ROUSSELET ROBATEL®
ROUSSELET CENTRIFUGATION GROUP

hydrometallurgy

nuclear

LABORATORY OR PILOT DECANTER MIXER MD

MD RX 3-1
PVDF

MD UX 1-2
PTFE

Battery with 24 stages type SX
2-0 Construction INOX 316L X4

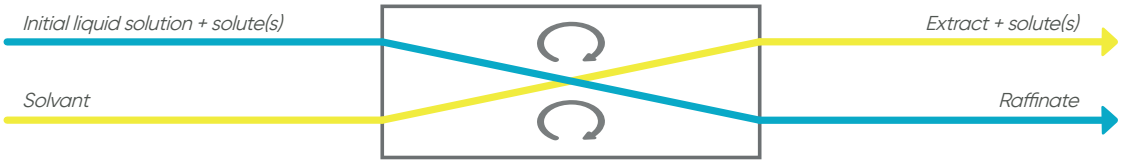
X4

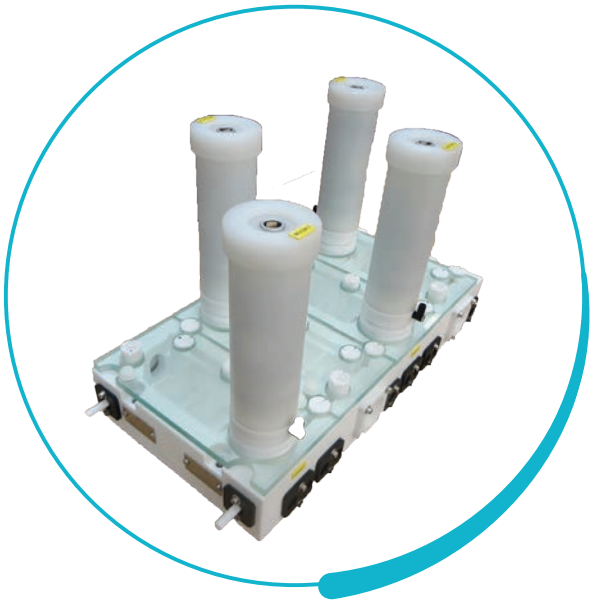
PRINCIPLES AND DEFINITIONS

LIQUID/LIQUID EXTRACTION

This process involves transferring one or more **solutes** contained in an initial liquid solution to another immiscible liquid **(solvent)**. The solvent enriched with solute(s) is called the **extract**, while the initial solution depleted of solute(s) is called the **raffinate**.

The initial liquid solution and the solvent are brought into contact to perform the solute transfer. The two outgoing liquid phases, **extract** and raffinate, are separated by static decantation (decanter mixer) or centrifugal decantation (Rousselet Robatel centrifugal extractors type LX or BXP).



