Installation

Surface Preparation
The test specimen surface must be prepared before the strain gages and bondable terminal pads can be installed. Cleanliness is important for successful strain gage bonding. The object of preparation is to create a smooth surface which can be wetted so it can receive the adhesive. Some steps may be disregarded or modified, based on the condition of the test piece and the type of material.

Coarse Cleaning
Rust, scale, paint and other contaminants must be removed from the location where strain gages will be installed. Remove any surface coating by sand blasting or by abrading with coarse grade emery paper.

Smoothing Surface
Surface imperfections must be removed. Pitting, scratches, protrusions, etc can be removed by grinding, filing or other suitable methods to smooth the surface where strain gages will be installed. Follow with a light sanding with a fine grit (240 grit) silicon carbide or emery paper.

De-Grease the Surface
Use a solvent, and a soft tissue to remove all excess oil and grease. Select a solvent. Check the chemical resistance of the material, making sure that the solvent will not damage the test piece.

Clean Surface with Metal Conditioner and Neutralizer
Clean the surface with a mild acid or metal conditioner. Sand lightly with the metal conditioner and wipe clean with a clean tissue or gauze pad. Clean the surface with a mild base, or metal neutralizer, wipe with a clean tissue or gauze pad. Brush with lint-free brush to remove any dust particles that may have settled.

Bonding Procedure
Specific instructions may be provided with strain gage adhesives. Instructions may vary with the type of adhesive that has been selected. For example, a two-part epoxy may need to be mixed, clamped and cured at an elevated temperature. Some adhesives, like the cold cure SG496 (typically used for metals) and SG401 contain solvents. Check the chemical resistance of the material, making sure that the solvent used in the adhesive will not damage the test piece. For best strain gage installation results consider the following procedures.

Clean Tools and Surfaces
Clean and degrease the tools that will be used to handle the strain gages. Prepare a clean and degreased work surface. A piece of glass can be used as a work surface. Do not handle the strain gages or bondable terminal pads with your hands, as you may introduce oils and contaminants that will cause bonding problems.

Orienting, Handling, and Bonding the Strain Gage
Use tweezers to remove the strain gage from the package. Place the strain gage onto the work surface making sure that the ribbon leads or solder pads are facing up. Use cellophane tape, placed gently on top of the strain gage to lift it from the work surface. PTFE tape may be required for use with adhesive that will need to be cured at an elevated temperature. Position the strain gage onto the transducer or test specimen. Secure one end of the tape onto the test specimen. Gently, lift the other end of the tape, lifting the strain gage assembly being careful not to stretch the gage. Leave a hinge of tape so that access to the bottom of the strain gage is available, yet the position is fixed. Continue onto bonding of the strain gage. Adhesive can be applied to the bottom surface of the strain gage and it can be returned to the correct position. Follow instructions that were provided with the strain gages adhesive. Clamping and curing instructions vary with the adhesive selected. Repeat the procedure for the bondable terminal pad. Locate the bondable terminal pad within reach of the ribbon leads or in a convenient position for connection to the strain gage solder pads. When bonding has been completed, remove the tape. Peel the tape back carefully. Lift the edge of the tape, lay it back onto itself, and peel the tape back so that the tape is not pulling the strain gage up off the surface. You may need to use a small tool to hold the edge of the strain gage, or ribbon leads down to avoid pulling them up or damaging them.

Inspect the Strain Gage Installation
Take a close look at the strain gage installation. Inspect to make sure that there are no loose edges, bubbles or voids beneath the strain gage. The color should be consistent. Check the strain gage resistance and verify that it is correct. Measure from solder-pad to solder-pad, or lead to lead. Check the resistance from the strain gage to ground. Measure from one solder-pad/lead on the strain gage, to the metal test piece, to make sure that the resistance to ground is 100MΩ or higher. Replace the strain gage if any problem is found.

Wiring
Remove oxidation from the bondable terminal pads. An eraser on the back of a pencil can be used to gently rub the terminal pad, making the copper tabs shiny. Tin the bondable terminal pads using rosin core solder and a small soldering pencil. If you have ribbon leads, bring the lead over to the bondable terminal pad leaving a small flex loop. Solder down onto the bondable terminal pad. Trim the end of the ribbon lead to length if required. With solder pads or tabs, you will need to make up a small jumper wire. For example, you can use the TFCP-010-50 spool of cable, and cut a small length, strip the PTFE coating from each end, tin the ends of the jumper wire. Solder one end of the jumper wire onto the strain gage solder tab, again, leave a flex loop, and bring the other end of the jumper onto the bondable terminal pad, solder it in place. Next, you will attach your insulated instrumentation wire. For example, you can use the TX4-100, which is color coded, 4-conductor, PVC coated, shielded cable. This can be used for short 2-wire runs, 3-wire bridge (compensates for effect of temperature on the lead wire), ½ bridge, or 4-wire full Wheatstone bridge. Solder the instrumentation onto the bondable terminal pad. Again, check the strain gage resistance, now at the end of the instrumentation lead wire, and verify correct. Check the resistance from the strain gage to ground.

Complete the Strain Gage Installation
Clean the area using Rosin Solvent. Allow the area to dry, and then apply protective coating.

Safety Precautions
Personnel who are working with solvents, metal conditioners, neutralizers, adhesives, epoxy and cements should receive proper instruction from their company prior to handling of these materials. The strain gage installation area should be well ventilated. Personnel should avoid prolonged contact of these materials with the skin. MSDS sheets are available at omegadyne.com
More than 100,000 Products Available!

- **Temperature**

- **Flow and Level**
  Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

- **pH and Conductivity**
  Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

- **Data Acquisition**

- **Pressure, Strain and Force**
  Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

- **Heaters**