



LULYLOK™

One sided Lockwireless anti rotational design for fluid, gas and pneumatic connection fittings



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LULYLOK™: One Sided Lock-wireless Antirotational Design

LULYLOK™ is technology created by JPB Système as part of its mission to provide innovative solutions to secure fluid, gas and pneumatic connections in the aviation industry. LULYLOK™ can be adapted to many types of fittings to eliminate the use of the lock-wire or complex positive locking mechanism, reduce maintenance time and eliminate potential FOD.

LULYLOK™ is a B-Nut for fittings including a self-locking device, which provides the benefit to prevent inadvertent loosening in harsh environments (vibration, high temperature, corrosive agents, etc.).

LULYLOK™ prevents loosening after multiple repeated assembly cycles. This concept has been tested in accordance with standard specifications such as AS85720 for traditional fittings tests and with ARP1185 for rotary flexure test (10 million cycles of flexure fatigue).

LULYLOK™ is a monobloc part, which acts automatically and transparently to the mechanic. It needs no special tool or technique to be assembled on tubing.

LULYLOK™ is designed to work with all kind of ferrules. For example, it is optimized to be mounted on ferrules with facets on their outer cylindrical face. The B-Nut interacts with the facets to create a prevailing torque opposing the direction of unscrewing the B-Nut. It requires no special features on the male half of the tubing.



LULYLOK™ can be assembled to any standard tubing, which includes a standard nipple. The individual B-Nut weights are reduced and the overall dimensions are the same as a standard B-Nut (type AN818). The LULYLOK™ is fully compatible with all existing fittings, adaptor and ferrule, with either shoulder or thrust wire.

LULYLOK™ is available in different materials to be adapted to each level of temperature. For example:

- Stainless steel 347 (AMS5646) up to 450°F (230°C).
- Nickel alloy 625 (AMS5666) up to 1250°F (677°C).

LULYLOK™: Self-Locking System Features

Eliminate the need of lock-wire

LULYLOK™ B-Nut does not need lock-wire thereby eliminating FOD, reducing maintenance costs and installation time and the possibility of injury due to a sharp wire end after cutting.

Loosening prevention

With the spring leg feature, the LULYLOK™ generates a self-locking prevailing torque by acting on the ferrule (facets on the ferrule for example). If there is no leakage during the initial static tightening, then there will be none during dynamic load.

Monobloc design

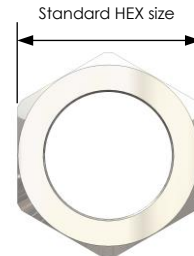
LULYLOK™ is a self-contained piece, which uses no deformed thread technology, no spring, and no complex assembly, which can generate FOD.

HEX Sizes – standard tooling

LULYLOK™ has standard HEX sizes and needs a standard wrench to be assembled on tubing.

Standard dimensions

LULYLOK™ has the same overall dimensions as specified in the AN818 standard. LULYLOK™ can fit to standard hardware and tube end configurations.



One-sided Solution

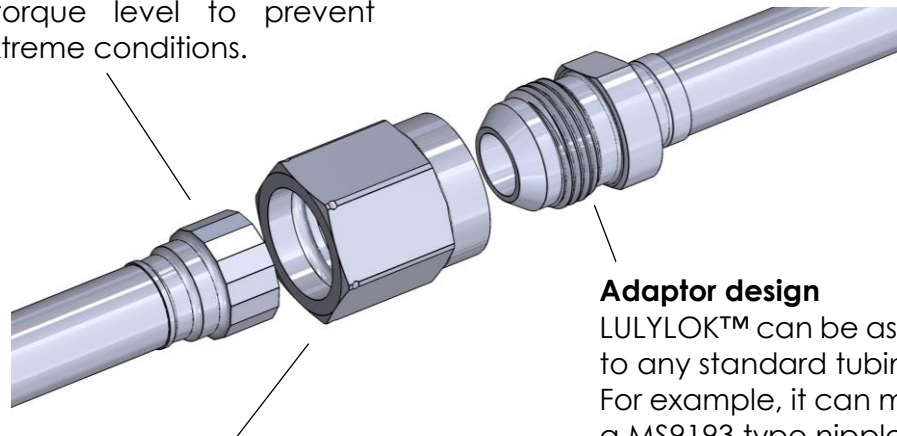
LULYLOK™ mates on all standard male fitting (type MS9193 for example). It locks onto the geometry of the ferrule, which is customized for each customer's applications.



