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Zeytinyađı Üretim Teknolojisi

Ayrıştırma – dekantör

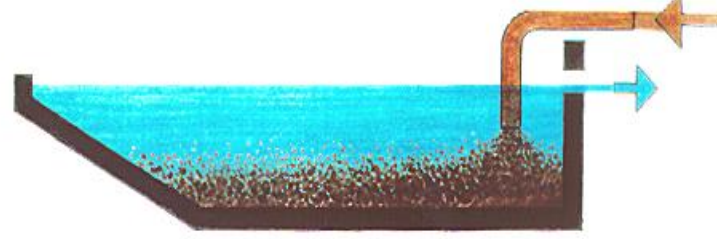
Ders Notu 130



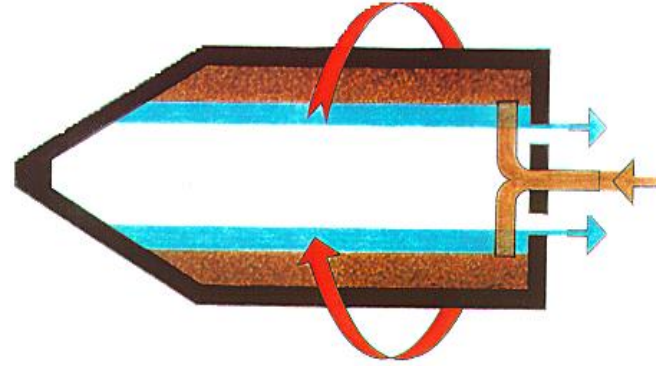
SEDİMENTASYON / ÇÖKELME VE DEKANTÖR İLGİSİ

Dekantasyon Nedir?

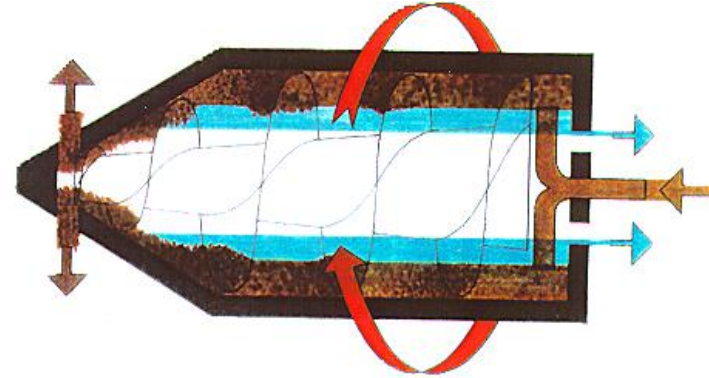
çökeltme



çökeltme + santrifuj kuvvet

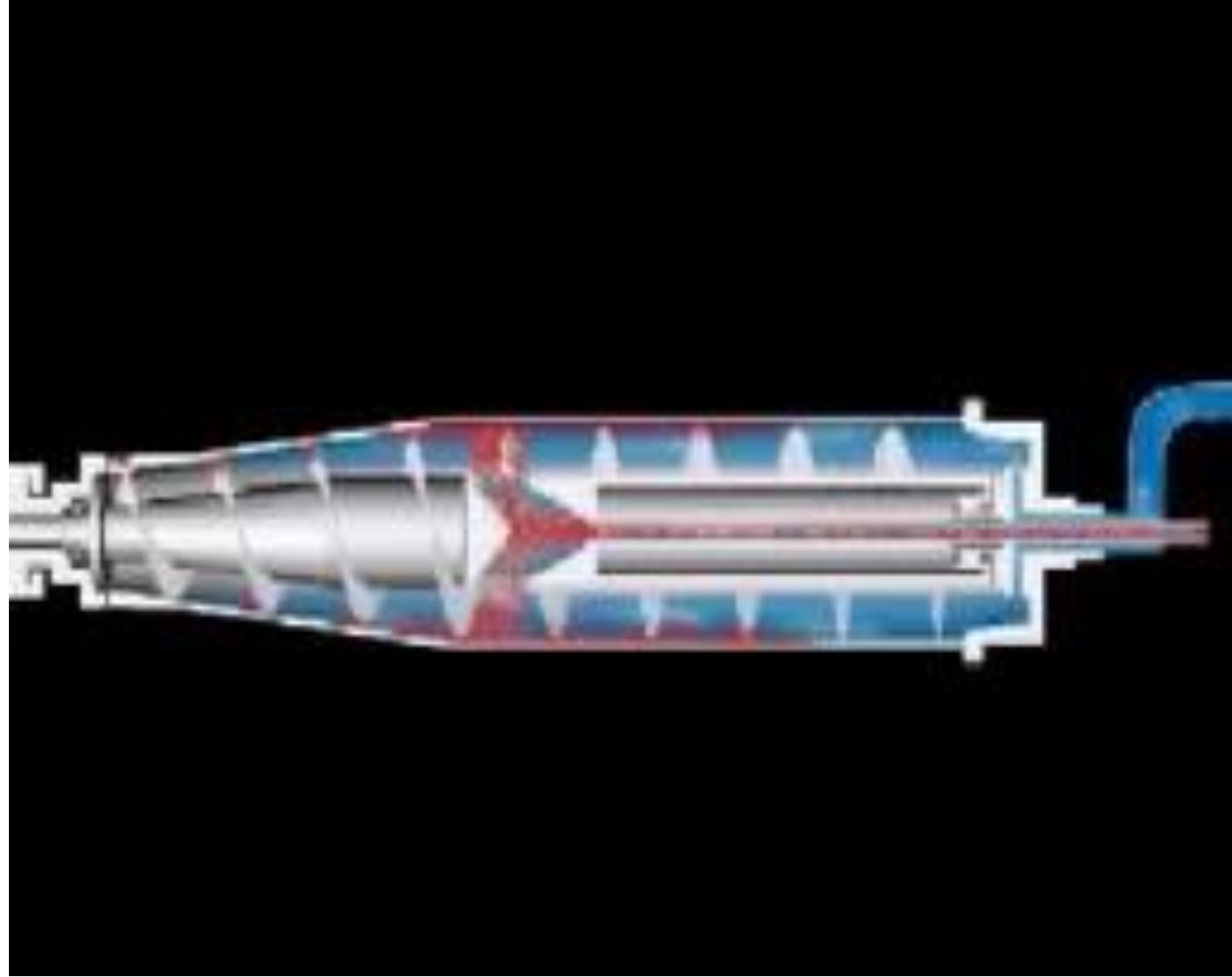


çökeltme + santrifuj kuvvet + sürekli kek deşarjı



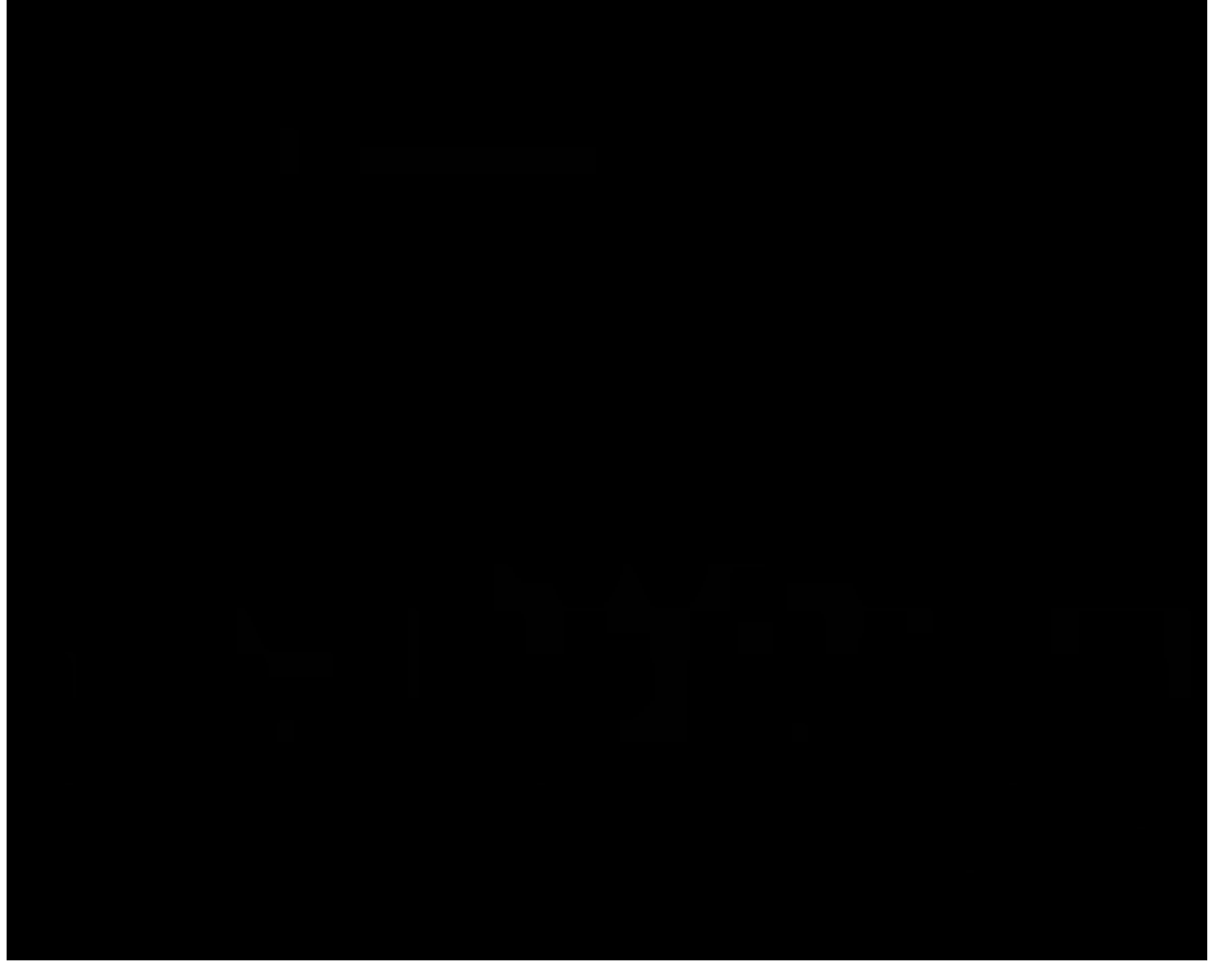
Dekantör iç mekanizması

İzleyelim.



Dekantör iç
mekanizması

İzleyelim.

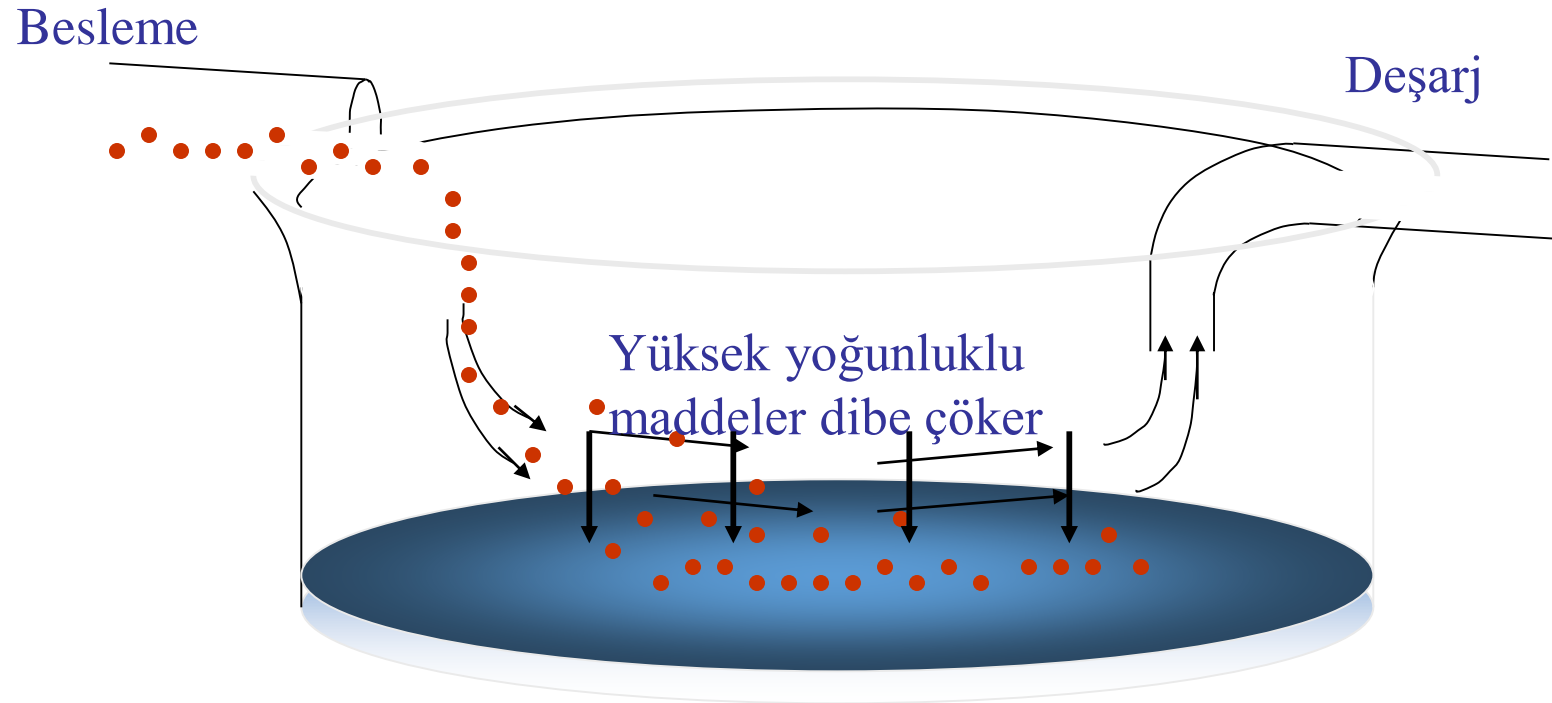


Separasyon nedir?

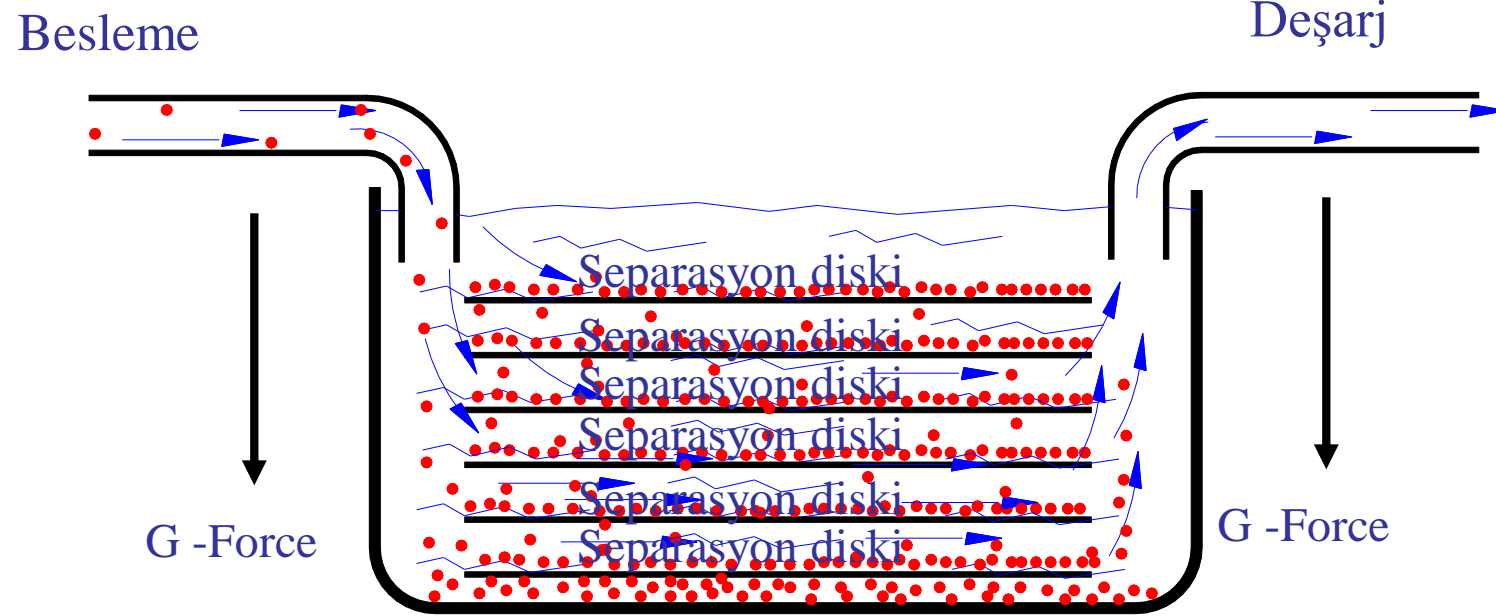
Separasyon, iki veya daha fazla bileşenli homojen karışımların yoğunluk farklılıklarından dolayı fiziksel kuvvet yardımı ile bileşenlerine ayrıldığı bir prosestir.

Santrifüjler (Separatör ve dekantör) sıvı-sıvı, sıvı-katı, iki sıvı ve katı separasyonlarında yaklaşık 2000 farklı proseste kullanılmaktadır.

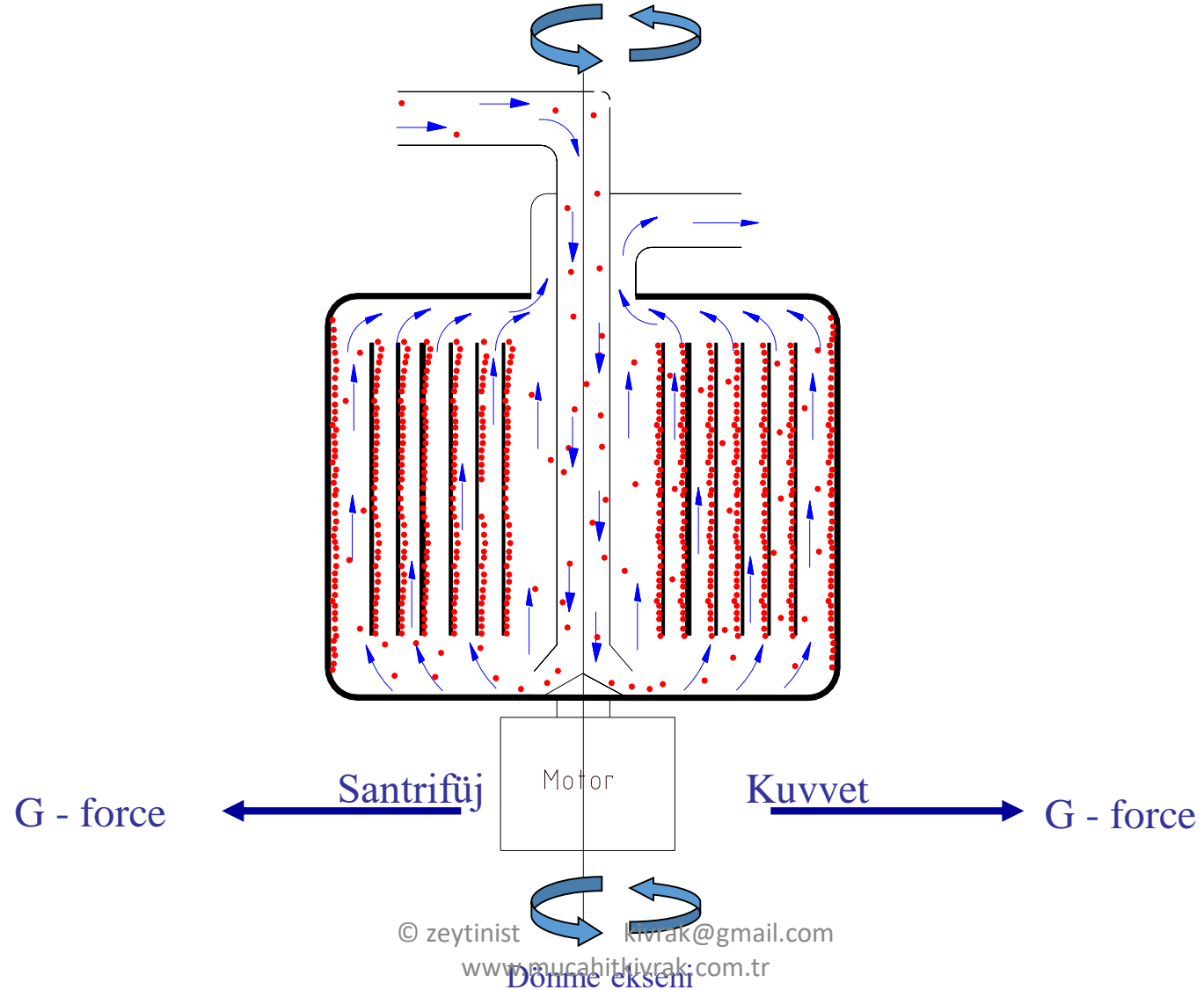
Temel Separasyon



Disk İlaveli Temel Separasyon



Disk İveler ve Santrifüj Kuvvet ile Temel Separasyon



Separasyonda önemli parametreler

Fiziksel kuvvet

Bileşenlerin yoğunluk farkı

Kütle büyüklüğü

Sıvıların viskozitesi

Sıcaklık

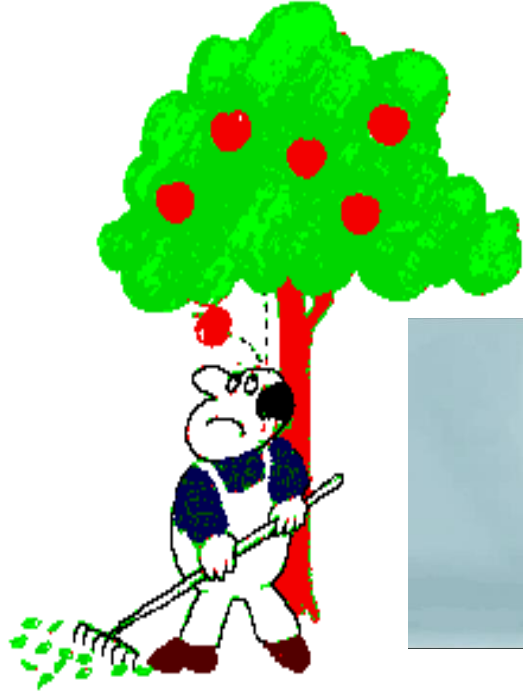
Zaman

TEKNİK ÖZELLİKLERİ

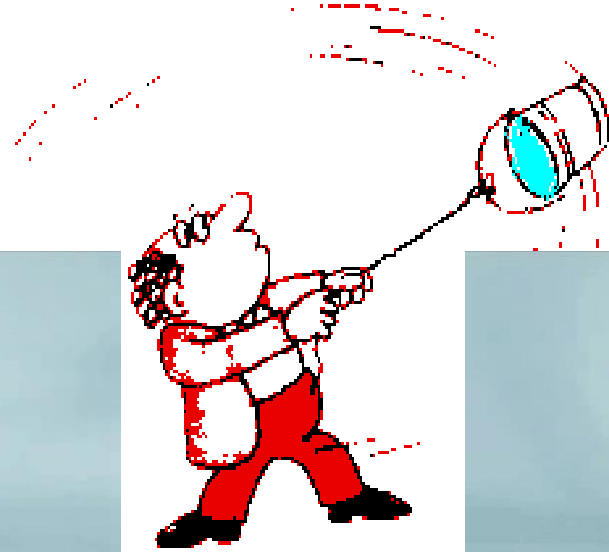
Saatte 300 Kg. kapasitelidir. 430 Krom malzemedden yapılmış tamburun içerisinde yine 58 rockwell sertleşmiş Krom malzemedden imal edilmiş bir helezon bulunmaktadır. Yağın ve prinanın temas ettiği yüzeyler Krom malzemedden tasarlanıp hazırlanmıştır. Entegral ekolojik sistemi sayesinde su sarfiyatı yok denecek kadar azdır (Sadece çalışmaya başlarken tambur içine alınan 100 - 200 litre su vardır. Buna karşılık emsal makineler takribi 650 - 900 litre /saat kadar tüketilirler.)

Zeytin hamuru; dekantör tamburu ve özel şanzıman sayesinde tamburla arasında devir farkı yaratılan tambur içi helezonla takribi 8 ATM'lik bir basınçla 12 metre taşınarak merkezkaç kuvvetiyle sıkılır. Bu sistem sayesinde zeytin içindeki moleküller parçalanmadığı için alınması zor olan "SIZMA YAĞI" emsalinde yağ elde edilmektedir.