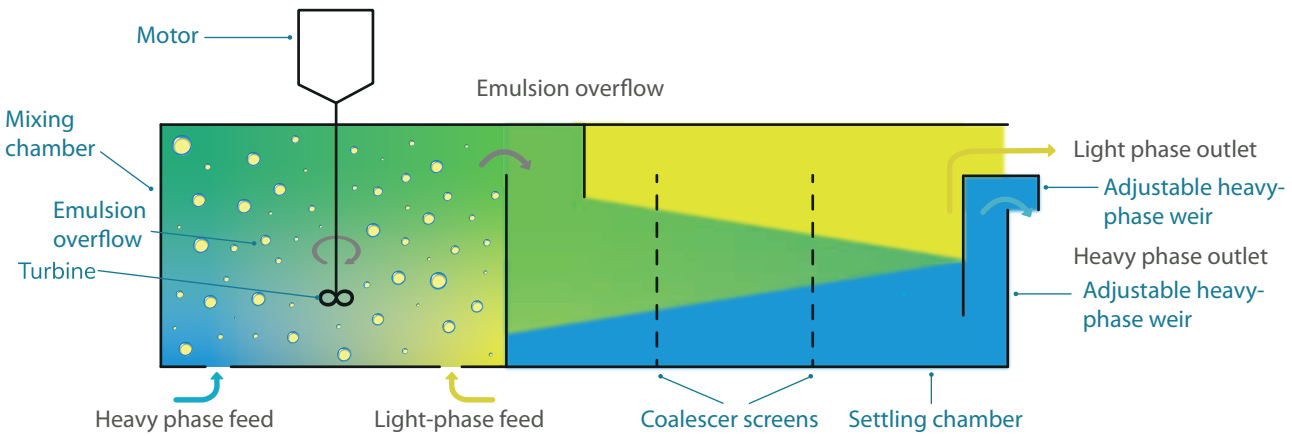


TECHNOLOGY

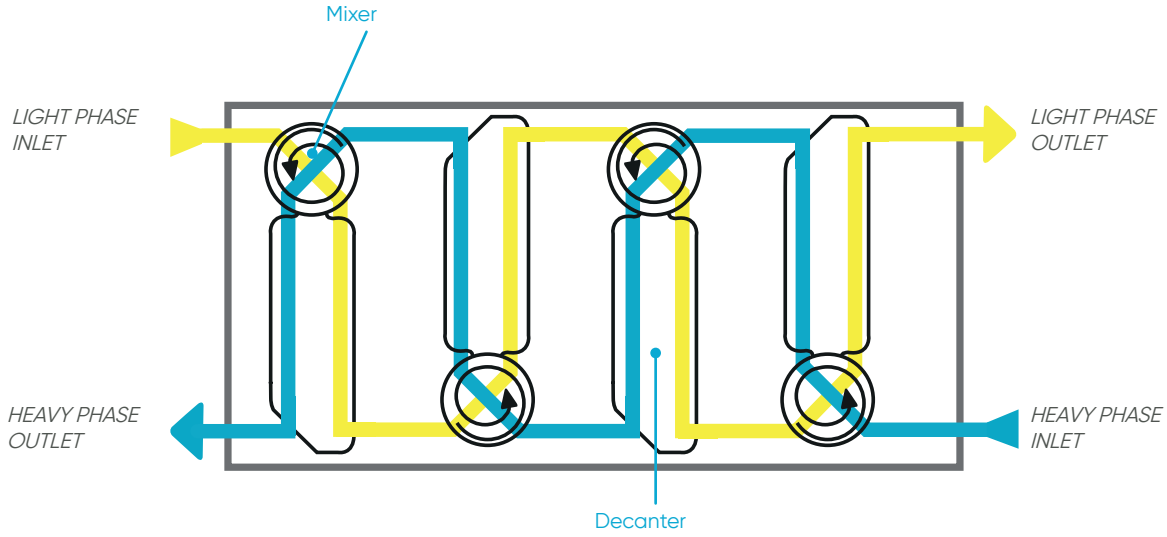
A decanter mixer stage consists of two zones:

• **Mixer:** Mixing zone where a mechanical agitator ensures intimate contact between the initial liquid solution and the solvent to transfer the solute(s). The mechanical agitator consists of an electric motor driving a mixing and pumping turbine. This turbine draws phases from adjacent decanters, mixes them, and pumps the generated emulsion to the decanter.
• **Decanter:** Static decantation zone between the two phases. Coalescence grids facilitate the separation of the generated emulsion into two phases (heavy and light). The transfer of separated phases occurs by overflow above weirs. The heavy phase weir is adjustable in height to position the heavy/light interface in the decanter based on the density of each phase.

CUTAWAY VIEW OF A DECANTER MIXER



BATTERY MOUNTING, TOP VIEW



CONSTRUCTION

A decanter mixer stage consists of:

• **Construction materials**: PE, PP, PVC, PVDF, PTFE (sizes 1 and 2 only), stainless steel (316L/Alloy C22).

• **Motorization** : The pumping turbine is driven by an IP55 electric motor, which can also be EExde. The motor is connected to a static frequency converter for speed adjustment.

• **Viewing port:** A viewing port at the end of the decanter allows observation of phase separation.

• **Cover:** A glass or plexiglass cover (depending on size) can be placed on the decanter to limit evaporation.

