



Draka



Cables for Space Applications

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Company profile

Draka

The group develops, produces and sells the full range of cable products for standard and specific customers applications.

Draka Aerospace refers to all Draka activities relating to Aeronautics, Space and Military providing just-in-time delivery of product in a high quality production environment.

Corporate name: Draka Fileca SAS

Legal form: Limited company, a fully owned subsidiary of the Draka Holding group.

Registered office : D 1001
60730 Sainte-Geneviève
France
Phone: +33 3 44 08 21 21
Fax: : +33 3 44 08 21 49
Mail:fileca-office@draka.com
www.draka-fileca.com

Capital: 5 439 700€

Creation date: 1959

Quality: Certified ISO 9001 (2000), AS/EN 9100, ESA, QPL

Activity: Development and manufacturing of tape wrapped and/or extruded wires and cables for Aeronautics, Military, Space, Geo physics, and Industrial applications.

Products: Single and multicore, high temperature, high immunity, electrical cables, coaxial cables, data transmission cables.

Cross Reference Table

Table of corresponding ESA/SCC and Draka references:

LIGHT WEIGHT CONSTRUCTION				MEDIUM WEIGHT CONSTRUCTION	
ESA/SCC	Draka	ESA/SCC	Draka	ESA/SCC	Draka
3901/002-31-B3	F A3901-2-2-26-G	3901/002-61-B3	F A3901-2-1-28	3901/001-24-B3	F A3901-1-1-26
3901/002-32-B3	F A3901-2-2-24-G	3901/002-62-B3	F A3901-2-2-28-G	3901/001-25-B3	F A3901-1-1-24
3901/002-33-B3	F A3901-2-2-22-G	3901/002-63-B3	F A3901-2-3-28-G	3901/001-26-B3	F A3901-1-1-22
3901/002-34-B3	F A3901-2-2-20-G	3901/002-64-B3	F A3901-2-1-28-HG	3901/001-27-B3	F A3901-1-1-20
3901/002-35-B3	F A3901-2-2-18-G	3901/002-65-B3	F A3901-2-2-28-HG	3901/001-28-B3	F A3901-1-1-18
3901/002-36-B3	F A3901-2-3-26-G	3901/002-66-B3	F A3901-2-3-28-HG	3901/001-29-B3	F A3901-1-1-16
3901/002-37-B3	F A3901-2-3-24-G	3901/002-67-B3	F A3901-2-4-28-HG	3901/001-30-B3	F A3901-1-1-14
3901/002-38-B3	F A3901-2-3-22-G	3901/002-68-B3	F A3901-2-4-26-HG	3901/001-31-B3	F A3901-1-1-12
3901/002-39-B3	F A3901-2-3-20-G	3901/002-69-B3	F A3901-2-4-24-HG	3901/001-32-B3	F A3901-1-2-16-G
3901/002-40-B3	F A3901-2-3-18-G	3901/002-70-B3	F A3901-2-4-22-HG	3901/001-33-B3	F A3901-1-2-14-G
3901/002-41-B3	F A3901-2-1-26-HG	3901/002-71-B3	F A3901-2-4-20-HG	3901/001-34-B3	F A3901-1-2-12-G
3901/002-42-B3	F A3901-2-1-24-HG	3901/002-72-B3	F A3901-2-5-28-HG	3901/001-35-B3	F A3901-1-3-16-G
3901/002-43-B3	F A3901-2-1-22-HG	3901/002-73-B3	F A3901-2-5-26-HG	3901/001-36-B3	F A3901-1-3-14-G
3901/002-44-B3	F A3901-2-1-20-HG			3901/001-37-B3	F A3901-1-3-12-G
3901/002-45-B3	F A3901-2-1-18-HG			3901/001-38-B3	F A3901-1-1-16-HG
3901/002-46-B3	F A3901-2-2-26-HG			3901/001-39-B3	F A3901-1-1-14-HG
3901/002-47-B3	F A3901-2-2-24-HG			3901/001-40-B3	F A3901-1-1-12-HG
3901/002-48-B3	F A3901-2-2-22-HG			3901/001-41-B3	F A3901-1-2-16-HG
3901/002-49-B3	F A3901-2-2-20-HG			3901/001-42-B3	F A3901-1-2-14-HG
3901/002-50-B3	F A3901-2-2-18-HG			3901/001-43-B3	F A3901-1-2-12-HG
3901/002-51-B3	F A3901-2-3-26-HG			3901/001-44-B3	F A3901-1-3-16-HG
3901/002-52-B3	F A3901-2-3-24-HG			3901/001-45-B3	F A3901-1-3-14-HG
3901/002-53-B3	F A3901-2-3-22-HG			3901/001-46-B3	F A3901-1-3-12-HG
3901/002-54-B3	F A3901-2-3-20-HG			3901/001-47-B3	F A3901-1-1-28
3901/002-55-B3	F A3901-2-3-18-HG				
3901/002-56-B3	F A3901-2-1-26				
3901/002-53-B3	F A3901-2-1-24				
3901/002-58-B3	F A3901-2-1-22				
3901/002-59-B3	F A3901-2-1-20				
3901/002-60-B3	F A3901-2-1-18				

Certificates



**european space agency
agence spatiale européenne**

Certificate of Qualification No. 07N

This is to certify that Draka - Fileca, Ste Genevieve, France has been qualified by ESA for the supply of Wires and Cables, Low Frequency, Polyimide Insulation, Based on Types FA 3901-1, FA 3901-2 for use in ESA space programmes, according to ESCC Generic Specification 3901 and associated Detail Specifications 3901/001 and 3901/002 as recommended by the Space Components Steering Board.

