84.10 - Hydraulic turbines, water wheels, and regulators therefor.

- Hydraulic turbines and water wheels :

8410.11 - - Of a power not exceeding 1,000 kW

8410.12 - - Of a power exceeding 1,000 kW but not exceeding 10,000 kW

8410.13 - - Of a power exceeding 10,000 kW

8410.90 - Parts, including regulators

This heading covers hydraulic turbines and water wheels which can, by themselves, transform into motive power the energy possessed by moving liquids or liquids under pressure (e.g., the flow or fall of water; pressure of water, oil or special fluids). These engines or motors may thus operate by directing a moving mass of water on to paddles, blades or helicoidal elements fitted to a wheel.

(A) HYDRAULIC TURBINES

Hydraulic turbines consist of a rotor encased in a stator which directs jets of water on to the blades, etc., of the rotor.

Hydraulic turbines are mainly of three types :

(1) **Pelton type**, for high-pressure water supply of comparatively small volume. The rotor consists of a wheel fitted radially around its periphery with a large number of cups. The stator consists merely of a strong casing with one or more jets directing the water tangentially on to the cups.

(2) **Francis type**, for medium or low water pressure at large volume. These comprise a one-piece cast steel rotor with large, fixed helicoidal blades, and a stator consisting of conduit tubing, usually spiralled, with large, variable angle guide blades ensuring a radial flow of water around the whole periphery of the rotor, and an axial water-outlet.

(3) **Kaplan type**, for low pressure supplies. These are turbines, closely resembling those described above, both the stator and rotor having adjustable angle blades.

The main use of hydraulic turbines is in hydro-electric installations.

(B) WATER WHEELS

These very simple engines consist of a large wheel fitted with flat or hollow paddles of wood or metal around its periphery, the axle of the wheel being generally fitted with a step-up gear. The mechanical power produced is generally used directly in small workshops, saw-mills, flour-mills, etc.

Paddle-wheels for boats, although similar in appearance, are **excluded** (**heading 84.87**).

Hydrometric paddle-wheels are also **excluded** (**heading 90.15**).

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), parts of the hydraulic turbines or water wheels of this heading are also classified here (e.g., rotors, stators, blades and buckets for stators or rotors, casings for spiral conduits, regulators which automatically regulate the flow of water or the angle of the variable pitch rotors or stators, according to type, in order to maintain uniformity of the speed of rotation despite variations in the load, valve needles for regulators).