

AH60.00-P-0012-01N	General information on dent removal and straightening aluminum parts	Model 215, 216, 221	i
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Dent removal:

On aluminum parts, it is possible to remove dents up to a certain deformation depth. In the event of higher deformation, it is necessary to replace the damaged parts. Comprehensive dent removal work can be accomplished only under the effect of heat. In contrast to sheet steel, on aluminum plate the dent removal operations should be started in the middle of the dent. If possible, attempt to eliminate the dents by pressing out. Replace sharp-edged and hard dent removing tools with plastic, wood or aluminum hammers. If stretched too highly, e.g. with steel tools, aluminum tends to work-harden (blocking of the displacement motion), which can lead to embrittlement or crack formation.

Drawing in:

To draw in, first heat up the aluminum plate with "neutral" welding flame to approx. 150 °C - 450 °C and then allow to cool down punctually at the drawing point. The rapid temperature change causes the surface to contract and the aluminum plate assumes its original shape. The heated point is flattened because the surrounding colder material expands less, preventing thermal expansion of the heated material. When it cools, the heated, flattened material contracts.

Important working rules for drawing in and straightening work:

- 1 Clean aluminum surface. Do not burn any contamination into the surface.
- 2 Heat up point to be repaired. Limit thermal expansion within repair area.

Straightening, reshaping:

The reshaping characteristics of aluminum present more problems than steel. Structural damage can only be straightened or reshaped under the effect of heat. After reaching the temperature for reshaping (250 °C to 300 °C), release tension present by tapping carefully with a hammer. It is necessary to check the temperature of the repair point frequently because the rebound effect resulting from resilient deformation is significantly higher with aluminum than with steel. Avoid jerky drawing operations due to the increased risk of cracking. Aluminum tends to tear out very quickly when notches or crimps are present in the reshaping area.

Temperature check:

The following procedures can be used for determining the temperature:

- Thermal colors to be applied to the edge area of the heating zone at interval of approx. 25 mm.
- Temperature determination with soft wood (spruce, willow). Heat up point to be repaired. Stroke piece of wood across heated point with medium pressure. Lines appear for the specific temperatures (approx. 350 °C - light brown, 400 °C - medium brown, 450 °C - dark brown, 500 °C - black).
 - ⊗ Use uncarbonized wooden tip, otherwise the aluminum can tear due to incorrect temperature display when reshaping.

Procedure for dent removal:

As with sheet steel, first feel the surface and localize high/low spots. Then remove dent. On aluminum, then feel the smooth surface again to determine the pulling point for the next heat draw-in. The working technique heating - dent removal - cooling must be accomplished quickly one after another and be matched exactly to one another.

i Use only special tools for aluminum processing for all types of repair work!

- 3 Use larger burner inserts. Adapt burner setting to material and part to be repaired.
 - i** Avoid settings with excess oxygen!
- 4 Heat up quickly point to be repaired. Determine temperature of straightening area.
 - i** With unhardened aluminum alloys, use wooden wedge or temperature color pen; with hardened aluminum alloys, use digital thermometer, to determine temperature!
- 5 Cool down point to be repaired again quickly. This maintains the mechanical material properties.

This also applies for high force in the area of weld joints. Reshaping also results in hardening, which can be and must be reduced again by heating up to approx. 170 °C to prevent cracking. Aluminum die-cast channels are extremely resistant to bending and cannot be reshaped. If damaged, they must be replaced. Extruded aluminum channels can be reshaped to a limited extent when heated up properly assuming that they are freely accessible.

- Colored pins.
 - i** Observe specifications of specific manufacturer!
- Self-adhesive temperature measuring strips.
 - i** When a certain temperature is exceeded, the corresponding fields on the temperature measuring strips change color.
- Infrared thermometer or pyrometer.
 - i** Observe specifications of specific manufacturer!