LULYLOK™: Self-Locking System Design

Ferrule design

LULYLOK™ is designed to interact with different geometries of the ferrule. For example, it can be optimized to interact with a faceted ferrule in order to provide a sufficient torque level to prevent loosening in extreme conditions.



Adaptor design

LULYLOK™ can be assembled to any standard tubing. For example, it can mate with a MS9193 type nipple.

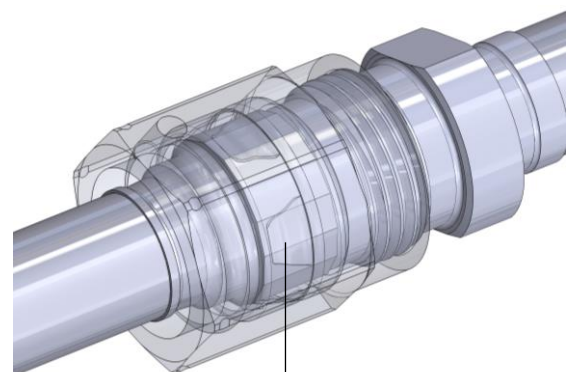
Self contained piece

LULYLOK™ is a self-contained piece which does not use deformed thread technology, or retained spring or complex assemblies which can generate FOD.

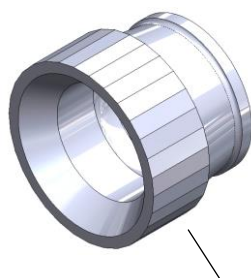
LULYLOK™: Self-Locking System Principle

Locking feature

The locking feature is composed with spring legs, which interact with the geometry on the ferrule to generate a prevailing torque, which prevents loosening in extreme conditions.



LULYLOK™ : spring leg interface generating self-locking torque



Example of ferrule : faceted ferrule

LULYLOK™: Self-Locking System Qualification

The LULYLOK™ B-Nut complies with the standard specification SAE AS85720

Proof Pressure	Twice the nominal operating pressure of the system for 5 minutes minimum without leakage, without evidence of permanent deformation or other malfunction that shall affect assembly or disassembly of the fitting. The LULYLOK™ maximum operating pressure is 3,000PSI (206bar).
Burst Pressure	Four times the nominal operating pressure of the system for 5 minutes minimum without leakage or rupture.
Impulse Test	200,000 impulses pressure cycles minimum without leakage from fitting.
Repeated Connection	25 repeated connections at the minimum and maximum torque values without leakage during the pressure test, without inability to assemble the fitting to point of interface by hand or B-Nut deformation preventing tool engagement.
Pneumatic Leakage	Pneumatic pressure equal to the maximum operating pressure for 5 minutes minimum at room temperature without any visible bubbles starting after 1 minute at pressure or other malfunction that would affect assembly or disassembly.
Fire	2,000°F, 4,500 btu/hour for 15 minutes without leakage detected by visual observation or failure of the test assembly.
Flexure Test	AZ85720 design bending stress test for 10 million cycles at operating pressure.

Complementary tests

Ultimate Torque	Torque to 150% of the final torque without cracking, damage or distortion that affects locking feature performance.
Locking Feature Performance	No back-off of the B-Nut at minimum torque assembly in harsh environments (applying the expected vibration spectrum).
Leakage Performance	No leakage of LULYLOK™ at a torque higher than the torque that the baseline leaking torque of the baseline B-Nut (leakage defined as one drop in five minutes. Five minutes begins after wetting has been identified and wiped away).
Reusability / Wear	No increase or reduction of the prevailing torque by more than 20% of the original prevailing torque after 25 reuses - more than 15,000 oscillations of the locking feature without failure (example for the size -10).

