

Thermal Survey

During the thermal survey process, try to determine possible hot and cold areas in the repair zone. Temporarily attach a patch of the same material and thickness, several thermal couples, heating blanket, and a vacuum bag to the repair area. Heat the area and, after the temperature is stabilized, record the thermocouple temperatures. Add insulation if the temperature of the thermocouple varies more than 10 degrees from average. The areas with a stringer and rib indicate a lower temperature than the middle of the patch because they act as a heat sink. Add insulation to these areas to increase the temperature. [Figure 7-43]

Solutions to Heat Sink Problems

Additional insulation can be placed over the repair area. This insulation can also be extended beyond the repair area to minimize heat being conducted away. Breather materials and fiberglass cloths work well, either on top of the vacuum bag or within the vacuum bag or on the accessible backside of the structure. Place more insulation over cool spots and less insulation over hot spots. If access is available to the backside of the repair area, additional heat blankets could be placed there to heat the repair area more evenly.

Types of Layups

Wet Layups

During the wet layup process, a dry fabric is impregnated with a resin. Mix the resin system just before making the repair. Lay out the repair plies on a piece of fabric and impregnate the fabric with the resin. After the fabric is impregnated, cut the repair plies, stack in the correct ply orientation, and vacuum bag. Wet layup repairs are often used with fiberglass for nonstructural applications. Carbon and Kevlar® dry fabric could also be used with a wet layup resin system. Many resin systems used with wet layup cure at room temperature, are easy to accomplish, and the materials can be stored at room temperature for long period of times. The disadvantage of room temperature wet layup is that it does not restore the strength and durability of the original structure and parts that were cured at 250 °F or 350 °F during manufacturing. Some wet layup resins use an elevated temperature cure and have improved properties. In general, wet layup properties are less than properties of prepreg material.

Epoxy resins may require refrigeration until they are used. This prevents the aging of the epoxy. The label on the container states the correct storage temperature for each component. The typical storage temperature is between 40 °F and 80 °F for most epoxy resins. Some resin systems require storage below 40 °F.

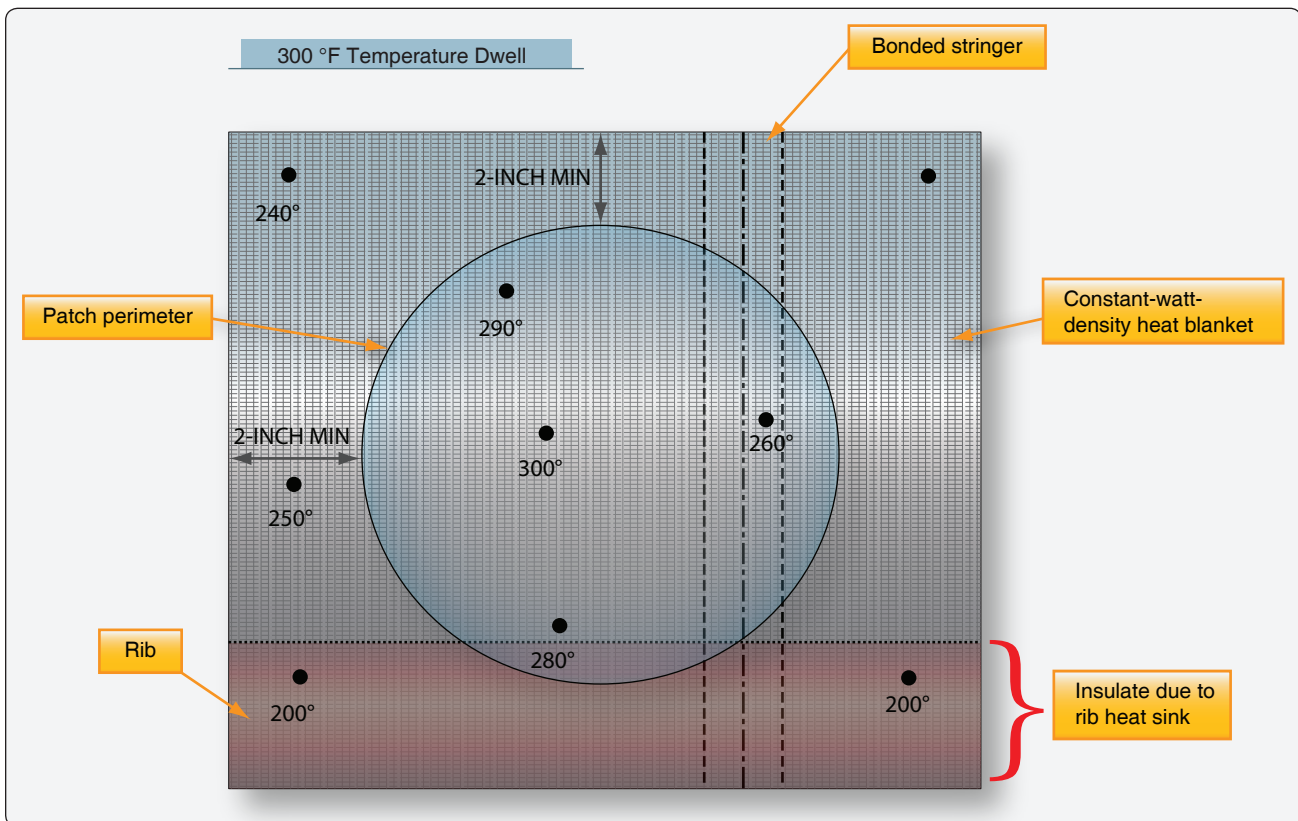


Figure 7-43. Thermal survey example.