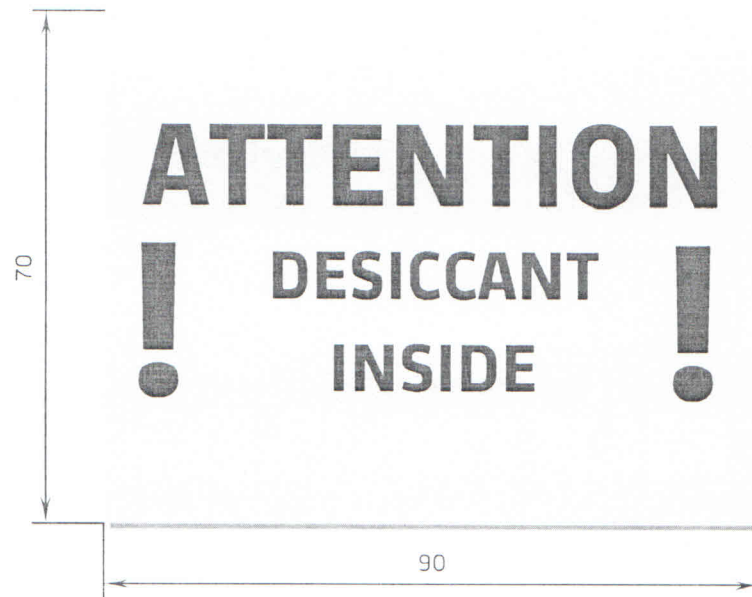


Figure 6: Desiccant label

Dept.	Document No.	Type	Rev.	Released	Log	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

A APPENDIX A: REQUIREMENTS FOR LONG TERM STORAGE

A1 General

These additional requirements allow the stator to be stored up to a maximum period of 4 years. At the end of the first storage period of 4 years, however, a general check of the stator must be made (check storage report, anti-corrosion coating, desiccant, etc. - see section A3) before it is stored for a further 4 years.

A2 Storage conditions

The following storage conditions shall be applied:

A2.1 Storage Area

- If possible the generator should be stored in a storage building with environmental control according to HDST601070 class „B“ (closed, air-conditioned storage room). This requires that the internal air inside the building be controlled within defined temperature and humidity levels.
- If such a storage area cannot be provided, then the minimum requirement is storage according to HDST601070 class „C“ (covered storage area). This requires that the generator be protected against contamination by mud, droppings, rain, snow and water spray.
- In either case, the generator internal air temperature and humidity shall be controlled within the limits given in section A3.

A2.2 Storage Area

- The generator is to be set up so that it rests either on the stator feet or on special areas of the housing as designated in the transport drawing. In order to avoid corrosion, a layer of chemically neutral, vapour-proof plastic sheet is placed between the supporting surfaces of the stator and any hygroscopic material, such as wooden block, which is placed underneath these supporting surfaces.
- A clearance shall be maintained between the lower side of the stator and the floor to allow air circulation.

A2.3 Generator Preservation

Before starting a planned long-term storage period, the checks listed in Table A2 shall be carried out and recorded.

A3 Inspection and tests during long-term storage

Table A1 gives the checks that shall be made during a long-term storage period. Every 4 years a more detailed internal check shall be carried out according to the requirements given in Table A2.

Dept	Document No	Type	Rev	Released	Ing.	Status
350	HDST600566	DC	G	2014-01-09	EN	Approved

Table A1: Regular Checks to be carried out during long term storage

* The electronic temperature/humidity data can be downloaded using the USB connectors and a suitable computer loaded with the device specific software supplied with the unit.

Table A2: Checks to be carried out after each 4 year storage period

Dept.	Document No.	Type	Rev.	Released	Log.	Status
1350	HDST600566	DC	G	2014-01-09	EN	Approved

Test / Measurement	Procedure	Equipment	Interval	Limits	Action if criteria not fulfilled	Remarks
Check the storage report (for changes in measured variables during the storage period and for comparison of measurements with allowable values).	-	None	4 years	See above	According to the findings, the following action may be required: i. Complete replacement of desiccant by new material; ii. Application of a dehumidifier to better control the stator internal humidity; iii. Better sealing of the stator at bolted joints, e.g. by retightening the bolts, renewing gaskets, or applying flash banding/sealant over the joint interfaces; iv. Improved conditions within the storage building /structure, e.g. heating / temperature control.	-
Visual inspection of stator winding, core back and core bore areas for signs of condensation / rust formation.	-	Boroscope, mirrors on extendable handles, digital camera.	4 years	No signs of rust, or marks due to condensation residue.	If rust is seen to be present then this shall immediately be reported to Alstom Turbogenerator Project Management for further advice.	-
Check for any damage to the paint coat And anti-rust protection on all exterior surfaces of the generator.	-	Boroscope, mirrors on extendable handles, digital camera.	4 years	No uncoated surfaces or spots which could lead to rusting of the component.	Clean up the affected area and re-coat with rust inhibitor (see section 6.2).	-
Measurement of insulation resistance R of each individual phase of the stator winding.	HTAE 60012 HTGG600670	500 V Megger	4 years	$R \geq 3 \times (n-1) M\Omega$ corrected to 20°C for the complete winding [n = rated voltage]	Apply a dehumidifier and see if the insulation resistance (IR) recovers. If the IR does not recover then contact Alstom Turbogenerator Project Management for further advice.	Insulation resistance measured against ground for each phase separately, during which the other two phases must be grounded. Reading to be taken 1 minute after applying test voltage.
Carry out electrical tests on the built-in RTD's and thermocouples.	HTGG600629	500 V Megger	4 years	See Test Instruction	Report findings to Alstom Turbogenerator Project Management for further advice.	-