Shin Nippon & MEIDEN – No. 15 Steam Turbine Generator Set

Data Sheet | Steam turbine and generator, accessories and boiler available on request

For sale by private treaty: the No. 15 steam turbine generator set at Daio Paper Corporation's Mishima Mill, Japan – Shin Nippon Machinery turbine C11-R16-EX, 62,920 kW, and MEIDEN generator TIC-AFT, 69,912 kVA, built 2019. The scope comprises the turbine and the generator; their associated accessories and the boiler is also available for sale upon request. Data is taken from the OEM/service reports and the supplied technical data.

Photos

Steam turbine No. 15

Steam turbine No. 15 (1)

Steam turbine No. 15 (2)

Steam turbine No. 15 (3)

Generator No. 15

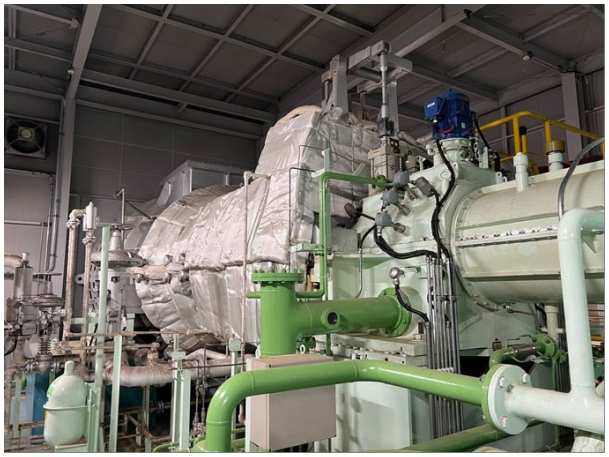
Generator No. 15 (1)

Generator No. 15 (2)

Generator No. 15 (3)

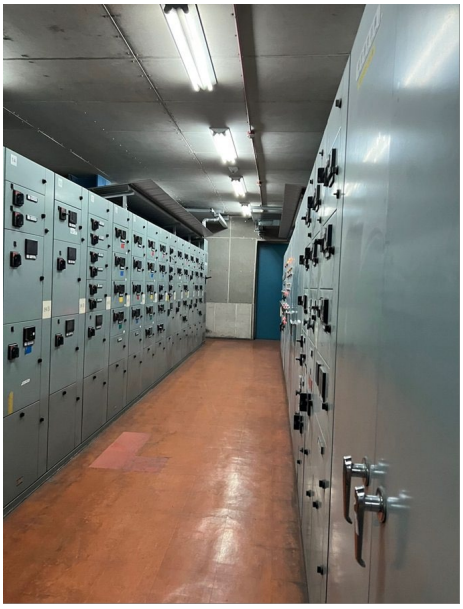
Other

Turbine hall



Turbine hall

Auxiliary unit with instrumentation



Switchgear room

Pump installation

Outdoor installation

1. Scope and site

Item	Data
Owner / site	Daio Paper Corporation (大王製紙株式会社), Mishima Mill
Unit	No. 15 steam turbine generator set (15 号機)
Scope of sale	Steam turbine and generator; associated accessories can be included on request
Boiler	Also available for sale upon request
Steam parameters (owner's data)	8.6 MPa / 512 °C / 236 t/h
Rated output	Turbine 62,920 kW; Generator 69,912 kVA
Delivery year of the generating equipment	2020 (per MEIDEN maintenance plan for the generator control panel)

Further detailed information about the scope of sale and the layout is available upon request.

