BWT BEST WATER TECHNOLOGY | For You and Planet Blue.

METERING UNITS | GE 3

A metering unit is usually composed of a metering tank, sometimes fitted with an agitator, a metering pump and an injection system.

The metering tank can be replaced by a storage tank or a palletised container.

There are two types of metering pumps.

1) *Rotating pumps*

Based on a cam system, an electric motor transfers an alternating movement to the metering valve diaphragm.

The flow-rate is adjustable by acting on this diaphragm stroke.

2) *Electromagnetic piston pumps*

Instead of a motor, the pump piston is directly driven by an electromagnet which is connected to the metering valve diaphragm.

The flow-rate is adjustable in two ways:

- by acting on diaphragm travel (displacement = volume per stroke),
- by acting on pulse rate (rate = number of strokes).

There is a wide range of metering pumps and the process and product requirements will dictate the choice of the appropriate type.

Metering pump control

Manual control: the pump continuously operates if it is powered on.

Automatic control:

- slaved to a transfer pump, a clock, etc.
- slaved to a pulse-emitting counter,
- slaved to a regulator (pH, redox).

When it is slaved to a regulator, and depending on the type of equipment selected, the pump control can be either the "go/no go" or the proportional type.

Making up a solution

When it is necessary to dilute the treating product, the quantity to use to make up a given volume of solution may be computed using the following formula:

$$Q = \frac{V}{d} \bullet D \bullet x \bullet \frac{100}{c}$$

Q : in grams	Quantity of product of commercial concentration (c) to be implemented
V : in litres	Volume of solution to be prepared
d : in l/h	Metering pump flow-rate
D : in m^3/h	Water under treatment flow-rate
x : in g/m^3	Expressed recommended proportion of active product
c : in %	Active product concentration in the commercial product

Note : The dilution water shall be preferably demineralised or softened.

Example 1 : *Disinfection using 30% - 110 volumes hydrogen peroxide*
(tank or piping system filling)

V	:	Volume of solution to be prepared	:	100 litres
d	:	Metering pump flow-rate	:	130 l/h
D	:	Water under treatment flow-rate	:	10 m^3/h
x	:	Recommended dosage	:	0.2 % in H_2O_2 ➔ 2000 g/m^3
c	:	Commercial concentration	:	30 %

$$\mathbf{Q} = \frac{\mathbf{100}}{\mathbf{130}} \bullet \mathbf{10} \bullet \mathbf{2000} \bullet \frac{\mathbf{100}}{\mathbf{30}}$$ ➔ 51.3 kg hydrogen peroxide at 30 % 110 Volumes

Example 2 : *Coagulation using alumine sulfate*

V	:	100 litres	}	d is taken for D = 1 m^3,
d	:	2 ml/stroke electromagnetic pump		i.e. 100 counter pulses
D	:	Pulse counter (1 pulse/10 litres)		d = 100 x 2 = 200 ml, i.e. 0.2 l.
x	:	15 g/m^3		
c	:	100 %		

$$\mathbf{Q} = \frac{\mathbf{100}}{\mathbf{0.2}} \bullet \mathbf{1} \bullet \mathbf{15} \bullet \frac{\mathbf{100}}{\mathbf{100}} = \mathbf{7500\,g}$$ ➔ 7.5 kg alumine sulfate

Example 3 : *Sodium hypochlorite chlorination*

V	:	100 litres
d	:	5 l/h
D	:	50 m^3/h
x	:	0.5 g/m^3 of free chlorine
c	:	15.2 % (1 kg of hypochlorite yields 152 g of free chlorine)

$$\mathbf{Q} = \frac{\mathbf{100}}{\mathbf{5}} \bullet \mathbf{50} \bullet \mathbf{0.5} \bullet \frac{\mathbf{100}}{\mathbf{15.2}} = \mathbf{3289\,g}$$ ➔ 3.3 kg hypochlorite