IDK-LOK

CORPORATION

IDK-LOK

CHAPTER

I

DK-Lok Nadcap

Nadcap Accreditation Detalis

Introduction

• DK-Lok R&D Projects on Aerospace Fittings

Period		Description
1	From Aug. 2015 to Jul. 2018	Developing 2 aerospace standards fittings, AS4234 & AS4407
2	From Jul. 2017 to Dec. 2021	Developing 9 aerospace standards fittings, AS5008, AS4217, AS5174, AS1034, AS1035, AS4408, AS4219, AS4226, AS4410
3	From Apr. 2022 to Dec. 2023	Developing 2 swivel fittings for landing gear on aircraft

• Nadcap Application Process

Event		Comment
2016	AS9100 Issued	Certificate of Quality Management System for Aerospace Industry
2019	Nadcap Application	Application for 'Fluid Distribution System' of Nadcap
2022 May	Nadcap Audit (Delayed due to Covid-19)	PRI* Auditor visits 3 days for system verification of DK-Lok production Flow
2022 Aug.	DK-Lok's Nadcap Accreditation Issued	Registered PRI QML (Qualified Manufacturers List)

* PRI(Performance Review Institute) _ www.p-r-i.org

Category of Nadcap

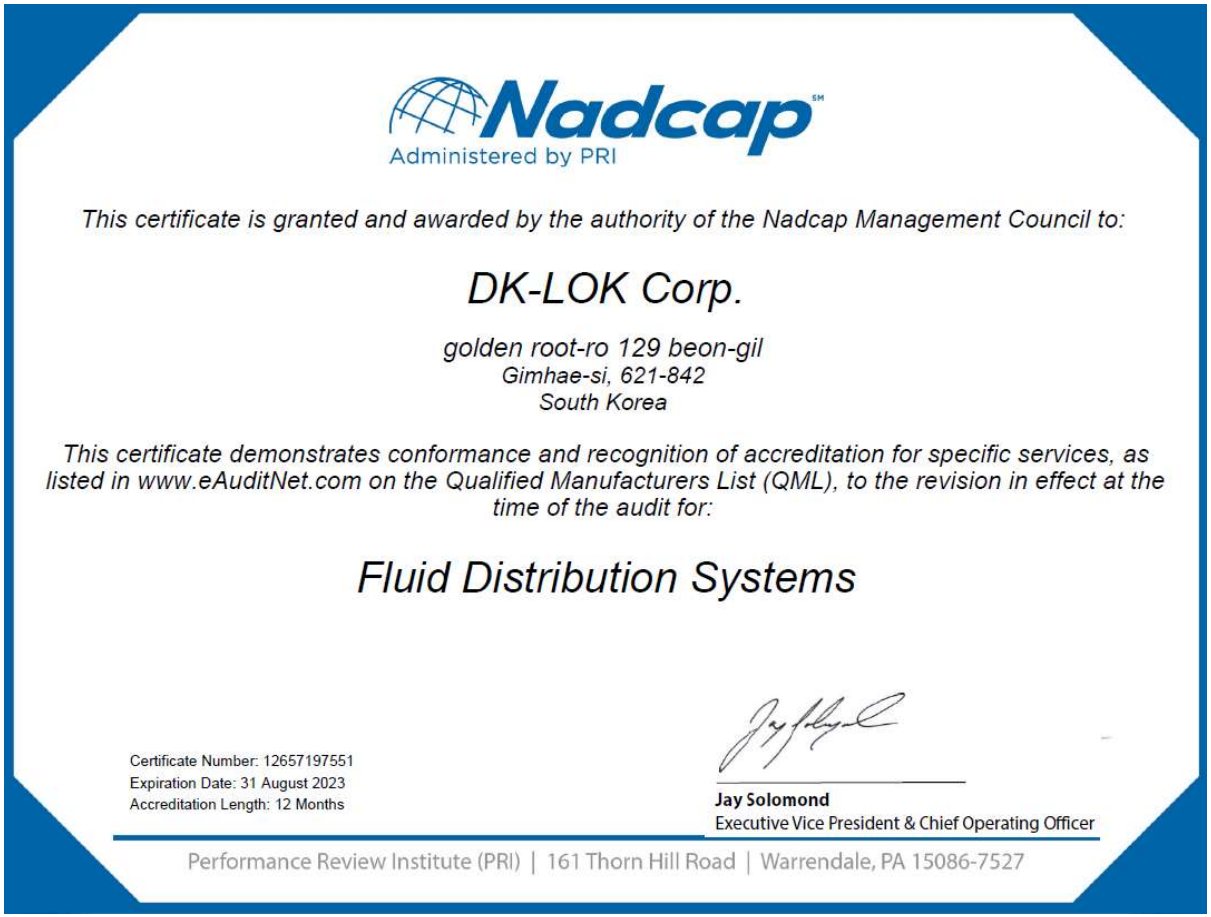
Category	Commodities	Check List for Approval
Quality System	1. Aerospace quality systems	AC7004
	2. Fundamental aerospace quality system	AC7005
	3. First Article Inspection	AC7150
Special Processes	1. Chemical processing	AC7108
	2. Coatings	AC7109
	3. Conventional machining as a special process	AC7126
	4. Heat treating	AC7102
	5. Materials testing laboratories	AC7101, AC7006
	6. Measurement & inspection	AC7130
	7. Metallic materials manufacturing	AC7140
	8. Nondestructive testing	AC7114
	9. Nonconventional machining and surface enhancement	AC7116~AC7117
	10. Non metallic materials manufacturing	AC7124
	11. Non metallic materials testing	AC7122
	12. Surface enhancement	AC7117
	13. Welding	AC7110
Products	1. Aero structure assembly	AC7135
	2. Composites	AC7118
	3. Elastomer seals	AC7115
	4. Electronics - Cable and Harness Assemblies	AC7119
	5. Electronics - Printed Board Assemblies	AC7120
	6. Electronics - Printed Boards	AC7121
	7. Fluids distribution systems	AC7112
	8. Sealants	AC7202

