



**ROUSSELET  
ROBATEL®**

ROUSSELET CENTRIFUGATION GROUP

# LABORATORY AND PILOT MIXER-SETTLERS TYPE MD



MD UX 1-4



### PHARMACY

Purification of active principles  
(example: antibiotics).



### CHEMICALS

Washing of polymers or extraction  
(example: acetic acid).



### FOOD INDUSTRY

Purification of good components  
(Lactic and Citric acids).



### HYDROMETALLURGY

Separation or purification (precious  
metals).



### PARACHEMISTRY

Perfumes, aromas, essential oils,...



24 stage battery type SX 2-0  
Stainless steel construction



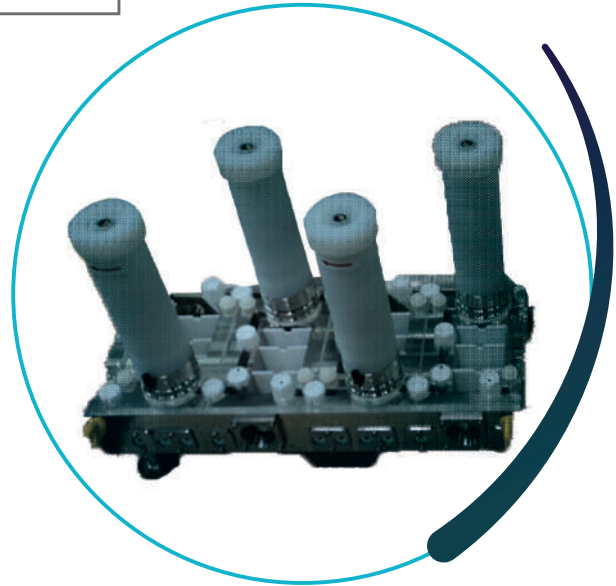
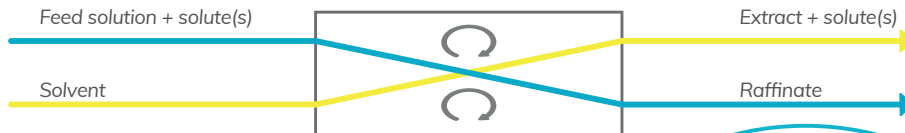
## PRINCIPLES AND DEFINITIONS

### LIQUID / LIQUID EXTRACTION

It consists in transferring one (or more) solute(s) contained in a feed solution to another immiscible liquid (solvent). The solvent that is enriched in solute(s) is called extract. The feed solution that is depleted in solute(s) is called raffinate.

The feed solution and the solvent are brought in intimate contact so as to carry out the transfer of the solute(s).

The two outgoing liquid phases extract and raffinate are separated by static decantation (mixer-settler) or by centrifugal decantation (Rousselet Robatel centrifugal extractors LX or BXP).

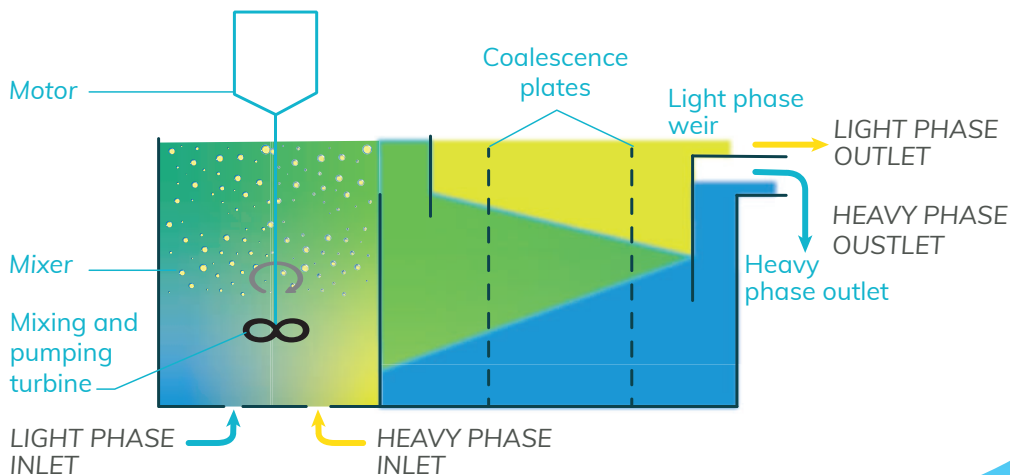


## TECHNOLOGY

One stage of a mixer-settler is comprised of two zones:

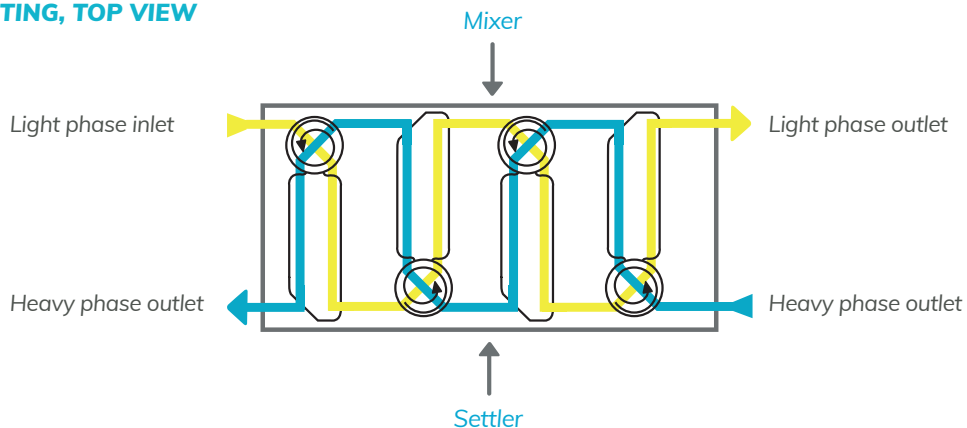
- **Mixer:** a mixing chamber where a mechanical agitator brings in intimate contact the feed solution and the solvent to carry out the transfer of solute(s). The mechanical agitator is equipped with a motor which drives a mixing and pumping turbine. This turbine draws the two phases from the settlers of the adjacent stages, mixes them, and transfers this emulsion to the associated settlers.
- **Settler:** a settling chamber where the two phases separate by static decantation. Coalescence plates facilitate the separation of the emulsion into two phases (heavy and light). The two phases then pass to continuous stages by verflowing the light phase and heavy phase weirs. The height of the heavy phase weir can be adjusted in order to position the heavy/light interphase in the settling chamber based on the density of each one of the phases.

