CLAIMS

1. A method for joining of at least two materials, non-weldable directly to each other with thermal joining processes in a lap joint configuration, **characterized** in that a two-step sequence is used consisting of a first step to apply a surface protective aluminium layer by thermal spraying on the surface of a steel substrate and a second step, where a welding process is used to weld the protective layer to an applied aluminum, aluminum alloy, magnesium or magnesium alloy sheet without having brittle intermetallic phases in the whole material configuration, the ratio of the thermally sprayed layer thickness to a reached spot weld diameter being lower or equal to 0.25 and the temperature in the contact area between the substrate and the thermally sprayed coating layer being below 350 °C.

2. The method according to the claim 1, **characterized** in that the surface protective aluminium layer is carried out by a thermomechanical coating method.

3. The method according to any of the preceding claims, **characterized** in that the thermally sprayed layer is aluminum, an aluminum based alloy or a combination of aluminum with carbides.

4. The method according to any of the preceding claims, **characterized** in that the thermally sprayed layer is welded with the applied sheet by a resistance welding method like weldbonding, spot welding, or projection welding.

5. The method according to any of the preceding claims, **characterized** in that the total sheet thickness including the substrate, the thermally sprayed layer and the applied sheet, is from 1.5 mm up to 6.0 mm.

6. The method according to any of the preceding claims, **characterized** in that the thickness of the thermally sprayed layer is from 0.25 mm up to 1.5 mm.

7. The method according to any of the preceding claims, **characterized** in that the substrate to be thermally sprayed is a carbon steel having the carbon equivalent (CEV) more than 0,65 %, where CEV is calculated using a formula (element contents by weight %) $CEV = C + Mn/6 + (Cu + Ni)/15 + (Cr + Mo + V)/5$.

8. The method according to any of the preceding claims, **characterized** in that the substrate to be thermally sprayed is a carbon steel material, preferably carbon steel with a galvanized surface coating.

9. The method according to any of claims 1 – 7, **characterized** in that the substrate to be thermally sprayed is a stainless steel.

10. The method according to any of the preceding claims, **characterized** in that the substrate surface is pretreated by cleaning and blasting.