This certificate is valid until February 2012.

**Head of Product Assurance
and Safety Department**

**Date
15 February 2010**

Certificates

BUREAU VERITAS
Certification



Certification

Awarded to

DRAKA FILÉCA
Route Nationale 1
60730 ST GENEVIEVE
FRANCE

Bureau Veritas Certification certify that the assessment was performed in accordance with the relevant Aerospace Supplier Quality system Certification Scheme EN9104 edition August 2006

Standard

AS 9100 Revision B : 2004 / JIS Q 9100 : 2004
EN 9100 1 EN : 2003

Scope of supply

DESIGN, PRODUCTION, MARKETING, SALE AND DISTRIBUTION OF WRAPPED CABLES, EXTRUDED CABLES IN AERONAUTICS, AND SPACE SECTORS.

CONCEPTION, PRODUCTION, COMMERCIALISATION ET DISTRIBUTION DE CABLES RUBANES, DE CABLES EXTRUDES DANS LES DOMAINES AERONAUTIQUE ET SPATIAL.

Original Approval Date: **18th January 2010**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until: **18th January 2013**

To check this certificate validity please call : + 33(0) 4 78 66 82 60

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation

Date: 18th January 2010
File Number: 2057219/B/REV0

Bruno LABARRE
Chief Executive Officer



MANAGING OFFICE ADDRESS: Bureau Veritas Certification France – 60, avenue du Général de Gaulle – 92046 Paris – La Défense
ISSUING OFFICE ADDRESS: Bureau Veritas Certification France – 41, chemin des Paupliers – BP 58 – 69573 Dardilly Cedex

Certificates

BUREAU VERITAS
Certification



Certification

Attribuée à

DRAKA FILÉCA
Route Nationale 1
60730 ST GENEVIEVE
FRANCE

Bureau Veritas Certification certifie que le système de management de la qualité de l'entreprise susmentionnée a été évalué et jugé conforme aux exigences de la norme :

Standard

NF EN ISO 9001 : 2008

Domaine d'activité

CONCEPTION, PRODUCTION, COMMERCIALISATION ET DISTRIBUTION DE CABLES RUBANES, DE CABLES EXTRUDÉS DANS LES DOMAINES AERONAUTIQUE, MILITAIRE, CIVIL, SPATIAL, INFORMATIQUE, TELECOMMUNICATIONS, GEOPHYSIQUE, INSTRUMENTATION, MEDICAL ET ELECTRONIQUE.

DESIGN, PRODUCTION, MARKETING, SALE AND DISTRIBUTION OF WRAPPED CABLES, EXTRUDED CABLES IN AERONAUTICS, MILITARY, CIVIL, SPACE, DATA PROCESSING, TELECOMMUNICATIONS, GEOPHYSICS, INSTRUMENTATION, MEDICAL AND ELECTRONIC SECTORS.

Date de certification originale : **18 janvier 2010**

Sous réserve du fonctionnement continu et satisfaisant du système de management de la qualité de l'entreprise, ce certificat est valable jusqu'au : **18 janvier 2013**

Pour vérifier la validité du certificat appelez au : + 33(0) 4 78 66 82 60

Tout éclaircissement sur cette certification peut être obtenu auprès de l'entreprise certifiée.

Date : 18 janvier 2010
Numéro d'affaire : 2057219/A

Bruno LABARRE
Directeur Général





Space applications Normal Weight Wires and cables

SCC 3901-001

CHARACTERISTICS:

Environmental:

- Operating temperatures: -100°C to + 200°C (ambient temperature + current heating).
- Non-flammable
- Very good solderability.
- Current rating: the currents shown in the tables for single wires generate a temperature in a vacuum environment. According to ESA/SCC specifications, those current values may be considered up to an ambient temperature of 150°C.
- Derating factors must be applied for cables and wires in bundles.
- High resistance to chemical agents, fluids and space radiations.
- The 2 µm thick of silver plating on the conductor and the shield give the best protection against the red plague phenomenon.

Mechanical :

- The wrapped construction technology allows very thin wall insulation, yielding weight and space savings and higher performances.
- Superior mechanical resistance eliminating handling and installation damage.
- Good strippability.

Electrical:

- Maximum operating voltage : 600Vac.
- Insulation resistance of core:
> 750 MΩ.km at 20°C (after 500V—1 min.)

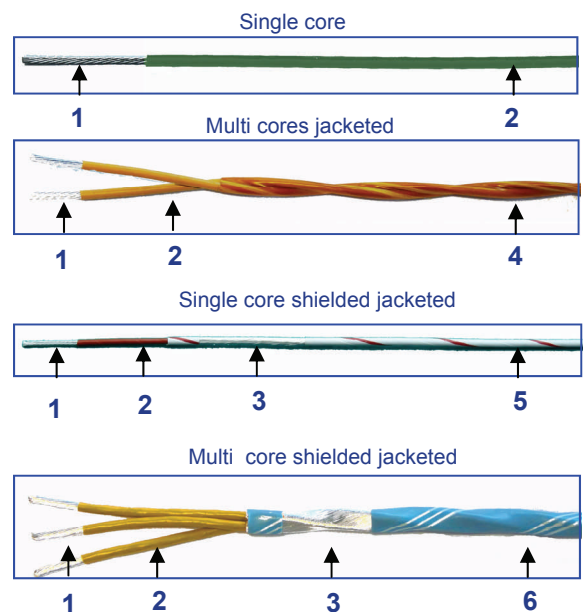
APPLICATIONS:

- Normal weight hook-up wires for use in launch vehicles, satellites and general space applications.

