TOWARDS ZERO LIQUID DISCHARGE IN HOT DIP GALVANIZING PROCESS

NG Annual Meeting, May 22nd 2018

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WHO IS SOPRIN?

- Manufacturer of specialty chemical additives for the treatment of steel surfaces in the hot-dip galvanizing process.
- Established in 1988 and headquartered in Treviso, Italy.
- Chemical division of the Bisol Group, which is running 7 hot-dip galvanizing lines throughout Italy.

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H.A.R.U.

Hydrochloric Acid
Regeneration Unit

+

PREFLUX TREATMENT UNIT

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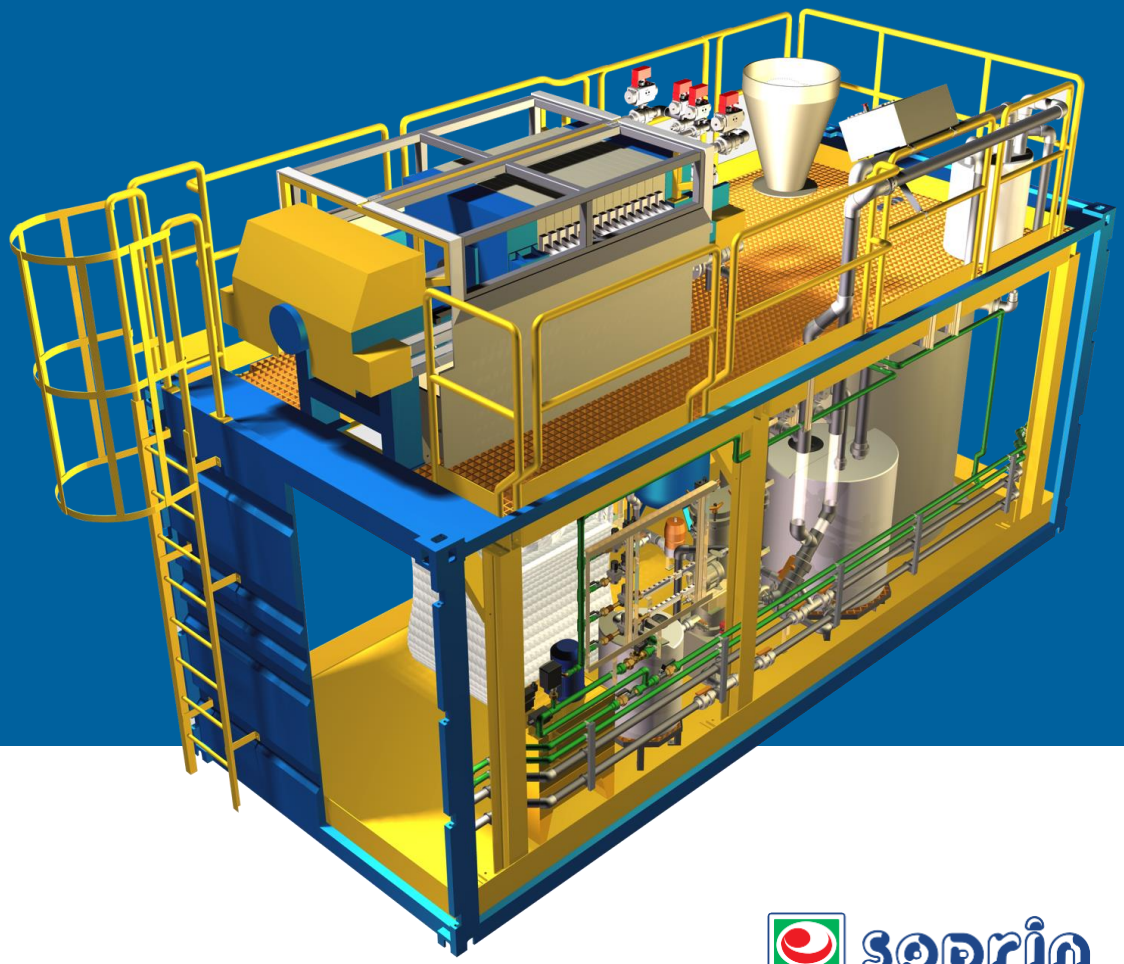
H.A.R.U.

