AIRWORK & Heliseilerei GmbH

Short and LongLines

AirWork & Heliseilerei GmbH (A&H) is a leading manufacturer of innovative high-quality products in the field of lifting accessories and slinging equipment for helicopter external load transport, rescue operations and load securing.

A dozen highly specialised ropes and accessories
allow you to choose the most appropriate solution for your needs.

Qualified safety

EC MD 2006/42/EC
REG. (EU) 2016/425 on PPE

CE EASA European Aviation Safety Agency

EASA CS-27.865, CS-29.865
EASA Part 21 G POA CH.21.G.0022

More benefit than you might think possible!

Introduction

Since 1988, AirWork & Heliseilerei GmbH (A&H) has been a leading name in the sector of ropes and rescue devices for helicopter operations. In the course of time, both the name and the associates of the company have changed repeatedly, as happened lately on the occasion of the fusion of Heliseilerei GmbH, Erstfeld, and AirWork Ragoni Services GmbH, Ebikon, which marked the beginning of AirWork & Heliseilerei GmbH (A&H) in Immensee. What has not changed, however, is our uncompromising commitment to innovation. This dedication plus the determination always to ensure quality and safety are the governing criteria of all our activities

Under the direction of Enrico Ragoni, AirWork & Heliseilerei GmbH mainly focuses upon its core business, i.e. the development, production and certification of load lifting accessories and rescue devices for helicopter transport, which are assembled under different product logos such as A&H Engineering, A&H Equipment, A&H Services and A&H Experts.

In order to protect our know-how we have decided to run all relevant production processes exclusively in Switzerland. Thus a multitude of small, even tiny sub-contractors build an efficient network for the development of innovative niche products. AirWork & Heliseilerei (A&H) itself acts as a supplier for helicopter companies working in the fields of load transport, logging, air/mountain rescue and off-shore operations, as well as for police and military forces, fire brigades and helicopter manufacturers

Buying A&H products means investing in reliability, functionality, conformity and safety – the basic prerequisites for working profitably and successfully.

We are your partner. In safety!

Some first impressions...

Fig. 1: CH-53 of the German Army Aviation with TLM_90_30 rope (WLL 90 kN).
By courtesy of Airbus MSC

Fig. 2: Airbus H225, aiRtelis France, with TLL_50_30 (WLL 50 kN) © Foto Julien Botella

Some first impressions...

Fig. 3: AS 350B3e of Heli Bernina AG with TLDS+_14_30 rope (WLL 14 kN).
By courtesy of Heli Bernina AG

Fig. 4: KAMAN K-1200 "K-MAX" with TLP_55_30 rope (WLL 30 kN).
By courtesy of SBV

References and further reading

AirWork & Heliseilerei GmbH (A&H) is deeply committed to research and development to ensure the construction of safe, functional and highly qualified lifting accessories, slinging devices and corresponding equipment for the transport of external loads and persons by helicopter.

When developing, manufacturing and repairing lifting accessories, slinging devices and corresponding equipment, AirWork & Heliseilerei GmbH (A&H) has always started where industrial standard applications failed.

The continuously higher requirements with regard to safety, reliability and functionality, as well as the risk of liability claims against operators and manufacturers, leave no margin for improvisation. Hence, we consequently challenge the existing regulations, standards and assertions by following the uncompromising credo: «Proven rules offer well-trodden paths but they can be dangerous since, given the absence of negative occurrences, they suggest a false sense of 'safety'».

«The strict application of standards leads to conformity, not to safety.»

To actually achieve safety, we must ask ourselves the following question: "What type of application does the client need and which material, dimensions, type of construction are suitable for this purpose? "

Link: Compilation of publications > www.air-work.swiss, News & Events/Bibliothek & Geschichte

Link: Data sheet on standards for cordage – lifting accessories – slings – PPEafh – EASA > www.air-work.swiss, A&H Engineering

Materials used

AirWork & Heliseilerei GmbH (A&H) chooses materials with a view to their processing, the function they must perform and the strain to be expected. In most cases, we employ high quality materials, such as grade 8 or 10 steel conforming to EN 1677, Dyneema SK78© or SK99©.

HMPE (high-modulus polyethylene or ultra-high-molecular-weight polyethylene = UHMW-PE or HPPE = high performance polyethylene), also known by its brand name Dyneema©, is a high performance material with specific “high performance properties”.

Dyneema ©

In approximately 95% of cases, AirWork & Heliseilerei GmbH (A&H) employs Dyneema© for all bearing components of lifting accessories and slinging devices. Therefore, in the past 20 years we have been able to gather significant knowledge regarding Dyneema© and to develop suitable types of construction (braiding, splicing technique, equipping, protective sheathings, etc.) for every known application.