Kuvvet – Çökeltme İlgisi



Gravitational force: 1 x g



Centrifugal force: C x g

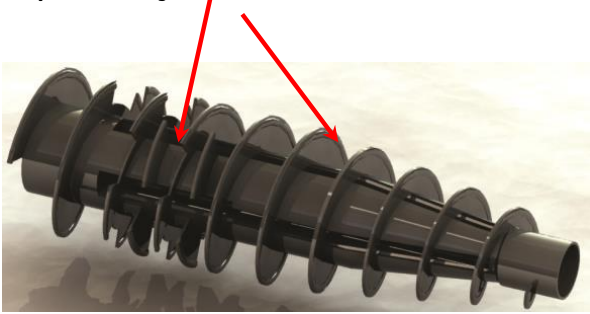
Centrifugal force in the decanter:

$$C = \frac{R \cdot n^2}{900} \quad \begin{array}{l} \mathbf{R = bowl\ diameter\ (m)} \\ \mathbf{n = speed\ (1/min)} \end{array}$$

Dekantör Teknolojileri

Uzun ömür ve Rahat Kullanım

Yapraklar ve hamur girişi metrekarede 800 tondaki kütleye dayanıklı **wolfram karbür** ile kaplanmıştır



Aşınmaya karşı paslanmaz çelik burçlar



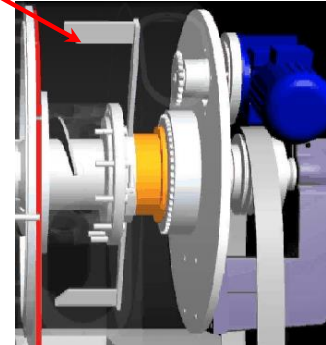
6 kat emniyetli dövme paslanmaz çelik malzeme

Pirina sıyrıcı odası sürekli boşaltma sisteminde çalışarak, pirinanın makine içinde sıkışmasını ve parazitlenmesini engeller.

Hız kontrol cihazı ile **yumuşak kalkış**



Tambur grubunu **sökmeden** üzerinde arıza giderebilme

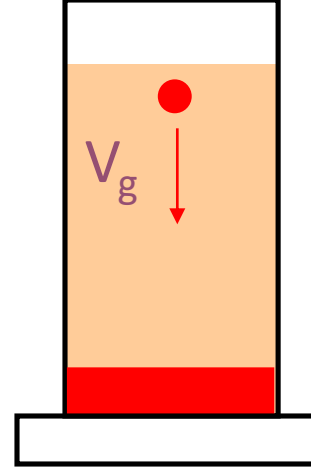


Stokes Kanunu

Çökeltme hızı V_g aşağıdaki şekilde hesaplanır:

$$V_g = \frac{(\gamma_P - \gamma_L)}{18\eta} d^2 g$$

V_g = Dünya yerçekimi etkisi altındaki $g = 9,81 \text{ m/s}^2$ belirli bir sıvının içinde sallanan küresel bir katı partikülün nihai hız durumu.



Stokes Kanununun Dekantör ile ilişkisi

$$V_g = \frac{(\gamma_P - \gamma_L)}{18\eta} d^2 r \omega^2$$

Tambur yarıçapı r

Açısal hızla dönüş

tamburun dönüş hızı d/dk)

Merkezkaçtan kaynaklanan yerçekimi yaratır: $r \omega^2$

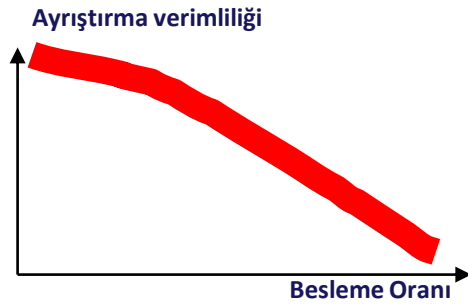
Çökeltme hızı:

- Viskozite azaldıkça artar
- Partikül büyüklüğünün karesi kadar artar
- Yoğunluk farkı arttıkça artar

Üretim Parametrelerinin Etkisi

$$V_g = \frac{(\gamma_P - \gamma_L)}{18\eta} d^2 r \omega^2$$

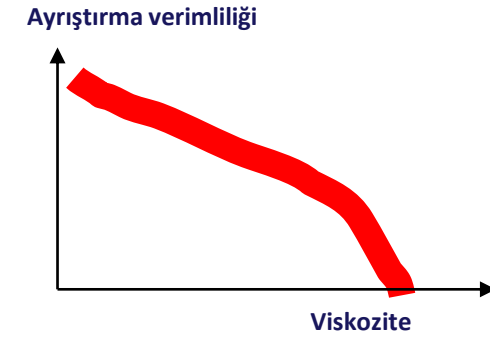
Besleme Oranı (Q)



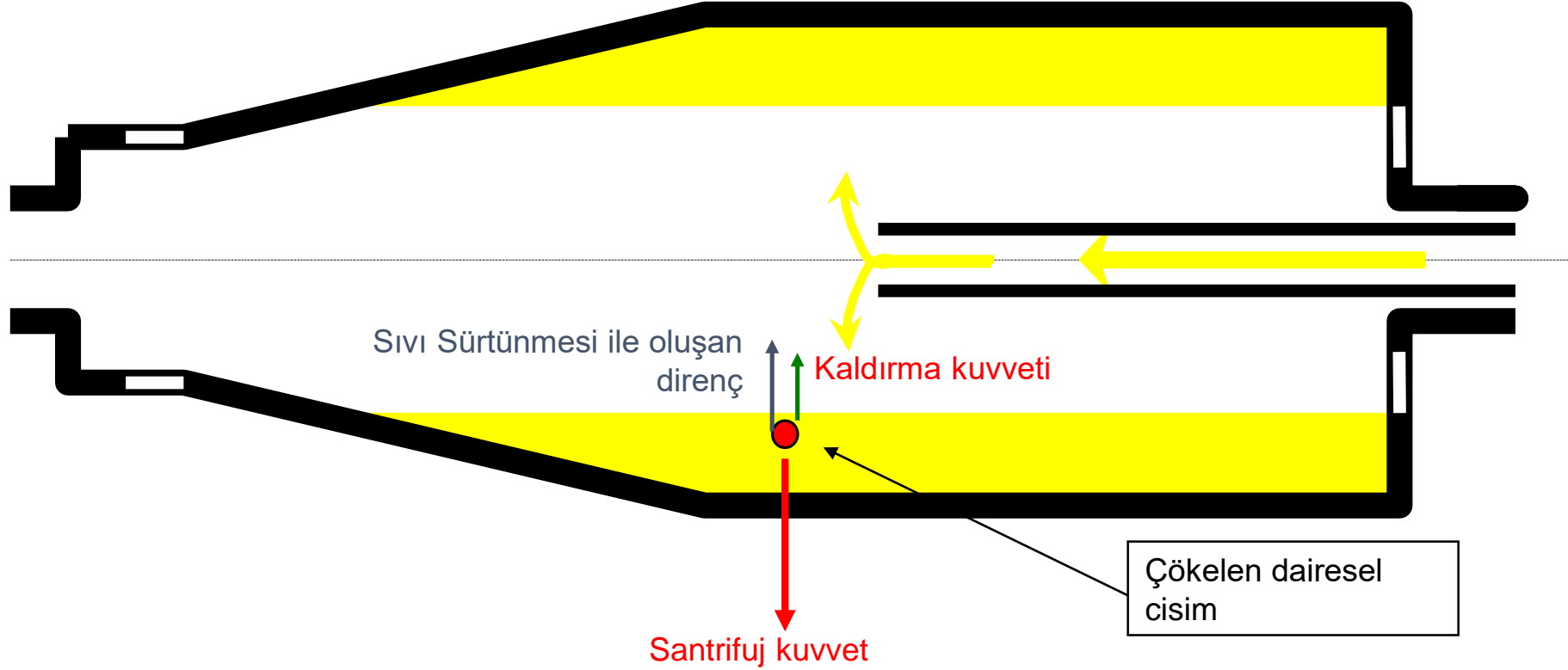
Partikül Büyüklüğü



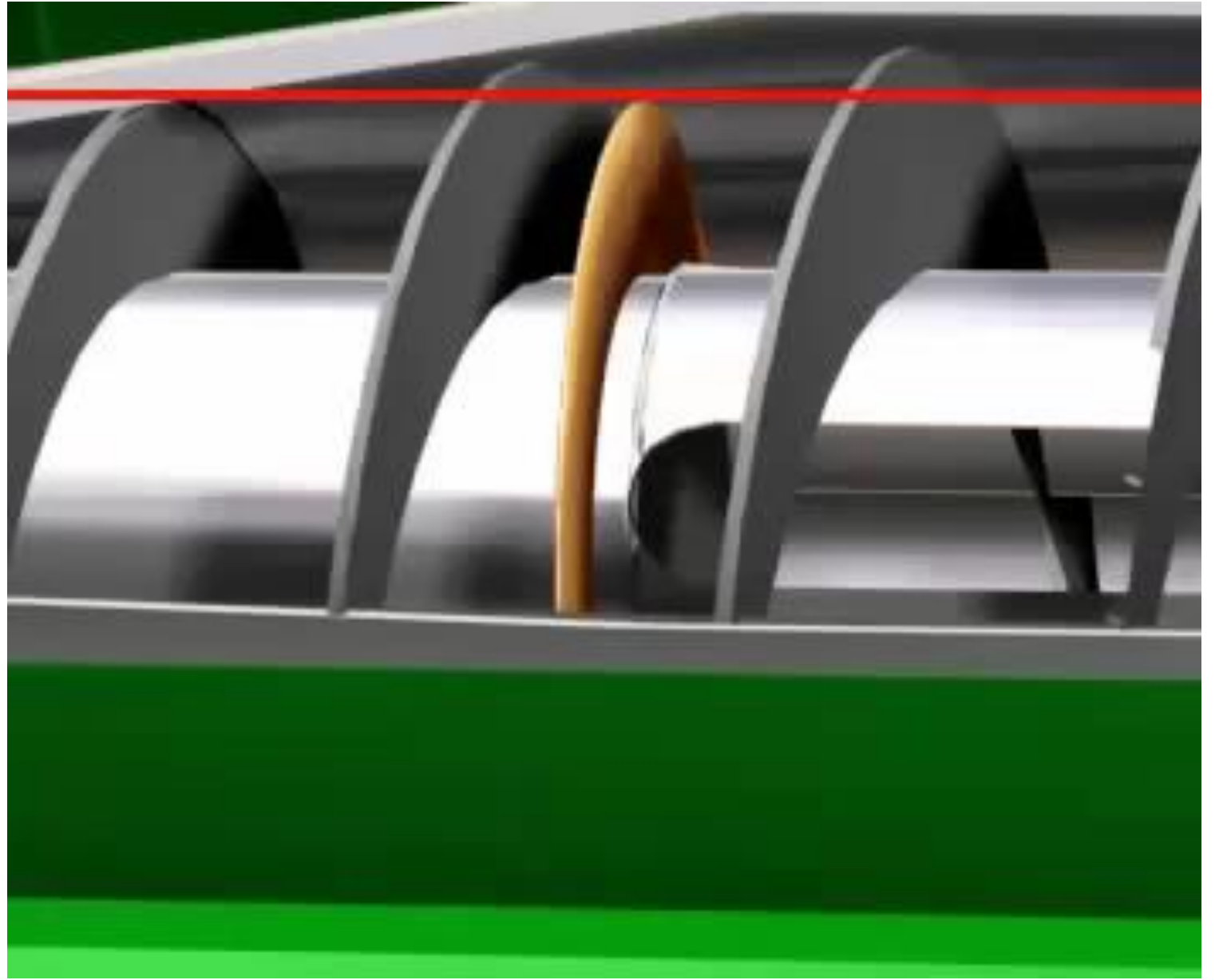
Viskozite



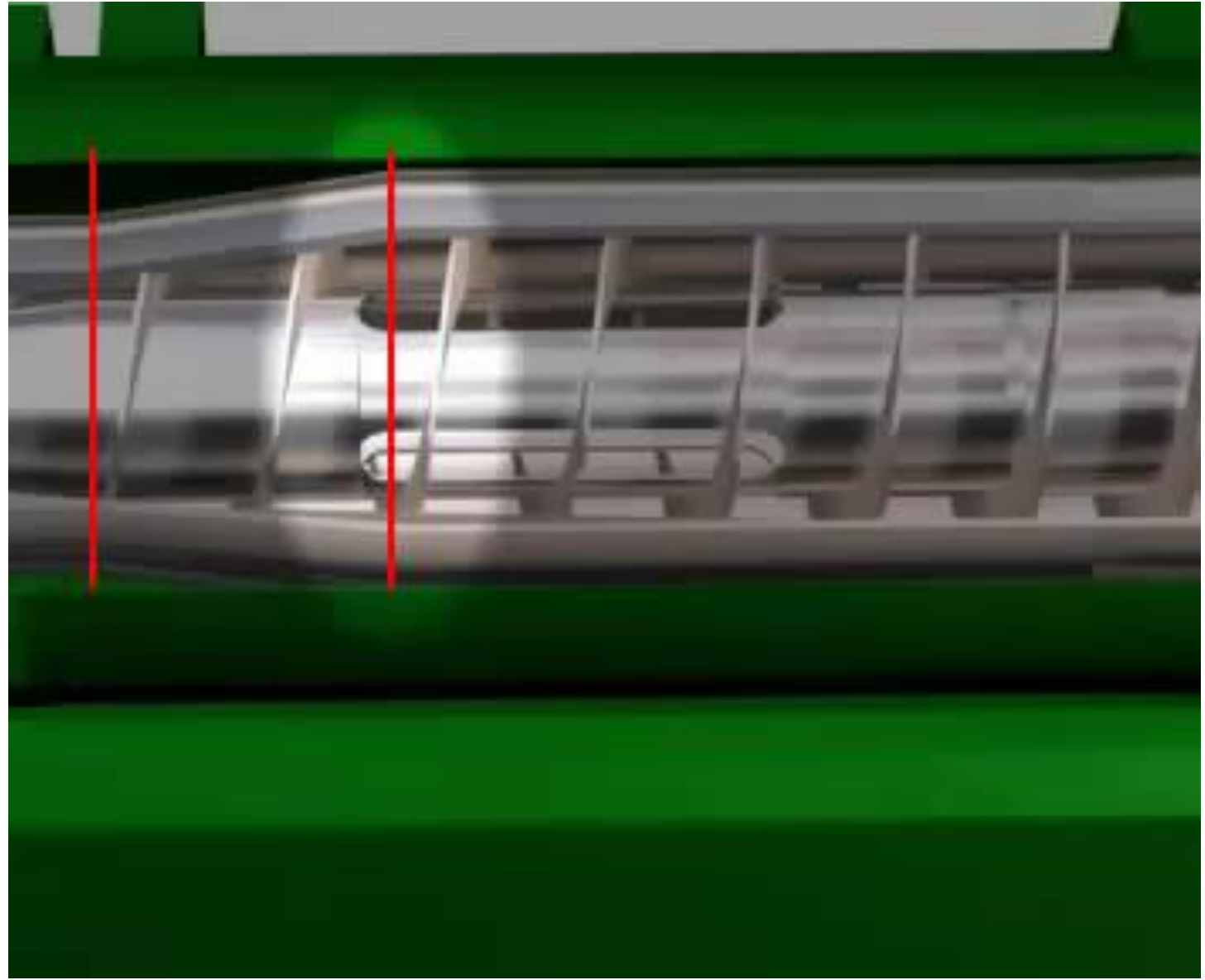
Dönen Dekantördeki Dairesel Cisme Uygulanan Kuvvetler



Ayrıştırma veya
seviye diski de denen
disk çıkan hamura
seviye vererek
ayrıştırmayı sağlar.

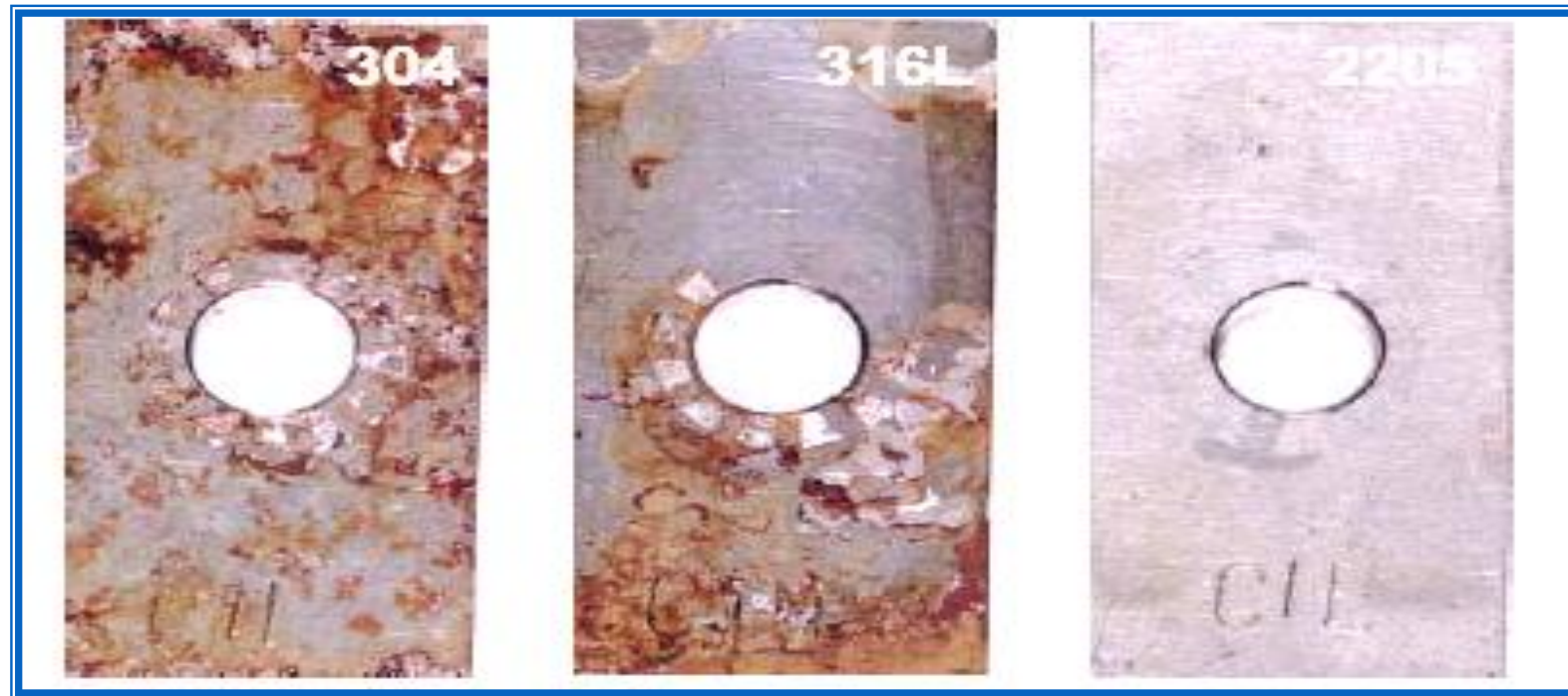


Ayrıştırma veya
seviye diski de denen
disk çıkan hamura
seviye vererek
ayrıştırmayı sağlar.



DUPLEX STAINLESS STEEL 1.4462 (2205) COMPARISON

Resistant against corrosive media measured in same conditions and same period of time



Corrosion resistance

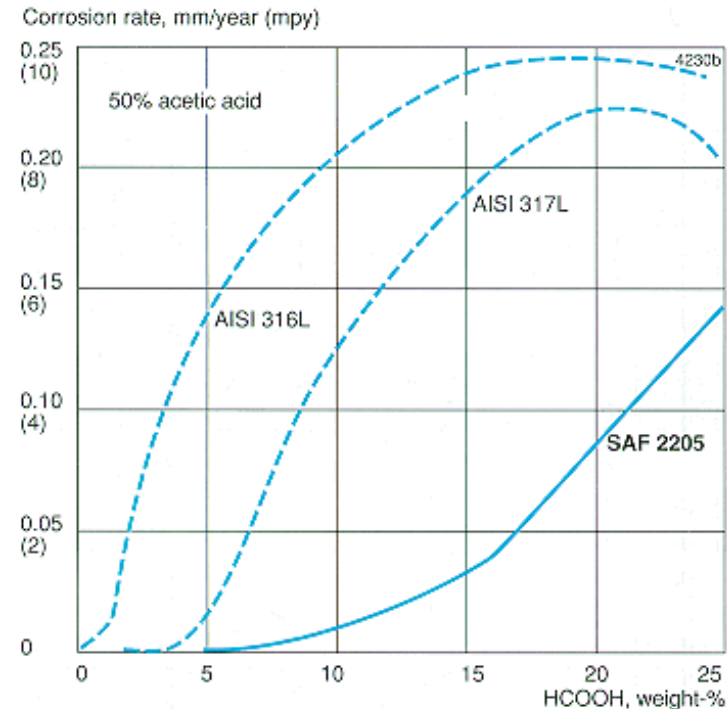
General corrosion

In most media, 1.4462 Duplex (SAF 2205) possesses better resistance to general corrosion than steel of type AISI 316L and 317L.