Nadcap certified category of DK-Lok

DK-Lok Nadcap Certificate & Scope of Accreditation

I

* First Company in S. Korea accredited for '**Fluid Distribution Systems**' category



Nadcap
Administered by PRI

This certificate is granted and awarded by the authority of the Nadcap Management Council to:

DK-LOK Corp.

golden root-ro 129 beon-gil
Gimhae-si, 621-842
South Korea

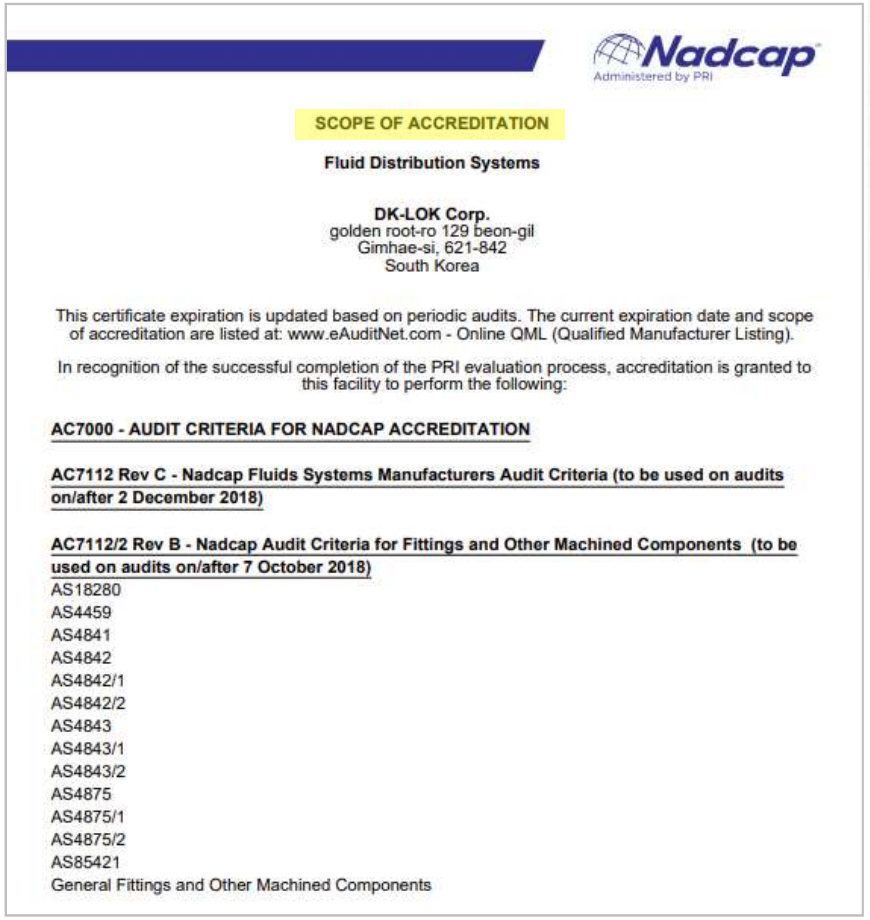
This certificate demonstrates conformance and recognition of accreditation for specific services, as listed in www.eAuditNet.com on the Qualified Manufacturers List (QML), to the revision in effect at the time of the audit for:

Fluid Distribution Systems

Certificate Number: 12657197551
Expiration Date: 31 August 2023
Accreditation Length: 12 Months

Jay Solomond
Executive Vice President & Chief Operating Officer

Performance Review Institute (PRI) | 161 Thorn Hill Road | Warrendale, PA 15086-7527



Nadcap
Administered by PRI

SCOPE OF ACCREDITATION

Fluid Distribution Systems

DK-LOK Corp.
golden root-ro 129 beon-gil
Gimhae-si, 621-842
South Korea

This certificate expiration is updated based on periodic audits. The current expiration date and scope of accreditation are listed at: www.eAuditNet.com - Online QML (Qualified Manufacturer Listing).

