



QUALITY CONTROL ABSTRACT

Assembly of Aluminum Extrusions with Technoform Bautec Strut

Abstract

This document defines the process for proper assembly of aluminum extrusions with Bautec strut to minimize scrap and ensure a consistent product. It can be used as the basis for developing internal work instructions, quality control procedures, and for developing supply contracts for assembly operations.

Acceptance of Incoming Bautec Strut

1. **Identification.** Technoform Bautec labels all struts, identifying the production batch number and part (article) number. The labels are permanent and produced in a way that insures it does not degrade over time and in use.
2. **Match to Purchase Order.** Upon receipt of an order, the quantity and part number should be matched to the purchase order.
3. **Dimensional Integrity.** Upon receipt of an order, the principal dimensions of the strut (e.g. strut width, thickness, head width, etc.) of at least one sample must be compared to the established engineering drawing for the strut.

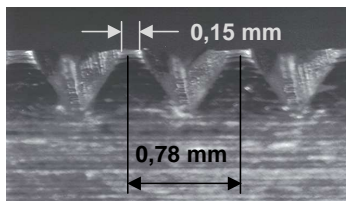
Storage of Insulating Struts

Bautec struts should be stored in an area protected from water and direct sunlight. It is recommended that stock be stored in a manner that allows the struts to be used first in, first out (FIFO).

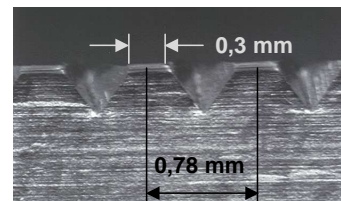
Description of the Assembly Process

1. **Knurling.** This first step in the production process is performed to produce teeth in the aluminum hammer and anvil that will “bite” into the polyamide strut during the crimping process. Proper knurling is required to insure adequate shear strength of the composite profile.

This knurling generates teeth that are between 0.15 mm and 0.30 mm long. The distance between teeth centerlines should be no greater than 0.78 mm. To generate adequate size and spacing of the teeth, the operator must (a) properly align the knurling wheels in the aluminum recess, (b) provide adequate pressure upon the knurling wheels during the process, and (c) use a knurling wheel capable of providing the teeth indicated in the pictures below:



Optimal teeth



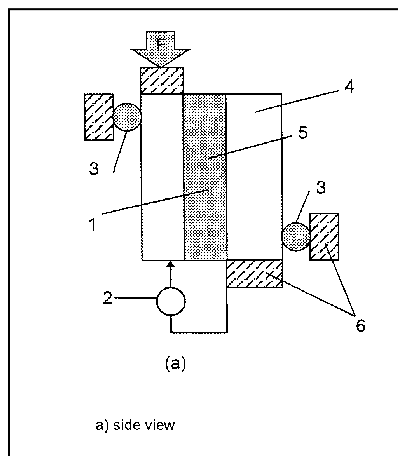
Adequate teeth

It is recommended that an operator review the knurling on the first shape of each batch under a magnifying glass to verify its integrity. Since it is possible to knurl a recess too deeply, making it difficult to insert the struts, operators may use a small section of strut as a “test piece” during initial setup. If the test piece cannot be easily inserted, the knurl is too deep and the pressure should be reduced.



Assembly of Aluminum Extrusions with Technoform Bautec Strut – page 2

2. **Insertion.** Before insertion, selected struts should be verified against the production paperwork. In addition, care must be taken that the struts are oriented per the order requirements, since not all struts are symmetric.
3. **Crimping.** Set up the crimping machine according to the equipment manufacturer's recommendations. The shape should be adequately supported during the crimping process, with sufficient pressure to adequately move the aluminum hammer tightly against the strut. Typically, machine setups are determined the first time a particular assembly is run. Provided adequate shear values are attained, the machine settings are then recorded and used as a general guideline each time a particular assembly is required.
4. **Shear Testing.** Shear testing provides the necessary verification that an assembly will perform as required. Failure to conduct adequate shear testing or failure to achieve adequate results may result in field failures including loss of structural integrity and/or water leakage. It is highly recommended that shear testing be conducted each time setups or profiles change. Additionally, for large runs of the same profile, shear tests should be conducted at least once for each 100 lengths of profile assembled.
 - a) **Samples.** Samples are 4" (100 mm) pieces of assembled profiles cut at least 4" away from the end.
 - b) **Test Method.** The test is performed by applying a force to one half of the assembled profile while supporting the other half as shown:



| Key | |
|-----|--------------------|
| 1 | test specimen |
| 2 | displacement gauge |
| 3 | guide |
| 4 | metal profile |
| 5 | thermal barrier |
| 6 | rigid support |

The maximum shear value attained before slippage between the struts and the aluminum profiles is recorded in the test records. Care must be taken to minimize the eccentricity of the load so as not to induce bending in the test sample.

- c) **Performance Requirements.**
 - i. All measured values must be greater than 200 lbs/in (35 N/mm) or as defined by customer requirements.
 - ii. The engineer for the project must verify the shear strength required using structural analysis as defined in AAMA TIR-A8-04.
- d) **Test Records.** The results of all shear tests should be recorded in a Test Records book. Each entry should include the test date, the profile tested, the shear value attained, whether or not it was acceptable, and the name of the person conducting the test.