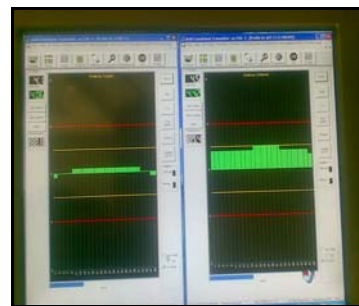
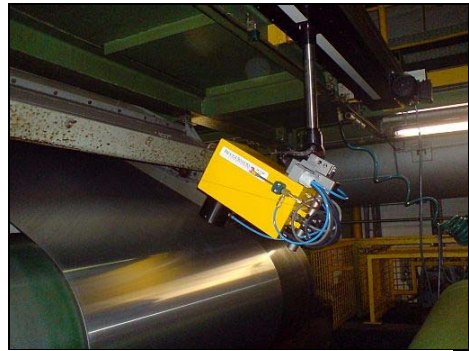


**Near Infrared
Conversion Coat-weight measurement**



Conversion Coatings

Chromate Conversion Coatings have traditionally been applied to electro-galvanised steel and aluminium alloy surfaces to render them corrosive resistant, and to establish an adhesive base for organic coatings in the early stages of the coil coating process. Chromium VI, hexavalent chromium has been the most predominantly used form, but its usage is being curtailed through RoSH legislation owing to its toxicity. Chromium III is safe to use, and is still being used by many aluminium manufacturers but recently, newer alternatives based upon titanium, zirconium, cerium and cerium molybdenum systems have been introduced.

Control of coat weight and coverage is important as it impacts the physical and chemical properties of the sheet metal. The surface film is formed by a chemical reaction so it effectively becomes an integral part of the metal surface. Provided the film is continuous, the metal sheet can be moulded without adhesive failure of paint, lacquer or powdered coatings that are applied further down the coil coating line.

Application process and measurement location

The aqueous based coatings can be applied in a number of ways; via a roll coater, brushes or spray nozzles.

Water is an excellent absorber of NIR so measurement is made at the “wet end” shortly after the tensioned metal sheet has left the metal roller with the water based coating applied. As coating is applied to both front and back of the metal sheet, a gauge is typically mounted either in a fixed position or on a scanning frame either side of the web, the scanning option will obviously provide a better indication of the total coverage. The MCT 360 is calibrated against the dry coat weight value and is extremely accurate providing the solids ratio remains constant; gauge readout is continuous, updating every 90ms. The data enables manual, or automatic adjustment of the coater through the MCT Controller Output. This could be implemented through a change of speed and/or pressure of the rollers, or pressure in the case of the spray nozzle.

Measurement Performance

Typical measurement performance: 0.05 – 0.1 mg m⁻² over the range of 3 – 8 mg m⁻² dry coat weight.

Example: Titanium based granodine coating.

The calibration and trend plot below relate to 9 samples that were taken from production. In this example dry coat weight range was between 3.4 and 6.5 mg m⁻²