In recognition of the successful completion of the PRI evaluation process, accreditation is granted to this facility to perform the following:

AC7000 - AUDIT CRITERIA FOR NADCAP ACCREDITATION

AC7112 Rev C - Nadcap Fluids Systems Manufacturers Audit Criteria (to be used on audits on/after 2 December 2018)

AC7112/2 Rev B - Nadcap Audit Criteria for Fittings and Other Machined Components (to be used on audits on/after 7 October 2018)

AS18280
AS4459
AS4841
AS4842
AS4842/1
AS4842/2
AS4843
AS4843/1
AS4843/2
AS4875
AS4875/1
AS4875/2
AS85421
General Fittings and Other Machined Components

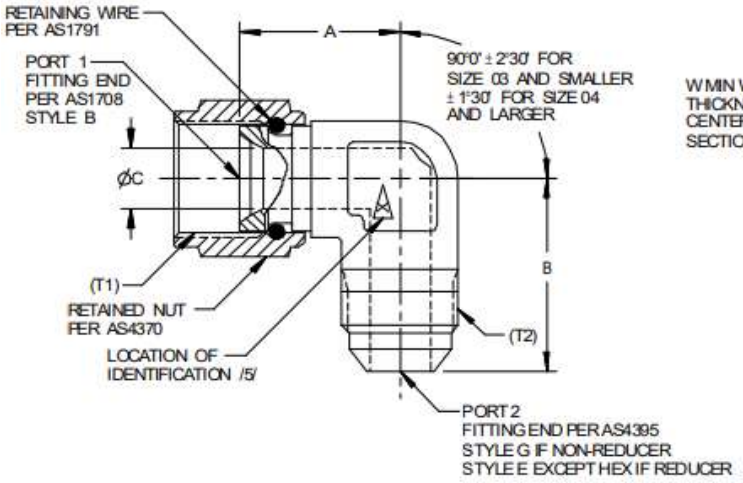
Scope of Accreditation Details

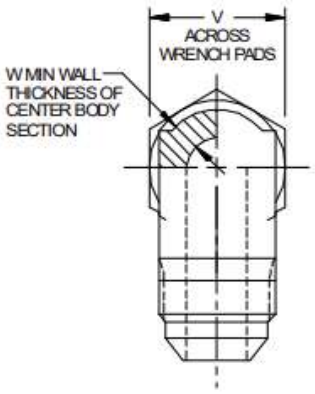
Procurement Specification	Description
AS18280	Fittings, Flareless Tube, Fluid Connection
AS4459	Fittings, Tube, Fluid System 3000 psig (21 000 kPa) Rated Pressure, Externally Swaged, Specification For
AS4841	Fittings, 37 Degree Internal Flare, Fluid Connection, Procurement Specification
AS4842	Fittings and Bosses, Pipe Threaded, Fluid Connection, Procurement Specification
AS4842/1	Fittings, 37° Flared to Pipe Threaded, Fluid Connection
AS4842/2	Fittings, Flareless to Pipe Threaded, Fluid Connection
AS4843	Fittings, Beaded, Fluid Connection
AS4843/1	Fittings, Beaded to 37° Flared, Fluid Connection
AS4843/2	Fittings, Beaded to Pipe Threaded, Fluid Connection
AS4875	Fittings, Straight Threaded Boss or Flanged, Fluid Connection, Procurement Specification
AS4875/1	Fittings, Straight Thread Boss or Flanged 37° Flared, Fluid Connection
AS4875/2	Fittings, Flanged to Beaded, Fluid Connection
AS85421	Fittings, Tube, Fluid Systems, Separable, Beam Seal, 3000/4000 psi, General Specification For
General Fittings and Other Machined Components	Fluid Connection Products Designed by Clients

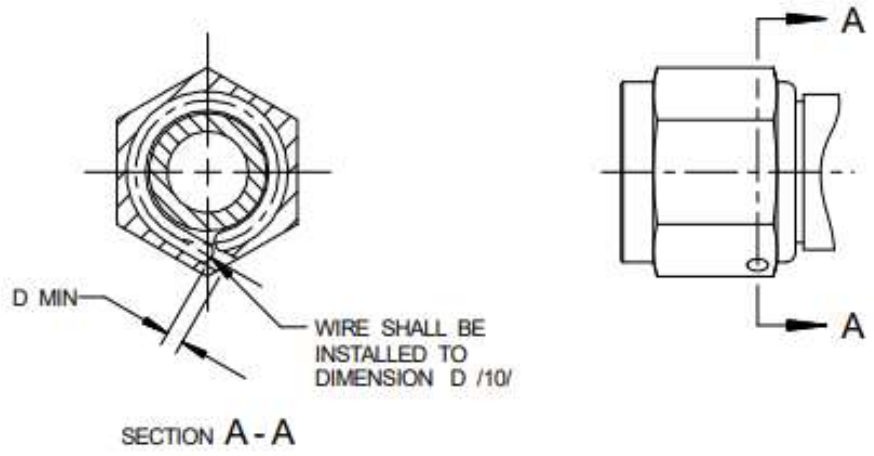
Example of Product Belong to AS4841 (I)

I

AS4407







MATERIAL:

A. DASH AS CODE LETTER:
   (1) BODY: TYPE 4130 STEEL FORGING OR BAR PER AMS6370 OR AMS-S-6758.
   (2) NUT: DASH AS CODE LETTER OF AS4370 (TYPE 4130 STEEL).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

B. CODE LETTER D /18/:
   (1) BODY: TYPE 2014-T6 ALUMINUM ALLOY FORGING PER AMS4133; OR TYPE 2024-T6 ALUMINUM ALLOY BAR PER AMS-QQ-A-225/6; OR 2024-T851 ALUMINUM ALLOY BAR PER AMS-QQ-A-225/6 OR AMS4339.
   (2) NUT: CODE LETTER D OF AS4370 (TYPE 2024 ALUMINUM ALLOY).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

