Masters Thesis Projects
Alfa Laval Copenhagen A/S
Product Center decanters (PCD)

This outline is for thesis work concerning sensors for rotating machines (decanter centrifuges) for Alfa Laval Copenhagen A/S. A typical decanter centrifuge is shown below:

The 2 projects should address the following problems:

**Wireless Liquid/Sludge Sensor**

This project suitable for a team of two persons. Aims:

- Measurement of liquid level in the rotating machine.
- Measurement of sludge concentration in the rotating machine.
- Measurement of sludge distribution and concentration in rotating machine.

The signal transmission should be included when addressing the problems above. Our starting point is that it would be most suitable to utilize RFID technology for this purpose; the relevant sensor data should be transferred using an active or passive RFID solution.

The sensor system must be designed so that it can be mounted on or near large metal structures, normally stainless steel. There may be process fluids in the vicinity. These are normally mostly water based but may be hot (<100 °C) or contain salts or be acidic. The rotor centrifugal forces can be as high as 3000 g at the largest radius. A typical centrifuge speed of rotation is 3000 rpm.
The variation in liquid level at the outlet end of the machine is typically less than 50 mm. The variation in the sludge concentration is typically 0-40%DS (Dry Solids % weight). The liquid phase in the sludge can chemically be regarded as identical to the liquid leaving the machine as ”clean” effluent. (E.g. may be used as reference.) The sludge phase can be mineral, biological/organic or mixed.

**Wireless Turbidity Sensor**

This project is suitable for one person. The aim is a measurement of the local concentration of particles (turbidity) in rotating machine.

With regard to the turbidity, the effluent (light phase) can contain 200-1200 ppm solids where the higher value corresponds to a degree of contamination.

If the thesis projects will need manufacturing of test equipment or prototypes, Alfa Laval will assist with hardware issues. Testing on machines in Alfa Laval machine laboratories in Copenhagen is possible.

_Economical: Alfa Laval has a general policy for financial support of thesis projects._

**Contact Alfa Laval Copenhagen A/S, Denmark:** Jon Eiken / New Concepts, PCD  
email: jon.eiken@alfalaval.com  
phone:+45 39536403

**Contact EMT:**  
Hubert Zangl  
email : hubert.zangl@tugraz.at  
phone: +43 316 873 4275