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Questionnaire for Price Quotations of Water Turbines

Project: _____ Customer: _____

Address: _____

Telephone + Fax _____ E-mail: _____

1. Gross head (static head): ___meters Drinking water system: YES [ ] NO [ ]
   Net head: ___meters

2. What volume of water is available in months per year?
   (Means usable flow = after the hygienic minimum deduction)
   Max.: _____ l/s appr. _____ months/year
   Average: _____ l/s appr. _____ months/year
   Min.: _____ l/s appr. _____ months/year

3. Is storage available? What area? _____ m² What depth? _____ m

4. How is the flow conducted to the turbine?
   a) Open canal: length_____ m; width x height _____ m
   b) Penstock: material/length_____/_____ m; inside dia._____ mm; wall thickness ____ mm

5. What needs to be driven?
   a) Generator for electricity production [ ] Voltage _____ V;
   Frequency _____ Hz;
   b) Others _____

6. Turbine regulation
   a) Manual [ ]
   b) Automatic: b1) According to water level [ ]
   b2) Other_____ [ ]

7. In the case of a generator drive:
   a) Power supply to utility grid* [ ]
   b) Stand-alone operation only [ ]
   c) Stand-alone operation and power supply to grid (the most expensive variant) [ ]

8. a) Max. permissible pressure rise in the penstock (if known) _____ bars
   b) In case of drinking water system, notify the existing back-pressure _____ bars

9. Quality of water (e.g. silt content, ph-value etc.) _____

10. Scope of delivery: Turbine [ ]
    Governor or Regulator [ ]
    Speed transmission (if required) [ ]
    Generator [ ]
    Switchgear [ ]
    Service Valve [ ]

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11. Please submit the following (if known):

a) Dimension of upper water level _____
b) Dimension of tail water level with Q_{max} _____
c) Dimension of tail water level with Q_{min} _____
d) The highest possible level of machine room floor _____

In case of installing the equipment into the existing site, please submit site plans and drawings available.

_____ _____
Date and place Signature

Glossary for Turbine Questionnaire

To 1. Gross head is defined as the vertical distance between head and tail water level.

To 2. A flow duration curve is preferred, if available.

To 3. A reservoir will help to keep the turbine running throughout the year when flow rates vary (day-time operation; night-time fill-up of reservoir).

To 4. These figures are required for calculating net head and governor capacity.

To 5. a) A three-phase induction generator can be used for operating parallel with the utility grid. Electric current is supplied to the public network.

b) A three-phase synchronous generator is needed for stand-alone generation or for grid parallel operation with the ability to provide emergency power in case of grid failure.

c) Pumps, mills, sawing machinery, etc.

To 6. a) Manual turbine operation does not permit automatic operation.

b) Turbine regulation for run-of-the-river plants with grid parallel operation (power supply to utility grid), controlled by the available flow (water level signal).

c) Stand-alone operation requires speed control, to prevent frequency deviations caused by load changes.

d) Turbine regulation can be varied between water level controls for grid parallel operation and speed control for stand-alone (isolated) operation.

To 8. Length of penstock is important for design and capacity of speed governor for stand-alone generation.