Link: Data sheet on Dyneema© > www.air-work.swiss/A&H Engineering

Grade 8 and 10 accessories

All bearing components of lifting accessories and slinging devices by AirWork & Heliseilerei GmbH (A&H) are equipped with grade 8 or 10 accessories, e.g. oval rings, connex links and safety hooks. The design of some of these accessories, e.g. the HUB rescue hook or the slinging ring compatible with the primary cargo hook of NH90 helicopters, is the exclusive property of AirWork & Heliseilerei GmbH (A&H).

Slinging ring AM_NH90, developed by our company, is the only accessory conforming to EN 1677 on the market which can be used not only with the primary cargo hook of NH90 helicopters, but also with any other lifting accessory and slinging device. Moreover, it is compliant with STANAG 3542 MEDIUM and thus suitable for NATO Medium lifting accessories and slinging equipment.

Link: Data sheets on products by A&H Equipment > www.air-work.swiss/A&H Equipment

Fig. 10: Basic configuration of manual or hybrid ropes, with shock absorber (VM-DP), Short or LongLine (e.g. TLDS+, TLM) and load element with integrated low-torque swivel (SLE1)

Electric conductors

Electric conductors by A&H EQU feature 4 or 9 conductors made of 1.23 mm2 MILSPEC44 AWG16 wire. These conductors have been developed by A&H ENG and offer unique advantages. In fact, our conductors feature an elongation of > 3% and are reusable. They allow trouble-free employment of LongLines up to 120 m in length with an output of 28V/16A DCV (pulse). We also produce cable harnesses with MIL standard crimp connectors which can be employed to operate appliances such as helicopter buckets.

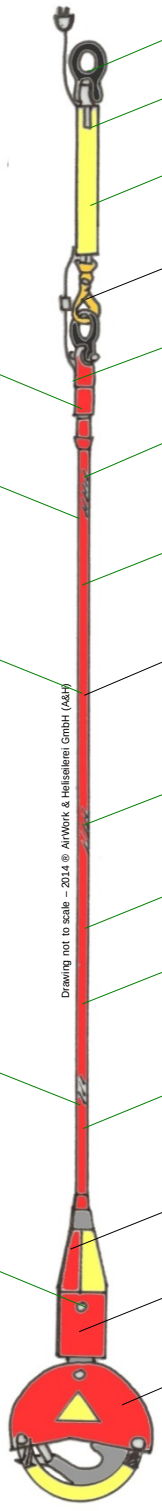
Link: Instructions for use and maintenance (AWA) > www.air-work.swiss/A&H Equipment

Special designs

AirWork & Heliseilerei GmbH (A&H) owns a series of designs referring to special-design accessories and custom-made lifting accessories and slinging equipment for helicopter external load transport and load securing.

Link: Data sheets on products by A&H Equipment > www.air-work.swiss/A&H Equipment

Example of product range: Short and LongLines, models TLL, TLP, TLL+



Interface in compliance with cargo hook requirements

Hard shock loads reduced by ~30%

Easy handling during inspection and/or replacement (PA-rope)

Master link fitting the PCH interface with special primary ring and shock absorber must always be placed at the head

Shock absorber

Over 100'000 hours of accident-free operation, rope always ready for use (little maintenance, very easy to repair)

Elongation of electric conductor ~ 3%

Rope and fittings have been unique in the market for over 25 years

Removable/reusable electric conductor

16 A / 28 VDC with LongLines of up to 120 m (resulting power > 10 A)

Safety factors are higher than the requirements given in technical rules and standards. If used in accordance with regulations, no servicing necessary.

ShortLine < 20m
LongLine > 20m
Models TLL, TLP, TLL+, TLF

Bearing core made of dyneema, polyester cover, electric conductor 4 or 9 x 1.23mm^2, lengths from 5 to 50 m, greater lengths on request, WLL from14 up to 60 kN, colours red/white (TLL), red (TLP) or mixed (TLL+)

Elongation of rope < 0.5%, very low rebound

Load-bearing core protected by 3 different layers

Resistant against UV light and hydrocarbon

Cover ensures full protection against sand, dirt, fluids, etc.

Round and rather stiff rope with steady diameter to ensure best flight behaviour.

Cone, protective casing for the electric conductors

Connecting and disconnecting of link in less than 2 minutes, no need for tools

Low-torque swivel

Remote cargo hook

Remote cargo hook, mass from 18 up to 50 kg different models

Information with regard to legal framework

Unless otherwise indicated, all products by AirWork & Heliseilerei GmbH (A&H) are compliant with EC machinery directive 2006/42/EC.

