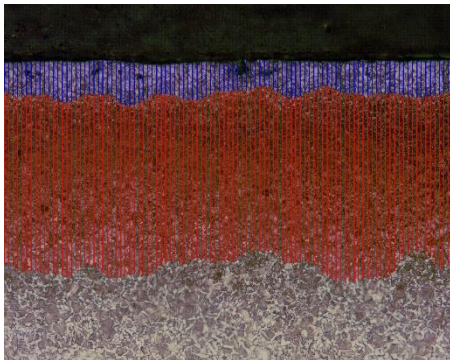


## DEPTH OF DECARBURIZATION OF STEEL AS PER ASTM E1077



**Figure 1:** The original image of decarburized steel.



**Figure 2:** Two decarburization layers transform into measuring lines and overlay against the original image.

### Sample Description

One image of decarburized steel is submitted to measure the depth of decarburization according to ASTM E1077.

### Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analysis system can discriminate and measure the depth of decarburized layers.

### Procedure

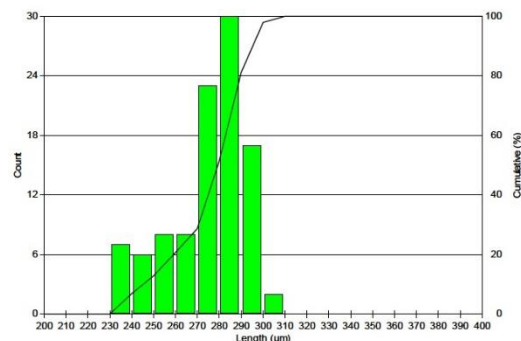
Two decarburized layers can be observed from the cross-section. Top layer closes to the surface is considered as free-ferrite or partially decarburization layer. The middle layer (partial decarburization) with color gradient indicates the diffusion of carbon atoms from center of the steel to the surface. Both layers were assigned to two bitplanes. Several binary operations were applied to remove artifacts or imperfections. Decarburization layers were transformed into measuring lines to allow a length distribution measurement.

### Equipment

**Image Analysis System:** Clemex Vision PE  
**Magnification:** 200X  
**Calibration:** 0.4659  $\mu\text{m}/\text{pixel}$

## Results

Length measurement is performed on two decarburization layers according to ASTM E1077. Automated statistics and graph are generated. Final results can be printed directly from Clemex Vision. Raw data are linked to their respective objects for validation purpose.



**Figure 3:** Depth distribution of total decarburization.

|                      | Mean   | Min.   | Max    | Std Dev | Count | 95% CI | % RA | Range (from - to) |        |
|----------------------|--------|--------|--------|---------|-------|--------|------|-------------------|--------|
| <b>Total:</b>        | 275.00 | 232.10 | 300.55 | 17.72   | 101   | 3.53   | 1.28 | 273.72            | 276.28 |
| <b>Partial (top)</b> | 43.81  | 23.91  | 54.39  | 6.19    | 101   | 1.23   | 2.81 | 40.99             | 46.62  |
| <b>Partial 2:</b>    | 231.20 | 198.34 | 254.60 | 14.71   | 101   | 2.93   | 1.27 | 229.93            | 232.46 |