C. CODE LETTER J:
   (1) BODY: TYPE 304 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS5639 OR AMS-QQ-S-763.
   (2) NUT: CODE LETTER J OF AS4370 (TYPE 304 CORROSION RESISTANT STEEL).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

D. CODE LETTER K:
   (1) BODY: TYPE 316 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS5648 OR AMS-QQ-S-763.
   (2) NUT: CODE LETTER K OF AS4370 (TYPE 316 CORROSION RESISTANT STEEL).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

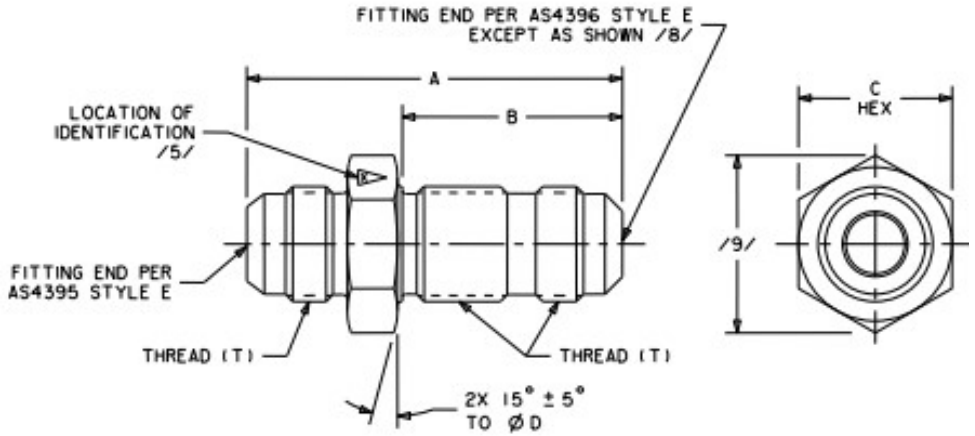
E. CODE LETTER S:
   (1) BODY: TYPE 347 CORROSION RESISTANT STEEL FORGING OR BAR PER AMS5646 OR AMS-QQ-S-763.
   (2) NUT: CODE LETTER S OF AS4370 (TYPE 347 CORROSION RESISTANT STEEL).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

F. CODE LETTER T:
   (1) BODY: TYPE 6AL-4V TITANIUM ALLOY BAR OR FORGING PER AMS4928.
   (2) NUT: CODE LETTER T OF AS4370 (TYPE 6AL-4V TITANIUM ALLOY).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

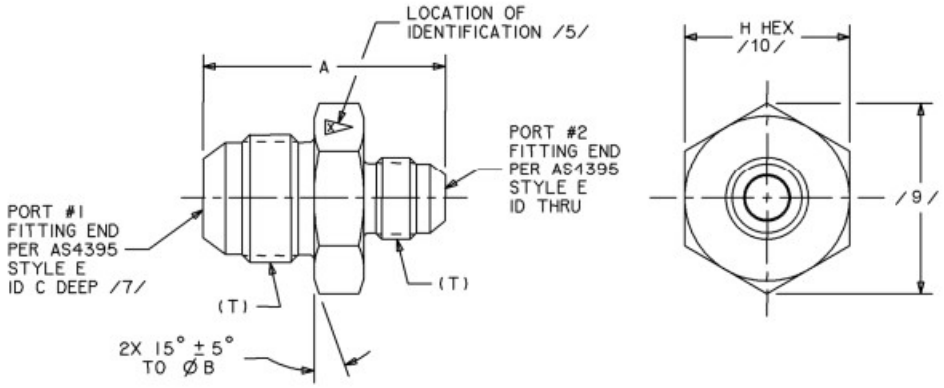
G. CODE LETTER W:
   (1) BODY: TYPE 7075-T73 ALUMINUM ALLOY FORGING PER AMS4141; OR 7075-T7351 ALUMINUM ALLOY BAR PER AMS4124; OR 7075-T73 ALUMINUM ALLOY BAR PER AMS-QQ-A-225/9.
   (2) NUT: CODE LETTER W OF AS4370 (TYPE 7075 ALUMINUM ALLOY).
   (3) WIRE: PER AS1791 (CLASS 302 OR 305 CORROSION RESISTANT STEEL).

