

WHITE PAPER | TAMCO DAMPER BLADES

Adjacent Blade Alignment

TAMCO 



Dane Carey, Director of Engineering | JULY 2021

EXPERIENCE TRUE EXCELLENCE IN SERVICE, QUALITY,
AND MAINTENANCE-FREE PERFORMANCE.



We are sometimes asked why a damper blade may not seem to lay completely flat when the damper is fully closed.

THE QUESTION

On the rare occasion, a few of our customers have observed that one or two blades of a TAMCO damper do not appear to lay completely flat when the damper is in the closed position. The objective of this paper is to explain why this happens from time to time, and that the damper is still fully functional.

THE FACTS

What is happening if a blade does not lie flat when the damper blades are fully closed?

When this situation does arise, the first question we should ask is, “Can you see light lines where the blades meet when the damper is closed?” If you apply a light source behind the damper and do not see any light lines through other side, then the damper is sealing properly and there is nothing wrong with it.

These dampers are typically:

- very tall, over 1220 mm (48”).
- such that the misaligned blades are adjacent to the drive blade.
- constructed with opposed blades (not parallel).
- Series 1000 or 1500. The misalignment is more easily visible with non-insulated air-foil blades than with insulated blades used for Series 9000 or 9000 BF.



Because parallel blades rotate in the same direction, each blade rests against the adjacent blade when in the full closed position. This applies a fairly even force across all blades, pushing the blades to sit flat relative to each other. Since opposed blades rotate towards each other, the tips are traveling in the same direction as they come to the full closed position. When the blade tips meet, there is no opposing force from the adjacent blades. As a result, the blades adjacent to the drive blade can be forced to over rotate and give the appearance of not sitting flat. This can happen when a heavy-duty actuator is installed on a damper, exerting a lot of spring tension on the drive blade while the damper is fully closed. The drive blade compresses the blade seals to the point that the drive blade forces the adjacent blades to appear slightly out of parallel.

TAMCO manufactures its dampers with the drive blade located near its middle. There is a minimum of four moving parts on each blade. A certain amount of clearance or tolerance must exist between each moving part to allow them to rotate. TAMCO maintains a tight tolerance between these parts. For example, the tolerance on our dual bearing system and the trunnion bearing system is $\pm .16 \text{ mm } (.006\text{'})$.

However, it is not possible to attain such tight control over tolerances for aluminum extrusions. The Aluminum Association has standard tolerances for their extrusion dies. Once an extrusion die's tolerance exceeds this standard, it must be remade. In almost all cases, TAMCO remakes its dies before they are out of tolerance. Even though this incurs additional costs, it is well worth the investment. But there are certain circumstances when remade dies are not available, so we are forced to live with the maximum Aluminum Association's tolerance range.

The standard tolerance can be as high as $\pm .51 \text{ mm } (.020\text{'})$ for small parts. This comes into play wherever an axle goes through a bearing and where a trunnion bearing rests in a crank arm. When an extrusion die is new, many parts will be looser when assembled. As the extrusion die wears over time, extrusions become thicker. This reduces the clearance between parts and contributes to less play.

TAMCO damper linkages are unique in the industry, as they can be factory-adjusted so the damper blades close completely, thereby ensuring a very tight seal. Sometimes when extrusion dies are new and the clearances are at their greatest, TAMCO's Quality Control personnel are able to over rotate a blade at the top or bottom of the damper while conducting the light box test and verifying that there are no light lines visible between blades. If required, over rotation of the top or bottom blade helps to ensure a tight seal. Other manufacturers do not produce dampers with adjustable linkage and as a result ship dampers that leak more.