Pitting and crevice corrosion

The pitting and crevice corrosion resistance of a steel is determined primarily by its chromium and molybdenum contents, but also by its nitrogen content as well as its slag composition and slag content. **A parameter for comparing the resistance of different steels to pitting is the PRE number (Pitting Resistance Equivalent).**

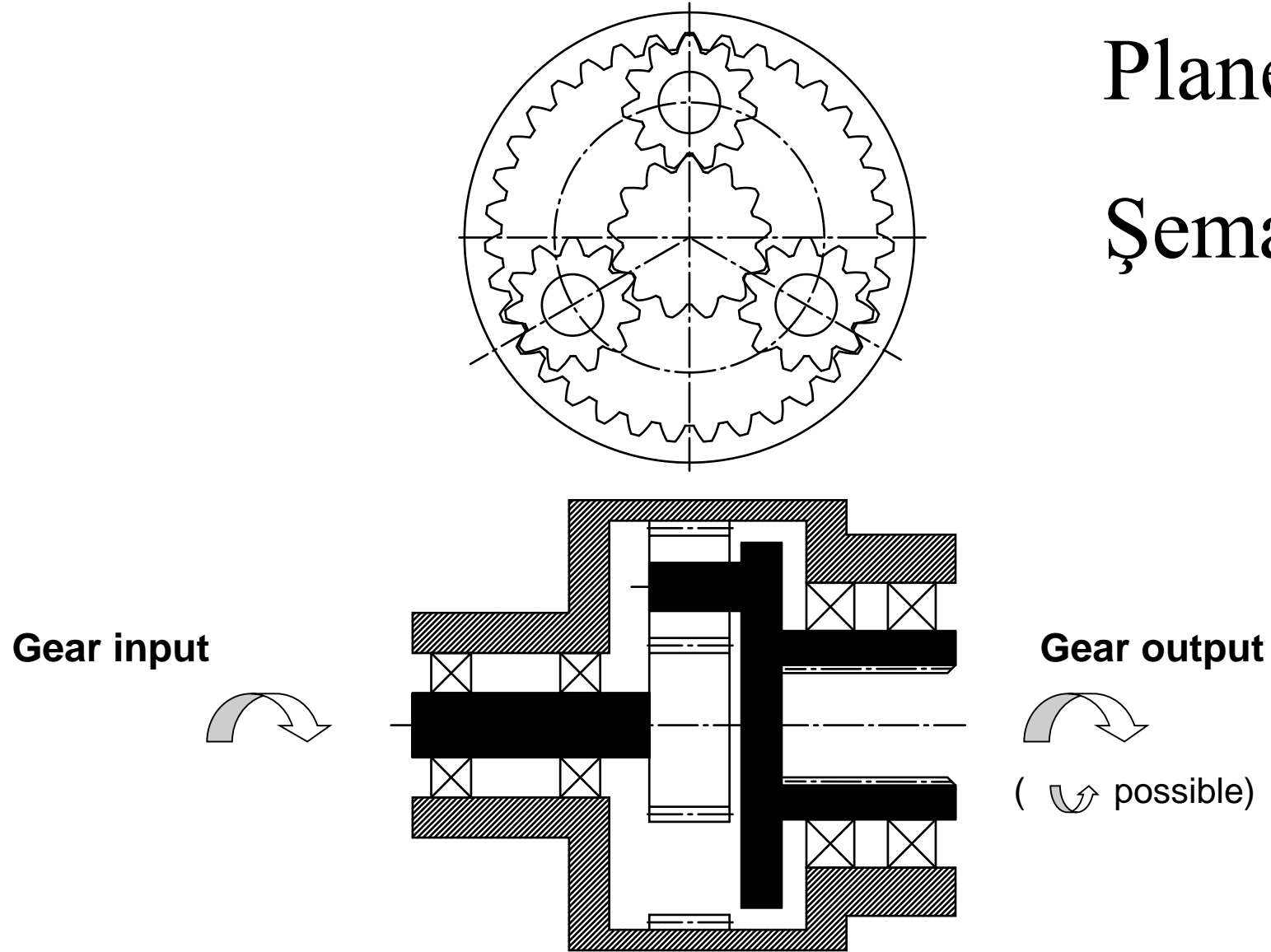
Corrosion rate of SAF 2205, AISI 316L and AISI 317L in boiling mixtures of 50% acetic acid



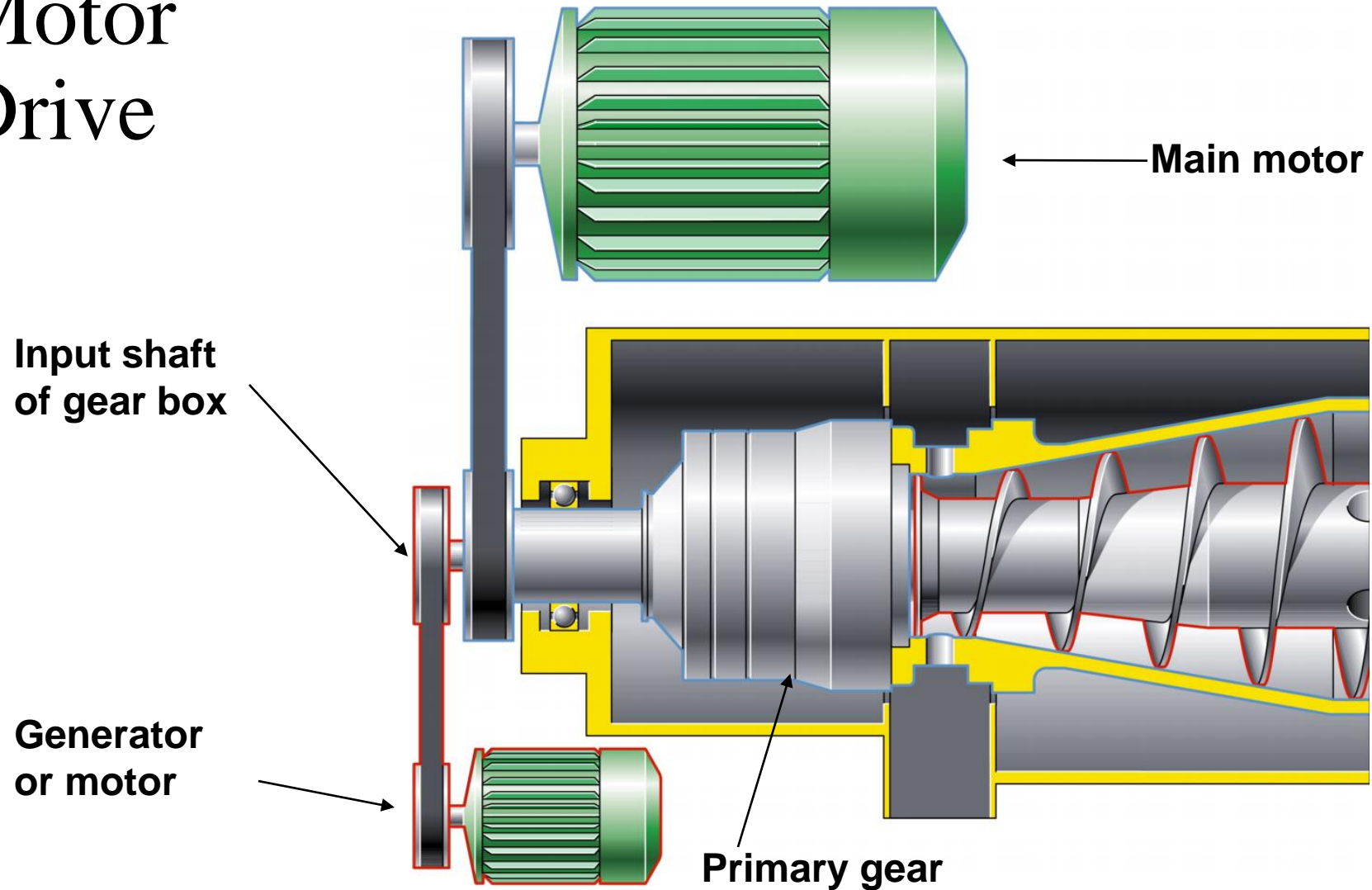
<http://www.steel.sandvik.com/>

http://www.avestapolarit.com/literature/2205_10599_gb.pdf

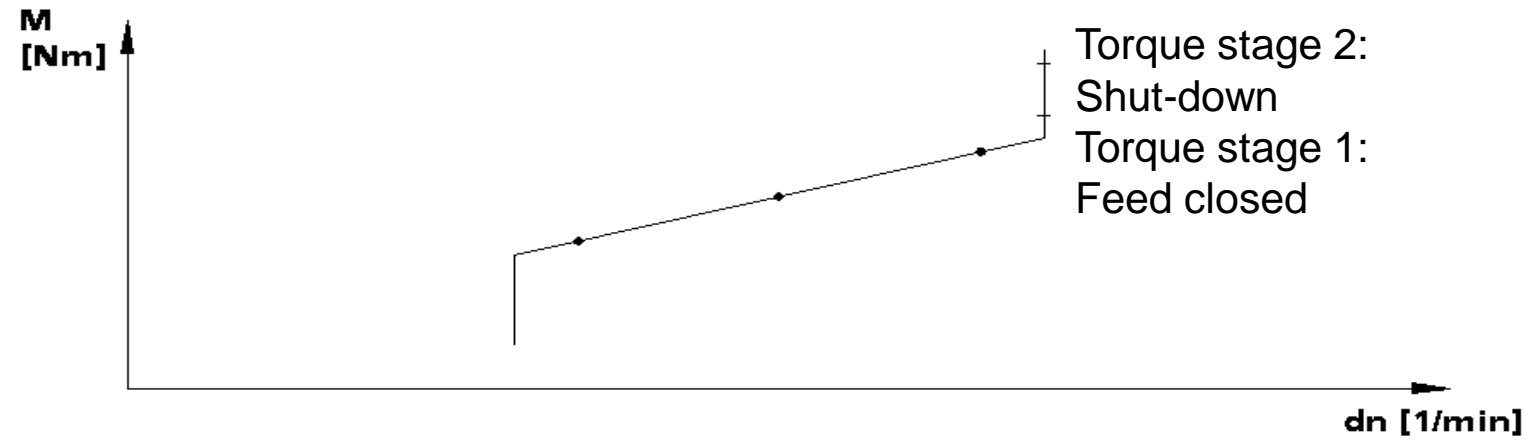
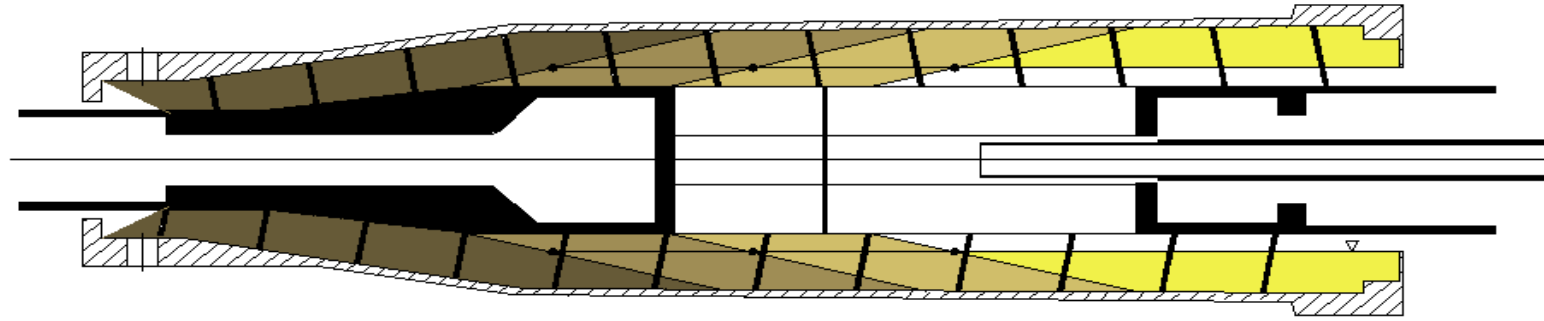
Planet Dişli Şematiği



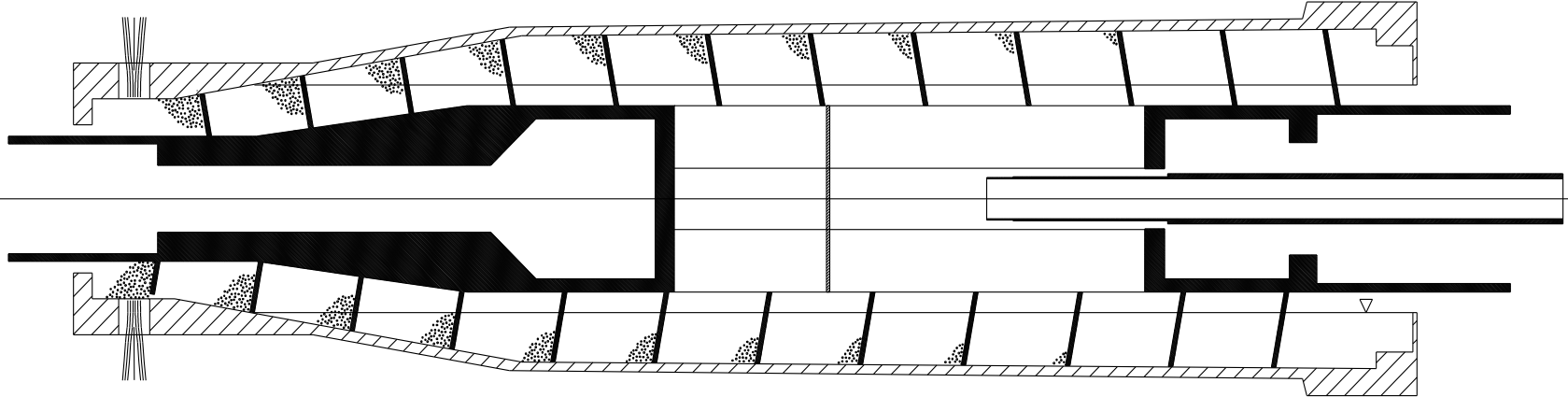
Twin Motor Drive



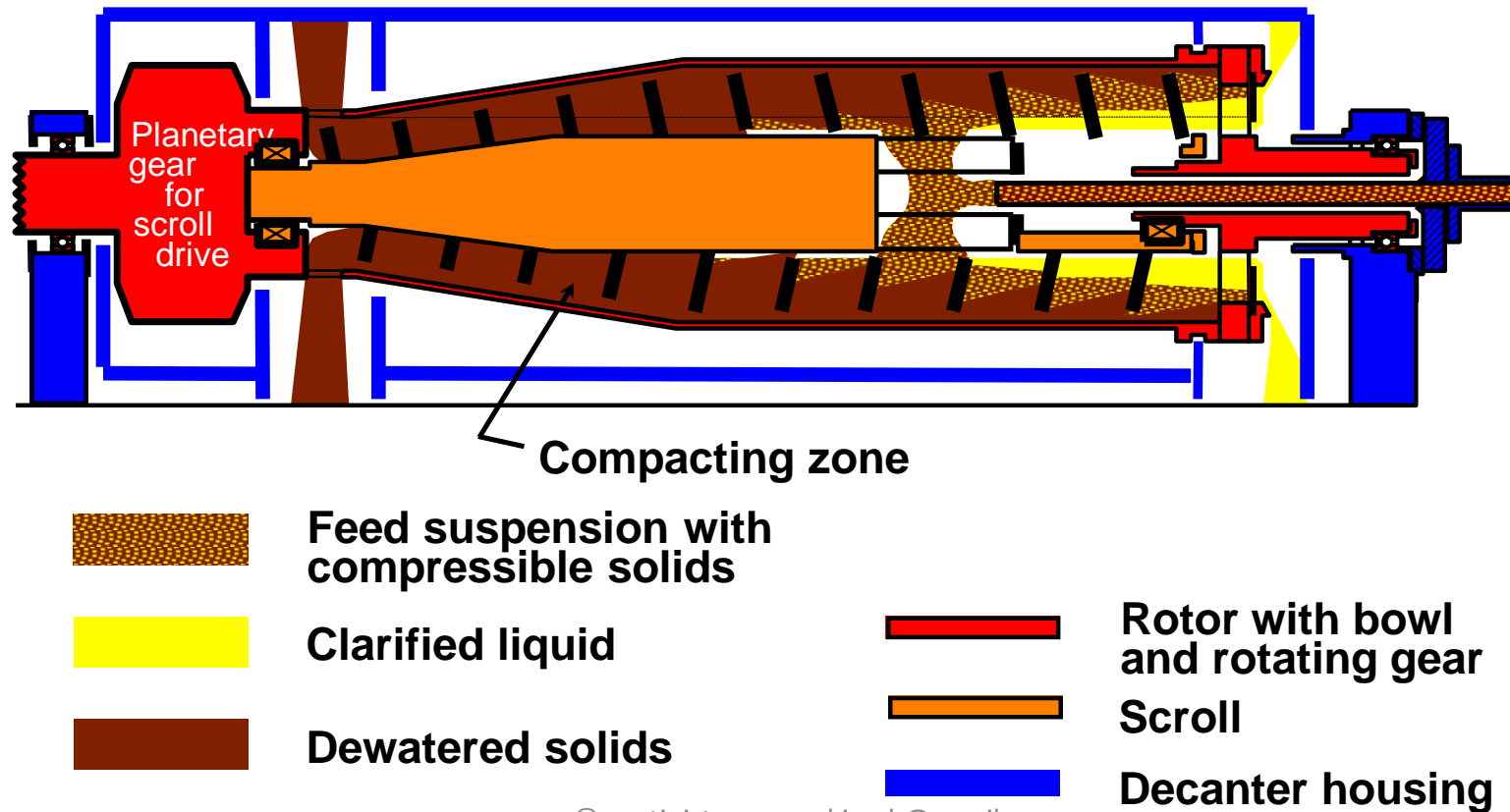
Tork ve Tambur İçi Katmanlaşma İlgisi



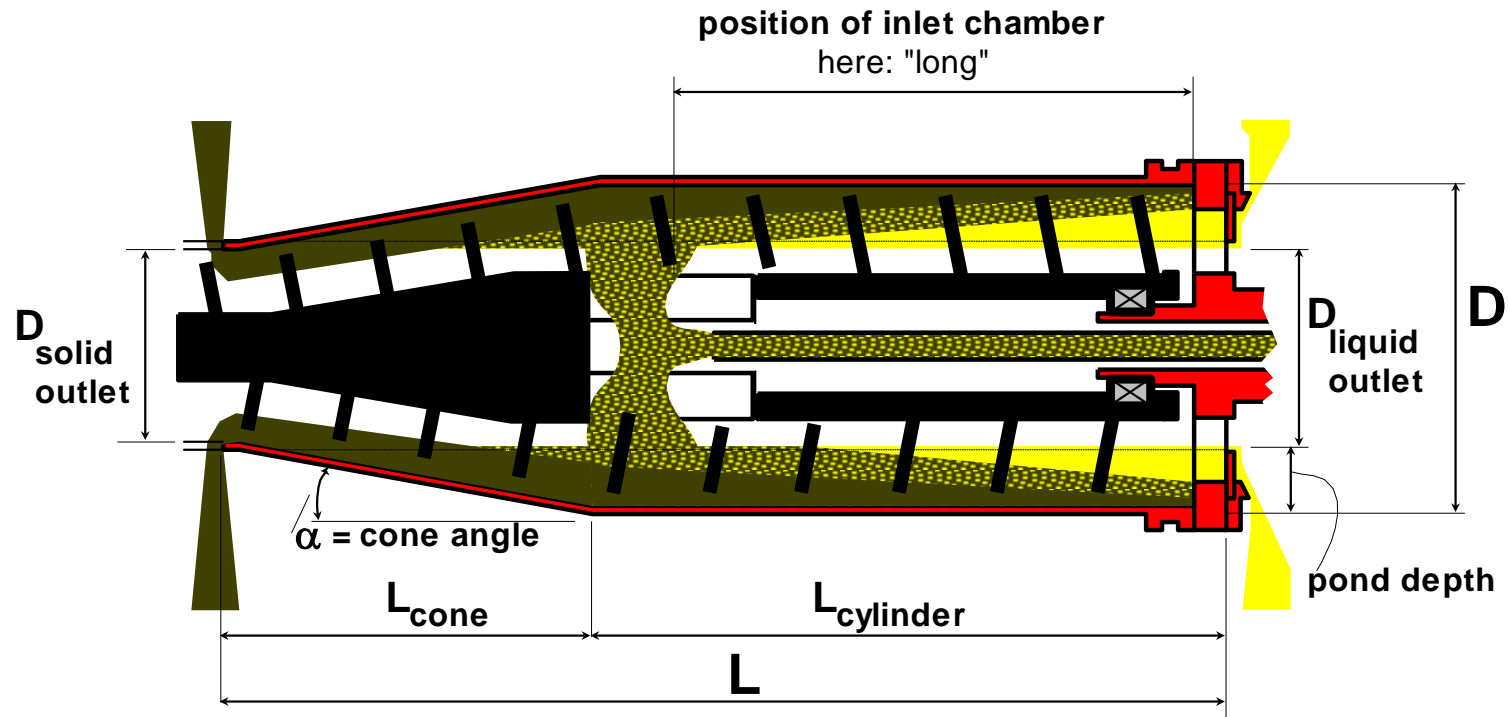
Basics of a Decanter Rotor for Dewatering of Suspensions with incompressible Solids



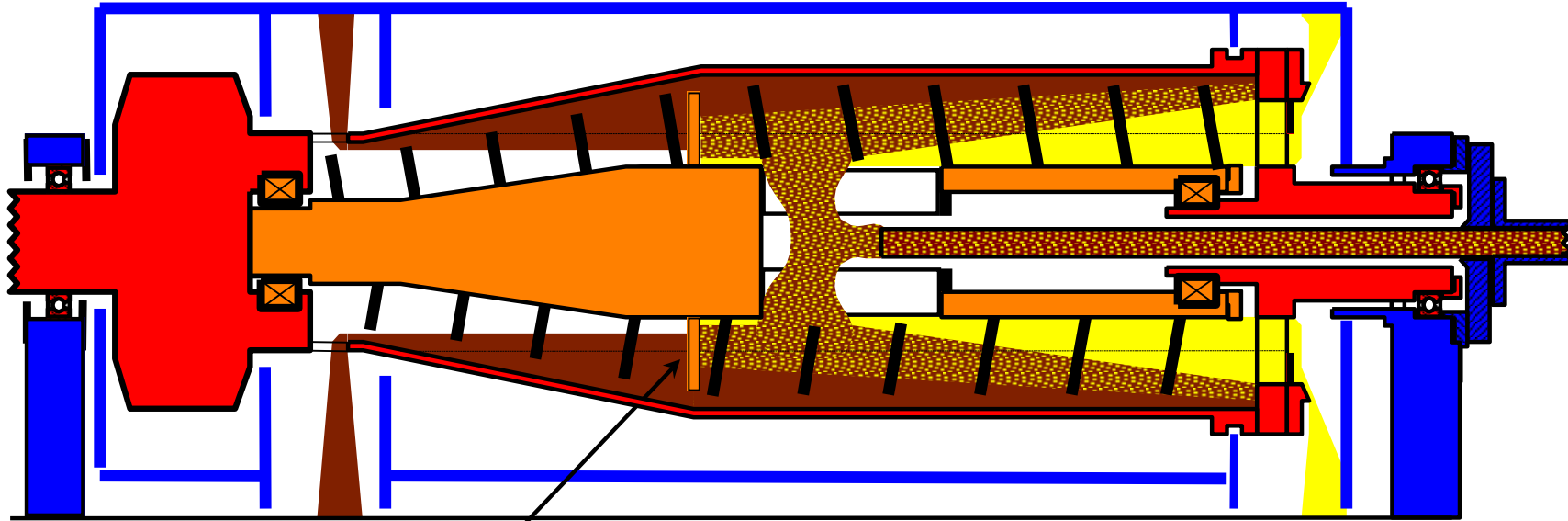
Decanter Rotor for High-Efficiency Dewatering of Suspensions with Compressible Solids



Basics of a Decanter Rotor for Dewatering & Clarification



Set Diskli Dekantör Rotoru/Helezon



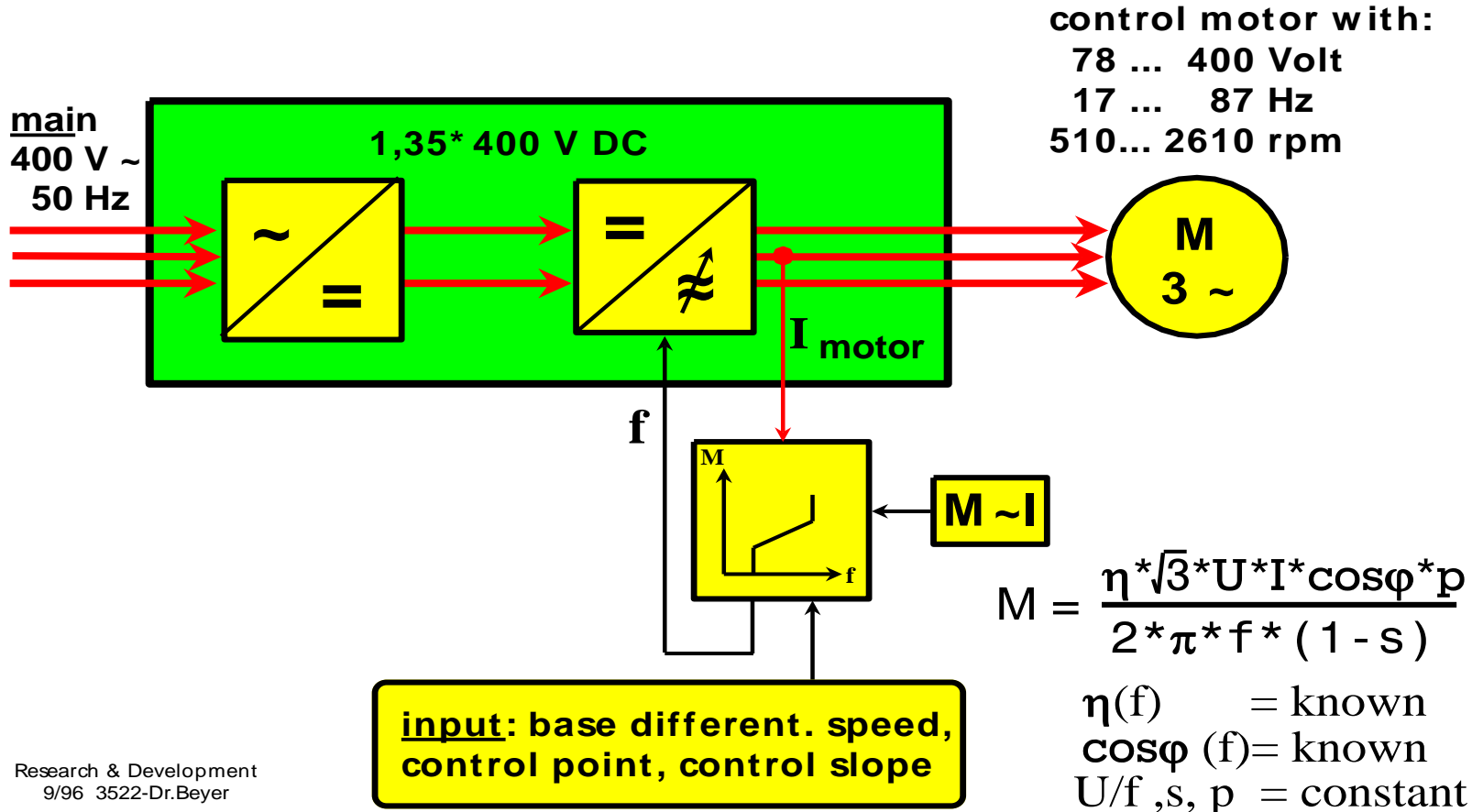
Immersion disc
(other names: Baffle disc, Dip Weir)

