WHAT IS CLAIMED IS:

1. A method of processing a plate-shaped workpiece, the method comprising:

a sheet affixing step of laying a thermocompression bonding sheet on a surface of the workpiece and heating and pressing the thermocompression bonding sheet against the workpiece to affix the thermocompression bonding sheet to the workpiece;

after the sheet affixing step, a laser beam applying step of applying a laser beam having a wavelength absorbable by the workpiece to another surface of the workpiece along a projected dicing line established thereon, thereby processing the workpiece along the projected dicing line; and

after the laser beam applying step, a sheet joining step of pressing the thermocompression bonding sheet while reheating the thermocompression bonding sheet to soften the same, so that the thermocompression bonding sheet is joined up by closing dividing grooves or through holes made in the thermocompression bonding sheet when the workpiece is processed in the laser beam applying step.

2. A laser processing apparatus for processing a plate-shaped workpiece, the laser processing apparatus

comprising:

a holding table having a holding surface for holding the workpiece with a thermocompression bonding sheet affixed to a surface thereof;

a laser beam applying unit for focusing a laser beam having a wavelength absorbable by the workpiece and applying a focused spot of the laser beam to the workpiece held on the holding surface of the holding table;

a heating unit for heating the thermocompression bonding sheet affixed to the workpiece, to soften the thermocompression bonding sheet; and

a pressing unit configured to press the thermocompression bonding sheet after the workpiece has been processed by the laser beam applying unit while the thermocompression bonding sheet is reheated by the heating unit to soften the thermocompression bonding sheet, so that the thermocompression bonding sheet is joined up by closing dividing grooves or through holes made in the thermocompression bonding sheet when the workpiece is processed by the laser beam applying unit.

3. The laser processing apparatus according to claim 2, wherein the pressing unit is disposed in facing relation to the holding surface of the holding table, and

is actuatable to press at least an outer circumferential edge of the workpiece and the thermocompression bonding sheet.