• **Size:** Rousselet Robatel offers six sizes of decanter mixers (1 to 6), each with several dimensional variants of decanters.

• **Recycling (optional for RX and UX versions):** The efficiency of phase contact or separation can be increased by adjusting the flow rate of one phase relative to the other. Recycling between the decanter and mixer of the same stage is achieved via internal channels with selection and flow regulation valves (sizes 1 and 2) or external piping (sizes 3, 4, 5, and 6).

• **Intermediate inlets and outlets (optional for UX version):** The UX universal settler mixers are equipped with intermediate inlets and outlets at each stage. A set of selectors allows, on a given unit, to operate the desired number of stages division of the battery into different sections (extraction, washing, retraction, etc.).

Module with 4, 2, and 1 stages

VERSIONS

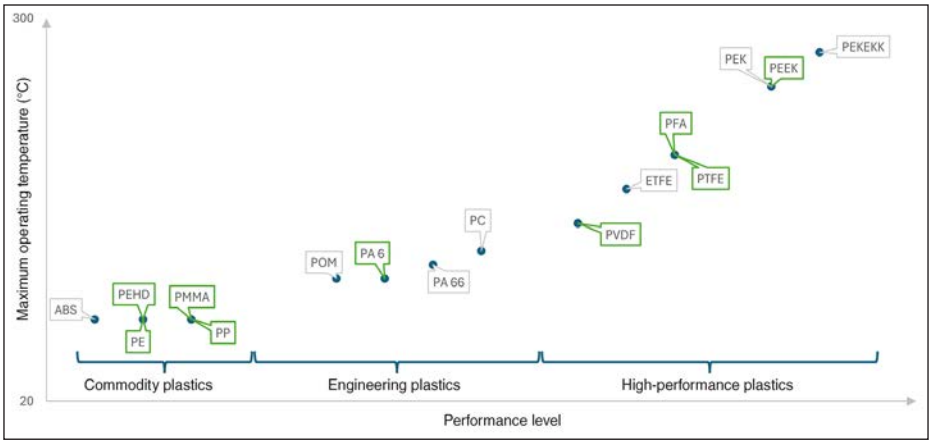
Rousselet Robatel offers 3 versions of settler mixers:

• SX standard (Basic module).
• RX version with recycling.
• UX universal version with recycling and inlets/outlets. Intermediate

TECHNICAL SPECIFICATIONS

TYPE	Variant	Usable volume Mixer Settler	Surface Settler (cm^2)	Flow rate range Combined (l/h)	Number of stages Possible per module*	Main construction materials
MD SX	1-1	0.035/0.143	49	0,2 to 4	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-2	0.05/0.2	49	0,2 to 5	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-3	0.035/0.2	71	0,2 to 5	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-4	0.05/0.257	71	0,2 to 6	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	2-0	0.2/1.3	215	1 to 20	4	PP-PVC-PEHD-PVDF-PTFE
	3-1	0.86/5	450	2 to 40	1	PP-PVC-PVDF
	6-0	8.5/29	1500	20 to 300	1	PP-PVC-PVDF
	6-1	8.5/50	2600	25 to 400	1	PP-PVC-PVDF
MD RX	1-1	0.035/0.143	49	0,2 to 4	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	3-0	0,62/3	270	1,5 to 30	1	PP-PVC-PVDF
	3-1	0,86/5	450	2 to 40	1	PP-PVC-PVDF
MD UX	1-1	0.035/0.143	49	0,2 to 4	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-2	0.05/0.2	49	0,2 to 5	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-3	0.035/0.2	71	0,2 to 5	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	1-4	0.05/0.257	71	0,2 to 6	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	2-0	0.2/1.3	215	1 to 20	4	PP-PVC-PEHD-PVDF-PTFE
	2-1	0.2/1.7	285	1 to 20	1-2-4	PP-PVC-PEHD-PVDF-PTFE
	4-0	2,3/11	100	4 to 80	1	PP-PVC-PVDF
	6-0	8,5/29	1500	20 to 300	1	PP-PVC-PVDF

* 1 stage = Mixer + Settler



PVC mixer-settlers: special design for hydrometallurgy.

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