Examples of Product Belong to AS4841 (II)

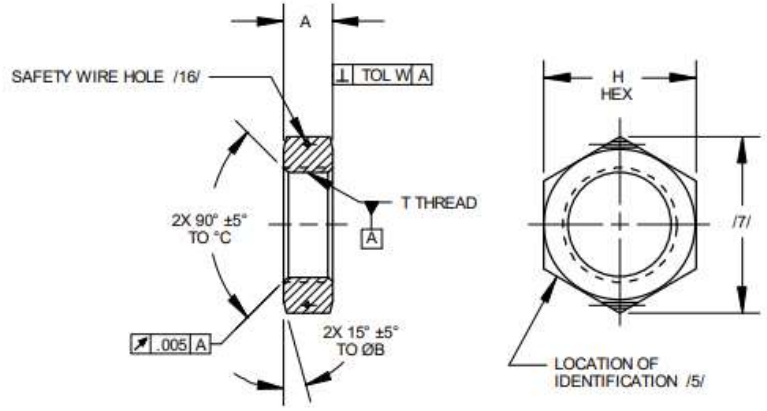
AS5406



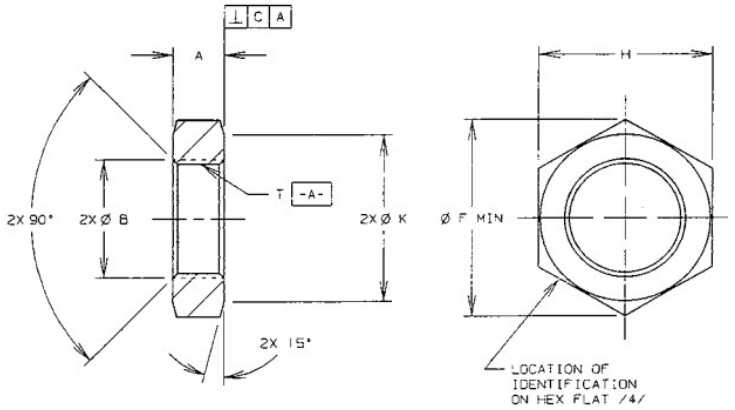
AS5174



AS5178



AS5019



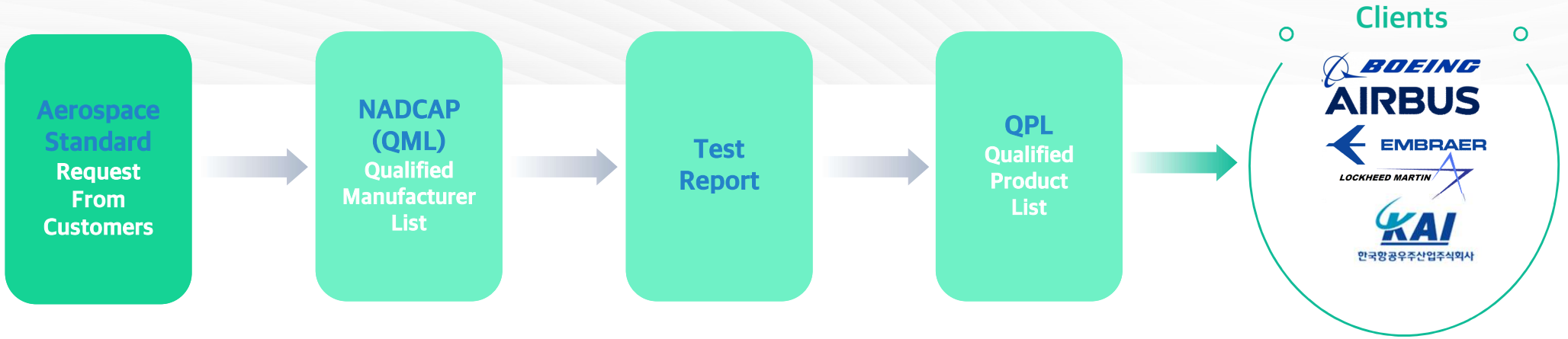
CHAPTER

II

DK-Lok Aerospace Business

FLARED FITTINGS FOR KF-21

Process of AS Fitting Development



1. Flare Type & Nut
2. External Swage Type
3. Beam Seal Type

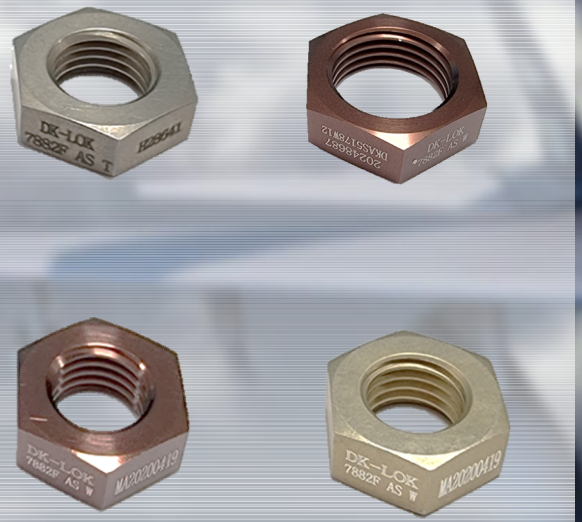
1. Flare Type
2. External Swage Type (NADCAP + Test Report)
3. Beam Seal Type (NADCAP + Test Report)

- After Nadcap accreditation, DK-Lok to supply flare fittings to any clients in aerospace industry.
- DK-Lok supplied nuts (AS4841) & flare fittings (AS4841) to KAI* since March, 2021.
- Need client QPL approval for external swage & beam seal type fittings.
- DK-Lok approved KAI QPL for 35 external swage type fittings on January, 2022.
- DK-Lok is testing beam seal type fittings for KAI QPL in 2022.
- Need QPL approval of each client (e.g. Boeing, Lockheed Martin, Airbus…) to supply external swage & beam seal fittings

*KAI: Korea Aerospace Industries

AS4841 Products Supplied to KAI on 2021 March

Nut



Flared Fitting

KF-21

The KF-21 is a fighter aircraft developed to retain the operational capability of the Republic of Korea Air Force(ROKAF) and satisfy the future operation concept of force battlefield as a multi-role fighter jet which features enhanced survivability, combined/joint operations, sustainment and logistics support system, air superiority and ground precision strike.