Decanter Rotor with Immersion Disc



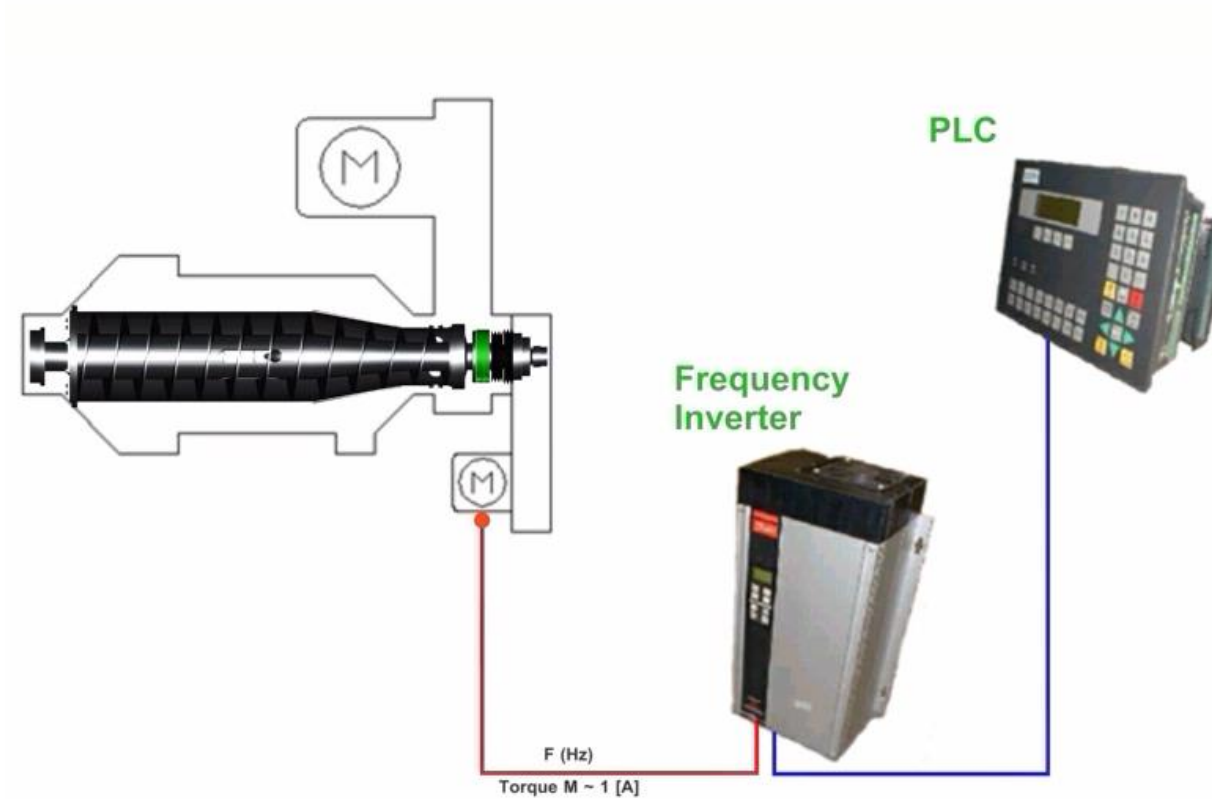
Immersion disc
(other names: Baffle disc, Dip Weir)

Control Diagram Differential-Drive

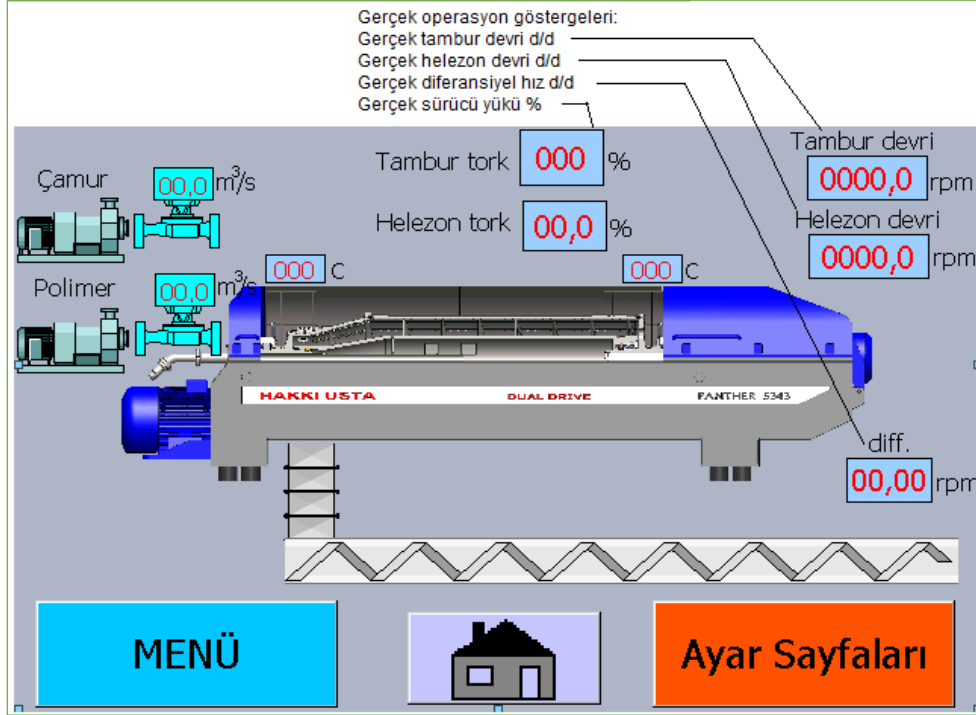


Research & Development
9/96 3522-Dr.Beyer

Control Diagram Differential-Drive



Our Operating Panel



Ayar sayfası 1	İstenilen	Aktüel
Δn	000,0	
Δn_{min}	000,0	00000,0
Δn_{max}	000,0	
Ss (rpm)		00000,0
L0	000,0	
L2	000,0	00000,0
Lmax	000,0	
Bs (rpm)	000,0	00000,0
Cp (m ³ /s)	000,0	00000,0
Pp (m ³ /s)	000,0	00000,0

GERİ OTOMATİK SAYFASI DUAL-DRIVE EGRİSİ AYAR SAYFASI 2

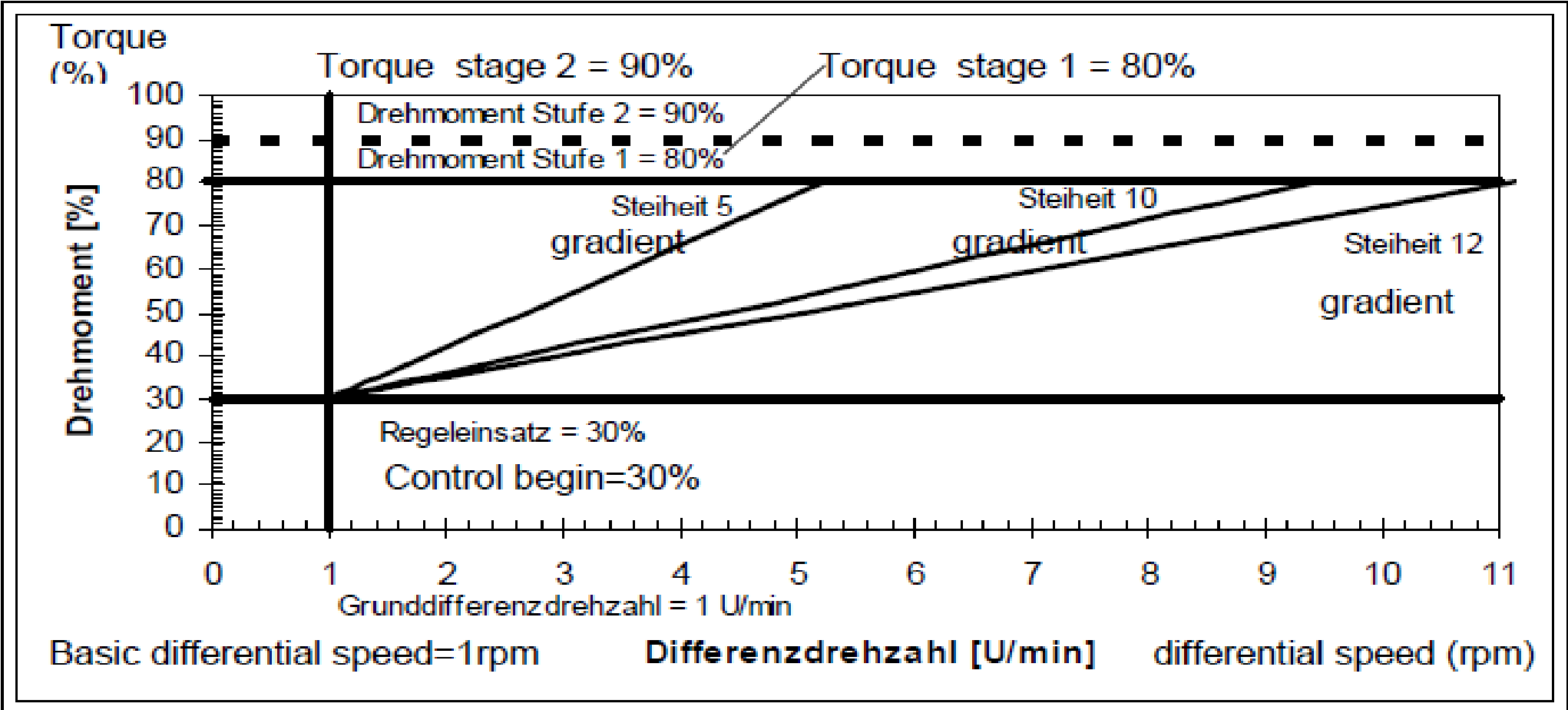
Ayar sayfası 2	İstenilen	Aktüel
T1		00000,0 °C
T2		00000,0 °C
K		00000,0 mm/sn
Bs		00000,0 d/dk

GERİ

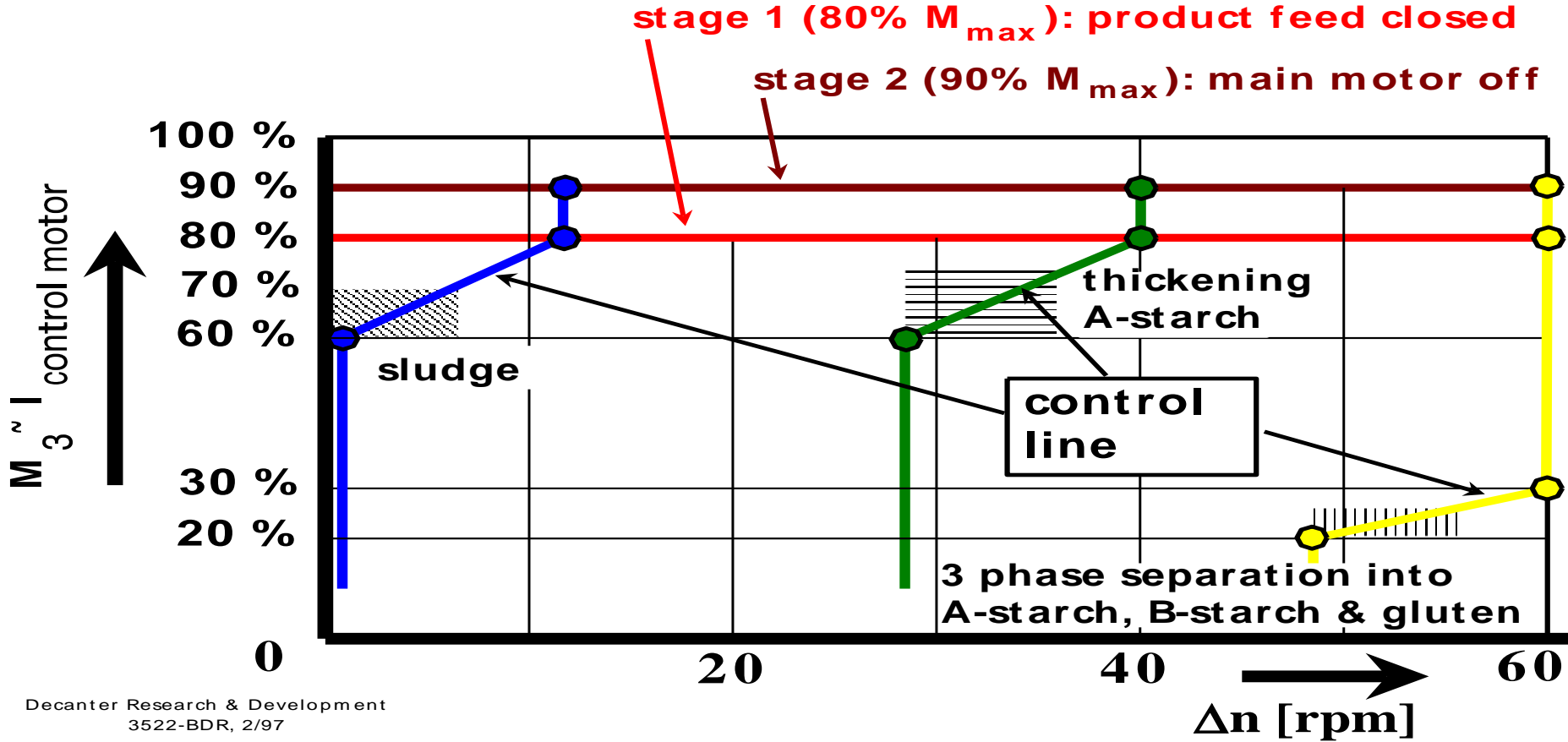
Kontrol panosu, IP 55 sınıfına uygun olup havalandırma ve aydınlatmaya sahiptir. Dekantör santrifüj ve batari limiti kontrolü ortak bir kontrol panosu üzerindedir.

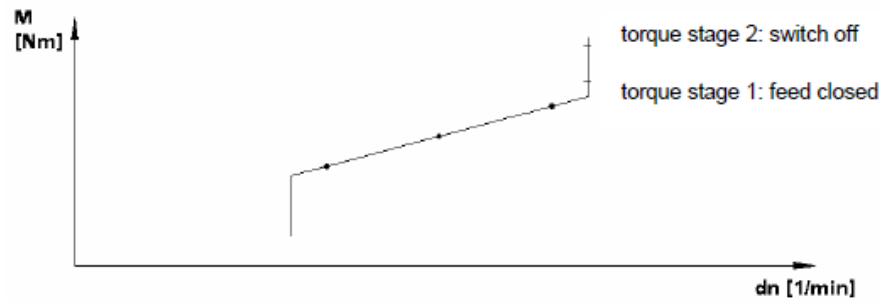
6" Dokunmatik ekran rahat kullanım kolaylığı sağlar. Tambur devri, diferansiyel hız, tork değerleri, çamur ve polimer debileri rahatça izlenebilmekte ve kontrol edilebilmektedir.

Control-Characteristics of 2-Gear/Differential-Drive



Control-Characteristics of 2-Gear/Differential-Drive





Control-Characteristics of 2-Gear/Differential-Drive

Parameter	Reaction of decanter	Reaction of product
Control begin higher	Diff. speed falls/ torque rises	DS value better - centrate worse
Control begin lower	Diff. speed rises/torque falls	DS value worse - centrate better
Control gradient higher	Fluctuating diff. speed, fluctuating torque	DS value worse - centrate better
Control gradient lower	Diff. speed stabilises, torque stabilises	DS value better - centrate worse
Product pump speed higher	Torque and diff. speed fluctuate, pumping and clarification may cease; risk of sludge breakthrough	DS value worse - centrate worse
Product pump speed lower	Diff. speed falls, motor speed falls. Torque may declined due to excessive basic diff. speed	DS value same - centrate better
Flocculant pump speed higher (excessive flocculation)	Lubrication effect - risk of scroll clogging; significant diff. speed and torque fluctuations	DS value better - centrate better; soapy, strong foam formation
Flocculant pump speed lower	Torque and diff. speed falls; performance not stable; torque and diff. speed fluctuate. Risk of sludge breakthrough	DS value worse - solids form large lumps, uneven discharge, centrate turbid to black
Basic diff. speed higher	1.5 - 2 1/min	Centrate better - solids worse
Basic diff. speed lower	Not less than 1.5 l/min	Centrate worse - solids better

The Ignition Residue for DS Estimation

To calculate the ignition residue:

When the DS content has been calculated, the DS sample is heated to 550 °C for two hours. The residue, known as the ignition residue, consists of mineral substances. The organic substances have been incinerated.

Ignition residue in %	Dry substance in %
> 40	>25-28
> 45	>28-32
> 50	>32-35
> 55	>35

The Ignition Residue for DS Estimation

Average Figures of approx. 280 municipal applications

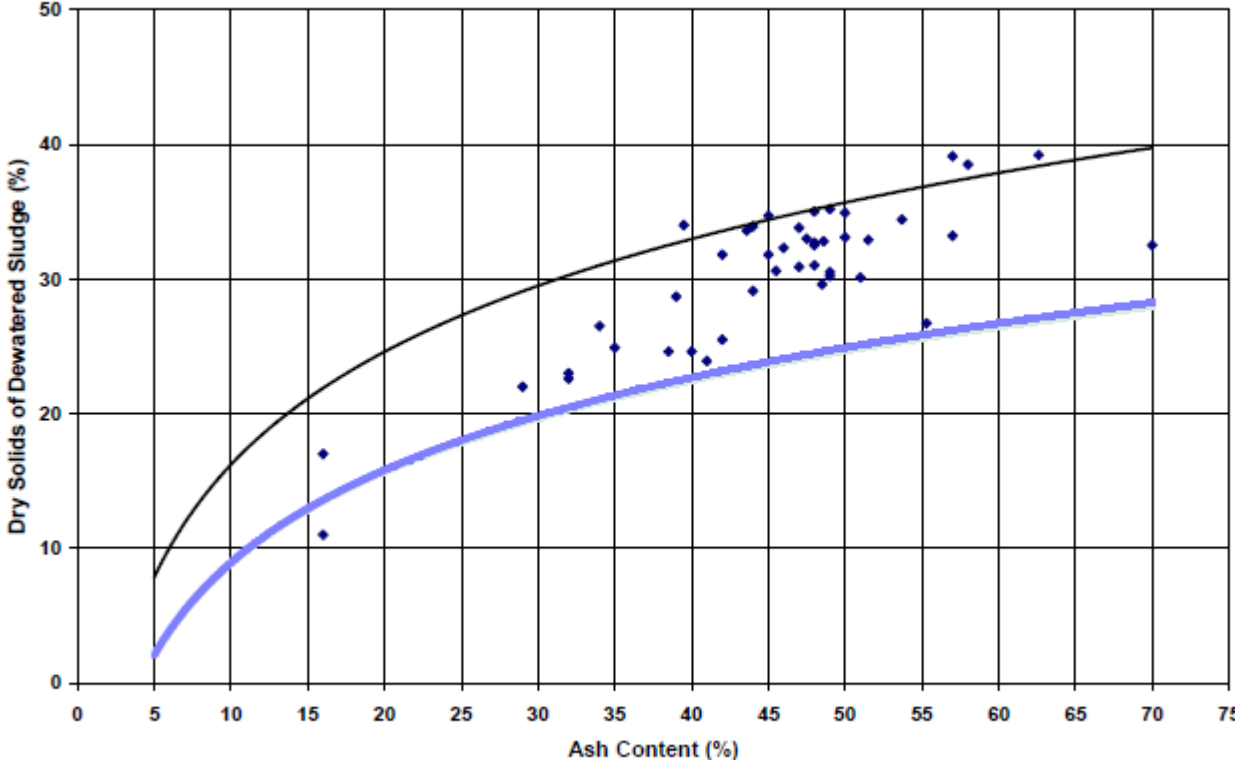


Abbildung 3: ignition residue / DS- relationship

MAKİNANIN TEKNİK DETAYLARI

Kapasite:1250-3400 kg/h

Tanbur devri :3000d/dk

Güç:12.32-30.82 kw

Tanbur çapı:470-480 mm

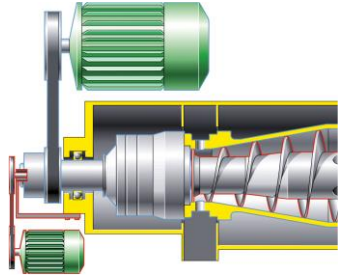
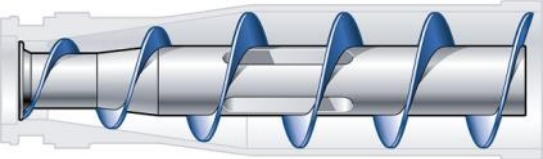
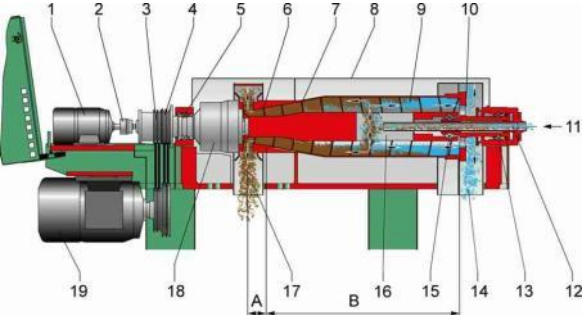
Uzunluk:2885-3705 mm