TAMCO linkage



TROUBLESHOOTING

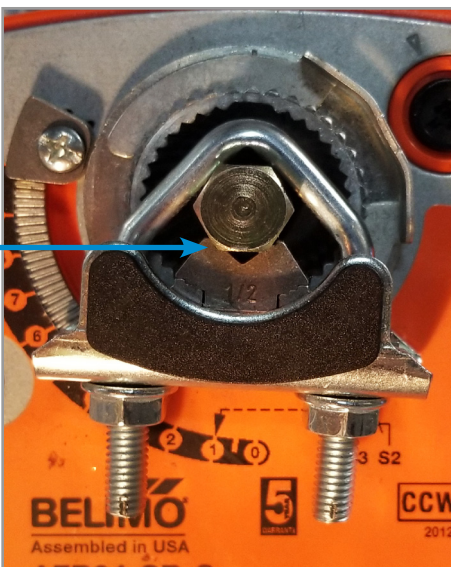
What should you do, if you do see visible light lines?

If you can see the light lines through the closed damper (more than just a pin hole), there are several possible reasons for this and some adjustment will be necessary.

1. Lay the damper on a level section of floor. Verify that the damper lies flat and that it is not twisted. If the damper is not flat, then the blades will remain slightly open on one side and will be closed on the other.
2. Ensure that the damper is installed square and that the frame is not stretched, compressed, or distorted at any point. (*Refer to TAMCO Aluminum Control Damper Installation Guidelines for more details.*)
3. Verify actuator installation. The actuator may not be installed correctly. It may not be providing enough force to close all of the blades tightly, or may be providing too much closing force. The simple remedy to correct this is to adjust the actuator. When setting up the actuator, be sure to open the damper blades and actuator completely, before fastening the actuator to the control shaft. Also, make sure that two of the flat surfaces of TAMCO's hex-shaped control shaft lie flat within in the machined groove of the actuator clamping mechanism. Tighten the clamp and allow the actuator to close the damper. This usually corrects any light (leakage) issues.



ACCEPTABLE ALIGNMENT



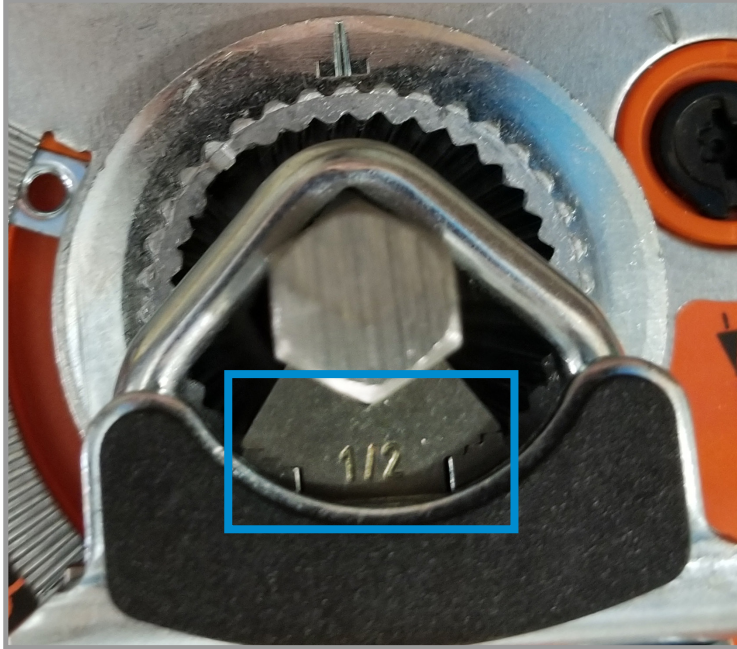
Acceptable if a minimum torque of 9 N-m (80 in-lbs) is applied to tighten the U-bolt nuts.

IDEAL ALIGNMENT



This alignment may cause the 0 to 9 position indicator not to read correctly.

4. Ensure that the ½" toothed block is being used in the actuator's clamping mechanism.



CONCLUSION

The main things to remember are:

1. This occurs rarely.
2. If there are no visible light lines when a light source is applied behind the damper, the damper blades are sealing properly.
3. The troubleshooting guidelines outlined in this paper will correct alignment issues if light lines are visible.

Caution:

Do not adjust the linkage mechanism. If the problem still exists after verification and correct action, contact TAMCO Customer Service at 1-800-561-3449.

ADJACENT BLADE ALIGNMENT

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