KAI QPL Approved External Swage Fittings

*****0001

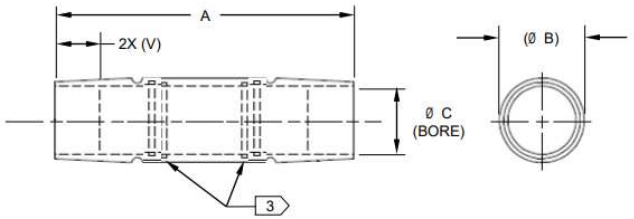


FIGURE 1, CONFIGURATION OF UNION

TABLE I , DASH NUMBER AND CHARACTERISTICS, inch

Dash No. (Size Code)	Nominal Tube Size	A	(Ø B)	Ø C	(V)	(Weight) lb
4	.250	1.530 1.540	.338	.257 .260	.190 .240	.009
6	.375	1.680 1.690	.480	.382 .385	.220 .270	.018
8	.500	2.686 2.700	.655	.508 .511	.410 .435	.060
10	.625	2.766 2.780	.787	.633 .636	.410 .435	.080
12	.750	2.906 2.920	.929	.758 .761	.365 .390	.110
16	1.000	3.195 3.209	1.257	1.008 1.011	.325 .350	.238

*****0002

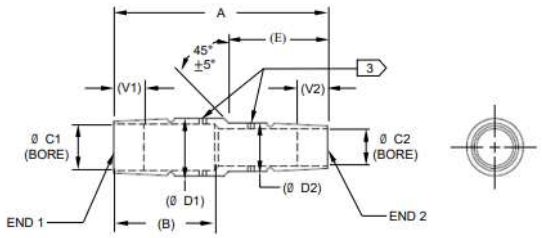


FIGURE 1, CONFIGURATION OF UNION

TABLE I , DASH NUMBER AND CHARACTERISTICS, inch

Dash No.	Nominal Tube Size		A ±.015	(B)	Ø C1	Ø C2	(Ø D1)	(Ø D2)	(E)	(V1)	(V2)	(Weight) lb
	End1	End2										
4-3	.250	.188	1.655	.760	.257 .260	.195 .198	.338	.275	.725	.190 .240	.170 .220	.009
6-4	.375	.250	1.865	.840	.382 .385	.257 .260	.480	.338	.825	.220 .270	.190 .240	.016
8-4	.500	.250	2.430	1.325	.508 .511	.257 .260	.655	.338	.825	.410 .435	.190 .240	.039
8-6		.375	2.440			.382 .385		.480	.890		.220 .270	.044
10-4	.625	.250	2.565	1.395	.633 .636	.257 .260	.787	.338	.825	.410 .435	.190 .240	.052
10-6		.375	2.605			.382 .385		.480	.890		.220 .270	.056
10-8		.500	2.968			.508 .511		.655	1.370		.410 .435	.073
12-4	.750	.250	2.635	1.395	.758 .761	.257 .260	.929	.338	.825	.365 .390	.190 .240	.070
12-6		.375	2.655			.382 .385		.480	.890		.220 .270	.073
12-8		.500	3.045			.508 .511		.655	1.370		.410 .435	.089
12-10		.625	3.045			.633 .636		.787	1.410		.410 .435	.097