LULYLOK™: Self-Locking System Options

Available B-Nut type

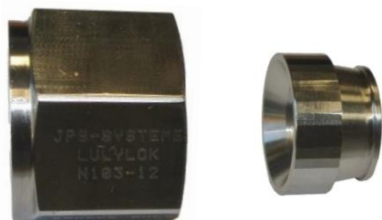
- ▶ B-Nut for fittings with Shoulder
- ▶ B-Nut for fittings with Thrust Wire

Available Sizes

- ▶ -04 through -16 available
- ▶ Other sizes on request

Available Material

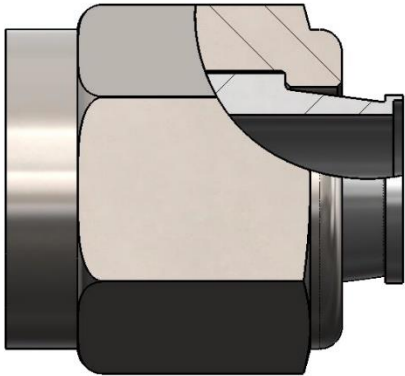
- ▶ Stainless Steel 347 - AMS5646
- ▶ Inconel 625 - AMS5666
- ▶ Other materials on request



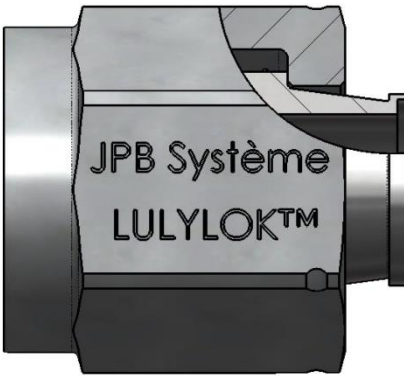
LULYLOK™ B-Nut and ferrule -12

LULYLOK™: Comparison with Standard B-Nut

Below, the comparison of the overall dimensions between a LULYLOK™ B-Nut and a standard B-Nut (following AN818 standard):



Standard fitting



LULYLOK™ fitting

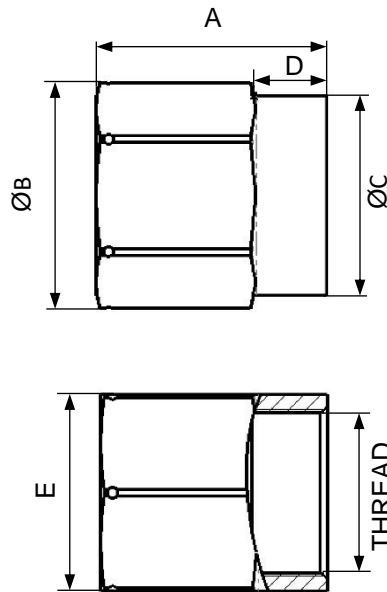
The overall dimensions are the same compared with standard B-Nut

Size Reference	Reduced Weight - lbs.	
	Ni Alloy	Stainless Steel
-04	- 0.0041	- 0.0038
-05	- 0.0055	- 0.0051
-06	- 0.0058	- 0.0055
-08	- 0.0098	- 0.0092
-10	- 0.0125	- 0.0118
-12	- 0.0167	- 0.0158
-16	- 0.0295	- 0.0281

Table: LULYLOK™ weight compared with Standard B-Nut

Weight reduction using LULYLOK™

LULYLOK™: B-Nut details



Size Reference	THREAD per AS8879	A in (Tol)	ØB in min.	ØC in ± .005	D in ± .008	E in + .003 / -.004
-04	0.4375-20UNJF-3B	0.620 (±0.003)	0.631	0.557	0.126	0.563
-05	0.5000-20UNJF-3B	0.683 (±0.003)	0.703	0.620	0.126	0.625
-06	0.5625-18UNJF-3B	0.724 (±0.010)	0.775	0.682	0.157	0.688
-08	0.7500-16UNJF-3B	0.849 (±0.010)	0.987	0.870	0.157	0.875
-10	0.8450-14UNJF-3B	0.974 (±0.010)	1.130	0.995	0.177	1.000
-12	1.0625-12UNJF-3B	1.021 (±0.010)	1.414	1.245	0.197	1.250
-16	1.3125-12UNJF-3B	1.131 (±0.010)	1.699	1.495	0.220	1.500