Genişlik:1180mm

Yükseklik:1600mm

Fiyat:60 ton – 400 bin tl , 40 ton – 280 bin tl

Decanter Technology



Basics

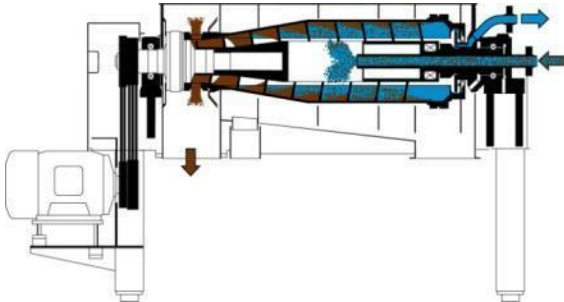
General Design

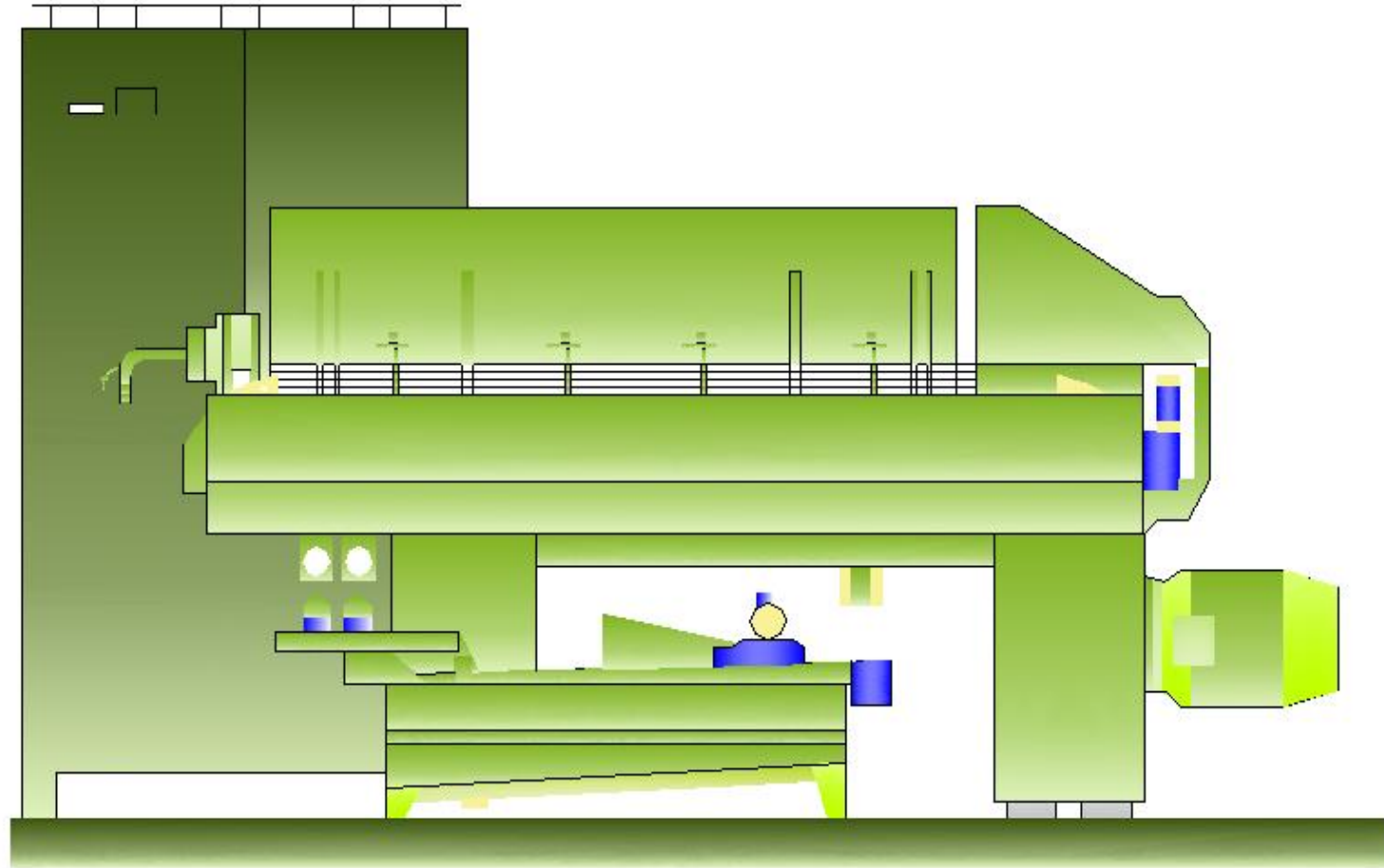
Bowl Parameters

Scrolls

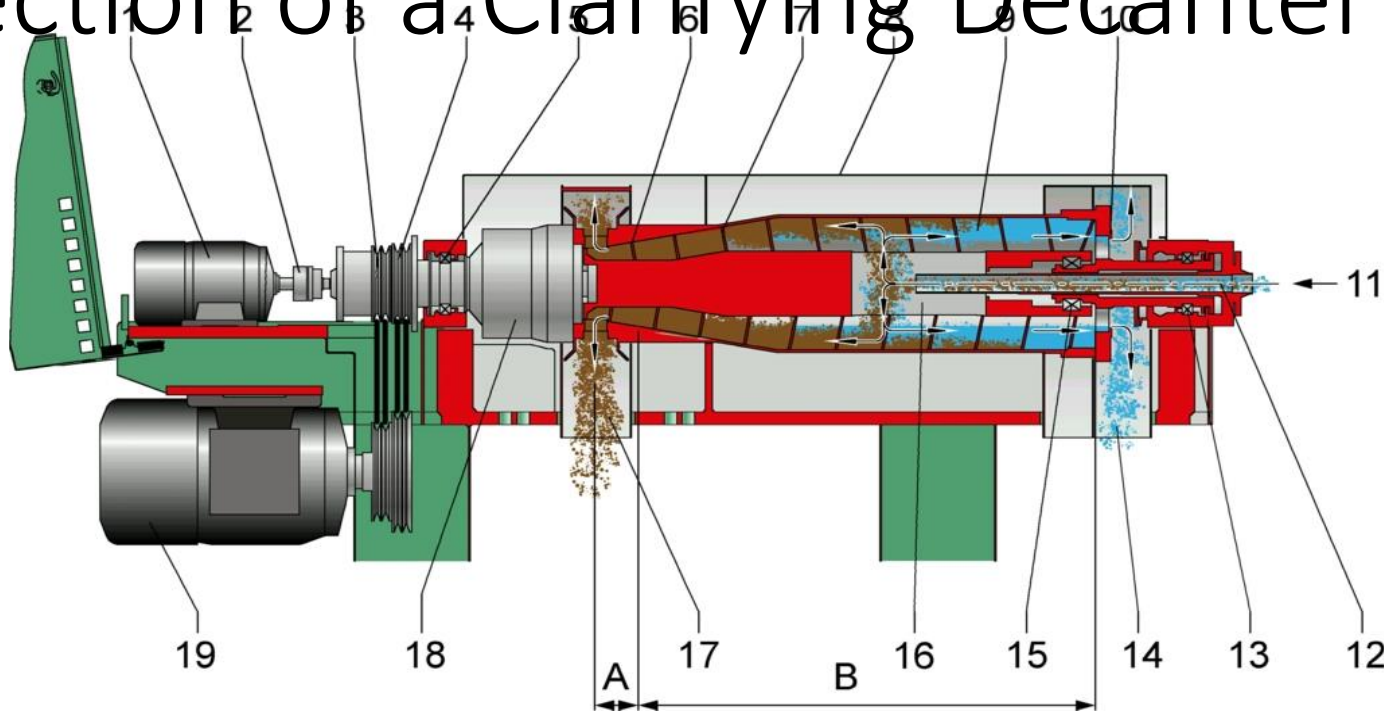
Discharges

Drives



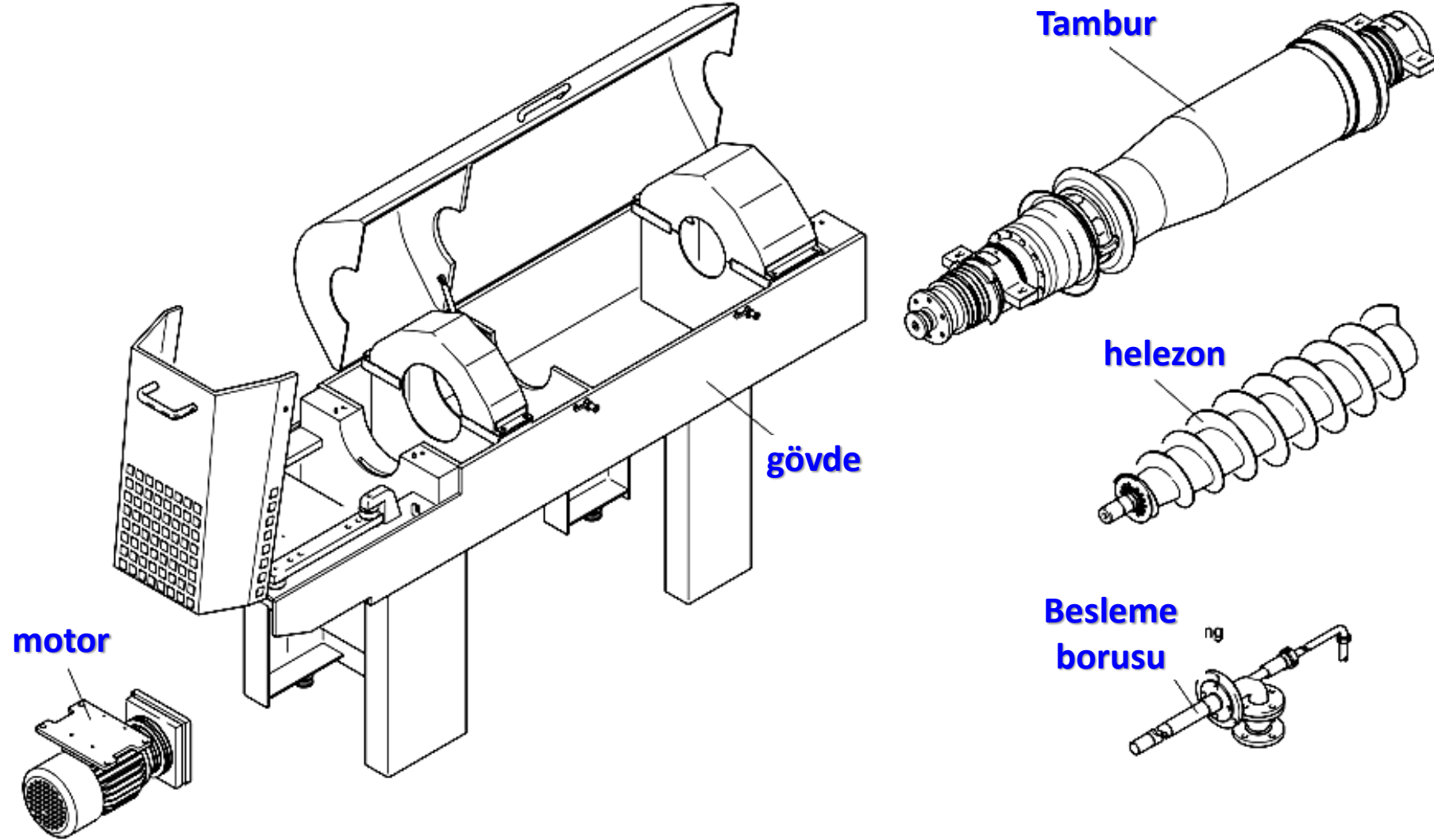


Cross Section of a Clarifying Decanter



A dewatering zone	6 bowl	14 gravity discharge of clarified liquid
B clarification zone	7 scroll	15 scroll bearing
1 secondary motor	8 housing	16 distributor
2 clutch	9 separation zone	17 solid discharge
3 scroll drive	10 regulating ring	18 primary gear
4 bowl drive	11 feed	19 main motor
5 bowl bearing	12 feed tube	
	13 bowl bearing	

Temel Bileşenler



İçerisine bakalım

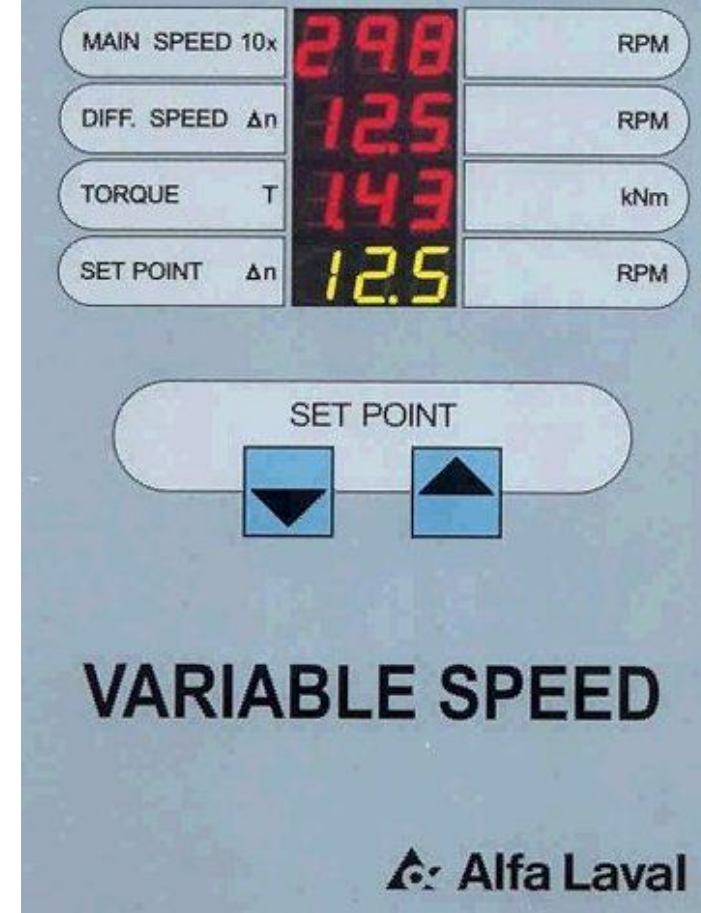
VS – VARIABLE SPEED

Değişken Hız

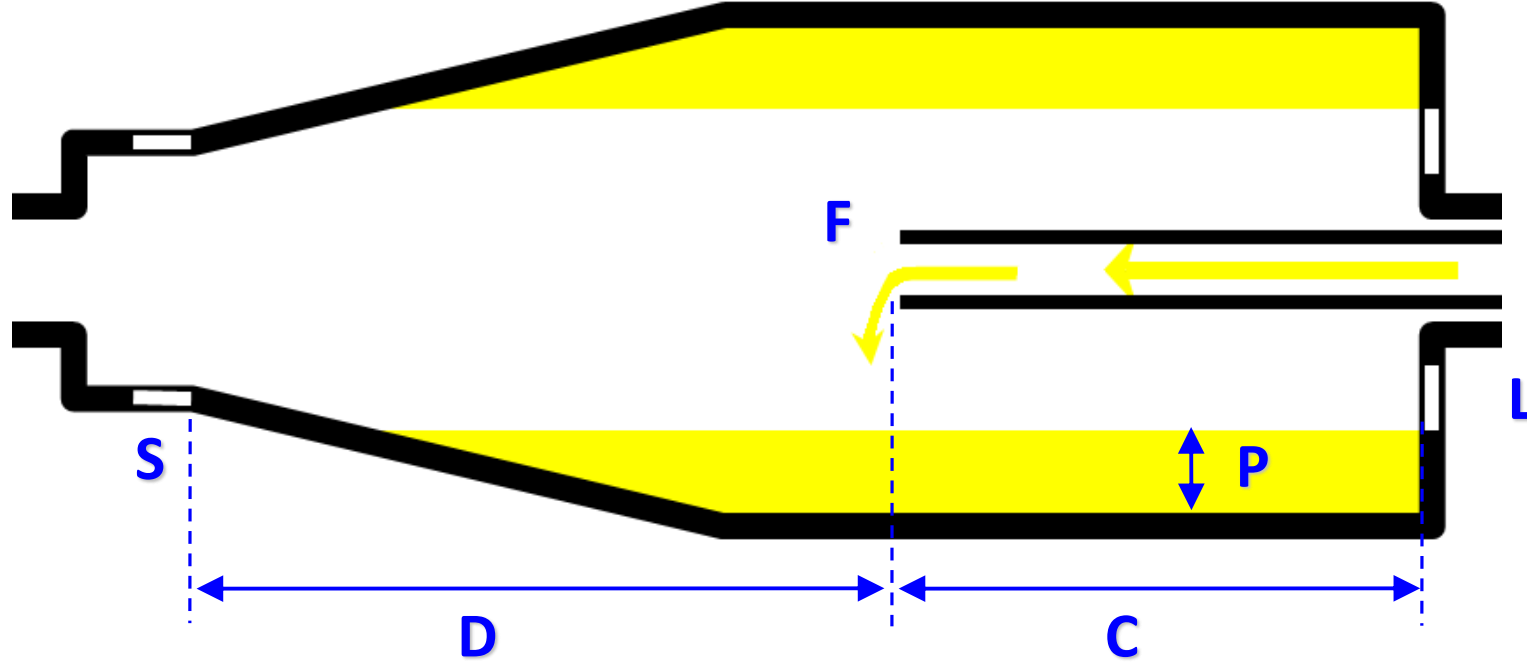
Konveyörün değişken hızını ayarlamak için elektronik kontrol sistemi

Operatör istenen değişken hızı belirler ve bütün sistem buna otomatik olarak adapte olur.

Sistem otomatik olarak tork'u tespit eder (KNm).

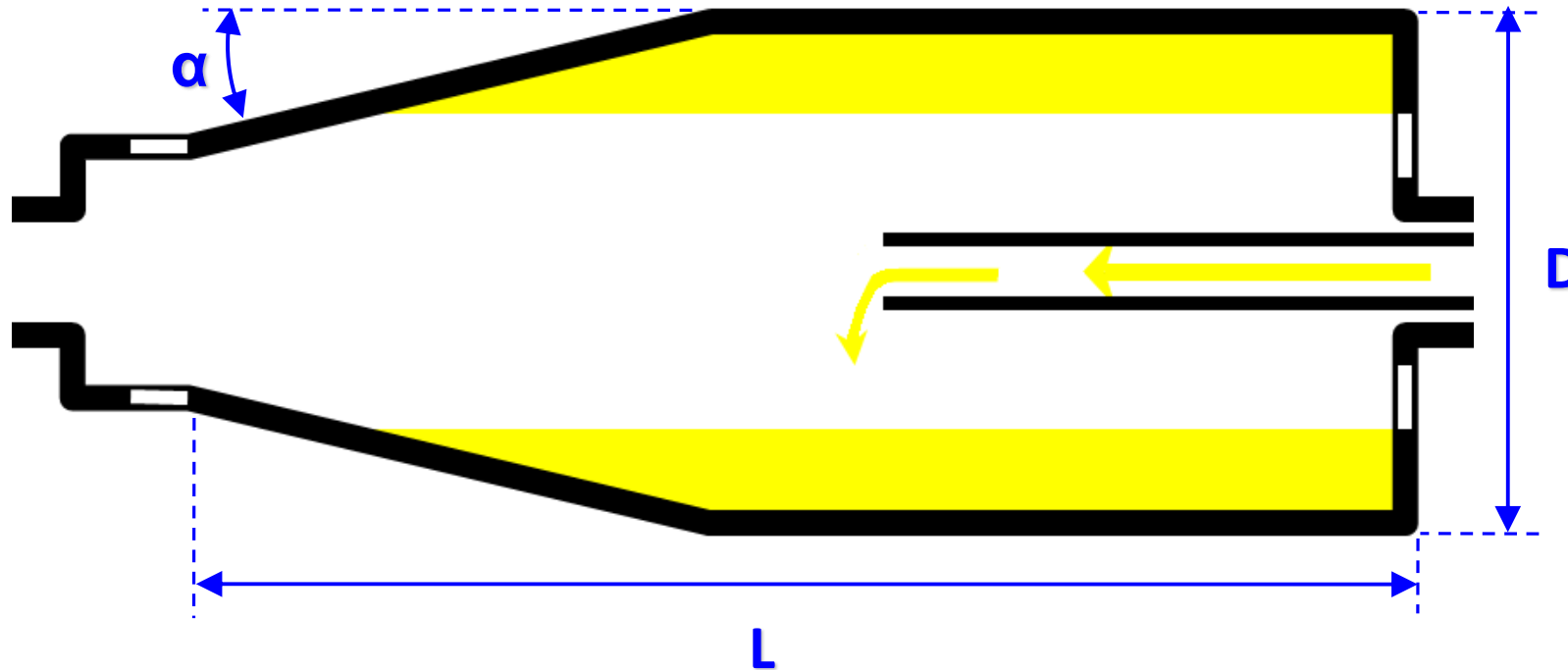


Ana tambur bölümleri



- F besleme borusu
- L sıvı çıkışı
- S pirina çıkışı
- C temizleme alanı
- D kurutma alanı
- P pond depth

