

# **MIXER-SETTLER-PLANT**

- Complete turn-key multistage extraction unit -
- Flow rates up to 4000l/h (sum of both phases) -
- Density difference down to 5% -
- Wide operating range -
- Pumps, drives for EX-rated areas -
- Highly corrosion resistant for universal use -
- Transparent for process optimization -



### HIGHLIGHTS

- Multistage extraction plant incl. dosing pumps, intermediate receivers and piping
- Flow rates up to 4000l/h ( sum of both phases)
- Difference in density up to 5%
- Wide operating range
- Turn-Key units incl. control systems
- EX-rated pumps and stirrer drives
- Easy to modify
- Highly corrosion resistant for universal use
- Transparent for process optimization



2 Stage Mixer-Settler Plant for ACHEMA 2018

Empty line to generate full width

### CONCEPT

The mixer-settler-plants are turn-key units incl. piping, pumps and intermediate receivers for the continuous <u>liquid/liquid extraction</u>. Due to the high mixing performance of the stirrer system and the efficiency of the phase separation almost one theoretic stage can be realized per <u>QVF® mixer-settler stage</u>. Depending on the required product quality several of such separation stages are operated together in a counter current manner. The diameter of the QVF® mixer-settler stage is determined by the required throughput. The length of the settler is determined by the required residence time of the phase separators can be equipped with phase coalescers to speed up this process step and hence to shorten the length.

Within the given dimensional limits the phase ratio, throughput and mixing performance can be varied over a wide range to fit most different requirements. These adjustments can be realized quite easily since the pressure drop across the QVF® mixer-settler stage and the interconnecting piping is compensated by the stirrer over a wide speed range. The standard solution is a high speed QVF® turbine stirrer.

In case emulsions are generated due to the required pumping performance of the QVF® turbine stirrer alternative QVF® suction stirrers having a higher pumping performance at lower speed can be provided.

All components incl. the dosing pumps are QVF® components and hence compatible with the <u>QVF® SUPRA-Line</u> construction set system. This eases eventual hard ware adaptation of the plant to various extraction processes.



2-Stage Mixer-Settler Plant

#### **FUNCTION**

The heavy phase is fed by the dosing pump P01 from the optional intermediate receiver B01 into the QVF® mixer-settler MIS01. The light phase is fed by <u>dosing pump P02</u> from the optional intermediate receiver B02 into MIS02. The 2 phases are then guided counter currently through the mixer-settler system. The raffinate phase as well as the extract phase leave the QVF® mixer-settler stages via free overflows and are finally guided into the optional intermediate receivers B03 and B04. Mixing and pumping performance are controlled by the stirrer speed. The level of the interphase is adjusted by the overflow valves V1 and V2 for the heavy phase.

The feed rates are adjusted by the stroke length and frequency of the QVF® bellows-dosing pumps. The transferred volumes can be taken from the graduated intermediate receivers. The size of the intermediate receivers should permit the continuous operation of the extraction without any interruption.





QVF® Mixer-Settler Stage with Turbine Stirrer



QVF® Mixer-Settler Stage with Suction Stirrer

#### **TECHNICAL DESCRIPTION**

This package-unit consist mainly of the QVF® mixer-settler stages made of borosilicate glass 3.3 and the interconnecting glass piping installed in a tubular steel structure. The stirrer shafts of the ex-rated stirrer drives are sealed be single mechanical seals. The QVF® turbine stirrer is made of PTFE and situated above the feed inlet made of PTFE in such a manner that a maximum radial flow is generated without sucking and mixing any eventual present gas. The QVF® suction stirrer made of borosilicate glass 3.3 ends with its hollow shaft in the PTFE inlet pipe. The mixing chamber is separated by a PTFE weir from the settling chamber. With the hand wheels of V1 and V2 the height of the outlet for the heavy phase is adjusted.

The intermediate receiver made of borosilicate glass 3.3 and the <u>QVF® dosing pumps</u> can be integrated optionally. The QVF® dosing pump is also highly corrosion resistant as its pump head is also made of borosilicate glass 3.3 and the bellows are made of PTFE.

Gasket and bellows are made of PTFE having FDA material certificates. Coupling rings up to DN300m are made of stainless steel. The tightness of the complete flange couplings is certified according to TA-Luft. The dead volume reduced fire polished QVF® glass flanges are ideal in combination with inclinded horizontal glass piping for self-drainage. All parts of the plant are easily accessible for cleaning, inspection, maintenance and repairs.

The standard version of the control cabinet is not EX-rated, but optionally the complete plant can also be fitted for operation in ATEX-zone 1 IIC.



Outlets for heavy and light phase

## **TECHNICAL DATA**

Nominal Diameter of Mixer-Settler	DN	100	150	200	300	450
Capacity of Settler ( sum of both phases )	l/h	200	400	800	1700	4000
Speed Range of Stirrer	r/min	0 - 600	0 - 600	0 - 600	0 - 800	0 - 560
Electrical Capacity per Stirrer Drive - 230/400 V, 50 Hz	kW	0,09	0,25	0,25	0,50	0,55
Length x Depth x Height of 2-Mixer-Setter Stages incl. Structure	mm x mm x mm	1500 x 800 x 1500	1500 x 900 x 1600	2000 × 1000 × 1600	2500 × 1200 × 1700	3000 x 1500 x 1900
Capacity per Dosing Pump	l/h	30 - 300	52 - 520	77 - 770	114 - 1140	*
Electrical Capacity per Dosing Pump - 230/400 V, 50 Hz	kW	0,25	0,25	0,37	0,37	*
Volume of Intermediate Receiver		50	100	150	200	300

\* Alternative to QVF® Dosing Pump

#### **OPTIONS:**

- Additional QVF® mixer-settler stages
- Jacketed version for tempering
- Coalescers for the settlers
- QVF® Suction stirrer made of borosilicate glass 3.3
- <u>QVF® bellows dosing pumps</u>
- Air vessels and flow meters
- Graduated intermediate receivers made of borosilicate glass 3.3
- Vent lines made of PFA or borosilicate glass 3.3
- Control cabinet
- Equipment for operation up to EX-zone 1 IIC



WE WOULD BE PLEASED TO ASSIST YOU TO SIZE THE REQUIRED MIXER-SETTLER PLANT.

#### Which kind of industry can use this product?

Pharmaceuticals and Fine chemicals Specialty Chemicals Agricultural chemicals

#### Questions? We are here to help.

If you'd like to talk with a sales representative about purchasing De Dietrich Process Systems's products and services, you can reach us here.

# Características destacadas

- Equipo de extracción multietapa con bombas de dosificación, depósitos intermedios y tubería incluidos -

- Caudales de hasta 4000 l/h (suma de ambas fases) -
- Diferencia de densidad de hasta un 5% -
- Amplio rango de funcionamiento -
- Equipos listos para el uso con sistemas de control incluidos y aptos para zona EX 1 IIB -
- Fáciles de adaptar -
- Sistema altamente resistente a la corrosión para un uso universal -
- Transparente para la optimización de los procesos -