STANDARDS/SPECIFICATONS:

- Meet ESA/SCC N° 3901 and ESA/SCC N° 3901/001.
- The certificate of qualification n° N 7N of February 15 2010 has been renewed to Draka Fileca by ESA.

CONSTRUCTION:



- 1– Conductor (s): Silver plated copper or silver plated copper alloy.
- 2– Polyimide top coat.
- 3– Spiral shield - silver plated copper
- 4– Polyimide tape
- 5– Polyimide top coat
- 6– PTFE tape

OPTION / INSPECTION LEVEL:

The ESA Generic Specification prescribes 3 levels of lot acceptance which, in order of decreasing testing requirements, are designated « B1 », « B2 », « B3 ».

Should the lowest « standard » level be considered insufficient, then add « B2 » or « B1 » to Draka Fileca references.

Example : F A3901-1-20-B2

Space Applications Normal Weight Wires and Cables

SCC 3901-001

PACKAGING:

- On plastic spools (flange diameter :180 or 280 mm).
Spools are heat sealed into polyethylene bags

ORDERING CODE :

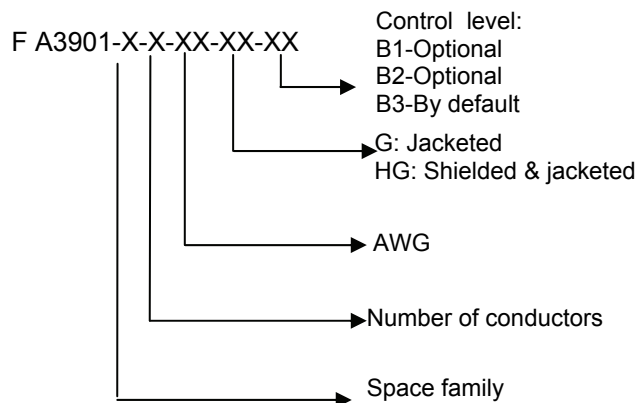


Table I - Wires

Example: F A3901-1-3-16-G-B2

Draka part number	AWG*	ESA/SCC	Conductor silver plated copper		Outer Diameter		Current Rating (Amp.)	Maximum Weight (g/m)
			Stranding (n x mm)	Nominal cross section (mm ²)	Mini (mm)	Maxi (mm)		
F A3901-1-1-28	28	3901/001-47	19x0.08 (1)	0.1	0.6	0.73	1.50	1.37
F A3901-1-1-26	26	3901/001-24	19x0.10 (1)	0.15	0.71	0.84	2.50	2.05
F A3901-1-1-24	24	3901/001-25	19x0.12 (1)	0.21	0.81	0.95	3.50	2.75
F A3901-1-1-22	22	3901/001-26	19x0.16	0.38	1.01	1.15	5.00	4.40
F A3901-1-1-20	20	3901/001-27	19x0.20	0.6	1.20	1.35	7.50	6.65
F A3901-1-1-18	18	3901/001-28	19x0.25	0.93	1.45	1.60	10.00	9.98
F A3901-1-1-16	16	3901/001-29	19x0.30	1.30	1.70	1.85	13.00	14.00
F A3901-1-1-14	14	3901/001-30	27x0.30	1.9	2.03	2.19	17.00	19.60
F A3901-1-1-12	12	3901/001-31	45x0.30	3.2	2.61	2.8	23.00	32.10

(1) Silver plated copper alloy.

Table II - Unshielded Jacketed Cables

Draka part number	AWG*	Number of cores	ESA/SCC	Conductor silver plated copper		Nominal Core Diameter (mm)	Maximum Outer Diameter (mm)	Maximum Weight (g/m)
				Stranding (n x mm)	Nominal cross section (mm ²)			
F A3901-1-2-16-G	16	2	3901/001-32	19x0.30	1.30	1.79	3.80	30.70
F A3901-1-2-14-G	14	2	3901/001-33	27x0.30	1.90	2.14	4.48	43.10
F A3901-1-2-12-G	12	2	3901/001-34	45x0.30	3.20	2.74	5.70	70.60
F A3901-1-3-16-G	16	3	3901/001-35	19x0.30	1.30	1.79	4.08	46.10
F A3901-1-3-14-G	14	3	3901/001-36	27x0.30	1.90	2.14	4.82	64.60
F A3901-1-3-12-G	12	3	3901/001-37	45x0.30	3.20	2.74	6.15	106.00

The product descriptions in our publications are correct to the best of our knowledge. They reflect the present state of the technology and our capabilities. The details are a general description of the characteristics of our products, which do not necessary apply to every purpose or under all conditions. The descriptions do not release the user from the responsibility of testing of the products for suitability the specific purpose. In cases of doubt, please contact our Service Department.