Bowl Parameters



bowl diameter D

according to machine type

λ or L/D ratio

short

standard

long

high capacity

cone angle α

flat

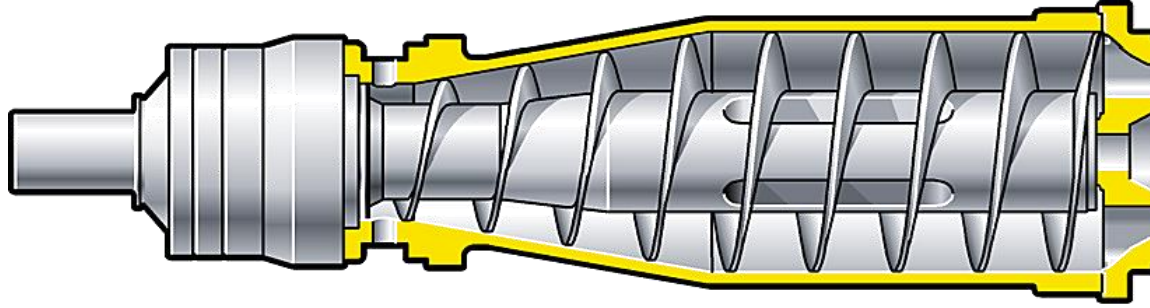
difficult solids

steep

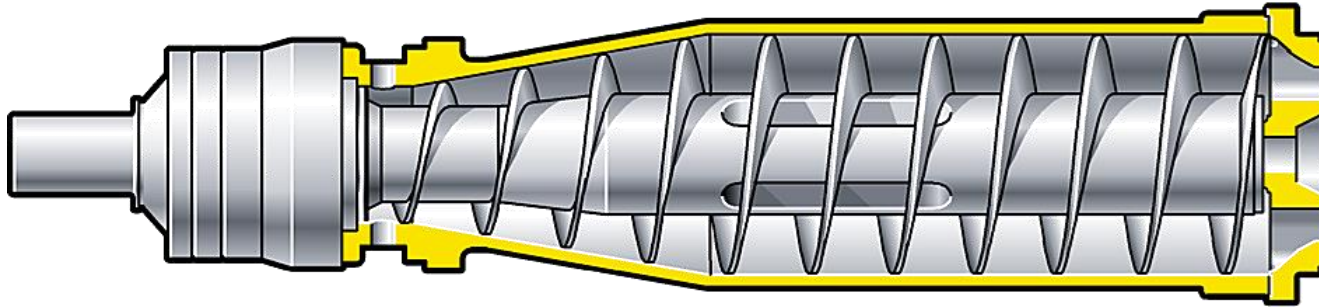
smooth sliding solids

L/D Ratio

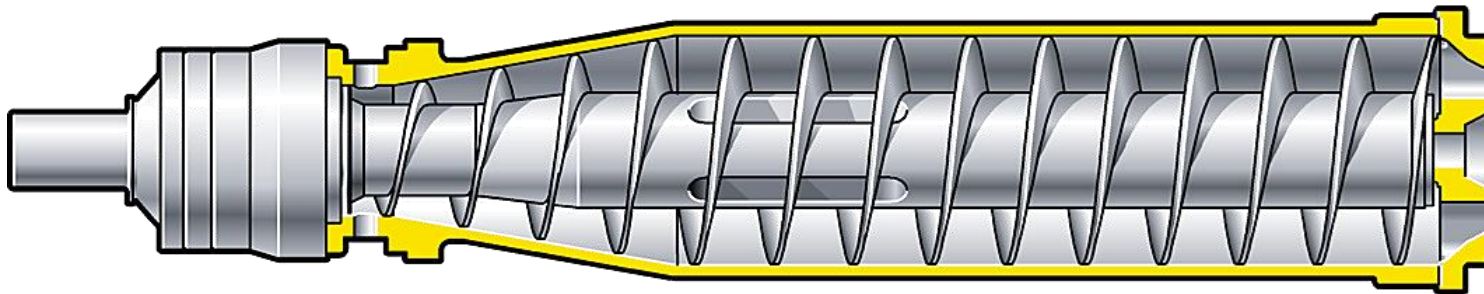
$\lambda=3,2$



$\lambda=4$

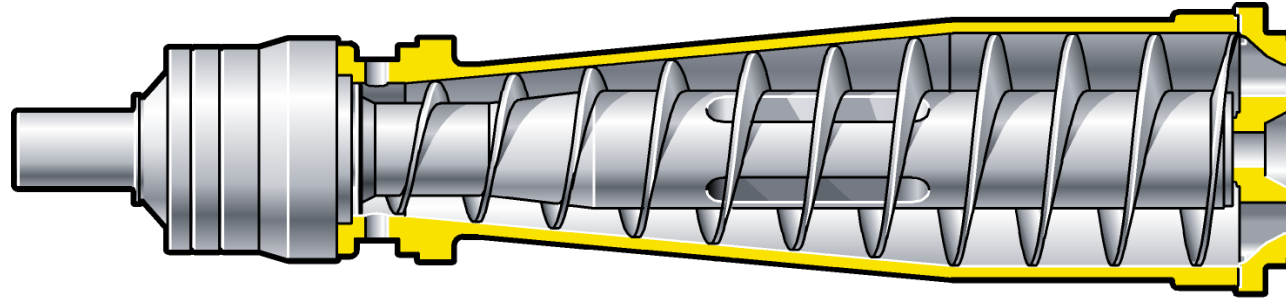


$\lambda=5$

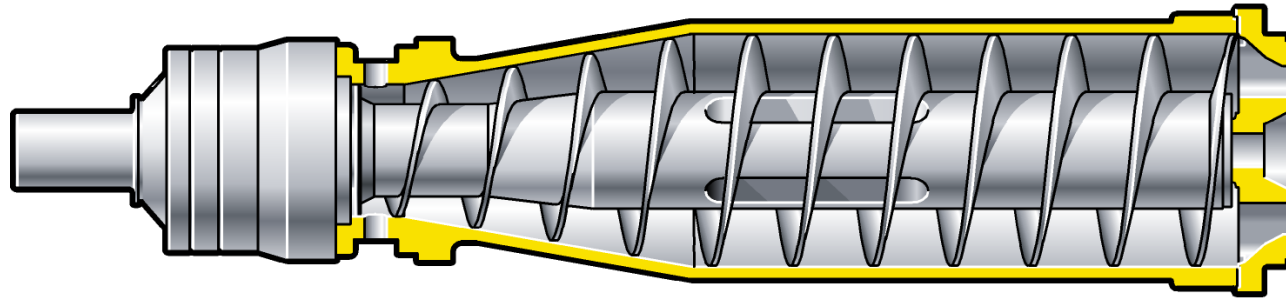


Cone Angle

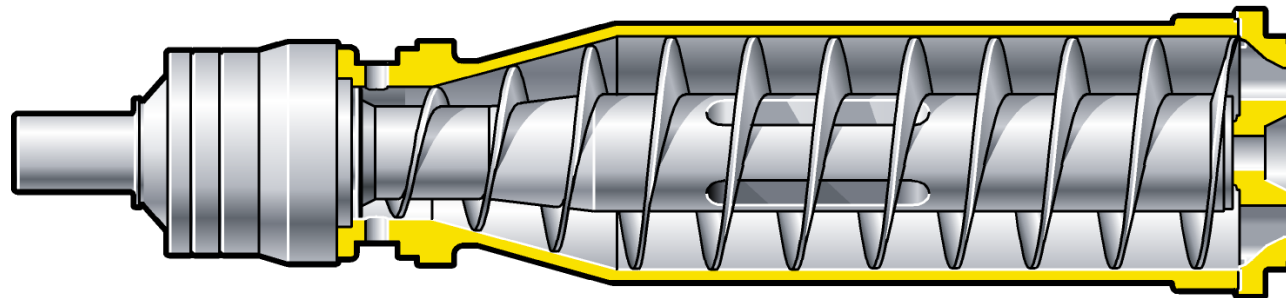
$\alpha=5^\circ$



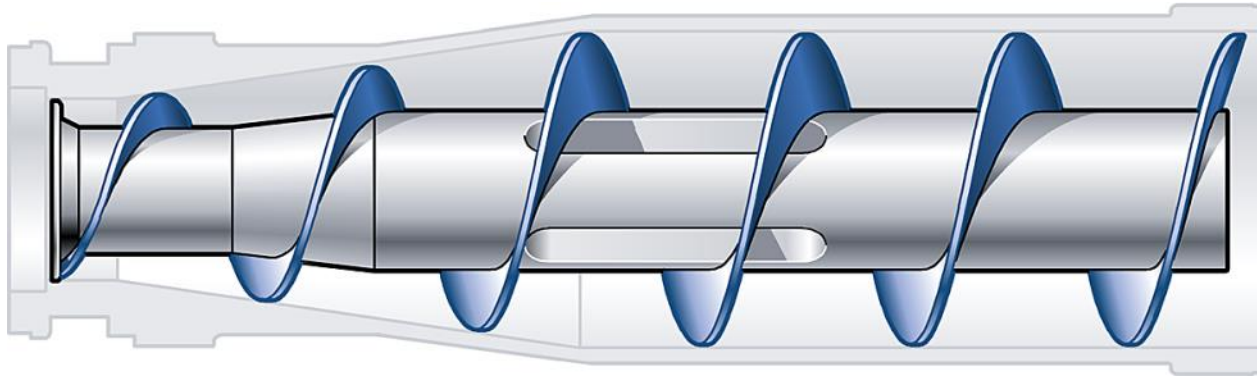
$\alpha=10^\circ$



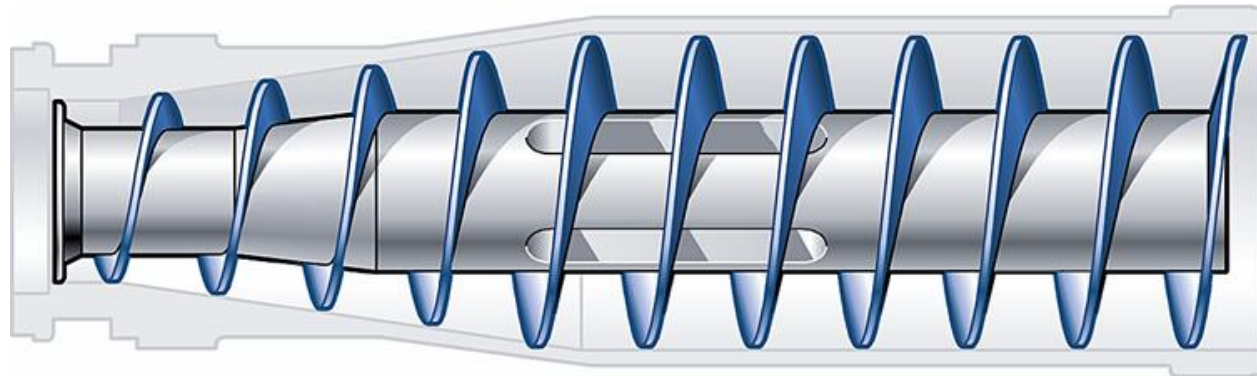
$\alpha=15^\circ$



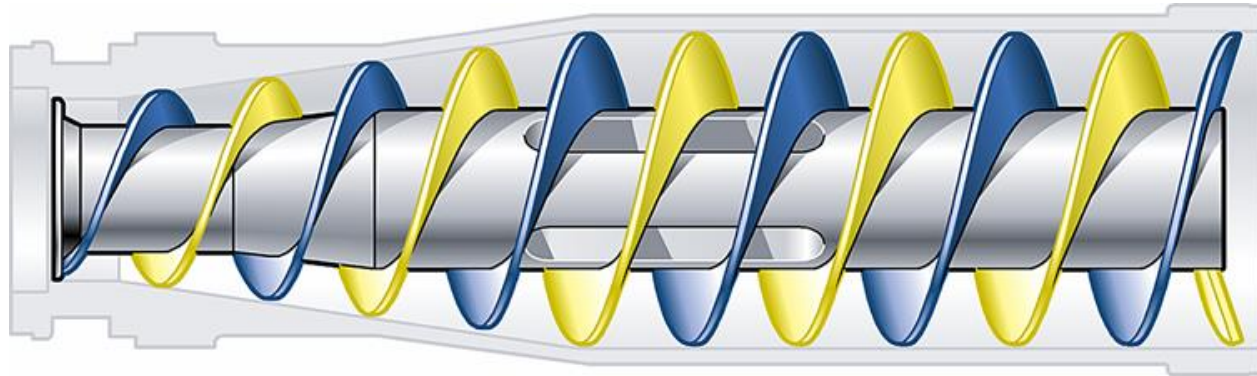
Scrolls



single flight
steep angle

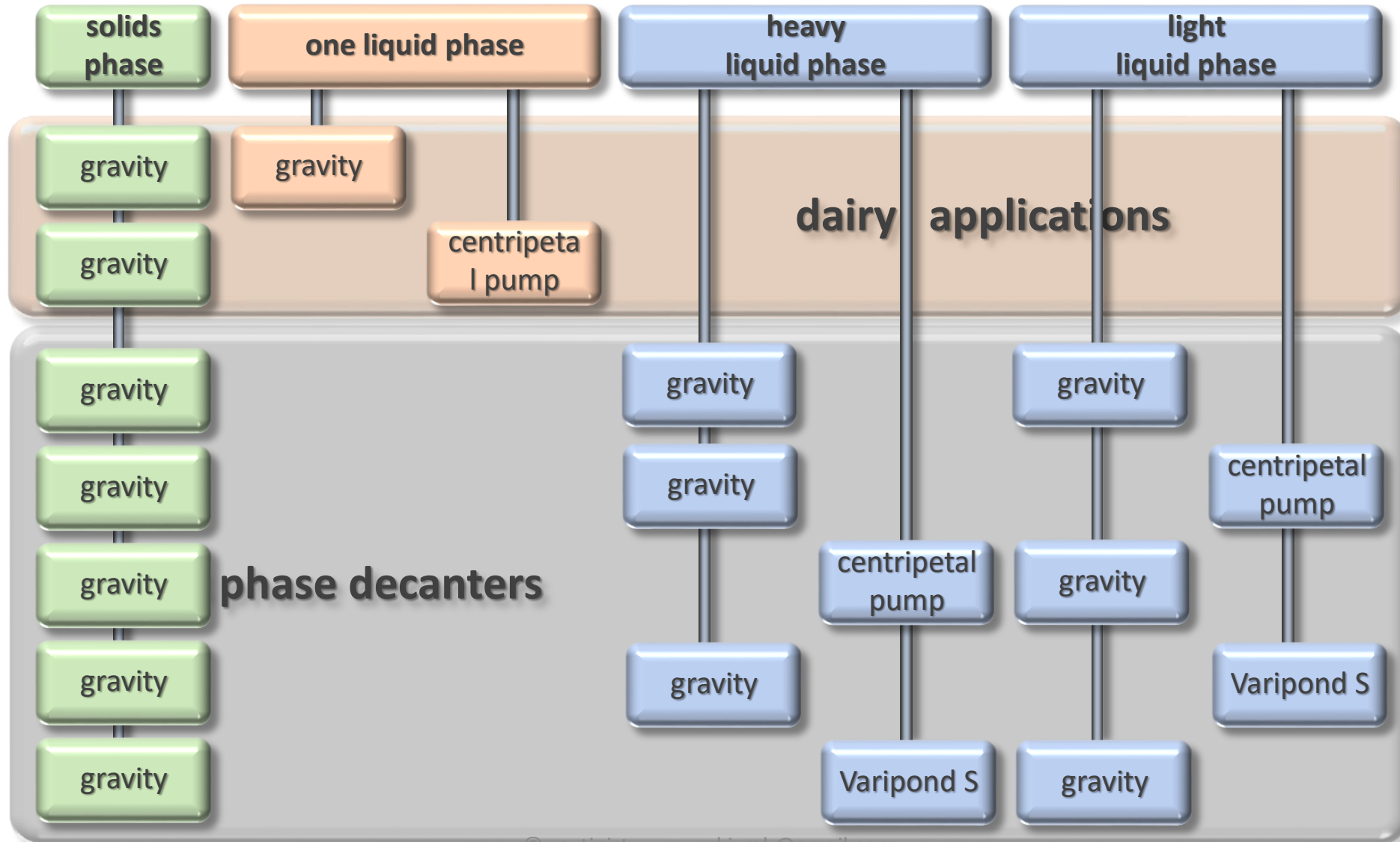


single flight
flat angle

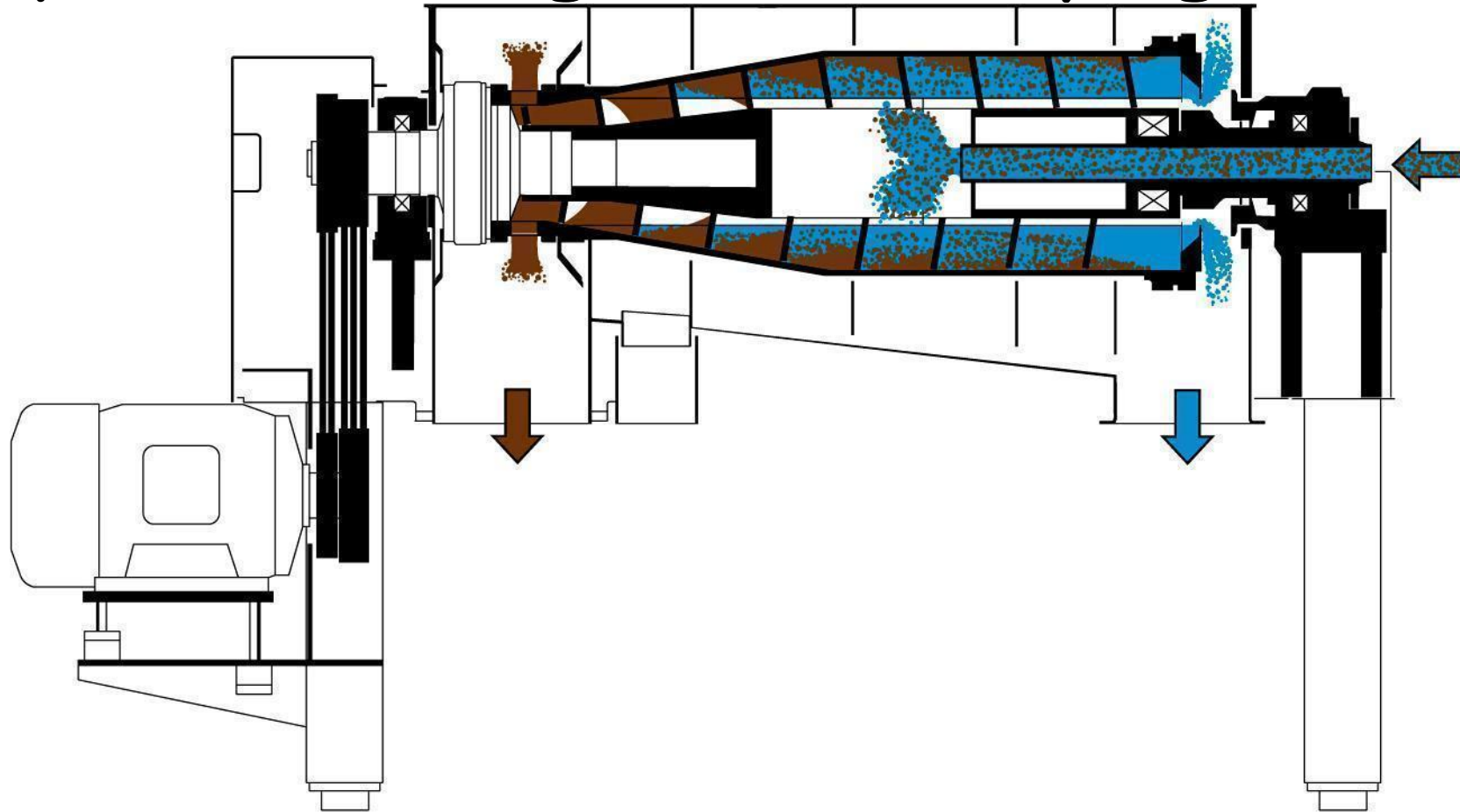


double flight
flat angle

Product Discharge Types

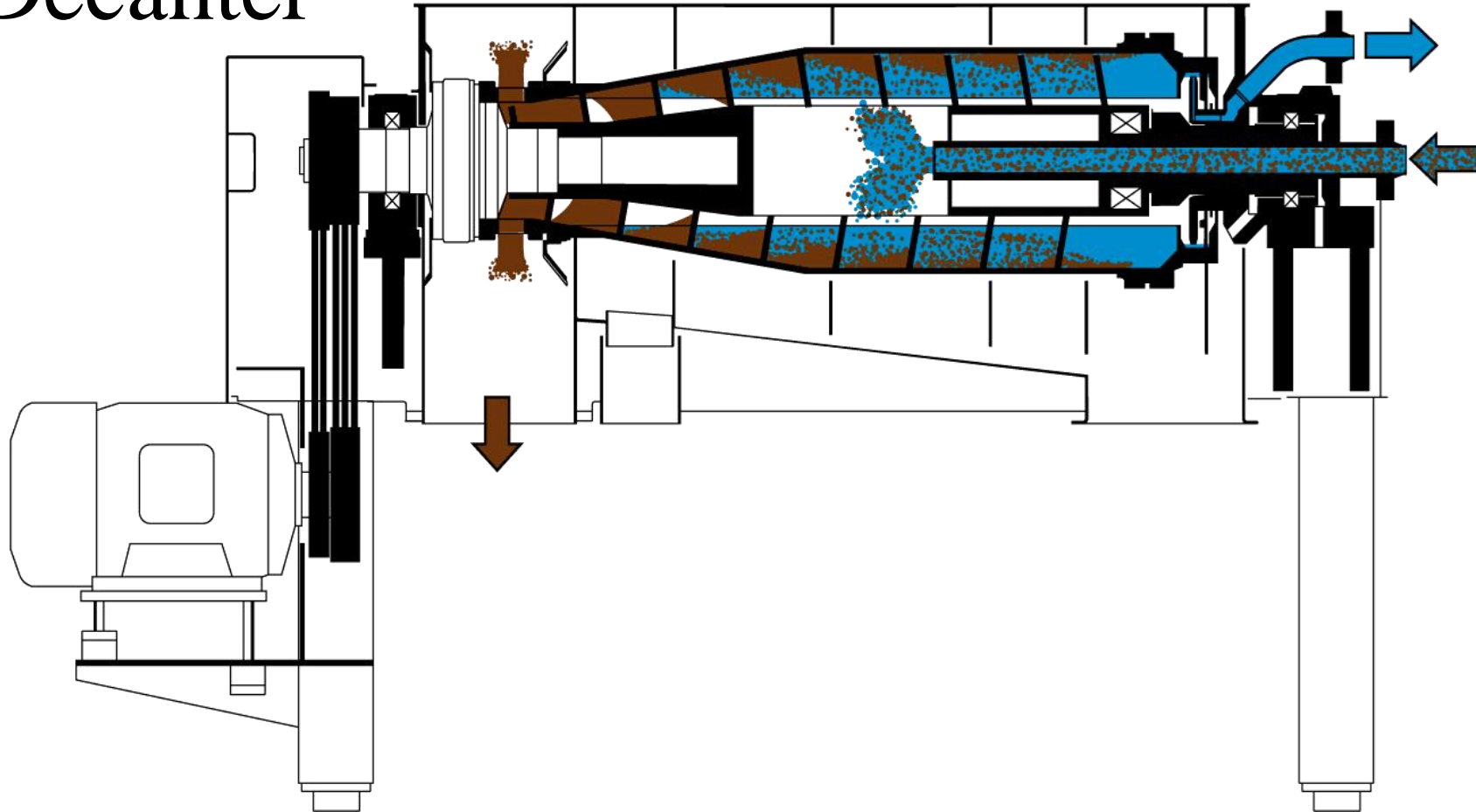


Liquid Discharge on Clarifying Decanter



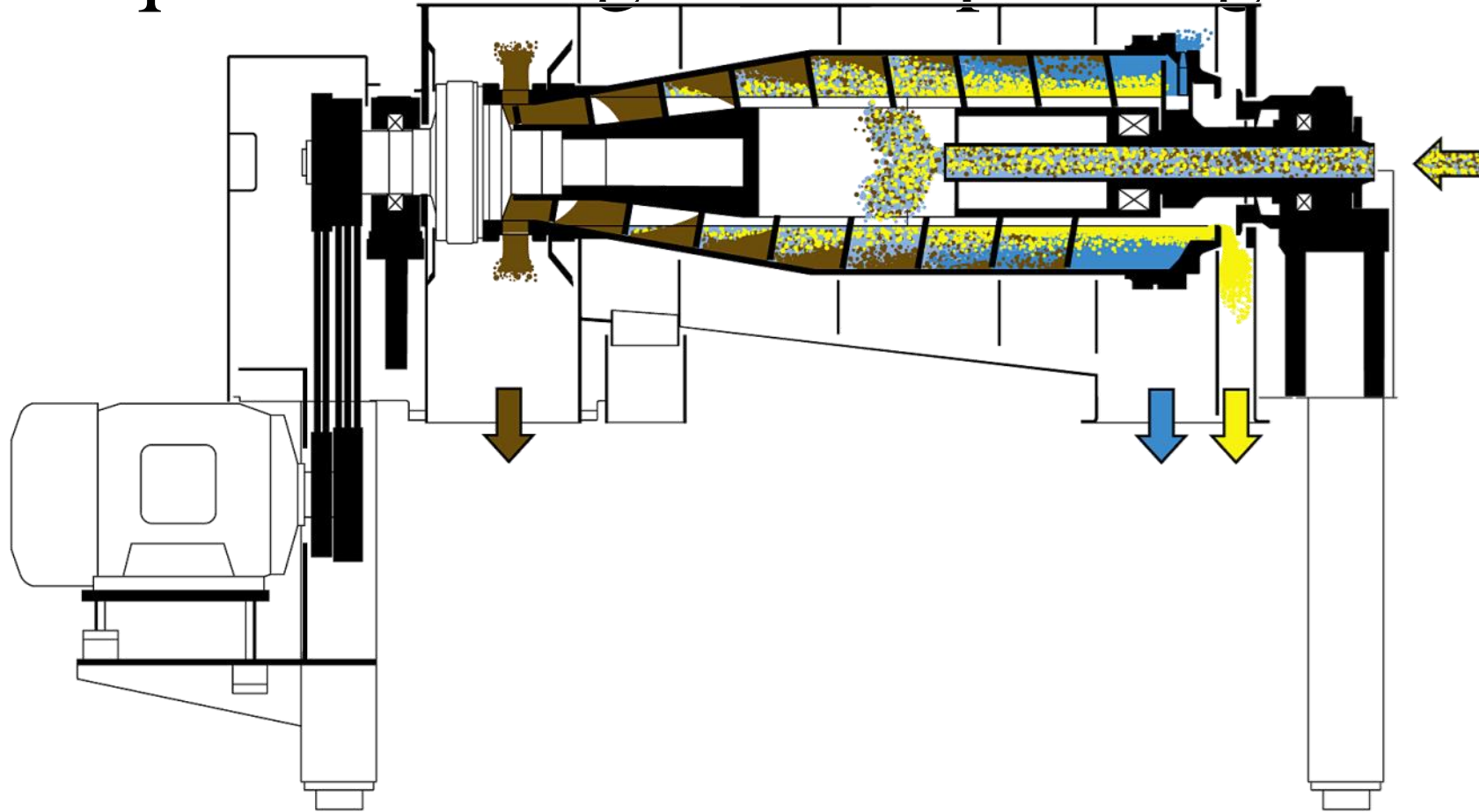
liquid discharge by **gravity**

Liquid Discharge on Clarifying Decanter



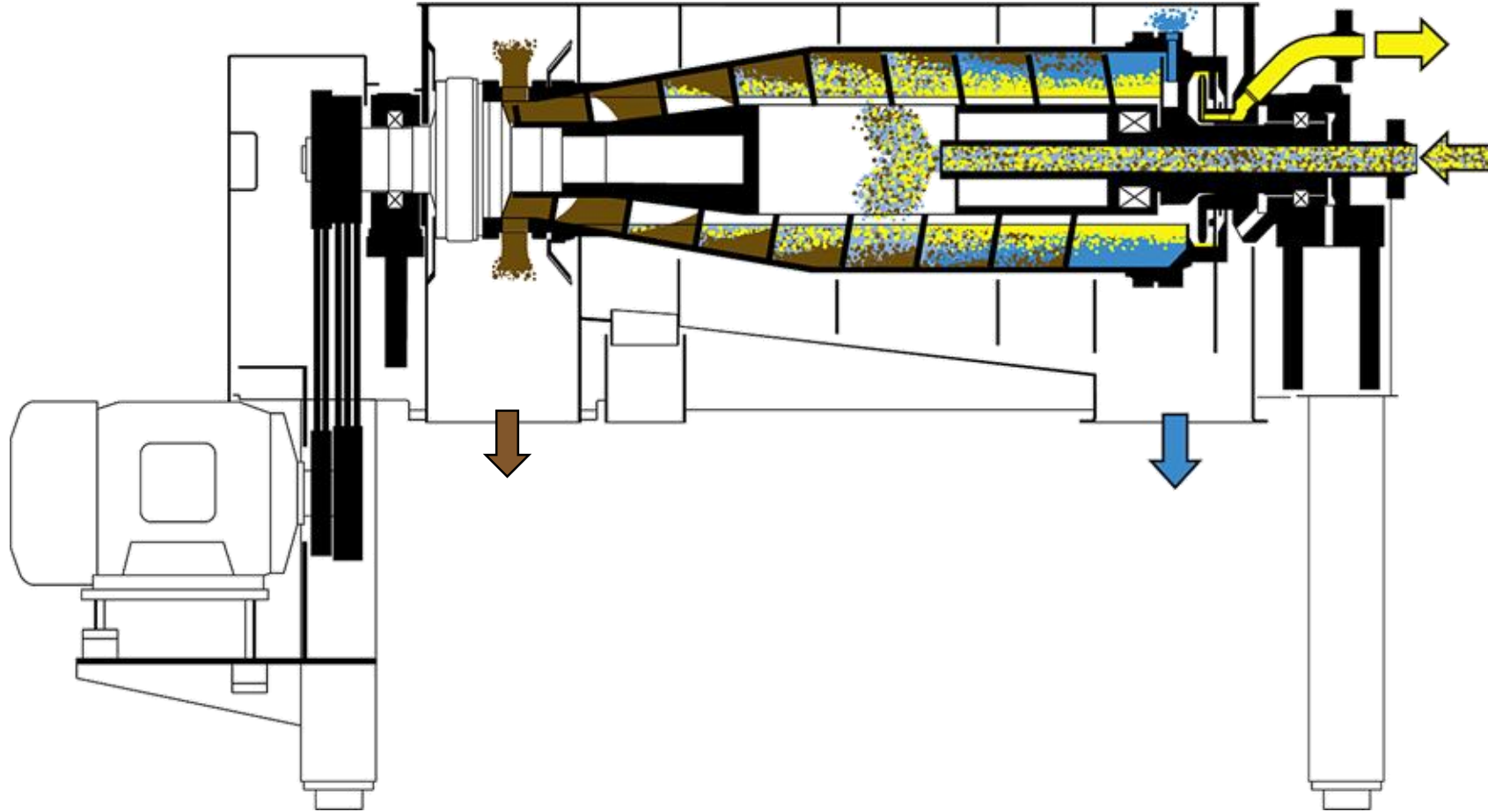
liquid discharge by **centripetal pump**