### CROSS SECTION VIEW OF A MIXER-SETTLER



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## BATTERY MOUNTING, TOP VIEW



## CONSTRUCTION

- **Material of construction:** polyethylene, polypropylene, polyvinylidene fluoride, PTFE only for sizes 1 et 2, stainless steel (for some models only).
- **Engine equipment:** the pumping turbine is driven in rotation by a three-phase, totally enclosed electric motor (IP55 protection) that can be explosion-proof. The motor is controlled by an AC variable frequency drive to adjust the speed of the agitation.
- **Sight glasses:** a sight glass at the end of the settling chamber enables to visualize the separation between the two phases.
- **Covers:** made from plexiglas or glass (depending on the sizes, can be positioned on the settling chamber to reduce solvent evaporation for instance).
- **Size:** Rousselet Robatel provides 6 sizes on mixer-settlers ranging from 1 to 6 with many options for mixers and settlers of different volumes.
- **Recycling:** the mixing efficiency or the phase separation may often be improved by increasing the flow rate of one of the phases → recycling of the phase from the settler to the mixer of the same stage. Mixer-settlers of sizes 1 and 2 are equipped with internal recycling channels, a recycle phase selector, and a recycle flow regulator who carry out this functionality. Mixer-settlers of sizes 3 to 6 are equipped with connections for external recycling and the recycle flow can be adjusted by external piping systems.
- **Intermediate inlets and outlets:** universal mixer-settlers UX are equipped with intermediate inlets and outlets at each stage. Various selectors permit operation on the required number of stages in a given battery and **allow the division of the battery into several sections** (for extraction, washing, back extraction for instance).



4, 2 and 1 stage module

## VERSIONS

Rousselet Robatel offers 3 versions of mixer-settlers :

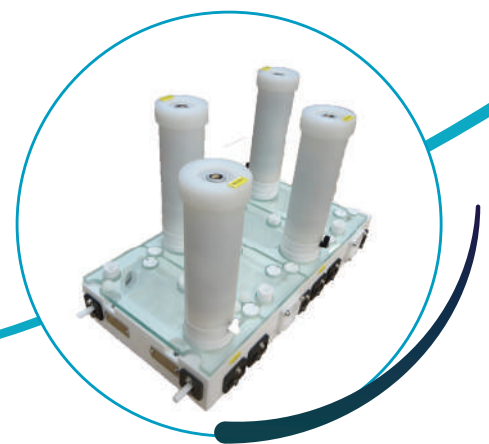
- **SX standard** (Basic module)
- **RX** version with internal recycling
- **UX universal** with recycling of intermediate inlets and outlets

## TECHNICAL CHARACTERISTICS OF CONSTRUCTION

Mixer-settlers	Type	Stage number	Length of stage mm	Width of 4 stages basic module, nipples excluded mm	Height with standard motor mm	Mixer volume L	Settler volume L	Decantation area cm <sup>2</sup>	Overall flow rate L x h	Weight of basic module made of polyethylene Kg
SX	1-1	4	200	305	345	0.035	0.143	49	2/4	13.5
	1-2		200	305	357	0.050	0.200	49	2/5	14.2
	1-3		240	305	345	0.035	0.200	71	2/5	13.9
	1-4		240	305	357	0.050	0.257	71	2/6	14.6
	2-0	4	492	494	399	0.200	1.300	215	10/20	27.0
	2-1		492	494	399	0.200	1.700	285	10/20	25.0
	3-0		490	130	523	0.620	3.000	270	15/30	7.8
	3-1		690	130	523	0.860	5.000	450	20/40	9.4
	4-0		950	192	523	2.300	11.000	1000	40/80	14.8
	5-0		990	250	615	5.200	21.000	1300	150/200	33.0
	5-1		1490	250	615	5.200	36.000	2300	200/300	45.0
	6-0		990	290	655	8.500	29.000	1500	200/300	41.0
	6-1		1490	290	655	8.500	50.000	2600	250/400	57.0
RX	1-1	4	200	385	345	0.035	0.143	49	2/4	14.4
	1-2		200	385	357	0.050	0.200	49	2/5	15.3
	1-3		240	385	345	0.035	0.200	71	2/5	15.0
	1-4		240	385	357	0.050	0.257	71	2/6	16.0
	2-0	492	494	399	0.200	1.300	215	10/20	26.0	
	2-1	492	566	399	0.200	1.700	285	10/20	24.0	
UX	1-1	4	200	470	345	0.035	0.143	49	2/4	15.5
	1-2		200	470	357	0.050	0.200	49	2/5	16.6
	1-3		240	470	345	0.035	0.200	71	2/5	16.3
	1-4		240	470	357	0.050	0.257	71	2/6	17.5
	2-0		492	675	399	0.200	1.300	215	10/20	30.0
	2-1		492	675	399	0.200	1.700	285	10/20	28.0



Mixer-settlers:  
special design for hydro-  
metallurgy.



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