Table III - Shielded and Jacketed Cables

Draka part Number	AWG *	Number of cores	ESA/SCC	Conductor silver plated copper or copper alloy (1)		Nominal Core Diameter (mm)	Shield strand Diameter (mm)	Maximum Outer Diameter (mm)	Maximum Weight (g/m)
				Stranding (n x mm)	Nominal Cross Section (mm ²)				
F A3901-1-1-16-HG	16	1	3901/001-38	19x0.30	1.30	1.79	0.10	2.23	18.80
F A3901-1-1-14-HG	14	1	3901/001-39	27x0.30	0.15	2.14	0.12	2.63	27.00
F A3901-1-1-12-HG	12	1	3901/001-40	45x0.30	0.21	2.74	0.15	3.30	43.30
F A3901-1-2-16-HG	16	2	3901/001-41	19x0.30	0.38	1.79	0.15	4.26	41.80
F A3901-1-2-14-HG	14	2	3901/001-42	27x0.30	0.60	2.14	0.15	5.07	55.60
F A3901-1-2-12-HG	12	2	3901/001-43	45x0.30	0.93	2.74	0.20	6.30	90.50
F A3901-1-3-16-HG	16	3	3901/001-44	19x0.30	1.30	1.79	0.15	4.54	58.20
F A3901-1-3-14-HG	14	3	3901/001-45	27x0.30	1.90	2.14	0.20	5.40	83.30
F A3901-1-3-12-HG	12	3	3901/001-46	45x0.30	3.20	2.74	0.20	6.72	127.30

* Closest American wire gauge.

Identification:

Core colour : AWG 28: Brown
 AWG 26: Black
 AWG 24 : Khaki beige
 AWG 22: Red
 AWG 20 : Green
 AWG 18: Yellow

Jacket: Amber + stripes (see color coding table)



Space Applications Light Weight Wires and cables

SCC 3901-002

CHARACTERISTICS:

Environmental:

- Operating Temperature: -100°C to +200°C (ambient temperature + current heating).
- Non-flammable
- Very good solderability.
- Current rating: the currents shown in the tables for single wires generate a temperature in a vacuum environment. According to ESA/SCC specifications, those current values may be considered up to an ambient temperature of 150°C.
- Derating factors must be applied for cables and wires in bundles.
- High resistance to chemical agents, fluids and space radiations.
- The 2 µm thick of silver plating on the conductor and the shield give the best protection against the red plague phenomenon.

Mechanical :

- The wrapped construction technology allows very thin wall insulation, yielding weight and space savings and higher performances.
- Superior mechanical resistance eliminating handling and installation damage.
- Good strippability.

Electrical:

- Maximum operating voltage : 600Vac.
- Insulation resistance of core:
> 750 MΩ.km at 20°C (500V– 1min.).

APPLICATIONS:

- Light weight hook-up wires for use in launch vehicles, satellites and general space applications.

STANDARDS/SPECIFICATONS:

- Meets ESA/SCC N° 3901 and ESA/SCC N° 3901/002.
- The certificate of qualification n° 7 N of February 15-2010 has been renewed to Draka Fileca by ESA.

CONSTRUCTION:

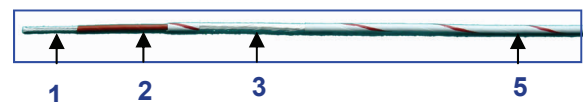
Single core



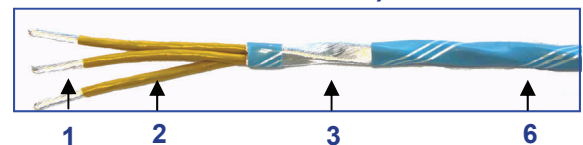
Multi cores jacketed



Single core shielded jacketed



Multi core shielded jacketed



- 1– Conductor (s): Silver plated copper or silver plated copper alloy.
- 2– Polyimide tape + Polyimide top coat.
- 3– Spiral shield: Silver plated Copper
- 4– Polyimide tape
- 5– Polyimide tape + top coat
- 6– Polyimide tape + PTFE tape

INSPECTION LEVEL:

The ESA Generic Specification prescribes 3 levels of lot acceptance which, in order of decreasing test requirements, are designated « B1 », « B2 », « B3 ».

Should the lowest “standard” level be considered insufficient, then add « B2 » or « B1 » to Draka Fileca references.

Example : F A3901-2-1-20-B2

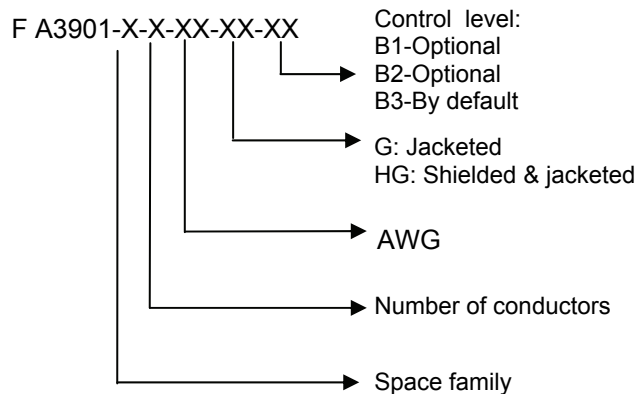
Space Applications Light Weight Wires and cables

SCC 3901-002

PACKAGING:

- On plastic spools (flange diameter : 180 or 280 mm).
Spools are heat sealed into polyethylene bags

ORDERING CODE :



Example: F A3901-2-2-28-G-B3

Table I : Wires

Draka part number	AWG *	ESA/SCC	Conductor silver plated copper		Outer diameter		Current Rating (Amp.)	Maximum weight (g/m)
			Stranding (n x mm)	Nominal cross section (mm ²)	Mini (mm)	Maxi (mm)		
F A3901-2-1-28	28	3901/002-61	19x0.08 (1)	0.1	0.56	0.68	1.50	1.23
F A3901-2-1-26	26	3901/002-56	19x0.10 (1)	0.15	0.66	0.78	2.50	1.93
F A3901-2-1-24	24	3901/002-57	19x0.12 (1)	0.21	0.76	0.88	3.50	2.64
F A3901-2-1-22	22	3901/002-58	19x0.16	0.38	0.96	1.08	5.00	4.25
F A3901-2-1-20	20	3901/002-59	19x0.20	0.6	1.14	1.28	7.50	6.49
F A3901-2-1-18	18	3901/002-60	19x0.25	0.93	1.39	1.53	10.00	9.79

