

1.1.13 STANDARD ACCESSORIES

1.1.13.1 STRAINER

Conical steam strainer for installation in the live steam pipe (supplied loose).

ACCESSORIES

1.2.1 SYNCHRONOUS GENERATOR

- Rated power : 3765 kVA
- Rated power factor: 0.85
- Rated voltage: 4.16 kV
- Rated frequency: 60 Hz
- Rated speed: 1800 rpm
- Connection: Star + N
- Efficiency*:

4/4 load:	96.6 %
3/4 load:	96.3 %
2/4 load:	95.5 %
1/4 load:	92.6 %
- Mounting: IM1001
- Enclosure: IP54
- Cooling: TEWAC
- Bearings: Sleeve type
- Lubrication: Forced oil lubrication
- Ambient temperature: 40°C
- Insulation class: F (155°C)
- Temperature rise: F (155°C)
- Thermal protection: 6 x PT100 sensors in the windings
- : 2 x PT100 in the bearings
- Altitude: up to 1000m above sea level

* efficiency is at rate power factor

1.2.2 LOCAL PANEL

Attached to the base plate of the turbine, the local panel has the following features:

- Speed indicator
- Switch for "Turbine START/STOP"
- Switch for "Speed INCREASE/DECREASE"
- Switch for "Trip test"
- Button for "Emergency Stop"
- Signal lamp "Turbine ready"

1.2.3 CONTROL AND PROTECTION PANEL

The entire control panel is assembled, wired and tested for connection at site. For indoor use (up to +40°C, 70% humidity) in a remote room (up to 100m distance). The control systems will be designed per technical specification section 4.3

- Turbine and generator Control Systems.

1.2.6 SEPARATOR (Optional and recommended)

Cyclone-type steam separator (supplied loose) for installation in the live steam pipe. It is used to separate fine droplets of liquid from a gaseous stream

Operating points TWIN CA36k

for driving a: Generator

	1	2	3	4	5	6
	Main Data	Max. Power Summer	Max. Steam	Heat Run	Guarantee Point	Additional LP
Turbine part A						
Inlet pressure	52.71 bar(a)	52.71 bar(a)	52.71 bar(a)	52.71 bar(a)	52.71 bar(a)	52.71 bar(a)
Inlet temperature	399 °C	399 °C	399 °C	399 °C	399 °C	399 °C
Exhaust pressure	7.89 bar(a)	7.89 bar(a)	7.89 bar(a)	7.89 bar(a)	7.89 bar(a)	7.89 bar(a)
Exhaust temperature	211 °C	211 °C	211 °C	211 °C	211 °C	211 °C
Enthalpy	2,862 kJ/kg	2,862 kJ/kg	2,862 kJ/kg	2,862 kJ/kg	2,862 kJ/kg	2,862 kJ/kg
Turbine speed	22,500 rpm	22,500 rpm	22,500 rpm	22,500 rpm	22,500 rpm	22,500 rpm
Mass flow	15,470 kg/h	15,470 kg/h	15,470 kg/h	15,470 kg/h	15,470 kg/h	15,470 kg/h
Turbine part B						
Inlet steam	7.80 bar(a)	7.80 bar(a)	7.80 bar(a)	7.80 bar(a)	7.80 bar(a)	7.80 bar(a)
Inlet temperature	210 °C	210 °C	210 °C	210 °C	210 °C	210 °C
Exhaust pressure	0.10 bar(a)	0.10 bar(a)	0.06 bar(a)	0.06 bar(a)	0.08 bar(a)	0.10 bar(a)
Exhaust temperature	46 °C	46 °C	36 °C	36 °C	42 °C	46 °C
Enthalpy	2,360 kJ/kg	2,360 kJ/kg	2,378 kJ/kg	2,462 kJ/kg	2,363 kJ/kg	2,360 kJ/kg
Turbine speed	11,471 rpm	11,471 rpm	11,471 rpm	11,471 rpm	11,471 rpm	11,471 rpm
Mass flow	13,770 kg/h	13,770 kg/h	7,580 kg/h	4,230 kg/h	11,130 kg/h	13,770 kg/h
Performance						
Output speed	1,800 rpm	1,800 rpm	1,800 rpm	1,800 rpm	1,800 rpm	1,800 rpm
Output at coupling	3,228 kW	3,228 kW	2,334 kW	1,790 kW	2,855 kW	3,228 kW
Power at terminals	3,115 kW	3,115 kW	2,246 kW	1,711 kW	2,753 kW	3,115 kW

Shut-off values for interlocking

	Turbine part A		Turbine part B	
	Min	Max	Min	Max
Inlet pressure	47.71 bar(a)	57.71 bar(a)	6.80 bar(a)	8.80 bar(a)
Inlet temp.	349 °C	427 °C	163.8 °C	360.5 °C
Exhaust pressure	6.89 bar(a)	8.89 bar(a)	0.10 bar(a)	0.10 bar(a)

Dimensions

	Turbine part A - casing		Turbine part B - casing	
Inlet flange ANSI	DN 4	PN 900	DN 12	PN 400
Exhaust flange ANSI	DN 10	PN 150	DN 32	PN 150

Howden no.:

Customer:

Date: 07.06.2019

Project:



Sound pressure level

Octave/LP(A)	31.5 Hz	0.0 dB(A)
	63 Hz	46.3 dB(A)
	125 Hz	59.4 dB(A)
	250 Hz	72.7 dB(A)
	500 Hz	78.7 dB(A)
	1000 Hz	78.6 dB(A)
	2000 Hz	79.8 dB(A)
	4000 Hz	79.6 dB(A)
	8000 Hz	77.5 dB(A)
	16000 Hz	0.0 dB(A)
Total level		86.1 dB(A)

Measuring surface factor 15dB
 measured at 1m distance from the surface;
 tolerance +3 dB(A); turbine without driven machine
 or separate gear

Ambient conditions

All components are designed for the following ambient conditions:

Country of site	Canada
Location	inside building
Ambient temperature	minimum 10 °C - maximum 40 °C frost-free
Site altitude	< 1000 m.(ASL)
Atmosphere	normal

Required Voltages

Voltage supply	Voltage:	Frequency:	Phase:
Auxiliary drives for operation el. Motors, etc.	575 VAC	60 Hz	3-phase
UPS (if required)	600 V	60 Hz	3-phase
*Power supply for Control Panels	600 VAC/ N/ PE (TN-S-System)	60 Hz	3-phase

*delivered by the customer

Estimated cooling water demand

Turbine oil cooler	17.64 m³/h (freshwater) at inlet temperature 30 °C and 6 K temperature rise
Generator cooler	see there (if water cooled)
Condensator*	see there (*if offered)