SoliQz

Solutions for high-purity chemicals

Green Chemicals deserve sustainable purification

Perfect pitch and boost the European Bio-economy event,
November 7, 2018, Brussels

Nicolaas Viets,
Athina Pantelidou
SoliQz B.V., Rotterdam,
The Netherlands

viets@soliqz.com

SoliQz B.V. is a Rotterdam, NL based SME providing services and equipment for purification of (bio-based) chemicals

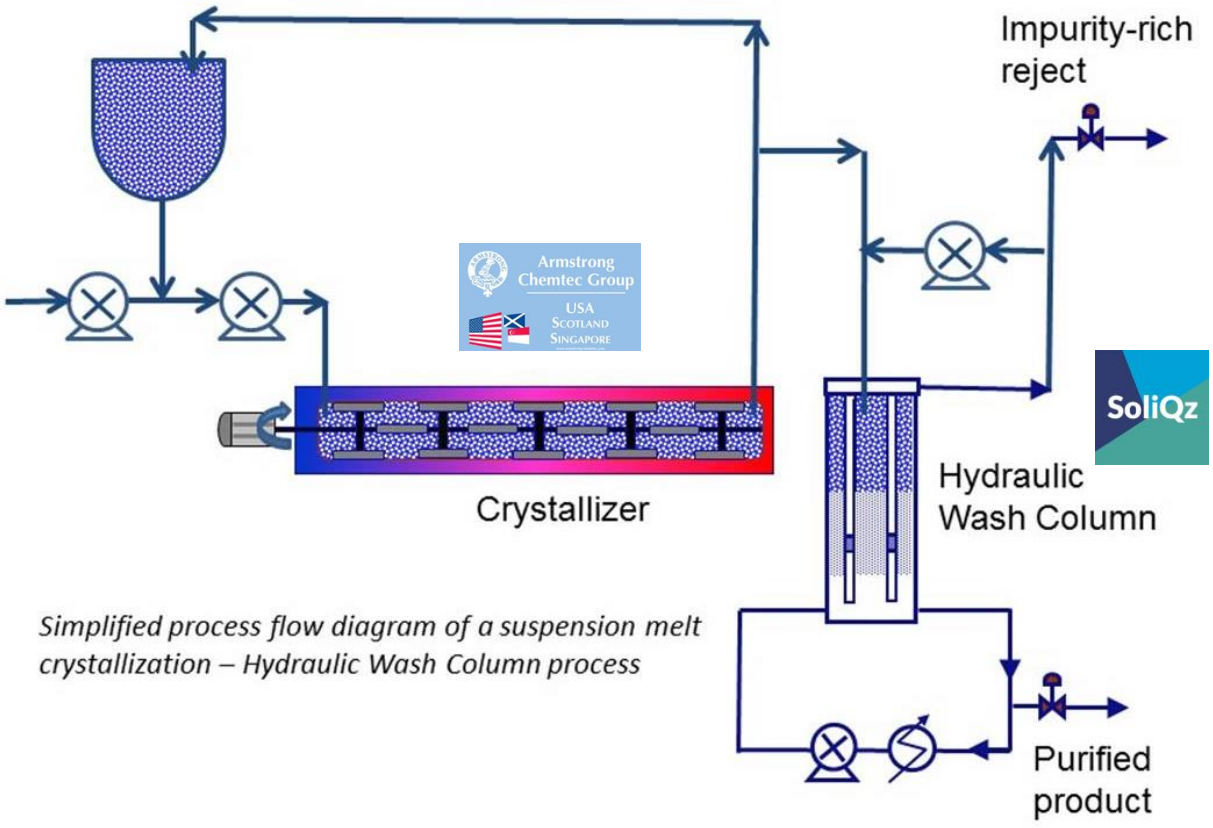
by bringing together:

- the proven Hydraulic Wash Column (HWC) technology from TNO,
- the state-of-art crystallisers and plant design/building experience from| Armstrong-Chemtec.