- (1) Silver plated copper alloy
* Closest American wire gauge

Space Applications Light Weight Wires and cables

Table II : Unshielded Jacketed cables

Draka part number	AWG*	Number of cores	ESA/SCC	Conductor silver plated copper		Nominal core diameter (mm)	Maximum outer diameter (mm)	Maximum weight (g/m)
				Stranding (n x mm)	Nominal cross section (mm ²)			
F A3901-2-2-28-G	28	2	3901/002-62	19x0.0.8 (1)	0.10	0.63	1.43	2.70
F A3901-2-2-26-G	26	2	3901/002-31	19x0.10 (1)	0.15	0.73	1.64	4.42
F A3901-2-2-24-G	24	2	3901/002-32	19x0.12 (1)	0.21	0.83	1.84	5.91
F A3901-2-2-22-G	22	2	3901/002-33	19x0.16	0.38	1.03	2.24	9.41
F A3901-2-2-20-G	20	2	3901/002-34	19x0.20	0.60	1.23	2.64	14.20
F A3901-2-2-18-G	18	2	3901/002-35	19x0.25	0.93	1.48	3.15	21.30
F A3901-2-3-28-G	28	3	3901/002-63	19x0.08 (1)	0.10	0.63	1.53	3.95
F A3901-2-3-26-G	26	3	3901/002-36	19x0.10 (1)	0.15	0.73	1.76	6.45
F A3901-2-3-24-G	24	3	3901/002-37	19x0.12 (1)	0.21	0.83	1.97	8.81
F A3901-2-3-22-G	22	3	3901/002-38	19x0.16	0.38	1.03	2.40	14.30
F A3901-2-3-20-G	20	3	3901/002-39	19x0.20	0.60	1.23	2.84	21.10
F A3901-2-3-18-G	18	3	3901/002-40	19x0.25	0.93	1.48	3.40	31.6

(1) Silver plated copper alloy
* Closest American wire gauge

Identification:

Core colour : AWG 28: **Brown**
 AWG 26: **Black**
 AWG 24 : **Khaki beige**
 AWG 22: **Red**
 AWG 20 : **Green**
 AWG 18: **Yellow**

Jacket: Amber + stripes (see color coding table)

Space Applications Light Weight Wires and cables

SCC 3901-002

Table III : Shielded and jacketed cables

Draka part Number	AWG*	Number of cores	ESA/SCC	Conductor silver plated copper		Nominal Core diameter (mm)	Shield strand Ø (mm)	Maximum outer diameter (mm)	Maximum weight (g/m)
				Stranding (n x mm)	Nominal cross section (mm ²)				
F A3901-2-1-28-HG	28	1	3901/002-64	19x0.08 (1)	0.10	0.63	0.08	1.07	3.05
F A3901-2-1-26-HG	26	1	3901/002-41	19x0.10 (1)	0.15	0.73	0.08	1.13	3.85
F A3901-2-1-24-HG	24	1	3901/002-42	19x0.12 (1)	0.21	0.83	0.08	1.23	4.75
F A3901-2-1-22-HG	22	1	3901/002-43	19x0.16	0.38	1.03	0.08	1.43	6.86
F A3901-2-1-20-HG	20	1	3901/002-44	19x0.20	0.60	1.23	0.08	1.63	9.43
F A3901-2-1-18-HG	18	1	3901/002-45	19x0.25	0.93	1.48	0.10	1.92	13.80
F A3901-2-2-28-HG	28	2	3901/002-65	19x0.08 (1)	0.10	0.63	0.08	1.80	5.70
F A3901-2-2-26-HG	26	2	3901/002-46	19x0.10 (1)	0.15	0.73	0.08	2.01	8.00
F A3901-2-2-24-HG	24	2	3901/002-47	19x0.12 (1)	0.21	0.83	0.10	2.24	10.50
F A3901-2-2-22-HG	22	2	3901/002-48	19x0.16	0.38	1.03	0.10	2.65	14.80
F A3901-2-2-20-HG	20	2	3901/002-49	19x0.20	0.60	1.23	0.10	3.03	20.20
F A3901-2-2-18-HG	18	2	3901/002-50	19x0.25	0.93	1.48	0.12	3.58	29.60
F A3901-2-3-28-HG	28	3	3901/005-66	19x0.08 (1)	0.10	0.63	0.10	1.92	8.10
F A3901-2-3-26-HG	26	3	3901/002-51	19x0.10 (1)	0.15	0.73	0.10	2.15	11.20
F A3901-2-3-24-HG	24	3	3901/002-52	19x0.12 (1)	0.21	0.73	0.10	2.36	14.00
F A3901-2-3-22-HG	22	3	3901/002-53	19x0.16	0.38	1.03	0.10	2.82	20.20
F A3901-2-3-20-HG	20	3	3901/002-54	19x0.20	0.60	1.23	0.12	3.26	29.40
F A3901-2-3-18-HG	18	3	3901/002-55	19x0.25	0.93	1.48	0.15	3.86	44.10
F A3901-2-4-28-HG	28	4	3901/002-67	19x0.08 (1)	0.10	0.63	0.10	2.15	10.15
F 3901-2-4-26-HG	26	4	3901/002-68	19x0.10 (1)	0.15	0.73	0.10	2.40	13.30
F A3901-2-4-24-HG	24	4	3901/002-69	19x0.12 (1)	0.21	0.83	0.10	2.65	16.50
F A3901-2-4-22-HG	22	4	3901/002-70	19x0.16	0.38	1.03	0.12	3.17	26.40
F A3901-2-4-20-HG	20	4	3901/002-71	19x0.20	0.60	1.23	0.15	3.70	38.80
F A3901-2-5-28-HG	28	5	3901/002-72	19x0.08 (1)	0.10	0.63	0.10	2.27	12.10
F A3901-2-5-26-HG	26	5	3901/002-73	19x0.10 (1)	0.15	0.73	0.10	2.56	15.80