2. Steam turbine

Item	Data
Manufacturer	Shin Nippon Machinery Co., Ltd. (新日本造機株式会社)
Type	C11-R16-EX, multi-stage (16 stages)
Main unit serial no.	DIOSM-3A-11893
Rated output	62,920 kW
Steam parameters (owner's data)	8.6 MPa / 512 °C / 236 t/h
Exhaust	To condenser
Main steam stop valve	Emergency trip valve (MSV)
Governing valve	HP steam control valve, venturi type, 5 valves, servo-motor actuated
Turbine–generator coupling	Diaphragm coupling; face-to-face distance 550 mm (design +0.2/+0.5 mm; measured 550.32 mm, June 2024)
Turning device	Fitted
Lube oil system	Main oil pumps No. 1 and No. 2, type HG-65MT (motor driven); emergency oil pump type NHG-10 (motor driven); control oil pumps No. 1 and No. 2 (No. 2 motor driven)
Protection	Manual trip cock; remote trip device incl. solenoid valve
Bearing clearances (May 2024)	Journal 0.48 / 0.47 mm (management value 0.34–0.48); thrust 0.71 mm (management value 0.58–0.74)

3. Generator

Item	Data
Make	MEIDEN – OEM reports by Meiden Engineering Corporation; generator control panel manufactured by Meidensha (明電舎)
Type	TIC-AFT
Rated capacity	69,912 kVA
Voltage / frequency	11,000 V / 60 Hz
Poles / speed	2-pole / 3,600 min^{-1}
Serial no.	4B6490R1
Year of manufacture	2019
Excitation	AC exciter with rotating rectifier and PMG (permanent magnet generator)

Item	Data
Cooling	Air cooler with water-cooled tubes; flange gaskets 10K-150A-t2 (replaced 2024)
Bearings	Bearing metal with labyrinth seals, oil lubricated; bearing box at negative pressure in operation
Shaft voltage (18 Sept 2025)	900 mV AC, NDE bearing to ground, at 11,000 V no-load – judged good
Generator control panel	Meidensha, S/N 2A7149PB, built 2019, installed in the electrical room; AVR, digital protection relays, transducers, sequencer
Insulation resistance (13 Sept 2025)	Stator 200 MΩ (1,000 V megger; criterion ≥ 10 MΩ); main field, rotating rectifier, exciter armature, exciter field and PMG ≥ 1,000 MΩ (500 V megger)

4. Inspection and maintenance history (newest first)

Period	Work	Contractor / document	Result
11–13 Sept 2025, test run 18 Sept 2025	Unscheduled generator internal cleaning (report title "突発 SD"): oil accumulation removed inside generator, exciter and PMG; oil leak outside the air cooler cleaned; insulation resistance, vibration, temperature rise, bearing box pressure, shaft voltage; load test to 56.44 MW	Meiden Engineering, report 0-220R25244	No abnormality found that would lead to an oil leak; load test judged good; periodic cleaning recommended
16–17 May 2024, start-up 12 June 2024	First periodic inspection of generator control panel / AVR: switchboard inspection, protection relay tests, insulation resistance, interlock tests, AVR static, no-load and load checks	Meiden Engineering, report 0-250R24109	No abnormalities
15–23 May 2024	Generator disassembly and detailed inspection with rotor withdrawn; insulation diagnosis; air cooler inspection (eddy current test, 30-min hydrostatic test, gaskets replaced); test run incl. ozone measurement	Meiden Engineering, report 0-220R24216 + photo album	No abnormalities; insulation judged sufficient for operation
8 May – 12 June 2024 (36 days)	Turbine periodic overhaul: casing opened; rotor, nozzles, bearings, valves inspected; clearance and alignment records; oil pumps serviced; safety and operation tests	Shin Nippon Machinery, job DIOSM-6M-82040, report dated 17 June 2024	All inspected items judged ○ (pass); repairs and OEM recommendations in section 5

