BVAT e.V.

Bundesverband
Ausbeultechnik &
Hagelinstandsetzung

Calculation Guidelines For Hail Repair

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Table of contents

General description

The system is based on recording the damage to the individual components, which are then totalled and added together to form the overall damage. Firstly, each component is assessed separately. To determine the labour values (AW), the list published by BVAT or the corresponding calculation system (e.g. DAT, Audatex Hagelexpert II, etc.) can be used, for example. The cost of dismantling and assembly work is not included in this calculation.

Detection of the dent size

All dents originating from the hail event to be assessed are counted. Preliminary damage such as hail-untypical indentations, outward dents, manufacturing-specific unevenness or residual images of previously repaired areas are not assessed.

10 or 12 divider

Depending on the manufacturer‘s specifications, the AWs are specified in 10, 12 or 100 units per hour, for which there are corresponding AW lists. This is automatically specified in the calculation system and must be taken into account when making manual entries.

10er devider: 1 AW = 6 minutes

12er devider: 1 AW = 5 minutes

100er devider: 1 AW = 0,6 minutes

There is no separate AW list for the 100 divisor, as the 10 divisor can be used here and the result is only shifted by one decimal place. For this reason, the following 100s values are not named.

Detection of the dent size

A dent size is measured by mirroring and using known aids. The size of the hail dent is defined by the maximum size. For example, dents measuring 21 - 30 mm are to be assessed as 30 mm dents. The following dent sizes are available: 1 - 10 mm, 11 - 20 mm, 21 - 30 mm,
31 - 40 mm, 41 - 50 mm, 51 - 60 mm, 61 - 70 mm and 71 - 80 mm AWs have been defined. For different dent sizes on a component, the average dent size must be determined. This can be done by estimation or calculation.

Step 1:
Recording the number of dents separately according to 8 size classes; 10 mm dents = Y1; number of 20 mm dents = Y2; number of 30 mm dents = Y3 ... etc.

Step 2:
Determine the total sum of all dents = Yges on the component Calculation formula for averaged dent diameter in mm (X)
Dent diameter in mm (X)

Calculation formula for averaged diameter in mm (X):

$$\frac{[10\ \text{mm} * \text{number Y1;}\} + \{20\ \text{mm} * \text{number Y2}\} + (40\ \text{mm} * \text{number Y3}) + ...]}{}$$

Calculation example:

1. recording the number of dents separately by size:

Y1 0 dents; Y2 120 dents; Y3 25 dents; Y4 15 dents; Y5 8 dents; Y6 1 dent; Y7 0 dents; Y8 0 dents

2. total sum of all dents Yges:

(Yges = Y1 + Y2 + Y3 + ...) 120 + 25 + 15 + 8 + 1 = 169

$$\frac{[\,(10 * 0) + (20 * 120) + (30 * 25) + (40 * 15) + (50 * 8) + (60 * 1) + (70 * 0) + (80 * 0)\,]}{}$$

$$X = \frac{4210}{169} \quad ; \quad X = 24{,}9\text{mm} \Rightarrow 30\text{mm}$$

Result: The average dent size is 30 mm.

Definition of horizontal and vertical components

Horizontal components: Bonnet, roof, upper tailgate (if not separable from the lower area by the rear window from the lower area, the entire tailgate is counted vertically), boot lid (flat/saloon)

Vertical components: Mudguard, door, side panel or wall, roof frame or pillar, side-opening rear door opening rear door, bottom tailgate

Aluminium surcharge

The surcharge for aluminum components is 25% on the AW list price. Any additional surcharge for adhesive technology is applied after calculating the aluminum surcharge.

When combining the material surcharge and adhesive technology, the calculation is as follows:

First, material-related surcharges are applied (aluminum):

100 AW + 25% aluminum surcharge = 125 AW (material total)

If applicable, the surcharge for the repair method (adhesive technology) is then applied to the total:

125 AW + 30% adhesive technology = 162.5 AW

Surcharge glueing technique

The surcharge for adhesive technology applies to the respective component and amounts to 30% on the AW list value. Additionally, a “Material Adhesive Technology” position must be added per vehicle if adhesive technology is used. This process may also be automated within the system if possible.