Hydrochloric Acid Regeneration Unit



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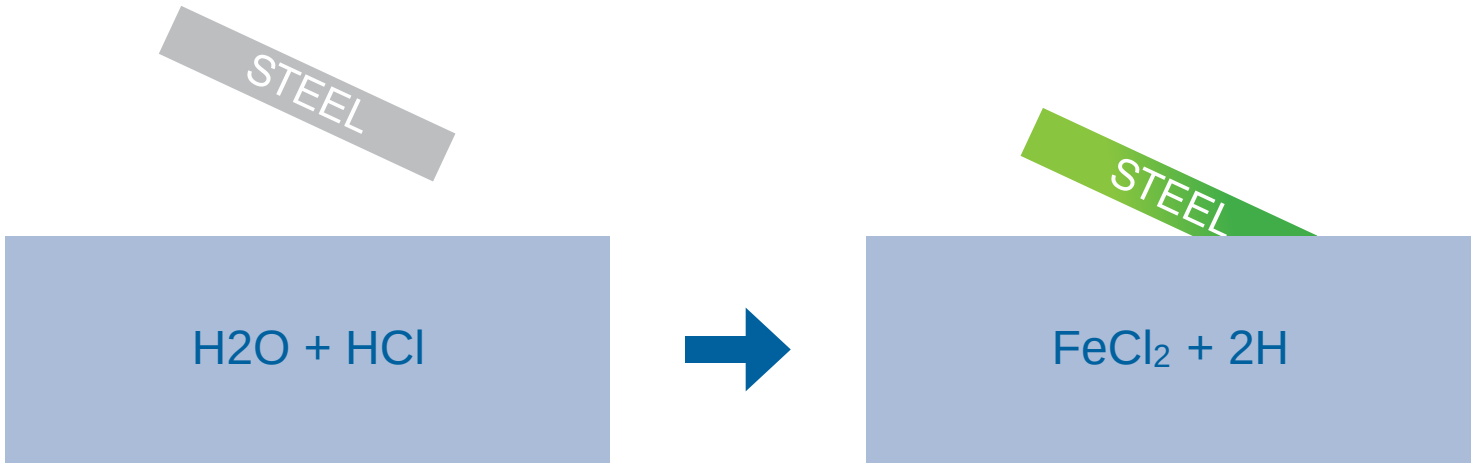
PICKLING PROCESS

$$Fe + 2HCl = FeCl_2 + 2H$$



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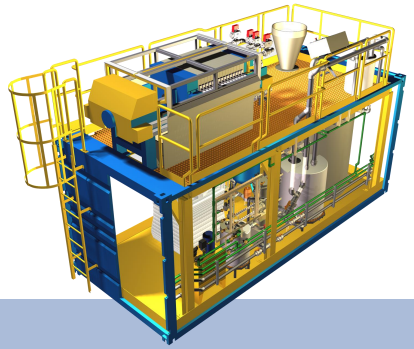
PICKLING PROCESS CYCLE

SPENT PICKLING TANK



H.A.R.U. SYSTEM

REGEN. PICKLING TANK

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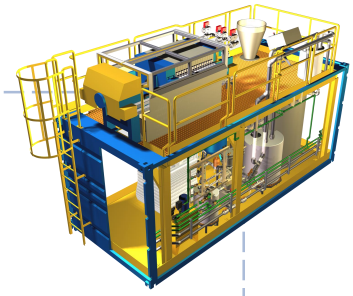
HCL PURCHASE WITH H.A.R.U. SYSTEM VS. WITHOUT

100%
HCL PURCHASE WITHOUT H.A.R.U.



5%
HCL PURCHASE WITH H.A.R.U.

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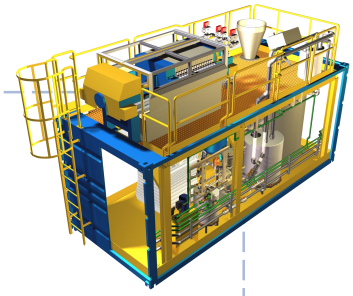
HCL DISPOSAL WITH H.A.R.U. SYSTEM VS. WITHOUT

100%
HCL
DISPOSAL
WITHOUT
H.A.R.U.



