HYDROCHLORIC ACID PICKLING CHART


## CONDITIONS:

- New acid pickling tank thoroughly cleaned prior to refilling to get maximum HCl concentration possible.
- New acid preparation is $15 \%$ by weight using moderately acidic rinse water ( $\mathrm{pH}>1.5$ ) as dilution water and the addition of $0.2 \% \mathrm{w} / \mathrm{w}$ corrosion inhibitor. No top-up with fresh acid in spent pickles.
- Spent acid replaced at baumé equal to 21 . Pickling acid drag-out estimated to be around $0.002 \mathrm{M}^{3} /$ ton-day.
- Iron test using Hach's FerroVer reagent for visual colorimetry. Maximum iron in fresh water is about $0.002 \mathrm{~g} / \mathrm{Li}$ Fe and $4 \mathrm{~g} / \mathrm{Li}$ in the fresh acid.


## HOW TO USE THE CHART

Say you want to know the resulting acid concentration from a preparation of $40 \%$ fresh acid ( $30 \%$ by weight HCl ) and $60 \%$ recycled rinse water ( $\mathrm{pH}>1.5$ ). Here you will have to use the dotted HCl concentration line and project a horizontal line from its tip perpendicular to the $y$-axis. Read the value (number) on which it falls that is about 14. Select the corresponding $\% \mathrm{w} / \mathrm{w}$ unit from the legend and you expect your pickling acid to be $14 \% \mathrm{HCl}$ by weight. Projecting a straight line down perpendicular to the x -axis will give you the expected iron content of $10 \mathrm{~g} / \mathrm{Li} \mathrm{Fe}$.

Use the same procedure for all the lines and curve. Please note also that the actual zero (0) pH of the hydrochloric acid solution lies around $1.1 \% \mathrm{w} / \mathrm{w}$ free HCl content or equivalent to about 0.3 M acid concentration as opposed to the theoretical that is at 1 M concentration or about $3 \% \mathrm{HCl} w / w$.