*****0005

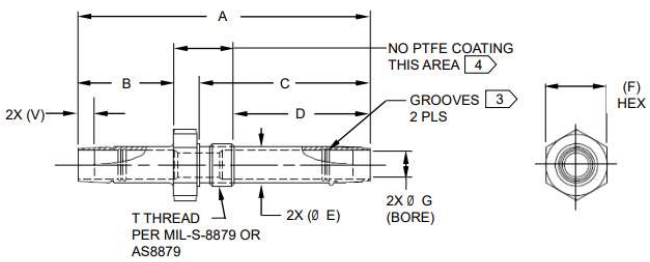


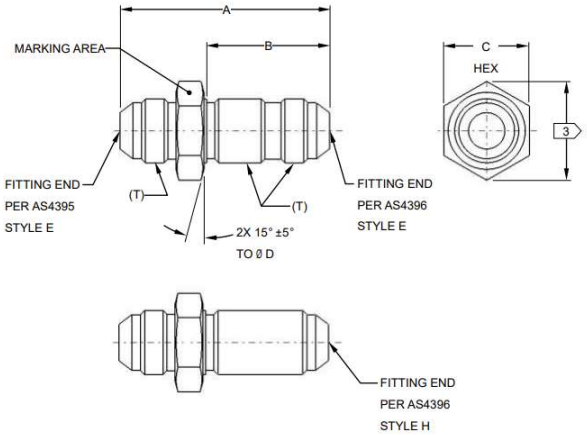
FIGURE 1, CONFIGURATION OF UNION

TABLE I , DASH NUMBER AND CHARACTERISTICS, inch

Dash No.	Nominal Tube Size	A ±.015	B ±.015	C ±.015	D ±.015	(Ø E)	(F)	T Thread
4	.250	3.125	1.200	1.650	1.203	.338	.688	.4375-20 UNJF-3A
4-1		3.725		2.250	1.803			
6	.375	3.325	1.260	1.720	1.256	.480	.813	.5625-18 UNJF-3A
6-1		3.855		2.250	1.786			
8	.500	5.203	2.220	2.615	2.122	.655	1.000	.7500-16 UNJF-3A
8-1		5.383		2.795	2.122			
8-2		5.643		3.055	2.122			
10	.625	5.203	2.220	2.615	2.063	.787	1.125	.8750-14 UNJF-3A
10-1		5.383		2.795	2.063			
10-2		5.650		3.062	2.063			
12	.750	5.203	2.170	2.615	2.020	.929	1.375	1.0625-12 UNJ-3A
12-1		5.393		2.805	2.210			
12-2		5.573		2.985	2.210			
16	1.000	6.410	2.770	3.235	2.640	1.257	1.625	1.3125-12 UNJ-3A
16-1		6.518	2.841	3.371	2.776			
20	1.250	6.410	2.770	3.235	2.640	1.489	1.875	1.6250-12 UNJ-3A
20-1		6.372	2.766	3.280	2.689			

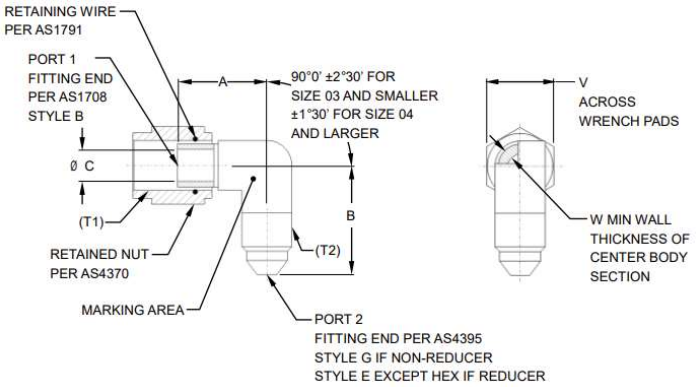
KAI QPL Approved Customized Fittings

*****0701



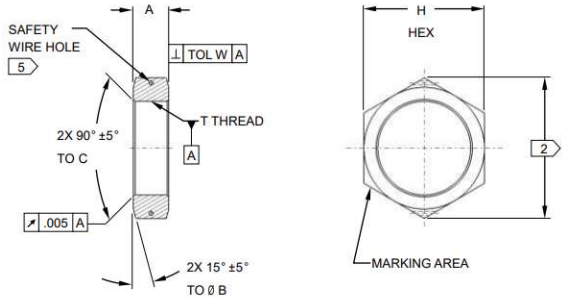
Port Size Code	(Nominal Tube Size)	T Thread per AS8879 Class 3A	A	B	C	D ± .010
02	.125	.3125-24 UNJF	1.828	1.109	.552 - .565	.542
03	.188	.3750-24 UNJF	1.859	1.109	.615 - .628	.605
04	.250	.4375-20 UNJF	2.047	1.203	.678 - .691	.668
05	.312	.5000-20 UNJF	2.047	1.203	.740 - .753	.730
06	.375	.5625-18 UNJF	2.219	1.281	.802 - .815	.792
08	.500	.7500-16 UNJF	2.453	1.437	.990 – 1.003	.980
10	.625	.8750-14 UNJF	2.719	1.578	1.113 – 1.128	1.103
12	.750	1.0625-12 UNJ	3.031	1.750	1.363 – 1.380	1.353
16	1.000	1.3125-12 UNJ	3.078	1.750	1.613 – 1.630	1.603
20	1.250	1.6250-12 UNJ	3.156	1.797	1.863 – 1.880	1.853
24	1.500	1.8750-12 UNJ	3.312	1.812	2.109 – 2.135	2.099
28	1.750	2.2500-12 UNJ	3.578	1.969	2.484 – 2.510	2.474
32	2.000	2.5000-12 UNJ	3.828	2.094	2.734 – 2.760	2.724

