

# application note



## Metal Hardness Testing

# Larsen & Toubro Ltd

## Hardness Testing of Pressure Vessels and Heat Exchangers

The material property of hardness has been used traditionally to determine consistency in the production of components and to test for conformity to specifications. There is, however, another emerging important role of hardness testing as a control on the state components which have been in service.

Hardness tests are frequently used in the production of components to control quality aspects and also in basic research into alloying behavior and thermal stability studies, for example. The hardness testing requirements in pressure vessels are to ensure that the heat treatment has resulted in the proper strength and that the strength is uniform throughout the entire vessel.

## Application

Larsen & Toubro uses Proceq's Equotip 3 Unit D in HB scale to determine the hardness of pressure vessels. With the increased use of submerged arc welding for pressure vessel construction, it was found that weld deposits significantly harder and stronger than the base metal could be produced. This leads to transverse cracking in the weld deposit.

Cracking is expected to occur in pressure vessels when the tensile strength exceeds 620 Mpa. There is a relationship between hardness and strength in steels, the above strength level approximates the 200 HB hardness limit.

## Customer Quote

"We are using the Equotip 3 Unit D for our internal Quality Control and on-site field testing. We are already using Equotip 3 in large numbers (more than 15 units) in all our branch offices / plants spread all over India. The attraction of the Equotip 3 lies in its technology, the relative ease with which it can be used and the rapidity with which a result can be obtained."

*Larsen & Toubro Limited, Mumbai (India)  
- Proceq customer since 1998*

## Profile

### Customer

Larsen & Toubro (L&T) is a technology-driven USD 8.5 billion company. It is one of the largest and most respected companies in India's private sector.

### Employees

L&T is a team of more than 29,000 spread across multiple locations around the globe.

### Requirements

- Hardness testing of pressure vessels.
- Speed of measurement required, as testing frequency is generally high.
- Ideal for on-site testing of heavy and large components before and after installation.

### Proceq Product

Equotip 3 Unit D

### Benefits to the Customer

- Portability of the instrument.
- Direct conversion to all common hardness scales.
- Interchangeable probes for wide range of testing.