Liquid Discharges on Separating Decanter



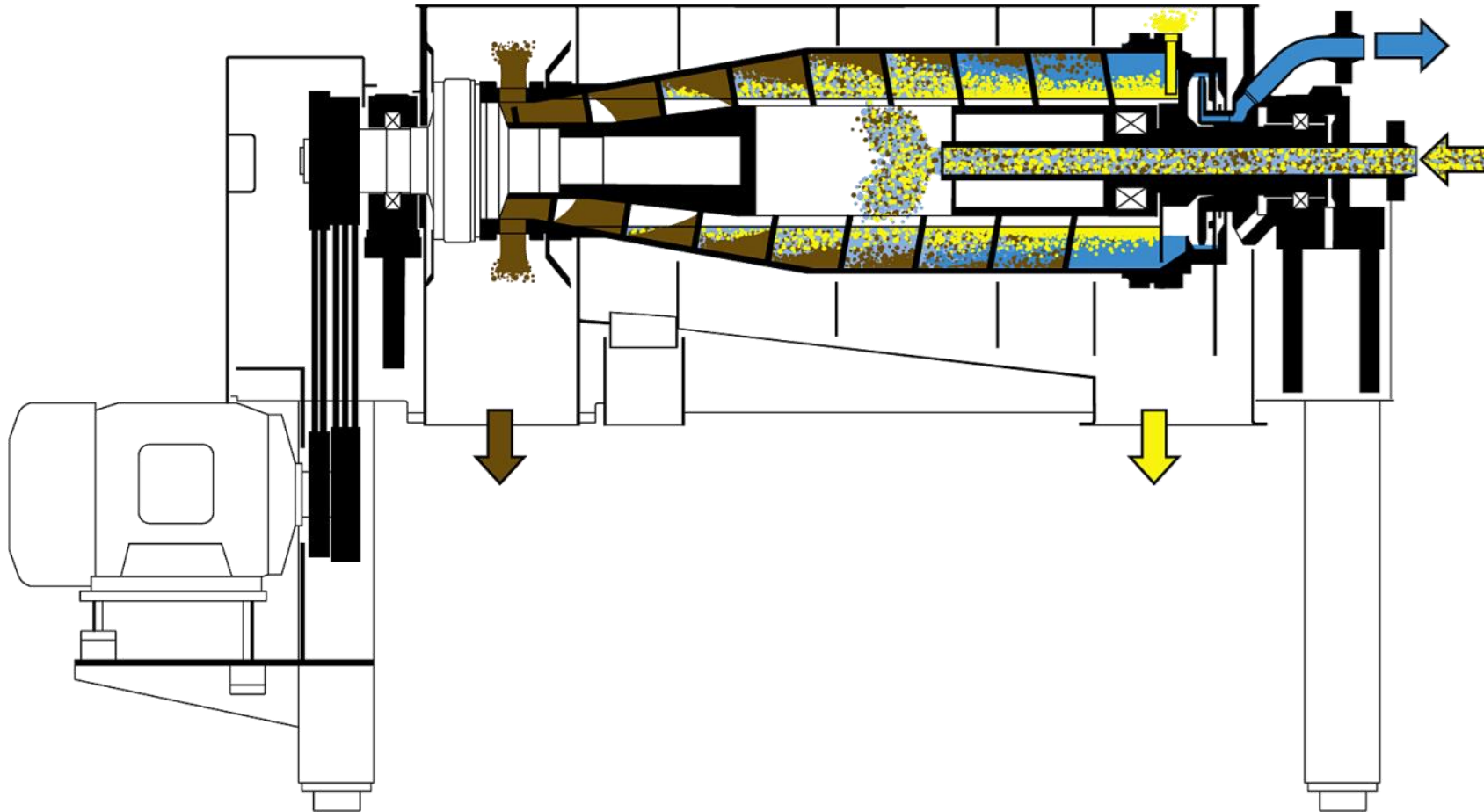
light phase discharge by **gravity**
heavy phase discharge by **gravity**

Liquid Discharges on Separating Decanter



light phase discharge by **centripetal pump**
heavy phase discharge by **gravity**

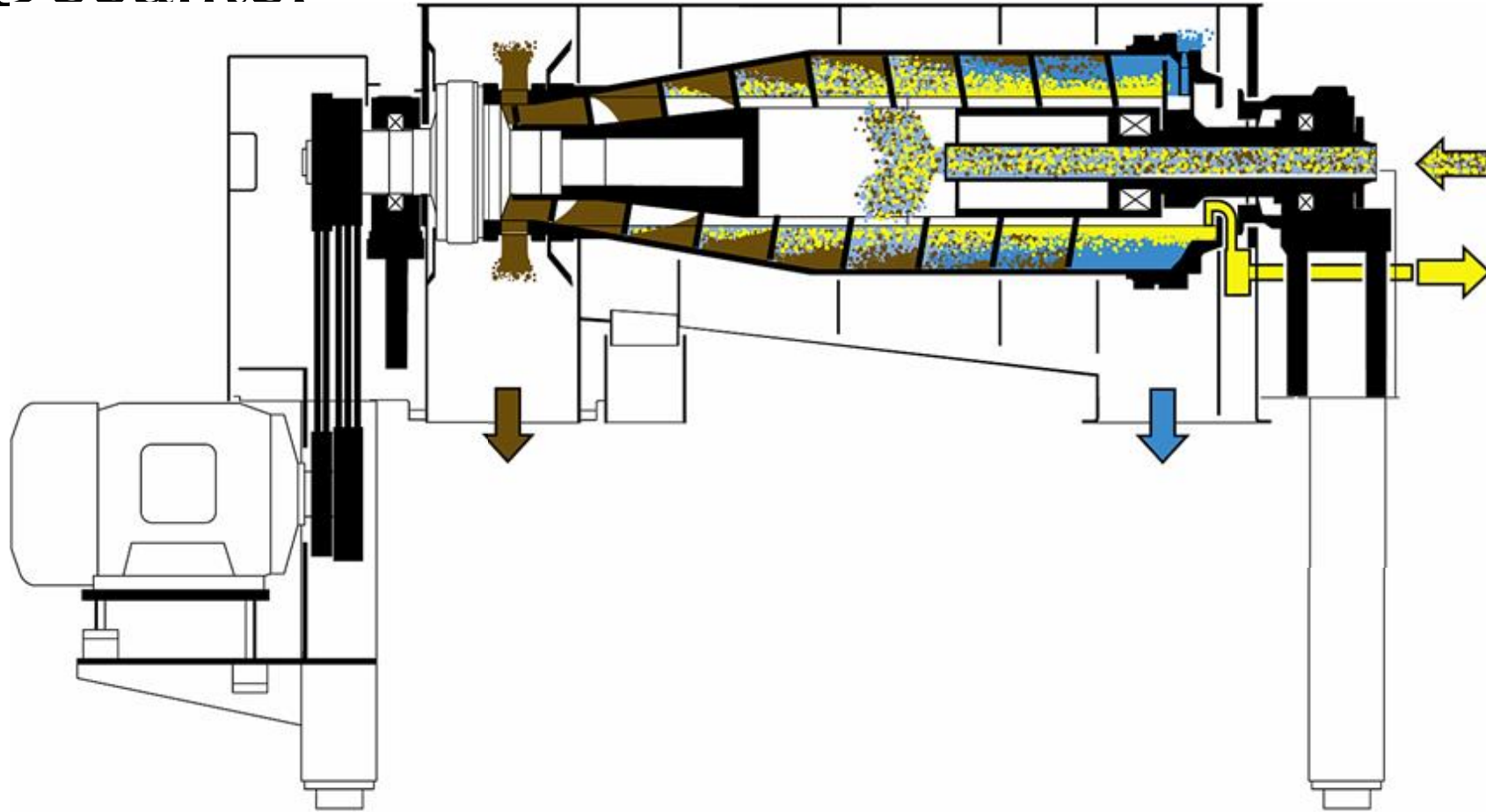
Liquid Discharges on Separating Decanter



light phase discharge by **gravity**

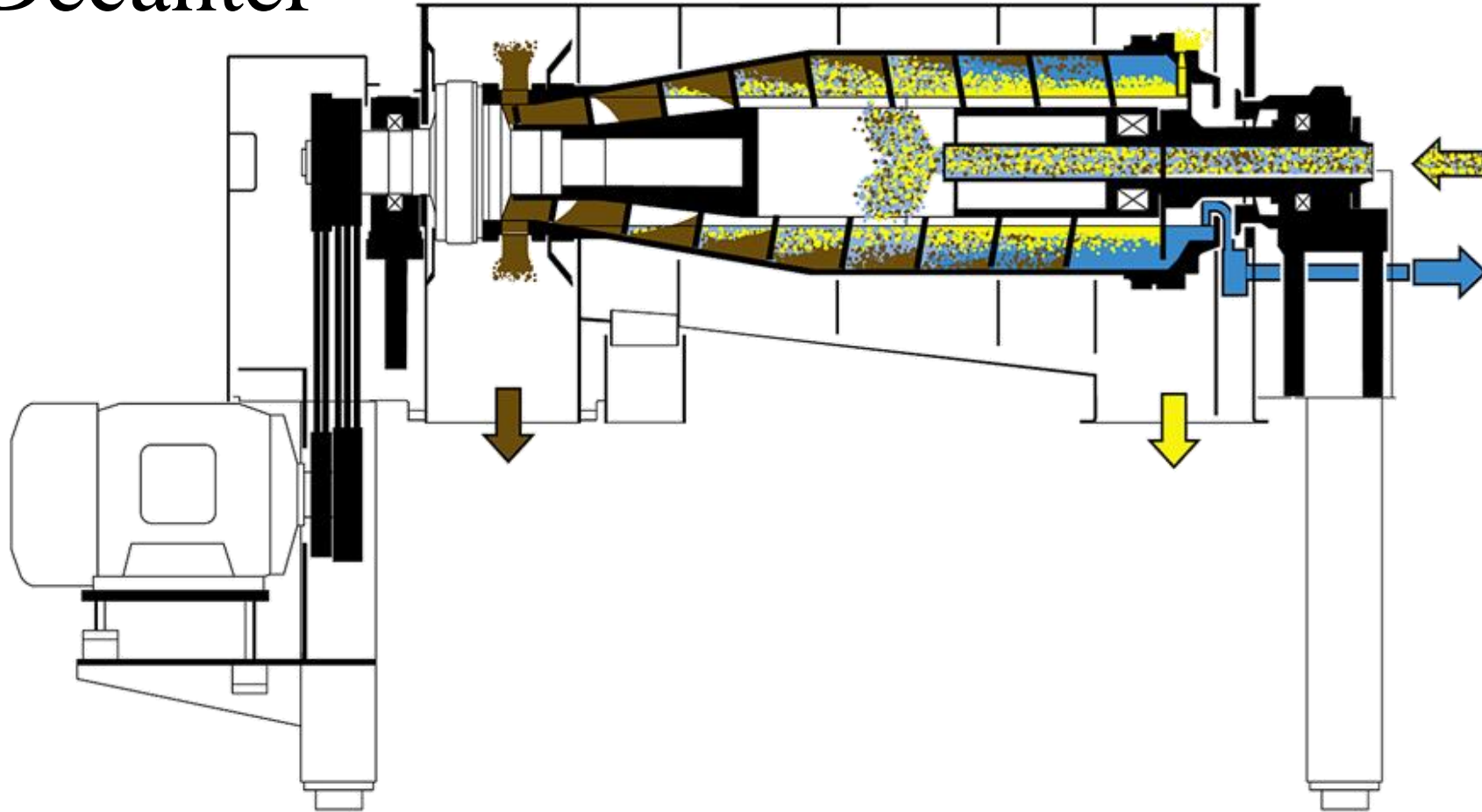
heavy phase discharge by **centripetal pump**

Liquid Discharges on Separating Decanter



light phase discharge by **Varipond S**
heavy phase discharge by **gravity**

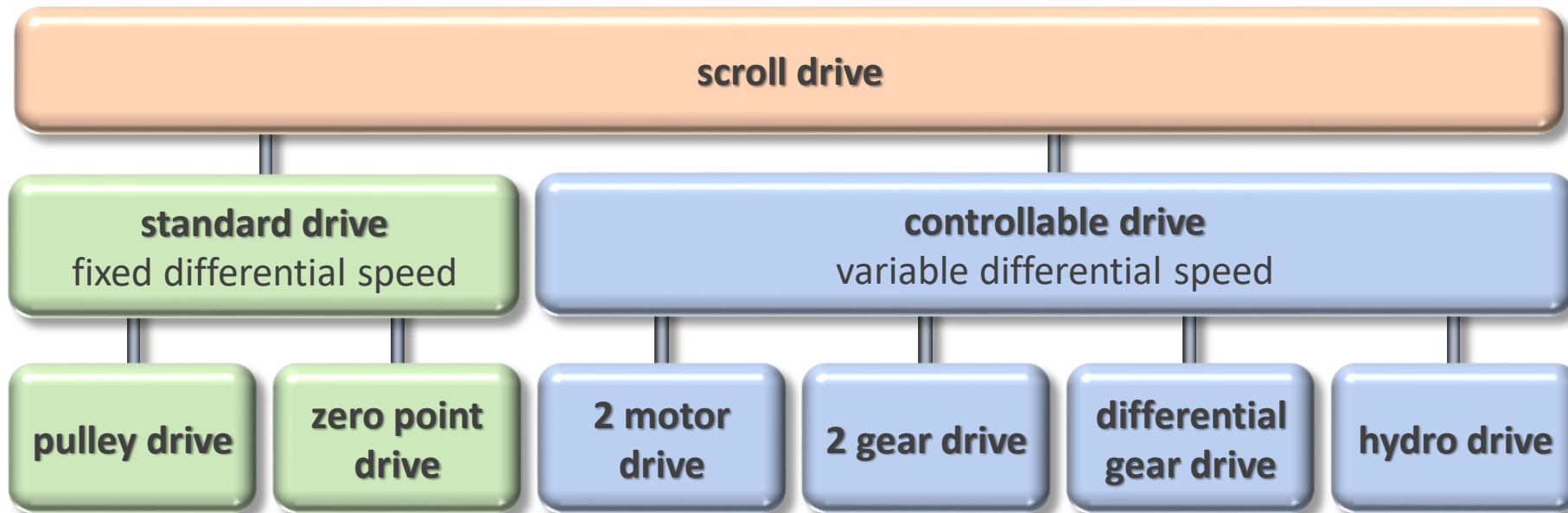
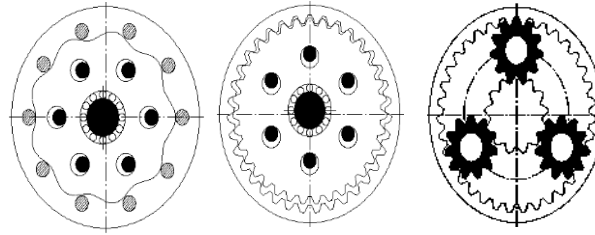
Liquid Discharges on Separating Decanter



light phase discharge by **gravity**

heavy phase discharge by **Varipond S**

Drives



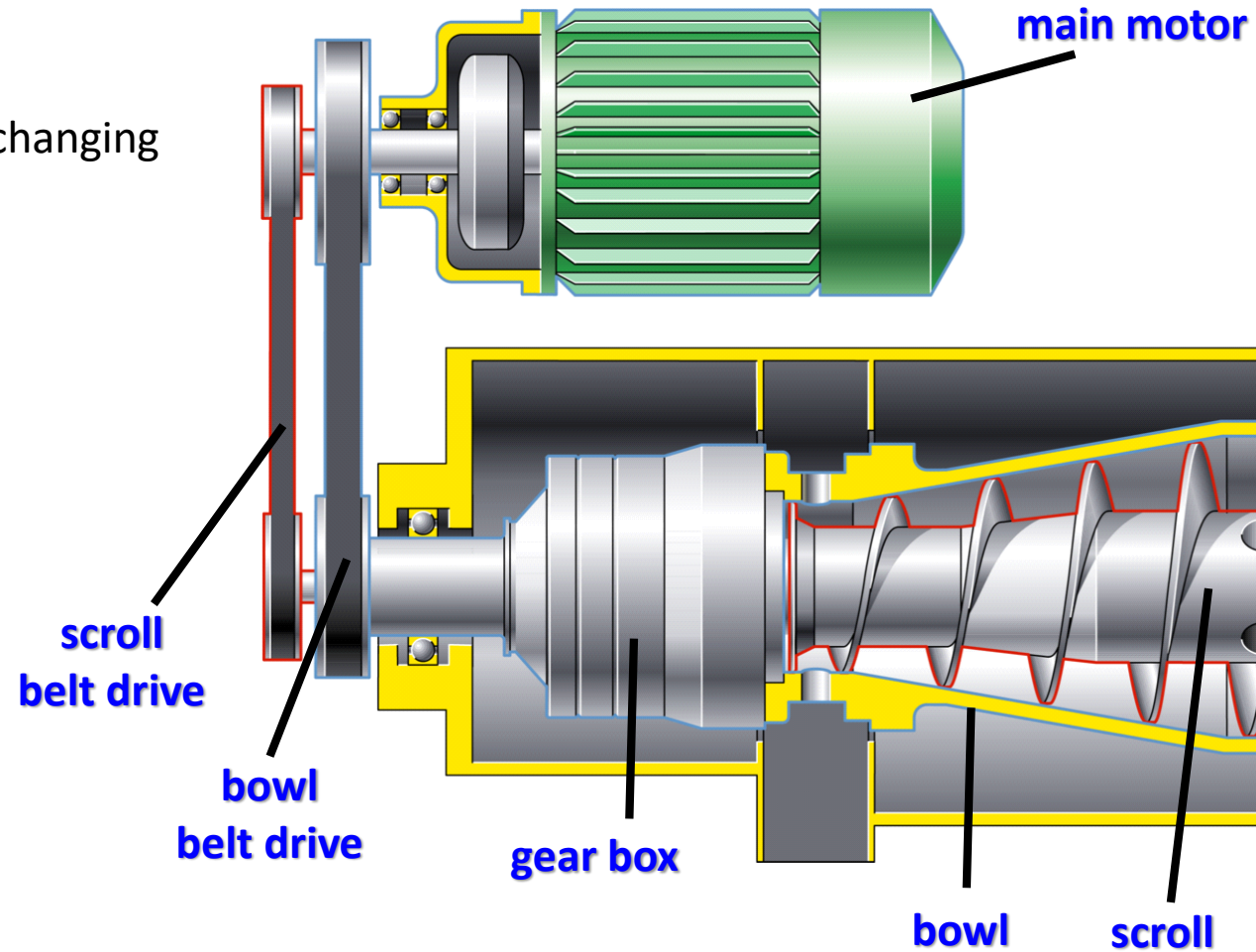
Standard Pulley Drive

fixed

differential speed
can be varied by changing
of the pulleys

1 motor

**1 frequency
converter**



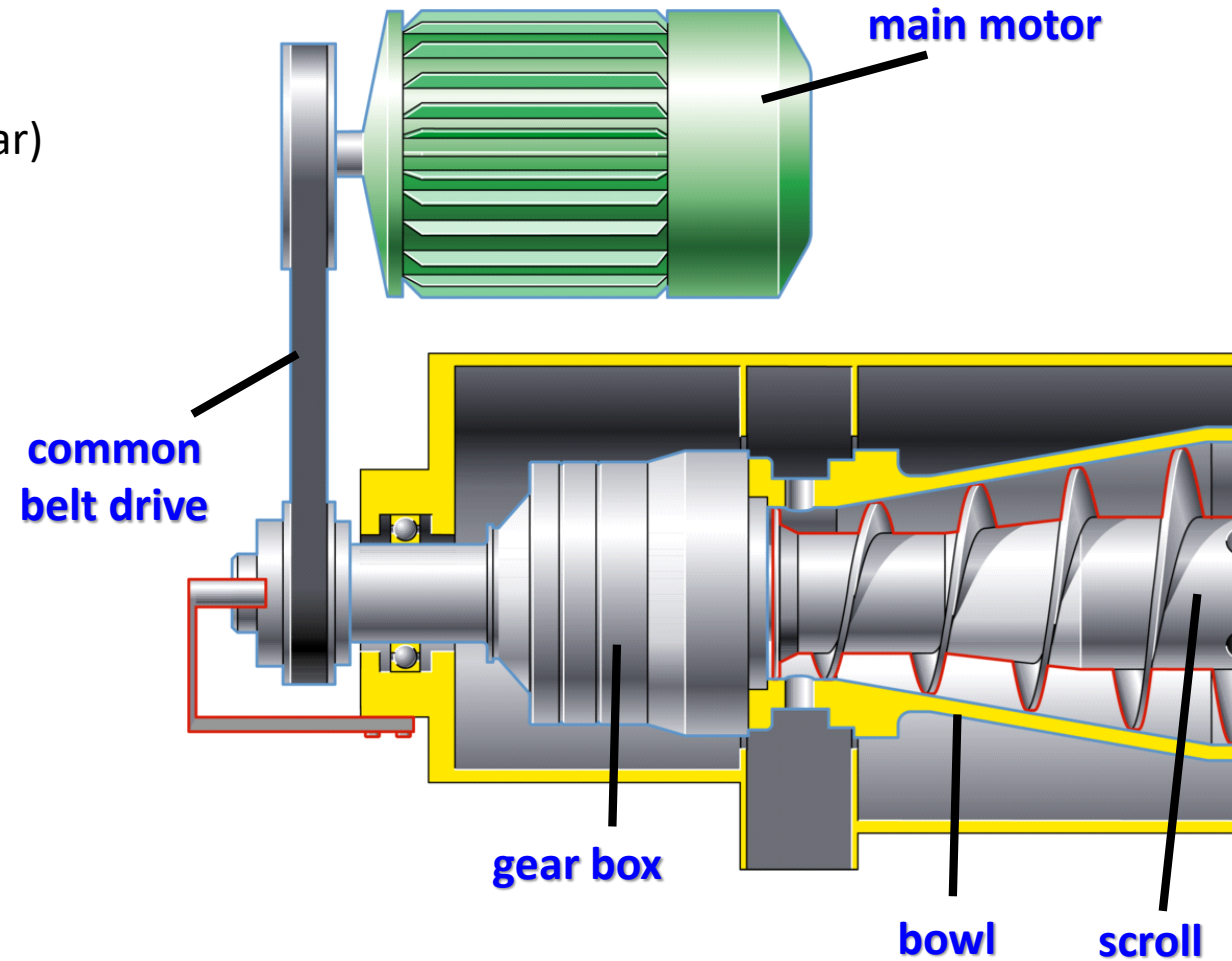
Zero Point Drive

fixed

differential speed
(defined by the gear)

