

# Alfa Laval PH clarifier and concentrator

## Recovery of starch in two stages

### Introduction

The PH clarifier clarifies the starch stream coming from the overflow of a starch washing system.

The PH concentrator concentrates the filtrate stream coming from the overflow of a peeler centrifuge.

### Application

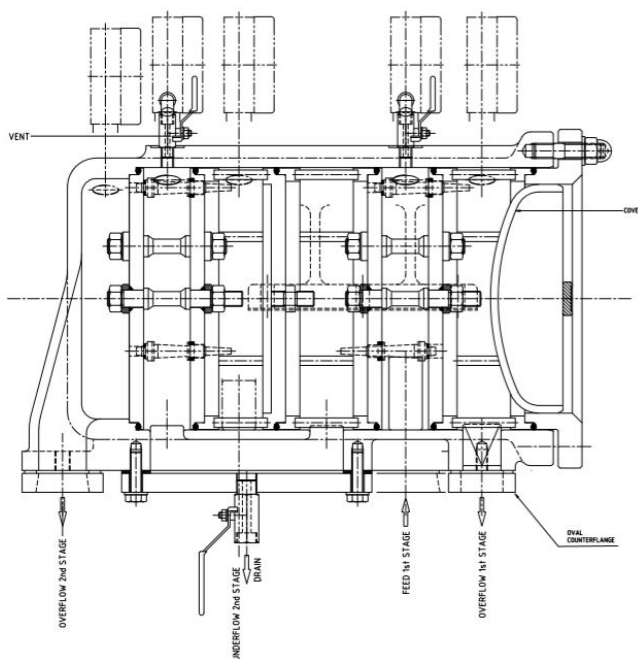
Corn-, potato- and wheat based starch processing.

### Benefits

- Absence of moving parts results in minimum wear and minimum downtime
- Easy to operate as underflow concentration is controlled by adjusting the control valves in the underflows and in the overflow
- Easy to implement CIP
- Easy conversion from clarifier to concentrator.

### Working principle

The PH clarifier and concentrator comprises two stages of hydrocyclones, connected in series, and arranged in one housing. Each stage contains a number of, internally manifolded, 10 mm diameter cyclones (multicyclone).



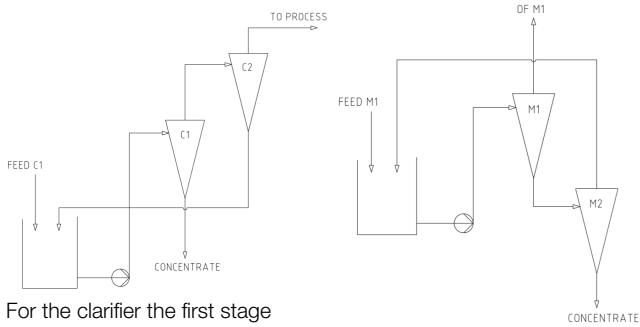
PH clarifier



The clarifier / concentrator is fed with a pressure of 7 to 10 bar. The feed flow enters the clarifier / concentrator into the feed chamber containing the feed sections of the first stage hydrocyclones. The feed pressure provides sufficient inlet velocity for the individual cyclones to create a vortex action. This action forces the slurry into a spiral, and as the rapidly rotating flow spins about the axis of the cyclone cone, a lighter fraction (low density slurry) is forced to spiral inwards and out through a centrally located overflow outlet and into an overflow chamber. The overflow chamber collects the overflows of the individual cyclones, and is connected to the feed chamber of the second stage cyclones.

The heavier fraction (high density slurry) is flung outwards against the wall of the hydrocyclone cone by centrifugal force within the vortex, and exits through the apex of the cone as underflow into the underflow chamber.

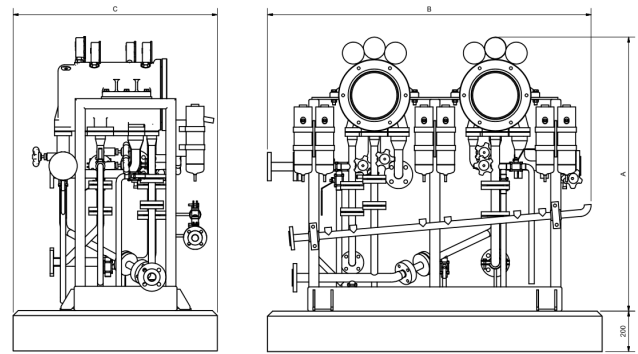
The same operation is repeated in the second cyclone stage. The second stage underflow is led back to the clarifier's / concentrator's feed tank.



For the clarifier the first stage underflow contains the concentrated starch slurry. The second stage overflow contains the separated water (process water).

For the concentrator the first stage overflow contains the separated water. The second stage underflow contains the concentrated starch slurry.

## Dimensional drawing



Dimensions in mm (inches)	PH 75/2 & PH 95/2	PH 165/2	PH 230/2	Weight kg (lbs)
A	1500 (59)	1600 (63)	1750 (69)	725 (1598)
B	1600 (63)	1700 (67)	1850 (73)	835 (1841)
C	1100 (43)	1300 (51)	1500 (59)	955 (2105)

## Design

The clarifier / concentrator consists of a housing and a supporting frame, both made of stainless steel. The housing is equipped with removable front cover (bolted), and with flanged feed, overflow, and underflow (first and second stage) connections.

PH clarifier / concentrator is available in 4 sizes: PH 75/2, PH 95/2, PH 165/2, PH 230/2.

The cyclonette gaskets and O-rings are in compliance with EC 1935 and FDA.

Technical data	PH 75/2	PH 95/2	PH 165/2	PH 230/2
Max. pressure diff.	2 x 5	2 x 5	2 x 5	2 x 5
Number of cyclones	2 x 76	2 x 94	2 x 166	2 x 228
Max. capacity in m <sup>3</sup> /h (gal/min) <sup>1</sup>	17 (75)	21 (92)	38 (167)	53 (233)

<sup>1</sup> The recommended feed pressure to the clarifier / concentrator is 7-10 bar. Approximate capacity when fed with a pressure of 10 bar, and with feed slurry with a dry solids content of approximately 5 % DS

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