

## FAPLAC APM

# MODEL BASED SETUPS FOR EFFICIENT STRIP PICKLING

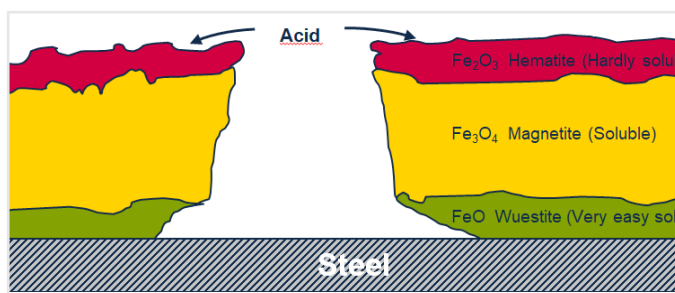
Market trends are forcing steel factories to manufacture higher quality products to sell at low market prices by using fewer resources.

Carbon steel strip from hot rolling mills must be perfectly pickled before being sold or cold rolled. At the same time regulations are becoming stronger with respect to safety, environment and sustainability

### CHALLENGE

Beside quality and production throughput customers also expect minimum operation costs as well as a rapid return of investment. Customers have the following main requirements of a modern pickling line:

- High quality of the pickling process (no under -, or overpickling)
- High and optimized line throughput (high speed)
- Reduced operating costs (energy, maintenance)
- Reduced consumption of media such as acid, water.

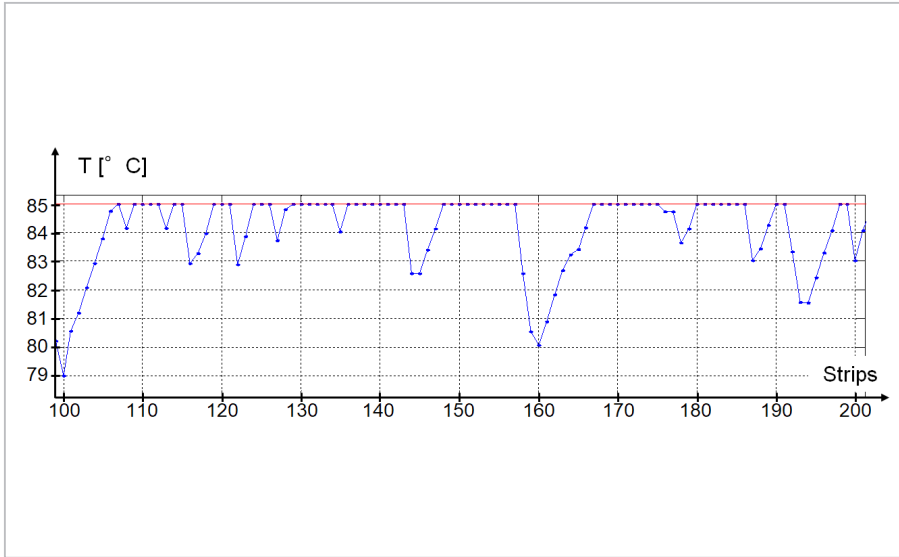


### OUR SOLUTION

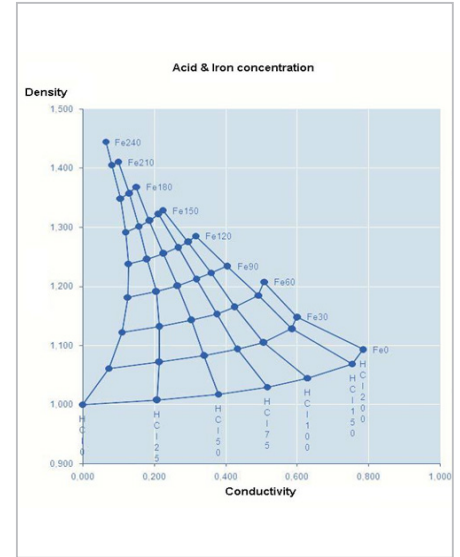
Primetals Technologies provides an Advanced Pickling Model to optimize your process and to help to increase the plant throughput, reducing the operational costs and therefore reducing the cost per ton of material.

FAPLAC APM is a model based control that takes into account:

1. Calculation of scale thickness and state of iron oxide for different strip segments (head-end, body, tail-end)
2. Optimum strip speed including speed range based on chemical-physical model:
  - Calculated from coil primary data
  - Considering actual bath temperatures
  - Considering actual concentration values in each pickling circuit
  - Calculated for different segments (head-end, body, tail-end)
  - Results transferred to Speed Optimization System of PLTCM
3. Forecast calculation, up to 100 coils in advance
  - Temperature gradient in pickling bath
4. Cyclic calculation of pickling rate according to actual context (strip, temperatures...)



Long term schedule optimization



Acid & Iron concentration

## PRODUCT FEATURES

The FAPLAC APM is an innovative package based on advanced physical and chemical process models in connection with long- and short-term adaptation techniques.

To meet such high requirements modern automation systems are used. They work closely together based on defined tasks at each process level, here in the combination of the Level 1 Basic Automation and Level 2 Process automation using well defined interfaces

**Relevant pickling process parameters related to the strip are considered:**

- Steel grade incl. alloying elements
- Strip dimension
- Yield strength
- Finishing and coiling temperatures at HSM
- Scale - thickness- distribution of iron oxides

**Key parameters for FAPLAC APM are:**

- Pickling speed
- Bath temperature
- Concentration of acid and iron ions in the pickling liquid for proper discharge/feed of used/fresh pickling liquid
- Elongation at scale breaker
- Intensity of turbulence in the bath

## FIELDS OF APPLICATION

- CPL Continuous Pickling Lines
- PLTCM Coupled Pickling – Tandem Mill Lines

## MAIN BENEFITS

- Improves the quality of your products: by optimizing the actual pickling speed and by supervising under- and overpickling
- Maximizes the overall production throughput of your pickling line: by optimizing pickling bath parameters according actual coil schedules (if available)
- Helps to minimize the acid consumption: by avoiding unnecessary over-pickling
- Repeatable results: independent of individual operator experience and habit
- Helps to improve your contribution to environmental protection: by avoiding unnecessary amount of pickling sludge

## SUMMARY

FAPLAC APM calculates automatically and model based the optimum set points for the pickling process. The results are strips with perfect pickling quality using minimum resources thus generating little waste.

Highest process throughput and minimized operation cost lead to a very fast ROI



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