*Table 1: LULYLOK™ overall **Dimensions** (in)*

Size Reference	Stainless Steel (in.lbf)	Ni Alloy (in.lbf)
-04	2.50	5.30
-05	2.80	5.20
-06	3.60	5.70
-08	3.50	6.10
-10	3.10	5.75
-12	4.30	6.60
-16	7.40	10.50

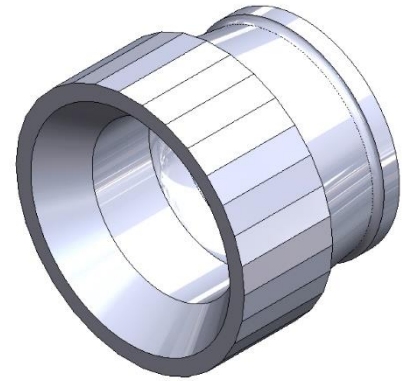
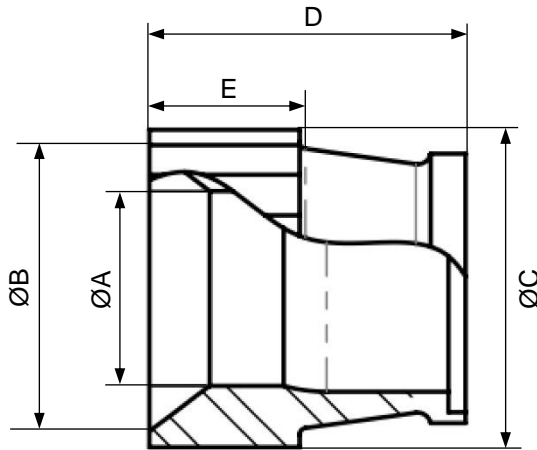
*Table 2: Prevailing **Torque***

Size Reference	Stainless Steel lb (g)	Ni Alloy lb (g)
-04	0.0235 (10.65)	0.0248 (11.25)
-05	0.0296 (13.41)	0.0313 (14.18)
-06	0.0365 (16.57)	0.0386 (17.52)
-08	0.0606 (27.50)	0.0641 (29.09)
-10	0.0811 (36.77)	0.0923 (41.88)
-12	0.1548 (70.22)	0.1639 (74.33)
-16	0.2090 (94.78)	0.2433 (110.34)

*Table 3: Approximative **Mass***

TEMPERATURE
STAINLESS STEEL: Min: -67°F (-55°C) Max: 450°F (232°C)
NI ALLOY: Min: -67°F (-55°C) Max: 1250°F (677°C)

LULYLOK™: Ferrule details



Size Reference	Tube OD in	Nb facets	Resolut°	ØA +0.004/-0	ØB ± .01	ØC min.	D ± .010	ØE ± .005	Stainless Steel lb (g)	Ni Alloy lb (g)
-04	0.250	20	18°	0.171	0.295	0.351	0.499	0.157	0.0059 (2.66)	0.0062 (2.80)
-05	0.312	20	18°	0.233	0.354	0.426	0.655	0.205	0.0108 (4.90)	0.0114 (5.17)
-06	0.375	24	15°	0.297	0.433	0.483	0.648	0.228	0.0129 (5.86)	0.0136 (6.18)
-08	0.500	24	15°	0.390	0.570	0.663	0.705	0.285	0.0273 (12.38)	0.0288 (13.06)
-10	0.625	32	11,25°	0.484	0.681	0.776	0.698	0.302	0.0377 (17.09)	0.0397 (18.03)
-12	0.750	40	9°	0.609	0.850	0.953	1.075	0.306	0.0709 (32.15)	0.0748 (33.92)
-16	1.000	48	7.5°	0.875	1.102	1.179	1.075	0.342	0.0982 (44.55)	0.1036 (47.00)

Table: Ferrule overall dimensions (in)

Notes: LULYLOK™ is designed to interact with different geometries of the ferrule. For example, it can be optimized to interact with faceted ferrule shown above in order to provide torque level to prevent loosening in extreme conditions.

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