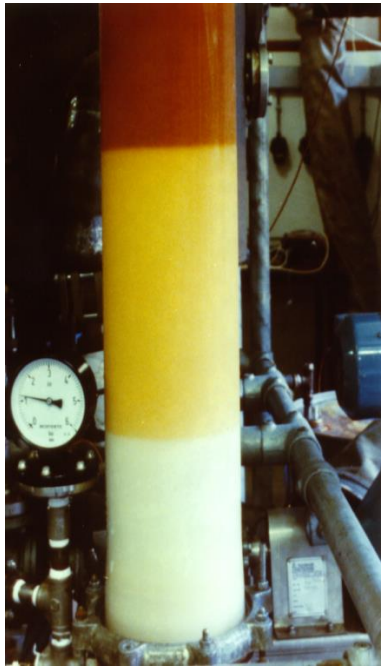
Present status:

- Founded in November 2013, 5 FTE's in 2018
- Armstrong-Chemtec (US/UK engineering company) as main shareholder
- Fully scalable technology with two industrial scale plants delivered;
- Partner in H2020 FIRST2RUN BBI-JU project
- Rapidly growing funnel of opportunities
- Pilot plant operational at PlantOne in Rotterdam (customer testing)
- Projected sales of 6-9 MM€'s (0,4 MM in 2018; 1,2 MM target in 2019)

HWC combines Solid-Liquid separation with highly efficient counter-current washing



Simplified process flow diagram of a suspension melt crystallization – Hydraulic Wash Column process



15 cm Hydraulic Wash Column operating with para-xylene

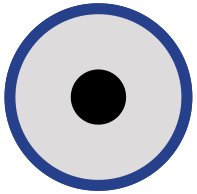
Melt crystallisation in combination with Hydraulic Wash Column: low cost process for high purity

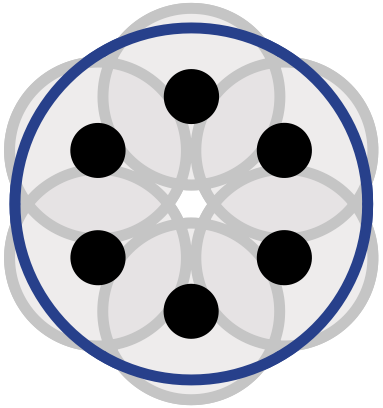
Compound	[Impurity] Mother Liquor	[Impurity] Product	Melting T (°C)	Viscosity (mPa.s)
Para-xylene	10.8 wt%	0.07 wt%	13	0.7
Acrylic acid	4.8 wt%	0.04 wt%	13	1.25
Para-dichlorobenzene	5.98 wt%	0.025 wt%	53	1.0
Maleic Anhydride	4.03 wt%	0.03 wt%	53	2.4
Naphthalene	10.0 wt%	0.02 wt%	80	0.94
Ice/$MgSO_4$	27.7 g/l	0.032 g/l	0	1

- Over 20 years experience with HWC at pilot and industrial scale: successful tests for more than 50 chemicals
- HWC product typically contains 100-1000 lower concentration of impurities than the mother liquor in which the crystals were grown
- Proven in broad T- (-50 to +100°C) and η-range (0.35 to 50 mPa.s)

Scale up and scale down of HWC

Code	Diameter (cm)	# filter tubes	Typical production capacity (kg/hr)
HWC-2	2 New	0	1-10
HWC-8	8 New pilot plant	1	5-175
HWC-15	15	6	50-650
HWC-30	30 (in industry)	16	200-2500
HWC-55	55 (in industry)	50	1000-9000
HWC-110	110	200	4000-36000





Scale-up principle

Increase diameter and keep filtration area around tubes constant

HWC-2

HWC-30

HWC-55

Candidates for purification by (melt) crystallization and HWC-technology

The potential to be purified by (melt) crystallization and HWC technology has been proven/identified for more than 450 chemicals, including e.g.:

Bio-Based Chemicals

- Itaconic Acid
- Succinic Acid
- Cinnamic Acid
- Levullinic Acid
- DDDA
- Adipic Acid
- Lactide
- Glyoxylic Acid
- Sebacic Acid
- Lactic Acid
- FDCA
- Butanediol
- Azelaic Acid
- HMF
- Fumaric Acid
- Malic Acid
- ……..

Bulk and fine Chemicals

- Caprolactam
- Phosphoric Acid
- Maleic Anhydride
- N-Vinyl Pyrollidone
- Phthalic Anhydride
- Naphthalene
- Benzoic Acid
- Di-aminohexane
- Methacrylic Acid
- Acrylic Acid
- Phenol
- MDI
- PDCB
- PNCB
- ONCB
- TDI
- $NaOH \cdot 1\ H_2O$
- ……..

Your product not on the above lists? Ask for a free desk evaluation

Producers of specialty and bio-based chemicals get high purity (upto 99,9%) products in a continuous, single step process and with:

Reduced OPEX:

- Energy savings of 20% up to 90% versus distillation
- No use of solvents
- No wash liquid consumption.

Reduced CAPEX:

- Truly continuous process with throughput up to 36 MT crystals per m2/hr.

Operational benefits:

- Reliable operations, lower maintenance: NO rotating/moving parts.
- Stable operation due to intrinsic self-correction of the process