*****0702



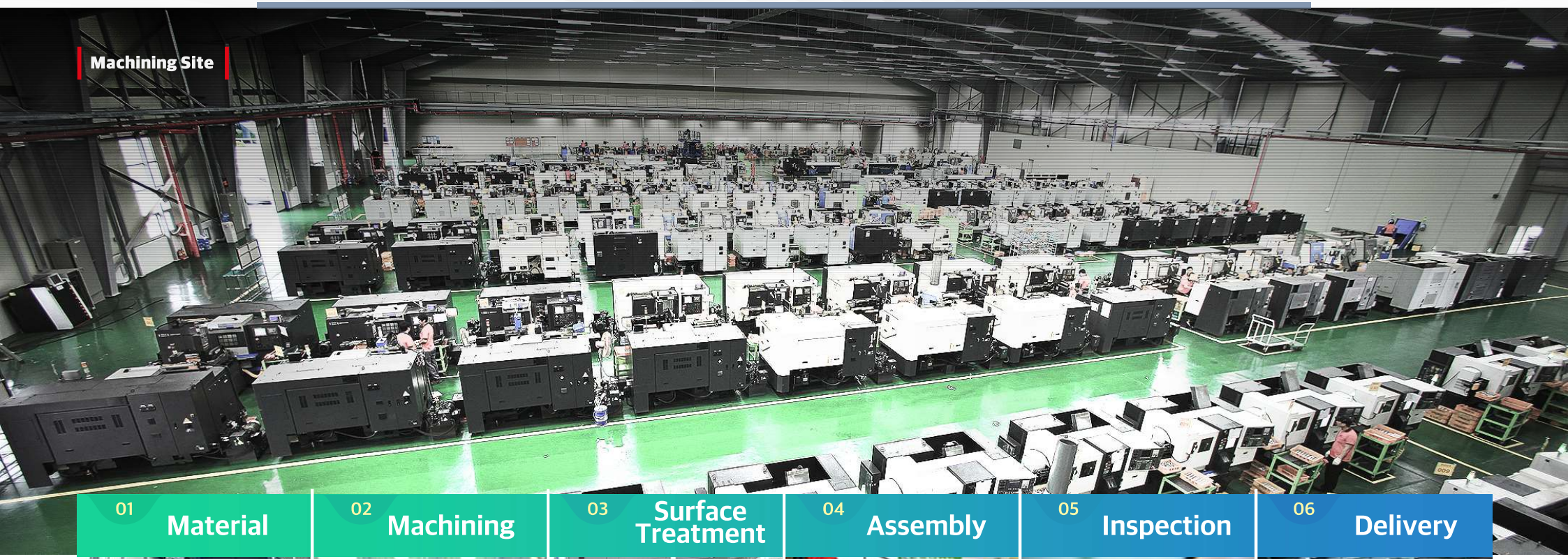
Port Size Code	(Nominal Tube Size)	T1, T2 Thread per AS8879	Ø C	D Min.	V	W
02	.125	.3125-24 UNJF	.058 - .065	.045	.297 - .314	.090
03	.188	.3750-24 UNJF	.121 - .128	.045	.360 - .377	.100
04	.250	.4375-20 UNJF	.168 - .175	.045	.423 - .440	.110
05	.312	.5000-20 UNJF	.230 - .237	.045	.485 - .502	.120
06	.375	.5625-18 UNJF	.293 - .301	.045	.547 - .565	.120
08	.500	.7500-16 UNJF	.387 - .395	.055	.735 - .753	.150
10	.625	.8750-14 UNJF	.480 - .488	.063	.860 - .878	.170
12	.750	1.0625-12 UNJ	.604 - .614	.095	1.047 - 1.065	.185
16	1.000	1.3125-12 UNJ	.839 - .851	.125	1.292 - 1.317	.205
20	1.250	1.6250-12 UNJ	1.073 - 1.086	.155	1.605 - 1.630	.240
24	1.500	1.8750-12 UNJ	1.307 - 1.320	.180	1.855 - 1.880	.250
32	2.000	2.5000-12 UNJ	1.776 - 1.791	.180	2.542 - 2.572	.350

*****0703



Port Size Code	(Nominal Tube Size)	T Thread per AS8879 Class 3B	A	Ø B ±.010	C	H	W
02	.125	.3125-24 UNJF	.219	.542	.312	.552 - .565	.005
03	.188	.3750-24 UNJF	.219	.605	.375	.615 - .628	.005
04	.250	.4375-20 UNJF	.250	.668	.438	.678 - .691	.005
05	.312	.5000-20 UNJF	.250	.730	.500	.740 - .753	.005
06	.375	.5625-18 UNJF	.266	.793	.562	.803 - .816	.005
08	.500	.7500-16 UNJF	.312	.980	.750	.990 - 1.003	.005
10	.625	.8750-14 UNJF	.359	1.103	.875	1.113 - 1.128	.005
12	.750	1.0625-12 UNJ	.406	1.352	1.062	1.362 - 1.380	.008
16	1.000	1.3125-12 UNJ	.406	1.603	1.312	1.613 - 1.630	.008
20	1.250	1.6250-12 UNJ	.406	1.916	1.625	1.926 - 1.943	.008
24	1.500	1.8750-12 UNJ	.406	2.162	1.875	2.172 - 2.198	.008
28	1.750	2.2500-12 UNJ	.406	2.536	2.250	2.546 - 2.572	.008
32	2.000	2.5000-12 UNJ	.406	2.787	2.500	2.797 - 2.823	.008
40	2.500	3.0000-12 UNJ	.406	3.286	3.000	3.296 - 3.322	.008
48	3.000	3.5000-12 UNJ	.406	3.786	3.500	3.796 - 3.822	.008

Nadcap Product Manufacturing Process



01 Material	02 Machining	03 Surface Treatment	04 Assembly	05 Inspection	06 Delivery
					
- CRES, Ti, Al for aerospace - Materials only from Nadcap accredited companies	- Exclusive machining line for Nadcap products - Traceability guaranteed	- Metal surface treatment by Nadcap accredited company	- Wire, Body &Nut assembly - Laser Marking	- 100% 2D & 3D scan for dimension verification - Sampling inspection for destructive test	- Individual Packing - Shipment with all QA documents

THANK YOU

감사합니다

DK-LOK