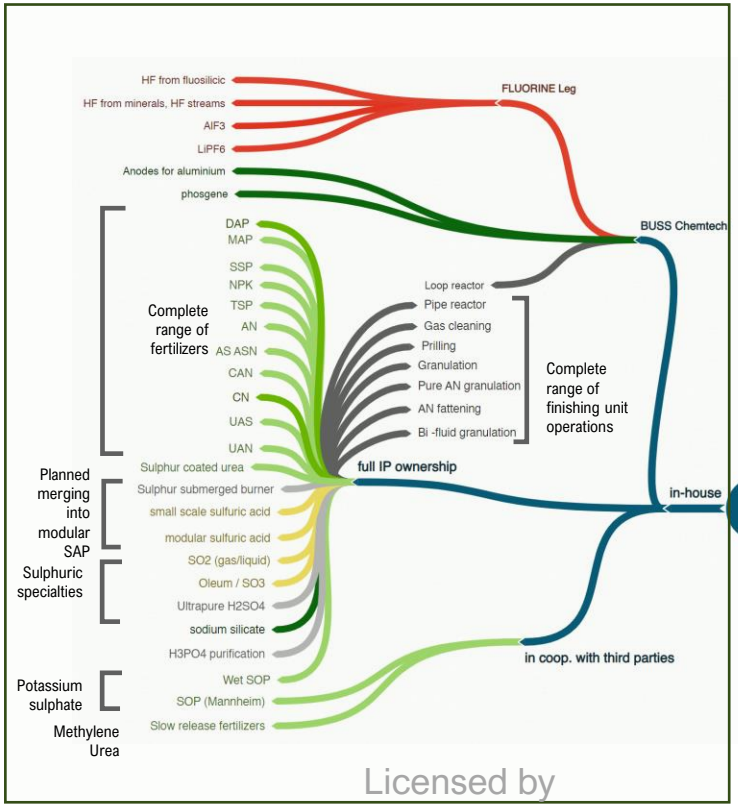
ballestra

Sulphuric Acid

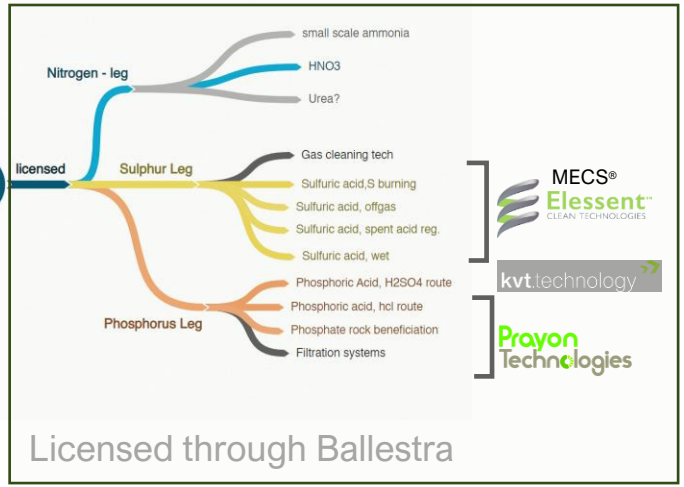
Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

CHEMICALS TECHNOLOGY PORTFOLIO



Sulfuric acid technologies
Phosphoric acid technologies
Fertilizer technologies
Nitrogen technologies
Other technologies
Unit operations
Hydrogen fluoride technologies
Coming up

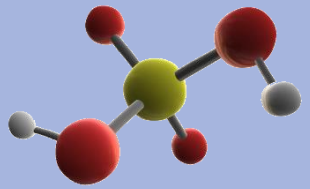
Ballestra Chemicals BU technology portfolio



Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID

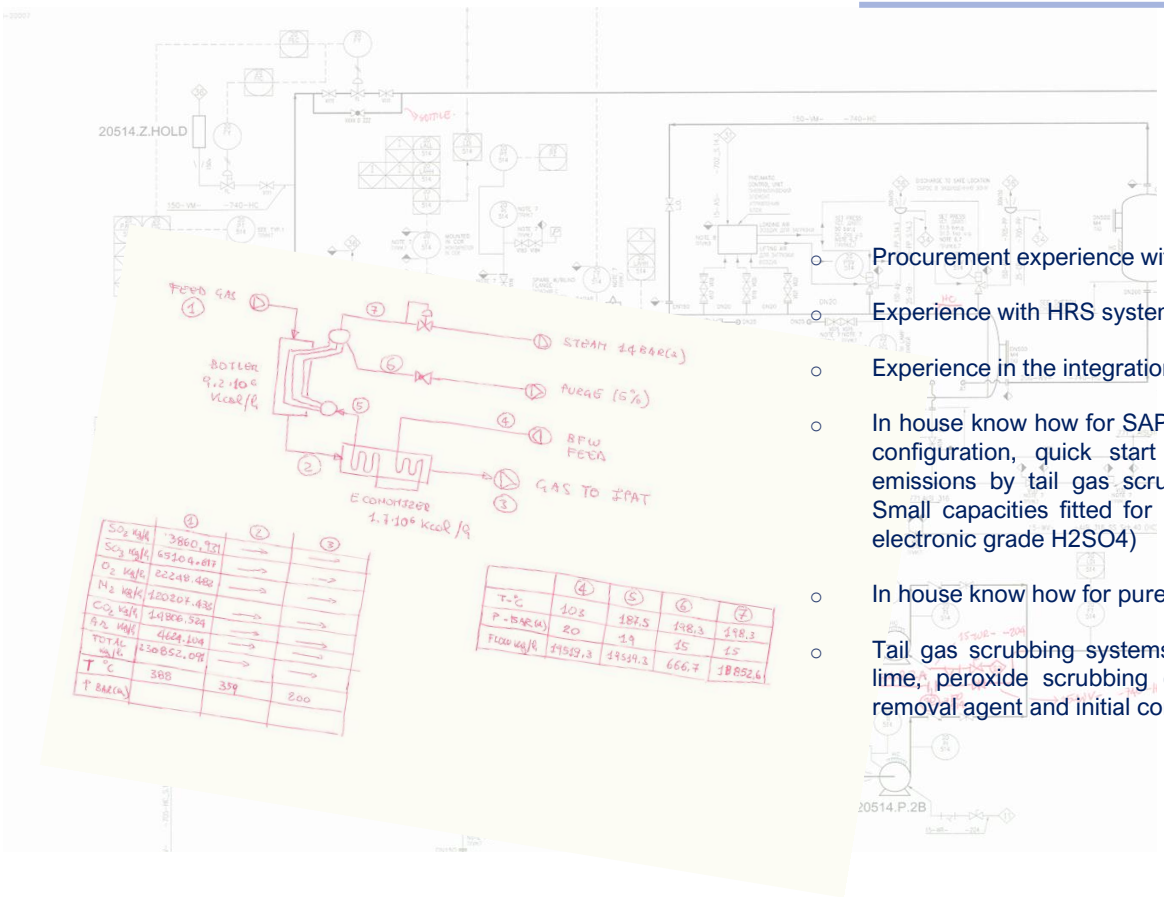
SULFURIC ACID TECHNOLOGIES A WORLD LEADER



- World class licensed double absorption technology from DuPont Clean Technologies MECS: All configurations available (sulphur burning, off/gas plants, wet route through “Sulfox” process, HRS enhanced recovery system, etc.)
- Well-referenced licensed technology from KVT Process Technology for Oxysulf™ solutions (based on wet catalysis), with a solid technical background
- N. 55 projects awarded since 1991. ALL successfully delivered
- High competence in process engineering (DBI process engineering team has been employed continuosly in sulphuric acid projects for the last years, gaining a remarkable design experience).
- High competence in critical detail design, such as:
  - Process equipment detail design
  - Piping/Ducting design, piping and ducting stress-analysis
- Skilled and experienced team of erection supervisor and commissioning engineers