(1) Silver plated copper alloy
* Closest American wire gauge



Space Application Light Weight Radiation Resistant Shielded Cables

F A3901-2-P

CHARACTERISTICS:

Environmental:

- Operating Temperature: -100°C to + 200°C (ambient temperature + current heating).
- High resistance to space radiations
- High resistance to chemical agents and aircraft fluids.
- Non flammable
- Very good solderability.
- The 2 µm thick of silver plating on the conductor and the shield give the best protection against the red plague phenomenon.

Mechanical :

- The wrapped construction technology allows very thin wall insulation, yielding weight and space savings and higher performances.
- Superior mechanical resistance eliminating handling and installation damage.
- Good strippability.
- Polyimide jacket insure a good mechanical and electrical protection to the helical screen.
- Bending radius: 10 times outer diameter.

Electrical:

- Maximum operating voltage : 600Vac
- Insulation resistance of core:
> 750 MΩ.km at 20°C (500V– 1min.)

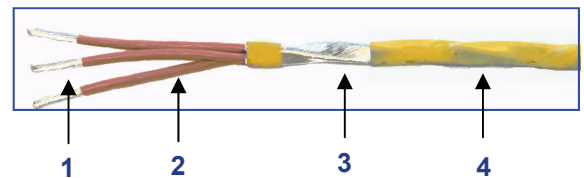
APPLICATIONS:

- Wires and cables for use in satellites and other space applications.

PACKAGING:

- On plastic spools (flange diameter : 180 or 280 mm).
Spools are heat sealed into polyethylene bags with humidity indicator inside.

CONSTRUCTION:



- 1– Conductor: Silver plated copper or Silver plated copper alloy.
- 2– Polyimide tape + Polyimide top coat.
- 3– Spiral shield - Silver plated copper
- 4– Polyimide tape

STANDARDS/SPECIFICATONS:

Cores according to specification ESA/SCC
N° 3901/002 (light weight wires).

INSPECTION LEVEL:

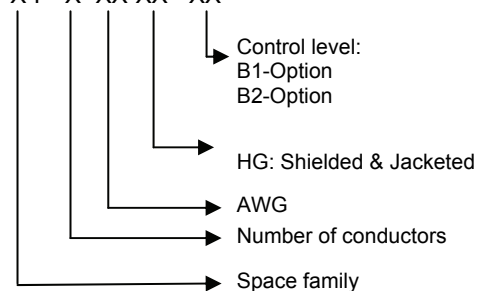
Level of lot acceptance which, in order of decreasing testing requirements, are designated « B1 », « B2 », « B3 ».

Should the lowest “standard” level be considered insufficient, then add « B2 » or « B1 » to Draka Fileca references.

Example : F A3901-2-P-2-28HG-B2

ORDERING CODE:

F A3901-X-P- X- XX-XX - XX



Space Application Light Weight Radiation Resistant Shielded Cables

F A3901-2-P

Draka part number	AWG*	Nb of cores	Cores as per ESA/ SCC references	Conductor		Nominal Core Ø (mm)	Shield Strand Diameter (mm)	Maximum linear resistance at 20°C (Ω/Km)	Maxi O.D (mm)	Max. Weight (g/m)
				Silver plated copper Stranding (nxmm)	Nominal Cross section (mm ²)					
F A3901-2-P-1-28HG	28	1	3901/002-61	19x0.0.8 (1)	0.10	0.63	0.08	242	1.02	2.95
F A3901-2-P-1-26HG	26	1	3901/002-56	19x0.10 (1)	0.15	0.73	0.08	148	1.09	3.75
F A3901-2-P-1-24HG	24	1	3901/002-57	19x0.12 (1)	0.21	0.83	0.08	105	1.19	4.65
F A3901-2-P-1-22HG	22	1	3901/002-58	19x0.16	0.38	1.03	0.08	50.9	1.39	6.75
F A3901-2-P-1-20HG	20	1	3901/002-59	19x0.20	0.60	1.23	0.08	32.2	1.59	9.3
F A3901-2-P-1-18HG	18	1	3901/002-60	19x0.25	0.93	1.48	0.10	20.6	1.87	13.65
F A3901-2-P-2-28HG	28	2	3901/002-61	19x0.08(1)	0.10	0.63	0.08	254	1.67	5.5
F A3901-2-P-2-26HG	26	2	3901/002-56	19x0.10(1)	0.15	0.73	0.08	155	1.87	7.4
F A3901-2-P-2-24HG	24	2	3901/002-57	19x0.12(1)	0.21	0.83	0.10	110	2.10	9.8
F A3901-2-P-2-22HG	22	2	3901/002-58	19x0.16	0.38	1.03	0.10	53.5	2.5	14.0
F A3901-2-P-2-20HG	20	2	3901/005-59	19x0.20	0.60	1.23	0.10	33.8	2.90	19.4
F A3901-2-P-2-18HG	18	2	3901/002-60	19x0.25	0.93	1.48	0.12	21.6	3.40	28.2
F A3901-2-P-3-28HG	28	3	3901/002-61	19x0.08(1)	0.10	0.63	0.10	254	1.81	7.9
F A3901-2-P-3-26HG	26	3	3901/002-56	19x0.10(1)	0.15	0.73	0.10	155	2.02	10.6
F A3901-2-P-3-24HG	24	3	3901/002-57	19x0.12(1)	0.21	0.83	0.10	110	2.24	13.3
F A3901-2-P-3-22HG	22	3	3901/002-58	19x0.16	0.38	1.03	0.10	53.5	2.67	19.2
F A3901-2-P-3-20HG	20	3	3901/002-59	19x0.20	0.60	1.23	0.12	33.8	3.14	28.4
F A3901-2-P-3-18HG	18	3	3901/002-60	19x0.25	0.93	1.48	0.15	21.6	3.67	42.0