1 motor

**1 frequency
converter**

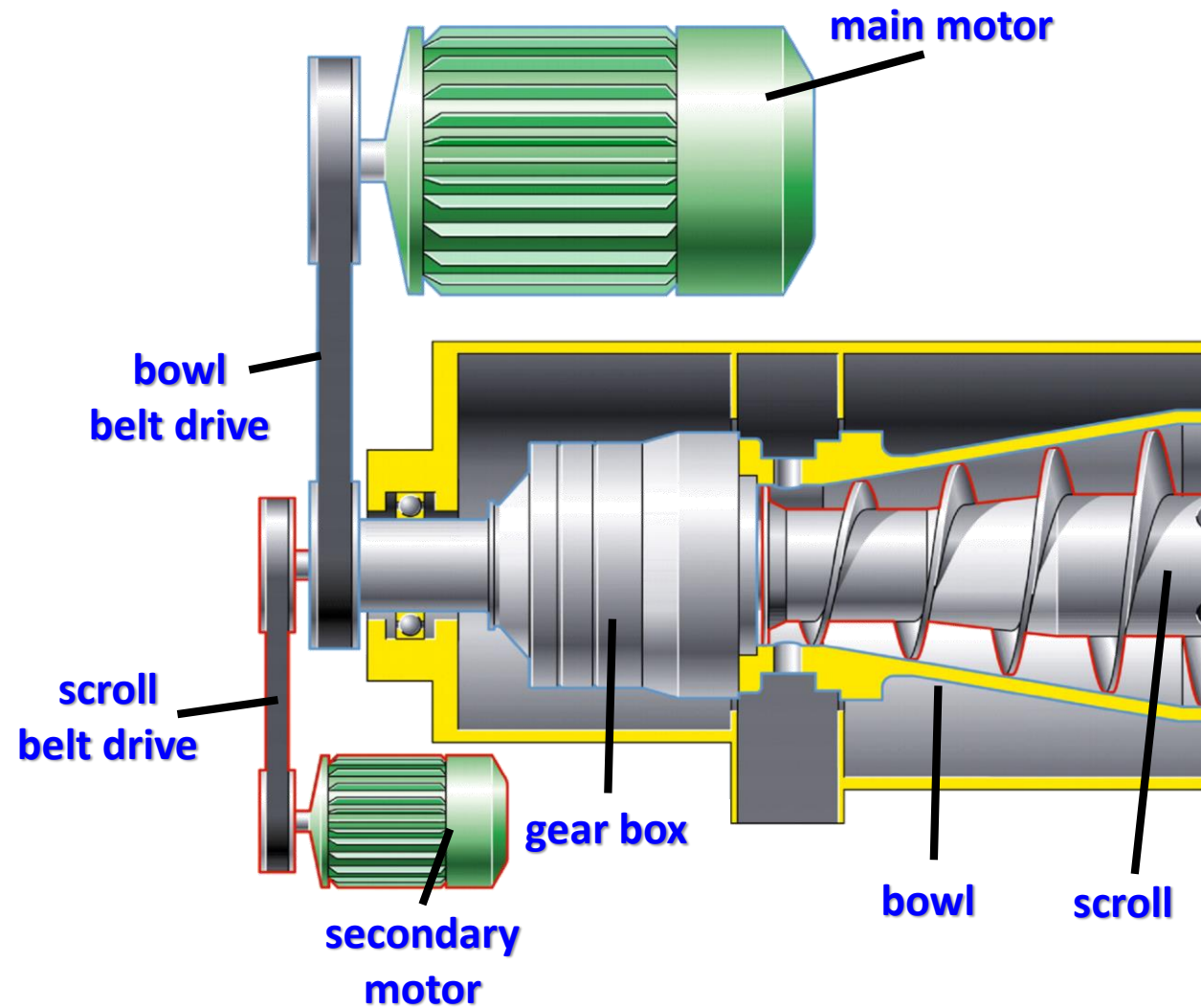


2 Motor Drive

variable
differential speed

2 motors

2 frequency
converter

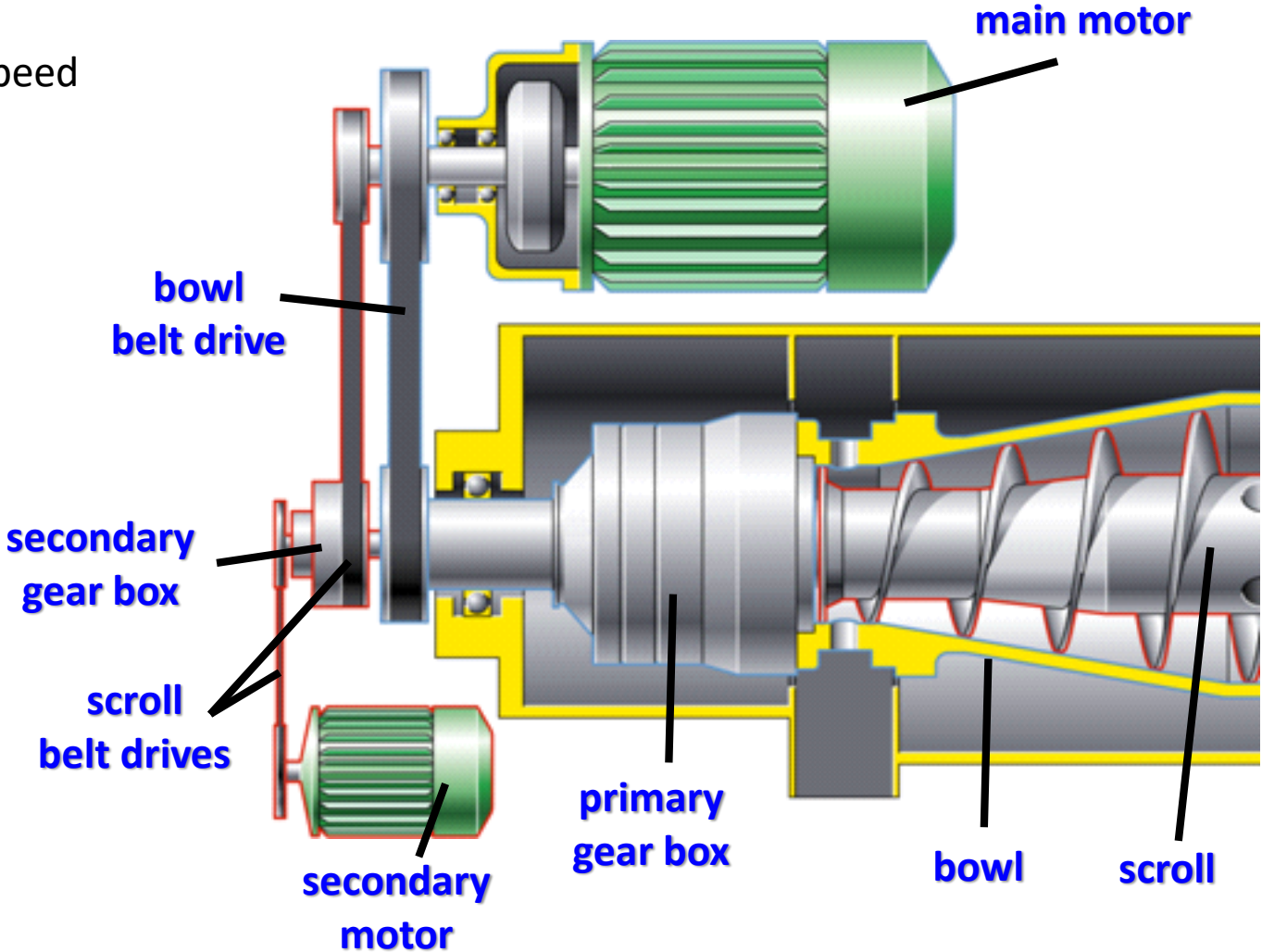


2 Gear Drive

variable
differential speed

2 motors

2 frequency
converter

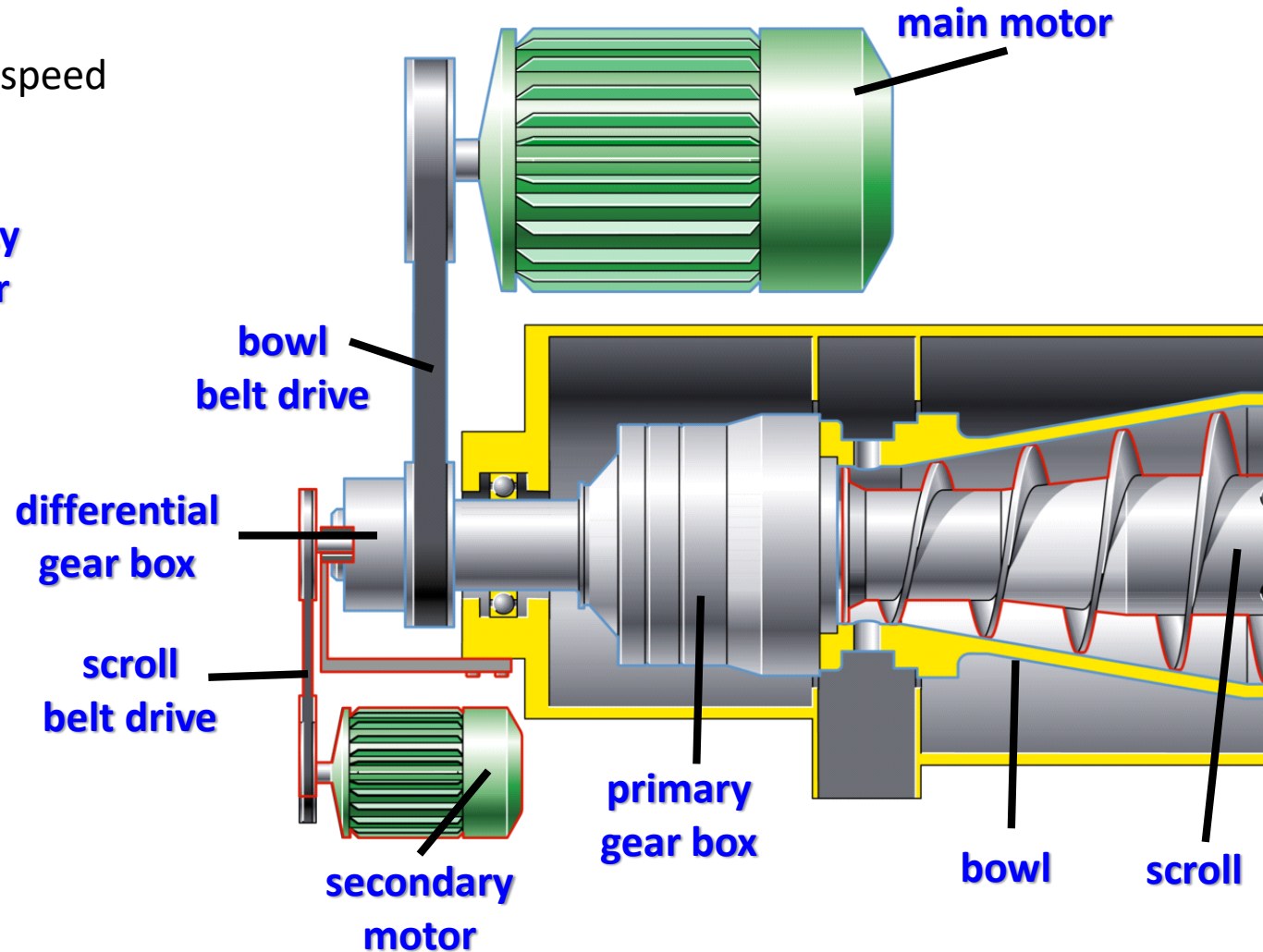


Differential Gear Drive

variable
differential speed

2 motors

2 frequency
converter



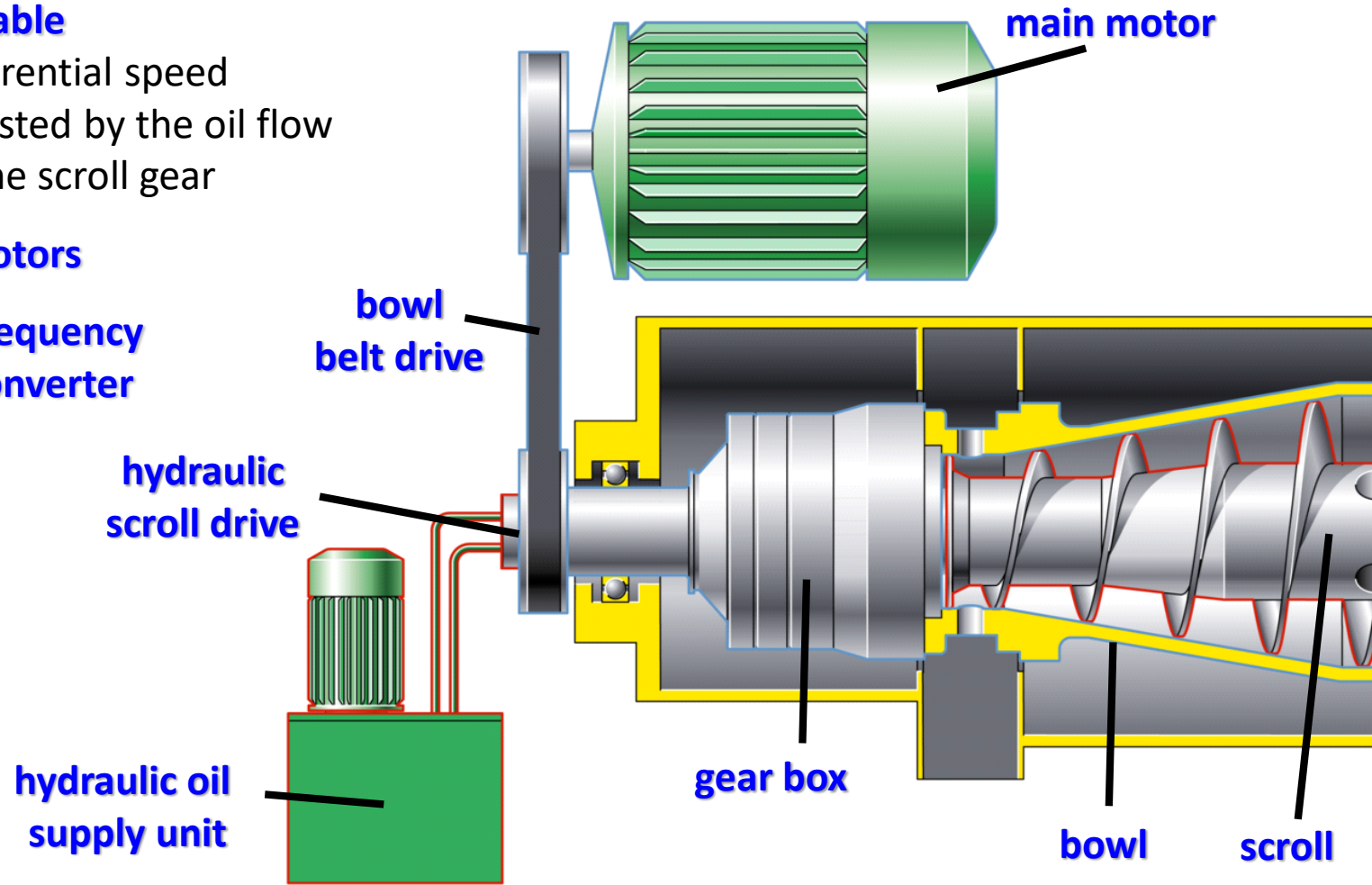
Hydro Drive

variable

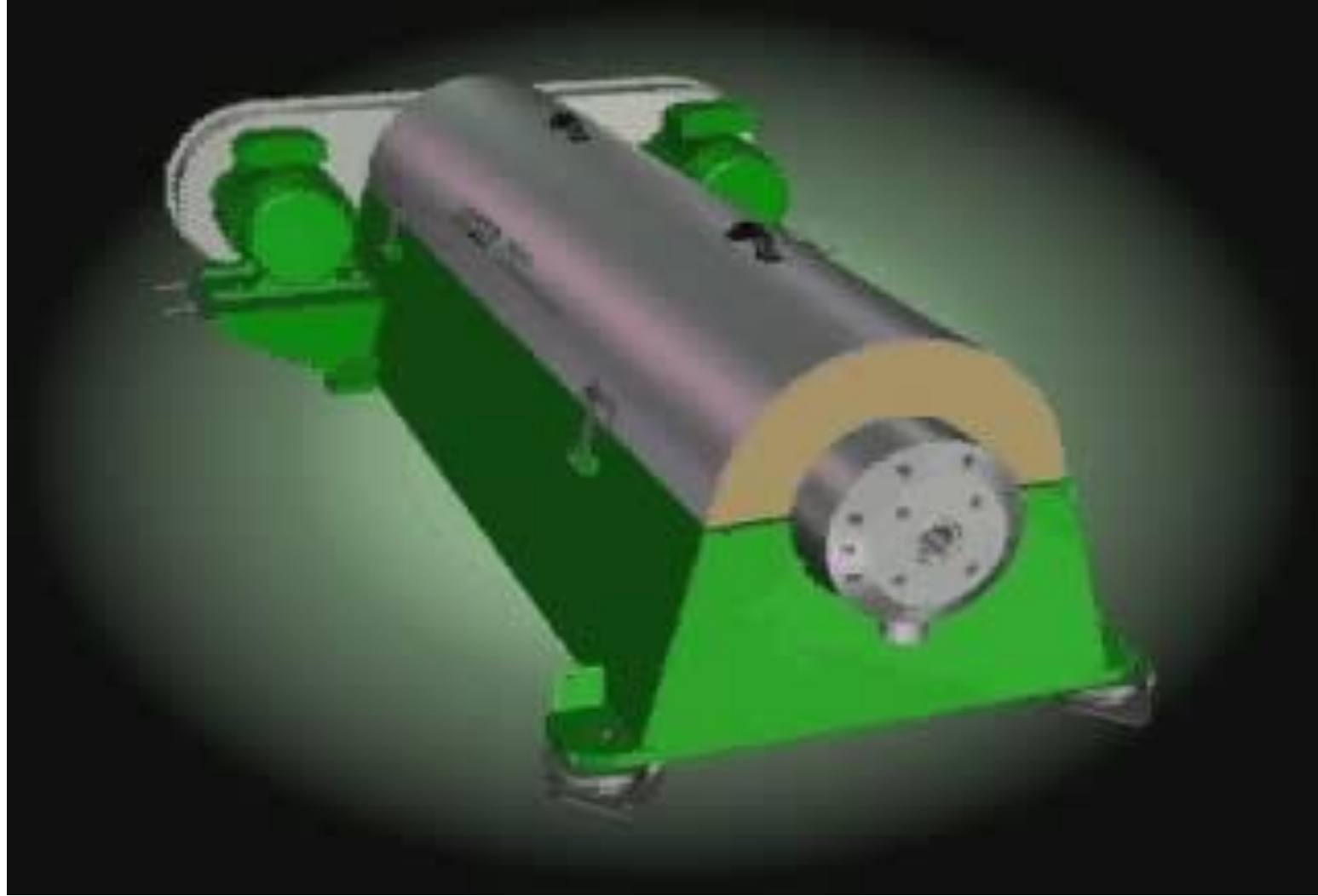
differential speed
adjusted by the oil flow
to the scroll gear

2 motors

1 frequency
converter



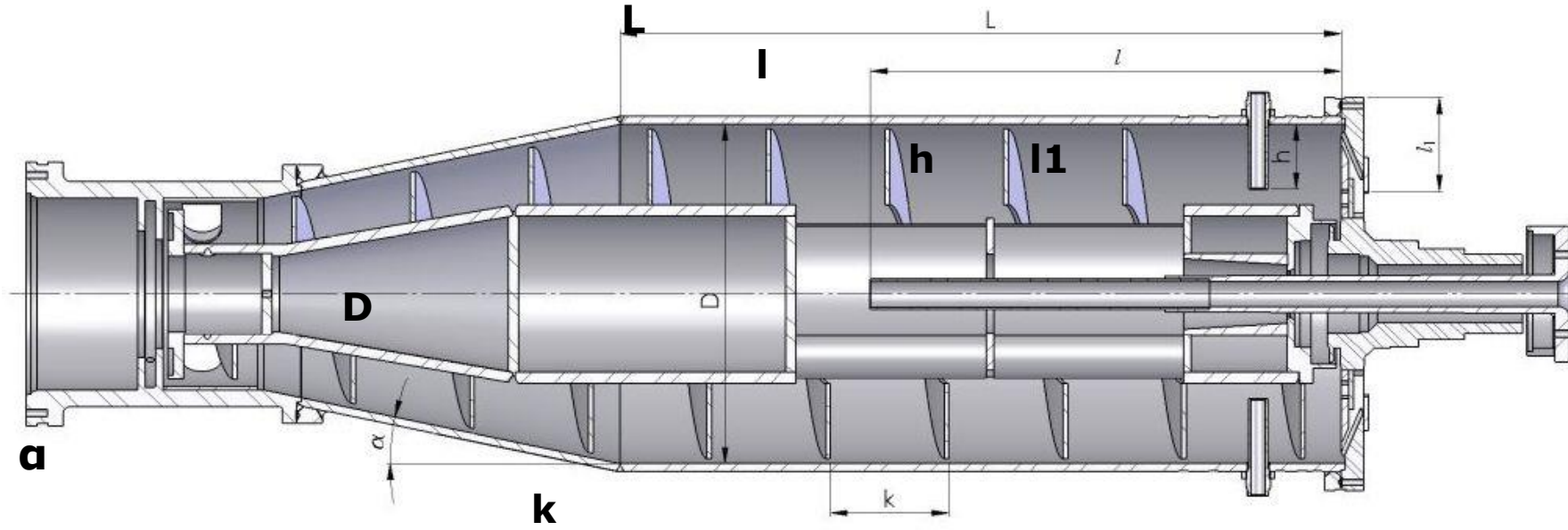
Dekantörün içi

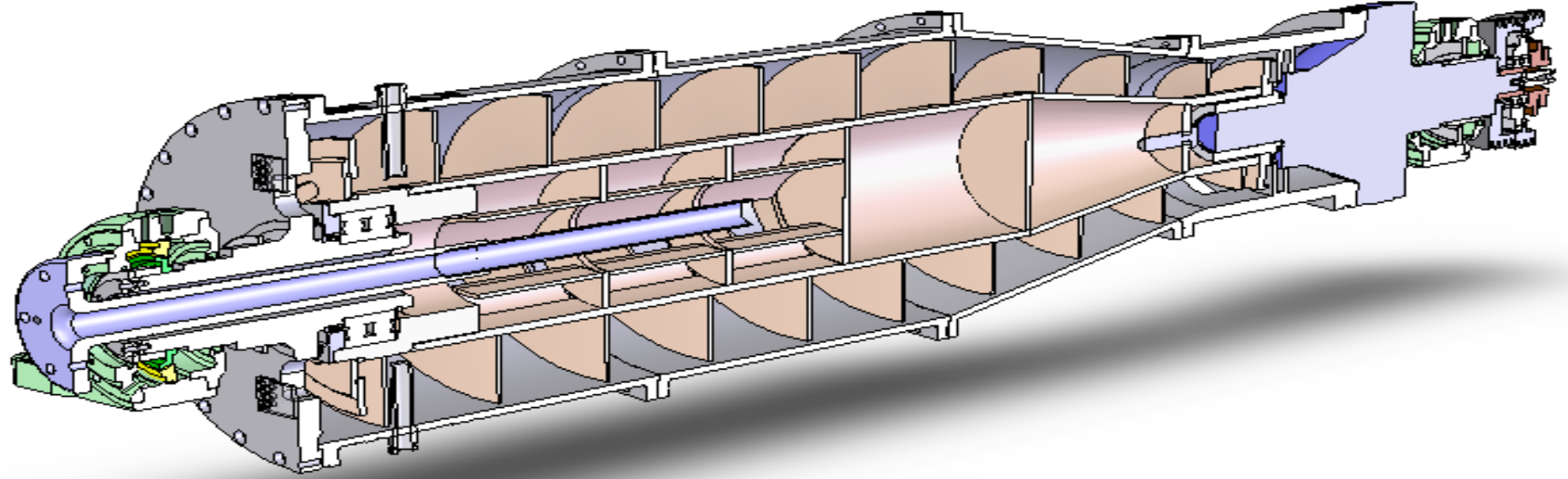


Installation Example



Dekantör (Yatay Santrifüj)







Sorularınız varsa cevaplayayım.

Daha sonra aklınıza soru gelirse lütfen yüz yüze, e posta veya telefon yoluyla ulaşınız.





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LÜTFEN DAHA ÖNCE İNDİRDİĞİNİZ DERS NOTU VARSA
YENİ TARİHLİ OLAN DERS NOTUNU TERCİH EDİNİZ.
NOTLARDA HATALI ve
EKSİK BİR YER GÖRDÜĞÜNÜZDE LÜTFEN BİLDİRİNİZ.

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