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID TAILORED TO YOUR NEEDS



- Procurement experience with most industry vendors
- Experience with HRS systems design, delivery and construction
- Experience in the integration of sulphuric acid plant in larger fertilizer projects
- In house know how for SAP units up to 200TPD, both single absorption (simple configuration, quick start up, flexible operation, capable to achieve low emissions by tail gas scrubbing, steam production) and double absorption. Small capacities fitted for niche specialties production (e.g. SO2 or SO3 for electronic grade H2SO4)
- In house know how for pure (98-99%) SO_3 and liquid SO_2 production
- Tail gas scrubbing systems for SO2, SO3, H2S emission reduction by soda, lime, peroxide scrubbing (e.g. SO2 down to 10 ÷ 30 ppm depending by removal agent and initial concentration)

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since 2021
Products:	Sulphuric Acid
Technology:	Elessent MECS (USA)
Plant size:	1’500 TPD
Plant Configuration:	DCDA 1’800 TPD + Oleum @24%
Contract type:	EP+CM

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since 2020
Products:	Sulphuric Acid + Liquid SO2 Production
Technology:	DuPont MECS (USA)
Plant size:	H_2SO_4 2'200 TPD (including 200 TPD for Liquid SO_2 as 100% SO_2)
Plant Configuration:	DCDA + Liquid SO_2 (Cryogenic)
Contract type:	EP+TA

Site June 2021

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since 2017
Products:	Oleum + SO_3
Technology:	Ballestra
Plant size:	Oleum (695 Kg/h @25% SO_3 free) and SO_3 (500 Kg/h as gas 100%) Production
Plant Configuration:	SO_3 and Oleum Production Plant Single Absorption
Contract type:	Phased Execution: (*) Ph1: BE (*) Ph2: DE + Supply of Critical Items + TA

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since Q1 2016
Products:	Sulphuric Acid
Technology:	Elessent MECS (USA)
Plant size:	2’200 TPD
Plant Configuration:	DCDA with HRS™, 29 MW STG
Contract type:	EP + TA

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

The new units at Torpa Tarim's Samsun Plant were undertaken by Tekfen Construction.

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since Q2 2014
Products:	Sulphuric Acid
Technology:	Elessent MECS (USA)
Plant size:	25 TPD
Plant Configuration:	Wet Route SulfoxTM Process
Contract type:	EP + SV

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since 2013
Products:	Sulphuric Acid
Technology:	Ballestra
Plant size:	100 TPD
Plant Configuration:	Sulphuric Acid Single Absorption
Contract type:	LSTK

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since Q3 2012
Products:	Sulphuric Acid
Technology:	Elessent MECS (USA)
Plant size:	1’500 TPD
Plant Configuration:	DCDA, 18 MW STG
Contract type:	EP + CM

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since Q1 2012
Products:	Sulphuric Acid + Liquid SO_2
Technology:	Elessent MECS (USA)
Plant size:	500 TPD as H_2SO_4 (including 73 TPD as Liquid SO_2 as 100% SO_2)
Plant Configuration:	DCDA + Liquid SO_2 (Cryogenic)
Contract type:	EP + SV

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Status:	In operation since Q4 2011
Products:	Sulphuric Acid + Oleum
Technology:	Elessent MECS (USA)
Plant size:	940 TPD (up to 250 TPD as Oleum)
Plant Configuration:	DCDA + 11,5 MW STG - SO_2 < 100 ppm
Contract type:	LSTK

Ballestra S.p.A. Milano – All rights reserved – Unauthorized copy prohibited

SULPHURIC ACID - PERFECT EXECUTION

Five-stages Converter

Vanadium & Cesium based Catalysts

Scrubber for H_2S removal from melting section
99+ % efficency (down to 3ppm)
4'600 Nm^3/h
Caustic Soda (removal agent) + Peroxide (oxidizing agent)