

**DATA PREPARATION OF
UTILITY SUMMARY****JGS 210-120-1-16E**

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1. SCOPE

This manual describes the required information to be prepared by the process unit engineer for the utility facilities design.

- (1) The design utility facilities is based on the utility summary (JGC blank form No. 806-1A/B, 2 and 3) created by the onsite process engineer, vendor and others.
 - (2) The utility summary shall contain all required information on various operation modes such as normal operation, start up and shut down.
 - (3) Optimization of the utility facilities can not be accomplished without accurate information on utilities demand in the process units.
- In order to make an exact utility summary, the necessary information, and the areas requiring special attentions are described in this manual.

2. WORK PROCEDURE

The utilities described in this manual are limited to those listed below. JGC blank form consists of four sheets of form No. 806-1A/B, 2 and 3. These forms will be used in the combination of 806-1A/B and 2 or 806-2 and 3. The blank form 806-1 and 3 are similar, but 806-3 is preferable than 806-1 for JOB phase.

Form No. 806-1A/B contains,

- (1) Electricity
- (2) Steam
- (3) Steam condensate and loss
- (4) Cooling Water (including cooling water for mechanical cooling)
- (5) Fuel oil and fuel gas

Form No. 806-3 contains, addition to above

- (6) Boiler feed water
- (7) Pure water
- (8) Steam condensate is divided into three columns of suspect, clean and loss
- (9) Industrial water
- (10) Instrumentation and plant air
- (11) Inert gas
- (12) Potable water

3. DESIGN

The necessary information and key points required for the preparation of utility summary are summarized in sections 3.3 to 3.6 for various operation modes.

3.1 Information Required for the Design of Utility Facilities

The information required for the design of utility facilities is described in detail from paragraph 5. The following gives a summary of the requirements.

- (1) Operation cases including shut down philosophy
- (2) Consumption of utilities of normal uses
- (3) Operating time and the frequency of intermittent use
- (4) Utility consumption for periodical shut down and starts up and emergency shut down
- (5) Nominate the driver to use turbine or motor, depending on the steam balance
- (6) Operation requirement in the event of major utility failure
- (7) Special requirements, if any

The utility summary shall be provided considering the following general precautions.

3.1.2 Utility Consumption

(1) The utility summary shall be given in the normal consumption basis, not that for the design case. A margin will be allowed in the system capacity of utility facilities. Therefore no margin in the utility consumption is required.

(2) Power consumption of motor drivers.

- The kind and amount of power consumed, (the motor ratings, the BHP of the pumps, or the power input to the motors) should be clearly mentioned.
- The power input of the motors or brake horse power of rotary machines shall be specified in the electric power or load BHP column of blank form.

The power input to motors is used for the design of electrical system capacity.

The following are the conversion factors for the motor input.

- For motor ratings, the amount of power used by small motors should be multiplied 0.8, and for medium and large capacity motors, 0.9 in general.

When motors used for low gravity liquid pumps, and may be used for water circulation during precommissioning stage, much smaller factors should be applied. This is because motor rating will be selected with bigger margins.

Motor Rating / less than 100 kw

Motor Input = Motor Rating (name plate rating) $\times$ 0.8.

Motor Rating / equal or more than 100 kw

Motor Input = Motor Rating (name plate rating) $\times$ 0.9.

- For the BHP of pumps, the amount of power consumption should be divided by 0.92 for small motors, and 0.95 for large motors.

Driver BHP / less than 100 kw

Motor Input = Driver BHP (kw) / 0.92

Driver BHP / equal or more than 100 kw

Motor Input = Driver BHP (kw) / 0.95

If there are several operation modes for a large capacity driver, the load shall be specified in accordance with the operation modes.

Design or rated BHP is not usually used for the utility balance.

(3) Steam turbines

The load of steam turbines shall be specified based on the normal steam supply conditions and relative operation modes.

(4) Intermittent users

Additional consumption, the frequency and the length of time used of intermittent users are required.

If possible, the simultaneity shall also be required.

Operation time of eight or longer hours in every day should be considered as a normal user.

The intermittently used amount will be covered by the margin of the used equipment. If the frequency is small (a few times a year), it is also possible to use spare equipment.

(5) Amount of inert gas consumption

The amount of inert gas used for the shaft seals of rotating machinery sometimes exceeds the figure specified in the vendor's information. Therefore, it is important to confirm the supply system with the Vendor of the rotating equipment.

The rotating equipment where inert gas is normally used, flow control devices and flow meters such as rotor meters should be installed, making it possible to control the inert gas flow quantity.

Large amount of inert gas will be used intermittently, for such as tank blanket, catalyst loading, and start up or shut down. For these cases, inert gas will be produced as liquid and stored in a liquid holder. The liquefied inert gas production rate has a large impact on the cost of nitrogen generator, therefore, when the total quantity of the nitrogen required for such operations shall clearly be mentioned in the utility summary.