0%
HCL
DISPOSAL
WITH
H.A.R.U.

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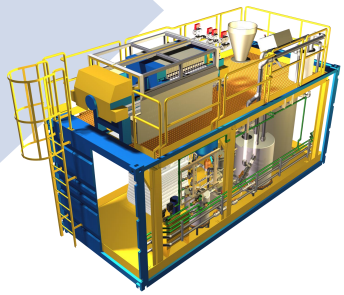
PICKLING TIME

100%
PICKLING TIME
WITHOUT H.A.R.U.

50%
PICKLING TIME
WITH H.A.R.U.



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BENEFITS COMPARISON

ACTUAL TRADITIONAL SYSTEM	INNOVATION HARU SYSTEM
PURCHASE FRESH HYDROCHLORIC ACID	REDUCTION BY 95% OF PURCHASE OF FRESH HYDROCHLORIC ACID
DISPOSAL OF SPENT ACID	NO MORE DISPOSAL OF ANY DANGEROUS LIQUOR
PICKLING TIME	50% TO 70% REDUCTION IN PICKLING TIME
HANDLING OF SPENT HCL TO BE SENT TO TREATMENTS CENTERS	NO MORE HANDLING OF SPENT HCL TO BE SENT TO TREATMENT CENTERS
INCREASE THE PICKLING TIME DUE TO ITS DETERIORATION	CONTINUAL PICKLING EFFICIENCY SINCE THE PARAMETERS OF THE PROCESS REMAIN OPTIMAL
	EASY, SAFE TREATMENT, WHICH GENERATES NO EMISSION
	MULTIACID ADDED IN ITS CRYSTALLINE FORM TO THE PROCESS DOES NOT INCREASE THE VOLUME OF TREATED LIQUOR

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PREFLUX TREATMENT UNIT

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THE ADVANTAGES

1. Strong reduction of zinc ash and dross production
2. Reduction of disposal volume of stripping acid
3. Reduction of disposal volume of flux solution
4. Reduction in chemicals and zinc consumption
5. Reduction of fume production during galvanizing
6. Increase in quality of the galvanized material

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PERFORMANCE GUARANTEES

1. Duration of a cycle: less than 12 hours
2. Iron removed per cycle: up to 50 or 100 kg (depending on model)
3. Flow of flux liquid: up to 3 cubic meters per hour
4. pH of filtrate: more than 2.5

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COMPACT EASY AND SAFE

1. The skid concept permits an easy positioning in any area of the galvanizing plant
2. The unit doesn’t need extra construction for its positioning
3. The compact design of the unit reduces the space required for the installation
4. The position of the pumps is optimized for easy and fast controls and maintenance
5. No corrosion risk
6. Safe conditions for the operators

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PROCESS DESCRIPTION

1. The plant is directly connected to the flux bath – no need of settler
2. Oxidation/neutralization: flux solution is pumped into reaction tank compartement
3. Hydrogen peroxide is added to the flux solution in order to oxidize Fe2 + to Fe3+
4. Ammonia is added to the flux solution when the pH falls below 3.0, as iron hydroxide precipitates at pH= 2.9

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PROCESS DESCRIPTION

5. Sludge: from the reaction compartment, the neutralized solution flows into the sludge compartment, the flux solution, including a considerable amount of iron hydroxide precipitated, is pumped through the filter press. The iron hydroxide precipitated is filtered of by the filter press. The filtered off iron hydroxide is collected as filter cake into storage bins
6. Filtrate: the filtrate returns via the connected piping to the flux bath

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ECONOMIC CONSIDERATION

1. No flux solution disposal costs,
2. The use of the stripping solutions reduces the consumption of flux
3. Reduction of the stripping solution volumes disposed of
4. The removal of iron and organics reduces the defects in galvanizing
5. Reduction of dross and ashes production

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THANK YOU

FOR MORE INFORMATION
PLEASE CONTACT SOPRIN SRL

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