5. Turbine overhaul 2024 – findings, repairs, OEM recommendations

- Slight erosion (length 10 mm) at the tips of the last-stage (16th) blades – to be monitored over time.
- Erosion at upper- and lower-half nozzles, stages 12, 13 and 14 – weld-repaired and hand-finished by the customer; to be monitored over time.
- Labyrinth and rotor fin damage at clearance-table positions C, D, E, F – hand-finished; rotor fin wear exceeds the management value, so the OEM recommends replacing the rotor fins together with the labyrinths.
- Governing valve: crack in the weld of the 1st valve seat, weld-repaired by the customer (PT good); gland packing replaced.
- Main steam stop valve: sub-valve cover could not be loosened and was not disassembled – OEM recommends servicing at the Kure works (呉工場) next time; damage to the valve cover and sub-valve bush hand-finished, replacement recommended next time; hydraulic relay and oil cylinder not disassembled this time, disassembly recommended next time.
- Servo motor not serviced this time; OEM recommends manufacturer servicing next time.
- 16 main steam flange bolts and 3 coupling spacer reamer bolts replaced; turbine–generator alignment adjusted.
- Main oil pumps No. 1/No. 2 and emergency oil pump serviced under the pump manufacturer's guidance (measurements, coupling, pump–motor alignment, motor and operation checked); control oil pump No. 2 replaced by a new unit, one unit serviced and kept as spare.
- Turning device initial torque changed from 10 % to 20 %.

- Recommended spare parts list for the next overhaul (MSV parts, governing valve packings, carbon brushes) included in the report.

6. Generator test data

Load test, 18 Sept 2025: 56.44 MW, 11,020 V, 2,999 A, power factor 98.40 %, exciter field 34.0 V / 7.2 A; stator winding U/V/W 62.6 / 63.8 / 63.0 °C; bearings DE 61.1 °C, NDE 63.4 °C; lube oil 46.6 °C at 102.1 kPa; cooling water in/out 29.8 / 32.0 °C. Criteria: stator temperature rise ≤ 100 K, bearing temperature ≤ 80 °C – judged good.

Vibration at 56,800 kW: bearings max. 8.3 µm p-p, casings max. 11.2 µm p-p (criterion for bearing pedestals ≤ 40 µm); shaft max. 36/50 µm p-p X/Y at DE (criterion ≤ 100 µm).

Insulation diagnosis, May 2024: stator insulation resistance U/V/W 28,860 / 31,250 / 31,250 MΩ (1-min values, DC 1 kV applied for 10 min), polarisation index 7.00 / 5.93 / 6.28; rotor 100 MΩ (DC 0.5 kV); tan δ0 at 2 kV 1.36 / 1.15 / 1.10 %; partial discharge Qmax 2,400 / 3,000 / 2,500 pC – all within the criteria.

7. Documentation available (in Japanese)

- Shin Nippon Machinery working report, turbine periodic inspection and maintenance, dated 17 June 2024 (checklists, clearance tables, bearing and alignment records, photos, spare parts list)
- Meiden Engineering report 0-220R24216, generator disassembly/assembly and detailed inspection, June 2024, plus photo album
- Meiden Engineering report 0-250R24109, generator control panel / AVR inspection, maintenance and repair, June 2024
- Meiden Engineering report 0-220R25244, unscheduled generator internal cleaning (“突発 SD”), September 2025

Attachment – Equipment photos

Photos and tag numbers according to the equipment photo list “15 号ﾀｰﾋﾞﾝ･発電機 機器写真” (No. 15 turbine/generator – equipment photos).

S-T01 Steam turbine

Generator

S-RD01 Turning device

S-HE02 Gland condenser / S-F01-1/2 No. 1/2 gland condenser exhaust fans

S-U01-01 Oil tank

S-U01-02 Oil tank

S-U01-03 Vapour extractor fan

S-U01-04-1/2 No. 1/2 main oil pumps

S-U01-05 Emergency oil pump

S-U01-06 Lube oil strainer

S-U01-07 Lube oil accumulator

S-U02-01-1/2 No. 1/2 control oil pumps

HE03-1/2 No. 1/2 oil coolers (upper/lower)

S-HE01 Steam turbine condenser

S-P01-1/2 No. 1/2 condensate pumps (south/north)

S-P02-1/2 No. 1/2 water injection pumps (south/north)

S-EJ01 Steam jet air ejector unit

S-EJ01-01 Start-up ejector

S-EJ01-04 Ejector condenser

S-U03 Condensate sampling unit

CW-P01-1/2/3 No. 1/2/3 circulating water pumps

CW-P02-1/2 No. 1/2 turbine cooling water pumps