Flat-rate material costs for adhesive technology:

- Up to 2 components with adhesive technology €10 net
- 3 – 5 components with adhesive technology €15 net
- 6 or more components with adhesive technology €20 net

To determine the correct repair method when both options (PDR/adhesive technology) are possible, the general principle remains to choose the most cost-effective method. A comparison must be made between:

Either: • Disassembly/Reassembly (A+E) AW + Repair AW

Or: • Repair AW + Adhesive Technology AW + Material

Addition to Points 6 & 7

When combining material surcharges and adhesive technology, the calculation is as follows:

First, material-based surcharges are calculated (Aluminum):

100 AW + 25% aluminum surcharge = 125 AW (Material Total)

If applicable, the surcharge for the repair method (Adhesive Technology) is then applied:

125 AW + 30% adhesive technology = 162.5 AW

Overrach zone

The surcharge “Above Reach Zone” is defined by the necessity of using steps, small ladders, etc., up to approximately 80 cm in height. For vehicles with a height of 1.60 m or more, a flat rate of 9 AW in the 10-unit scale or 11 AW in the 12-unit scale is applied per vehicle. The justification for this is the provision of the step, the additional effort required for frequent repositioning of the elevation, climbing up and down, extra positioning of tools, etc.

Use of scaffolding

For oversized vehicles such as buses, trucks, and high-roof vans, mobile scaffolding with fall protection (railings) is required and must be factored into the calculation. When performing maintenance work on oversized vehicles, facilities with fall protection must be in place if the fall height exceeds 1 meter (see DGUV Rule 109-009 “Vehicle Maintenance”). Corresponding positions are recorded in the calculation systems for this purpose.

Push to paint

Components that either have paint damage, sustain paint damage during repair, or have dents that cannot be fully repaired or economically processed are pre-pushed in preparation for the painter. The goal is to minimize the need for subsequent filler application as much as possible. The surface should be repaired in such a way that it can be finished with a combination of filler and surface painting or, at most, with the renewal of less than 50% of the paint structure.

For this, a 40% discount is applied to the AW list value.

Calculation Example: Paint Extraction

162.5 AW – 40% (preliminary work/pulling forward) = 97.5 AW

same as before:

100 AW – 40% (pre-pressing/pre-pulling) = 60 AW + 25% (aluminum) = 75 AW + 30% adhesive technology = 97.5 AW

Pull to paint

The application of the “Pre-painting Adjustment” method according to AZT specifications can be found in the current AZT resolution on the following website in German language.

Procedure for Repairing Hail Dents by Painting or Pulling and Painting

There are separate AW specifications for the corresponding damage patterns. The use of this method is very limited. The main criterion is the number of dents over 20mm. The limit is 30 dents per component. If this threshold is exceeded, this method must not be used.

It must be clearly defined that more than 50% of the paint structure needs to be calculated, as a significant amount of filler work is required.

Choosing the repair method

The primary goal of the PDR technique is to push out dents without subsequent painting. If this is not possible for technical or economic reasons, the most cost-effective alternative must be chosen. These alternatives include pre-pushing for painting, pre-pulling for painting, repairing using conventional bodywork methods, or part replacement. The cheapest option must be selected.
In justified exceptions, a more expensive method may also be chosen.
Most calculation systems do not include the position “pre-pushing for painting,” but only the conventional “repair” through manual entries in Class 3.

Setup time

A flat rate of 6 AW per vehicle, or 7 AW (12-unit divisor), is charged for the preparation and post-processing of tools and equipment.

Cavity protection

A flat rate of 4 AW per vehicle, or 5 AW (12-part division), is charged for cavity preservation of the internally treated components (excluding the roof, as it is not applicable).

Additionally, material costs of €15 net are charged as a flat rate.

Finish

Finishing work is defined by the removal of processing marks, such as the elimination of adhesive residues, fingerprints, tool marks, grinding marks, etc. It is charged per processed component at a rate of 2.5 AW or 3 AW (12-unit divisor). The maximum limit per vehicle is 13 AW or 15.5 AW (12-unit divisor). The finishing work does not include any additional vehicle preparation or cleaning.

Transfer:

Flat rate: 15 AW, or 18 AW (12-divider)

Overall calculation

The individual AW values of the components are to be calculated as a single amount using 1/10 or 1/12 of the applicable hourly rate. The individual amounts are then summed up and presented as a total amount, broken down into net sum and VAT share.

Miscellaneous

High-strength and ultra-high-strength steels are not considered despite the increased processing effort.

Important Notice on Calculation Guidelines

Please note that this guide for determining the optimal working time is intended as a support tool only. However, it is always important to consider the fundamental principles of cost-effectiveness! Always compare alternative repair methods according to the manufacturer's specifications and with the help of appropriate calculation systems.