(1) Silver plated Copper Alloy
* Closest American wire gauge

Identification:

Core colour : AWG 28: Brown
 AWG 26: Black
 AWG 24 : Khaki beige
 AWG 22: Red
 AWG 20 : Green
 AWG 18: Yellow

Jacket: Amber + stripes (see color coding table)

F A3901-2-P Series 15-02-2011 rev0

The product descriptions in our publications are correct to the best of our knowledge. They reflect the present state of the technology and our capabilities. The details are a general description of the characteristics of our products, which do not necessarily apply to every purpose or under all conditions. The descriptions do not release the user from the responsibility of testing of the products for suitability the specific purpose. In cases of doubt, please contact our Service Department.



Insulated space wires for wrapped connections

SCC 3903

CHARACTERISTICS:

Environmental:

These wires are designed for 2 temperatures classes:

Operating temperature :

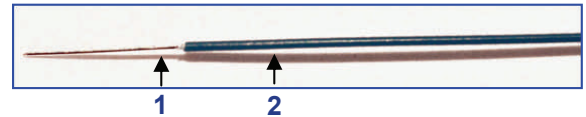
- 60°C to + 100°C Ref F A3903WY

References and applicable documents

- Technical specifications approved by the CNES on January 20, 1987.

Draka part number	AWG gauge	Conductor		Insulation
		Area (mm ²)	Diameter (mm)	Diameter (mm)
F A3903WY-1-30 F A3903WP-1-30	30	0.05	0.254	0.53 ± 0.03
F A3903WY-1-28 F A3903WP-1-28	28	0.08	0.32	0.62 ± 0.03
F A3903WY-1-26 F A3903WP-1-26	26	0.13	0.4	0.74 ± 0.03

CONSTRUCTION:



- 1- Solid conductor:
AWG 30 and 28: silver plated copper alloy.
AWG 26: Silver plated copper.
- 2- Insulation: Kynar F A3903WY
PFA FA3903WP.

APPLICATIONS:

- Wires for use on terminations requiring solder less wrapped connections.

STANDARDS/SPECIFICATIONS:

- Tested according to technical specifications approved by the CNES on January 20, 1987.

OPTION:

- Twisted pairs available on request.

IDENTIFICATION:

Colour code:

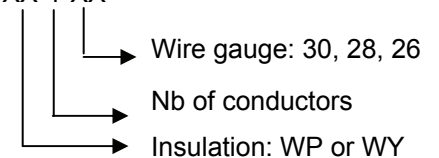
AWG 30 Red

AWG 28 Blue

AWG 26 Yellow

ORDERING CODE:

F A3903-XX-1-XX





Space application Flexible PTFE Wires

E-ESP Series

CHARACTERISTICS:

Environmental:

- Operating temperature: - 100°C to + 200°C (ambient temperature + current heating)
- High resistance to chemical agents
- High resistance to radiation in a vacuum environment.
- Non-flammable.
- Very good solderability.
- Excellent behaviour in out-gassing.
- The 2 µm thick of silver plating on the conductor give the best protection against the Red plague phenomenon.

Mechanical:

- High flexibility
- Reinforced mechanical resistance.

Electrical:

- Maximum operating voltage : 600Vac

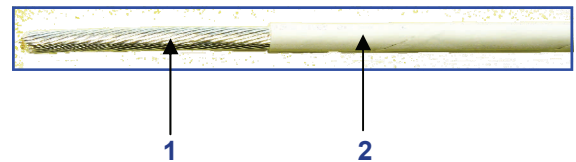
APPLICATIONS:

- Space applications
- Printed circuits board power supply.
- Test benches.

IDENTIFICATION:

- Standard version: white.
- Others colors available on request.

CONSTRUCTION:



1– Conductor: Silver plated copper or Silver plated copper Alloy.

2– PTFE tape.

STANDARDS/SPECIFICATONS:

- Conductors in accordance with ESCC 3901
- Dimensional: ANSI/NEMA HP3 (formerly MIL-W-16878).
- Inspection level references: ESCC 3901
- According to customer specifications: STAND-ST-DAD024924-V-ASTR.

