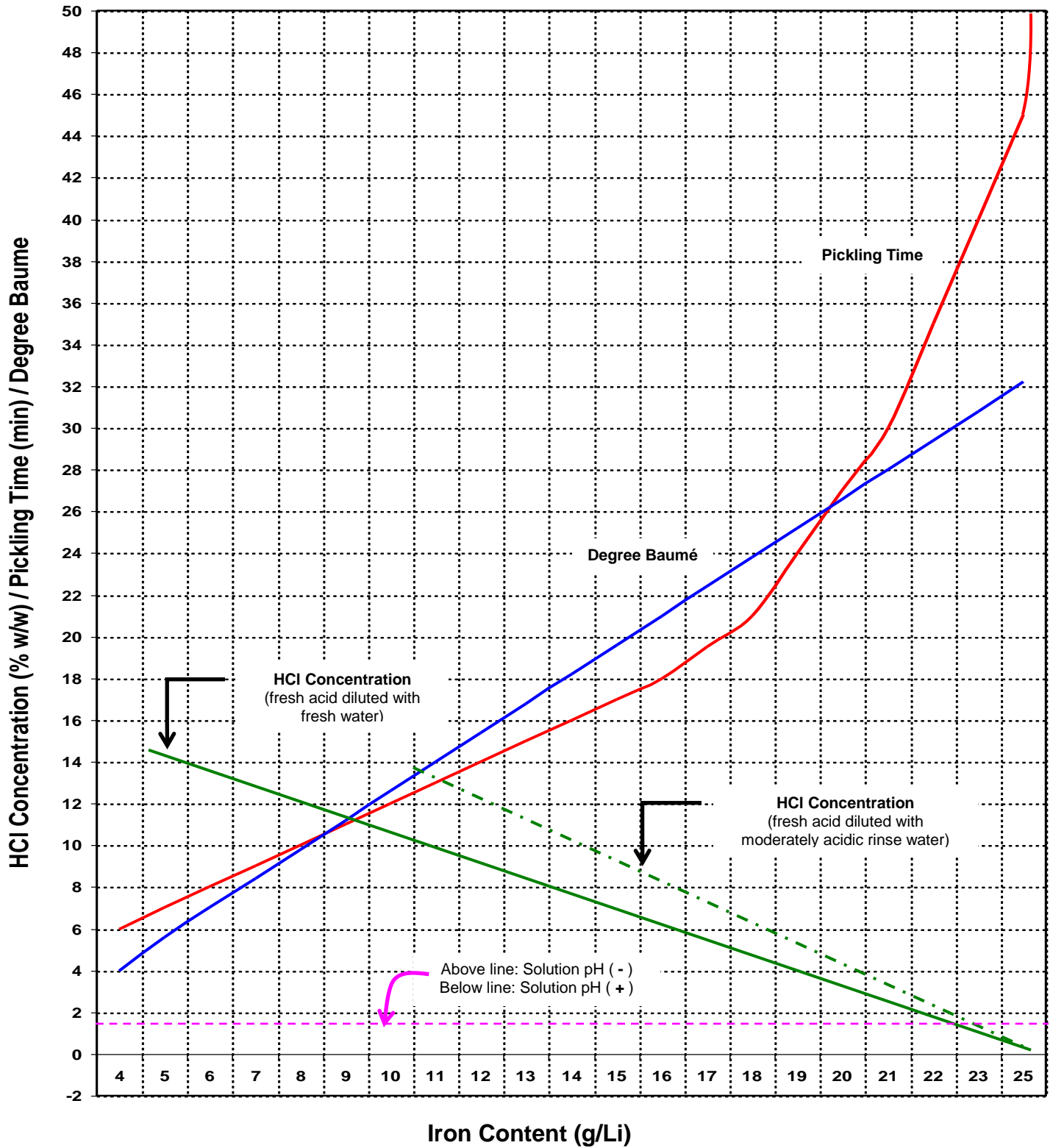


HYDROCHLORIC AC PICKLING CHART



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 (pH > 1.5) as dilution water and the addition of 0.2% w/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 M³/ton-day.
- Iron test using Hach's FerroVer reagent for visual colorimetry. Maximum iron in fresh water is about 0.002 g/Li Fe and 4 g/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 (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 % w/w unit from the legend and you expect your pickling acid to be 14% HCl by weight. Projecting a straight line down perpendicular to the x-axis will give you the expected iron content of 10 g/Li 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% w/w free HCl content or equivalent to about 0.3M acid concentration as opposed to the theoretical that is at 1M concentration or about 3% HCl w/w.

SOURCE: BRCampano, Hidada Co. Ltd., Jeddah, Kingdom of Saudi Arabia, October 30, 2010