

Self-Clinching Fasteners

Purpose:

This document outlines Alpha Technologies Ltd. ("ATL") standard requirements related to custom manufactured, fabricated or otherwise processed parts that incorporate self-clinching fasteners or other permanently inserted fasteners.

Scope:

This document applies to all Suppliers who supply to ATL manufactured, fabricated or processed parts as part of meeting the contractual requirements of an ATL-issued and Supplier-accepted Purchase Order. Specific requirements within this document apply as appropriate to the parts or services being supplied to ATL.

For the purpose of this document, the description "self-clinching fastener" includes all fasteners that utilize self-clinching, broaching, flaring, surface-mount, press-in, welded, molded-in or heat/ultrasonic installation methods to provide strong and reusable permanent threads and mounting points in sheetmetal, printed circuit boards, machined and/or molded parts.

Definitions:

ATL: Alpha Technologies Limited.

Original Fastener: The fastener specifically called for by the engineering documentation; the original fastener specification may include identification of one or more specific suppliers (such as PennEngineering) that have been identified as qualified vendors by ATL.

Substitute Fastener: A fastener proposed by a Supplier as a substitute to the fastener called for by the engineering documentation (the original fastener).

Supplier: An organization that supplies finished goods, raw materials and/or services to ATL.

Qualified Vendor: A fastener supplier that has been pre-qualified by ATL as a provider of original fasteners; individual fasteners obtained from a qualified vendor do not have to go through the testing procedures outlined in this document; rather, the entire catalog of fasteners have been pre-approved for use by ATL Engineering.

PennEngineering: A qualified vendor that supplies fasteners, and is recognized as THE industry standard with respect to self-clinching fasteners. Typically, PennEngineering components are the defacto self-clinching fastener components (original fasteners) called for on ATL part drawings.

1.0 General Requirements

1.1 Self-Clinching Fastener Installation Guidelines

The Supplier shall conform to the following guidelines when fabricating parts incorporating self-clinching fasteners into sheetmetal parts:

- Provide a mounting hole of the proper size (as specified in the data sheet provided by the fastener vendor) for each fastener.
- Do not deburr mounting holes on either side of sheet before installing fasteners – deburring will remove metal required for clinching fastener into sheet.
- Make certain that shank (or pilot) is within hole before applying installation force.
- Do not install steel or stainless steel fasteners in aluminum panels before anodizing.
- Do not over squeeze; it will crush the head, distort threads, and buckle the sheet. Apply proper installation forces as indicated by the component data sheet. Be certain to determine optimum installation force by test prior to production runs.
- Under any circumstances, do not attempt to insert fastener with a hammer blow. A hammer blow will not permit the sheet metal to flow and develop an interlock with the fastener's contour.

2.0 Substitutions to Original Fasteners

2.1 Key Characteristics Requirements:

UNLESS EXPLICITLY PROHIBITED BY THE DRAWING, substitute fasteners may be used providing that:

- The substitute fastener shall be capable of accepting a **maximum tightening torque** equal to or greater than the maximum tightening torque of the original fastener, as specified in the original fastener's data sheet published by the original fastener supplier.
- The substitute fastener shall be capable of withstanding a **pullout/pushout force** of equal or greater magnitude compared to the original fastener, as specified in the original fastener's data sheet published by the original fastener supplier.
- The substitute fastener shall be capable of withstanding a **Torque-out** of equal or greater magnitude compared to the original fastener, as specified in the original fastener's data sheet published by the original fastener supplier.

- The substitute fastener shall be comprised of the same **base material** and have **corrosion protection** equal to or greater than the original fastener as specified by the original fastener's data sheet published by the original fastener supplier.
- The substitute fastener shall have the same key **dimensions** and **tolerances** as the original fastener (as specified by the ATL drawing or original fastener data sheet).

In the event that a data sheet is not available for the original fastener, or the data sheet is missing one or more relevant parameters, then the data sheet from PennEngineering for an equivalent fastener may be used as a proxy for said information.

2.2 Testing Requirements:

It is at the onus of the supplier to prove that the conditions of Section 2.1 are met.

The Supplier shall perform appropriate tests on a statistically valid sample size (minimum quantity 10 per key characteristic assessed) of the substitute fastener and provide to ATL Engineering test results showing that the performance of the substitute fastener meets the requirements. A test report shall be provided to ATL by the Supplier including at a minimum: description of test procedure and photos of test setup, raw data and summary statistics (average, minimum and maximum), comparison data (from original fastener data sheet), and conclusions. Performance comparisons will be based on:

- * the sample *average* values of the key characteristics (maximum tightening torque, pullout/pushout force and torque-out) being equal to or greater than the average values published by the original fastener supplier; and,
- * the sample *minimum* values of the key characteristics (maximum tightening torque, pullout force and torque-out) being no more than 20% below the sample average.

In addition, the Supplier shall provide to ATL Engineering, at the Supplier's cost, a representative part that incorporates the substitute fastener(s) for review and inspection.

3.0 Order of Precedence and Exceptions

A drawing that refers to this document may also have noted exceptions. Any specified values, tolerances, requirements, exclusions or notes documented on a drawing take precedence over any specifications contained within this document.

Suppliers must secure written authorization in the form of a Temporary Deviation Notice (TDN) from ATL for any exceptions prior to delivery. Parts that do not meet these standards will be either returned to the Supplier for rework at the Supplier's expense or reworked by ATL with cost recovery to be determined between the Supplier and ATL.

END OF DOCUMENT