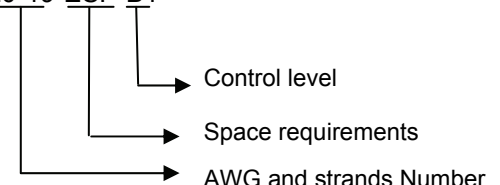
INSPECTION LEVEL:

The ESA Generic Specification prescribes 3 levels of lot acceptance which, in order of decreasing testing requirements, are designated « B1 », « B2 », « B3 ». Should the lowest « standard » level be considered insufficient, then add « B2 » or « B1 » to Draka Fileca references.

Example : F E20-19-ESP-B2

ORDERING CODE:

F E20-19-ESP-B1



Space application Flexible PTFE Wires

E-ESP Series

Draka part number	Conductors according to ESCC 3901 Standard			Maximum linear resistance at 20°C (Ohms/km)	Outer diameter according to ANSI/ NEMA HP3		Maximum Weight (g/m)
	AWG*	Stranding n x mm	Nominal Cross Section (mm ²)		Minimum (mm)	Maximum (mm)	
F E32-07-ESP	32	7x0.08 (1)	0.035	653	0.66	0.86	1.20
F E30-07-ESP	30	7X0.10 (1)	0.055	388	0.71	0.91	1.50
F E28-07-ESP	28	7x0.127 (1)	0.09	242	0.79	0.99	2.2
F E28-19-ESP	28	19x0.08 (1)	0.10	242	0.79	0.99	2.2
F E26-19-ESP	26	19x0.10 (1)	0.15	148	0.89	1.12	2.8
F E24-19-ESP	24	19x0.12 (1)	0.21	105	1.02	1.24	3.8
F E22-19-ESP	22	19x0.16	0.38	50.9	1.17	1.42	5.8
F E20-19-ESP	20	19x0.2	0.6	32.2	1.37	1.57	8.8
F E18-19-ESP	18	19x0.25	0.93	20.6	1.63	1.88	13.0
F E16-19-ESP	16	19x0.3	1.3	14.3	1.85	2.25	18.4
F E14-27-ESP	14	27x0.3	1.9	10.1	2.15	2.55	25.4
F E12-45-ESP	12	45x0.3	3.2	6.03	2.68	3.08	39.5

* Closest American wire gauge
(1) Silver plated copper alloy.

Colour coding

Colour coding according to ESCC specification:

Wire Size (AWG)	Core* Colour	Jacket assemblies	Colour shielded	Stripe colour on jacket
28	Brown	Amber	White	Brown
26	Black	Amber	White	Black
24	Khaki-Beige	Amber	Light blue	White
22	Red	Amber	White	Red
20	Green	Amber	White	Green
18	Yellow	Amber	White	Yellow

* Other core colours are available on request.

Identification of a cable for a given wire size is achieved by combining the colour of the jacket with the colour of the stripes. The number of stripes determines the number of cores.

For example :



Corresponds to:

2 cores, gauge AWG 24, jacketed.



3 cores, gauge AWG 24, shielded and jacketed

Lot acceptance levels

Depending on the customer required lot acceptance levels ; increased controls can be performed on request.

The ESA/SCC generic specification N° 3901 defines the level of testing severity designated by the letter B. and 3 levels of lot acceptance testing ;

Lot acceptance levels are designated as follows:

ESA/SCC		Draka Designation
Designation	Description of tests	
Level 3 (LA3)	None	B3
Level 2 (LA2)	Electrical and environmental subgroup	B2
Level 1 (LA1)	Endurance subgroup + electrical and environmental subgroup.	B1

Unless mentioned otherwise space cables according to ESA/SCC 3901 will be supplied under B3 testing and lot acceptance levels.

Packaging

Cables for space applications are typically packaged following the guidelines outlined below;

- All finished wires are packaged on plastic spools as defined in enclosed table.
- Each spool will only carry wire or cable from a unique production lot.
- Each spool will have a maximum of 3 lengths of wire with each length not being inferior to 30 meters.
- A spool shall not contain more than 400 meters of finished wire or cable.
- Wire or cable ends will be sealed against possible ingress of moisture under the insulation.
- Wire spools are sealed in heat-sealed polyethylene bags containing humidity indicators and a desiccant.

TYPES AND DIMENSIONS OF SPOOLS AND REELS

SPOOLS [plastic]

TYPE OF SPOOL	DIMENSIONS (in millimeters)					DRAKA FILECA REFERENCE
	L1	L2	D1	D2	D3	
B2	105 (+ 2, - 0)	90 (+ 2, - 2)	276 (+ 2, - 2)	160 (+ 2, - 2)	26 (+ 1, - 1)	LP 280
B3	185 (+ 5, - 5)	165 (+ 2, - 4)	290 (+ 10, - 15)	155 (+ 5, - 5)	26 (+ 1, - 1)	LPD 280

REELS [plastic (LP400) - WOOD (LB600 LB750)]

TYPE OF REEL	DIMENSIONS (in millimeters)					DRAKA FILECA REFERENCE
	L1	L2	D1	D2	D3	
T1	220 (+ 20, - 20)	200 (+ 20, - 40)	380 (+ 20, - 30)	225 (+ 25, - 25)	35 (+ 5, - 3)	LP 400
T2	320 (+ 30, - 30)	280 (+ 20, - 20)	600 (+ 20, - 20)	330 (+ 20, - 30)	40 (+ 5, - 0)	LB 600
T3	380 (+ 30, - 30)	350 (+ 20, - 20)	750 (+ 20, - 20)	350 (+ 20, - 30)	80 (+ 5, - 0)	LB 750