All secondary cargo hooks for transport ropes made by manufacturers from Europe, USA and Canada are without CE conformity approval. AirWork & Heliseilerei GmbH (A&H) only offers one model which has proven to be the most suitable, however, a certain amount of risk cannot be excluded.

Other products without CE conformity approval are specifically indicated, e.g. components for ANNEX I aircrafts (for military purposes).

Furthermore, all components are manufactured in compliance with EASA Certification Specifications CS-27 and CS-29. However, based on experience and the measurement results of test flights carried out between 2006 and 2015, AirWork & Heliseilerei GmbH (A&H) reserves the right to increase the safety factors.

Some components are also in compliance with the requirements of several NATO standards such as STANAG 3542.

Products designed for the transport of individuals or the rescue and securing of persons inside and outside the helicopter are in conformity with Regulation (EU) 2016/425 PPE and manufactured in keeping with the prescriptions given in EASA CS-27 or CS-29 and EASA Part 21 G production organisation (POA CH.21.G.0022).

The requirements described in Part 21.A.139 (quality management system) and ISO 9001:2015 are applied to all components by AirWork & Heliseilerei GmbH (A&H).

Depending on the article, all products are delivered with an EC type examination certificate (equivalent to STC), an STC and/or an EC declaration of conformity (equivalent to EASA FORM 1) or an EASA FORM 1.

Whenever assembling AirWork & Heliseilerei GmbH (A&H) products with components of other manufacturers, the users themselves are considered manufacturers, for which reason AirWork & Heliseilerei GmbH (A&H) will decline all product liability. This principle applies at all times but especially if the properties of the components of other manufacturers are lower with regard to functionality, safety and quality.

Link: General terms of business (GTB), sales terms and delivery conditions > www.air-work.swiss/Info & Kontakt/Impressum

Relevant legal framework

Binding law

CH SR 930.11 Swiss law on product safety

CH SR 819.14 Swiss council ordinance on safety of machines (MaschV)

EC Machinery Directive 2006/42/EC (all amendments included)

EASA Certification Specification Small rotorcraft CS 27, Amendment 6

EASA Certification Specification Large rotorcraft CS 29, Amendment 6

Harmonised standards (non-binding, since standards are only technical rules and non-committal)

C standards (specifications)	EN 1492-4:2004+A1:2008	Lifting slings for general service made from natural and man-made fibre ropes
	EN 1677-1:2000+A1:2008	Forged steel components, Grade 8 or 10
DIN, EN, ISO, not harmonised	EN 10325:2010	High modulus polyethylene , 8- and 12-strand braided ropes
	EN ISO 2307:2010	Fibre ropes - Determination of certain physical properties

These standards do not refer to finished products such as “Short”/“LongLines” or slinging equipment; they merely describe physical properties, dimensions or test and measuring procedures of the raw materials in question and not the intended use of the final products.

Link: Detailed overview of basic rules and standards > www.air-work.swiss/A&H Engineering

Product overview – rope properties

A&H offers a wide range of ropes which are subdivided according to their designated use and customers' needs

Manual ropes	are exclusively designed for manual operation (manual attachment/release of cargo) and cannot be operated electrically.
Hybrid ropes	can be operated manually, but can also be equipped with power connection. The letter "E" at the end of a product's name indicates ropes equipped with power connection.
Electric ropes	allow electric release of cargo and must be operated in combination with an electric cargo hook. Manual operation of such ropes is not reasonable.

Product codes and names

TLDP	Light power transport rope	TLM	Medium transport rope	TLL	Rope for transport and assembly
TLDS+	Light transport rope	TLME	Medium transport rope, electric	TLP	Rope for logging
TLK	Kernmantel transport rope	TL	Tactical rope	TLL+	Universal rope
TLS	Steel transport rope	TLE	Tactical rope, electric	TLF	Rope for fire fighting
TLSS	Steel transport rope with protective sheathing				

Rope properties / model	TLDP	TLDS+	TLK	TLS	TLSS	TL/TLE	TLM	TLME	TLL	TLP	TLF	TLL+
Sub-category	Manual ropes					Hybrid ropes			Electric ropes			
Textile fibres (Dyneema®)	X	X	X				X	X	X	X	X	X
Textile fibres PES						X						
Steel rope (low torque, cat. A)				X	X							
WLL 10 – 30 kN	X	X	X	X	X							
WLL 10 – 60 kN						X			X	X	X	X
WLL 10 – 120 kN							X	X				
L1 0.5 – 30 m						X	X	X			X	
L1 5 – 50 m	X	X	X	X	X		X	X	X		X	
L1 20 – 50 m	X									X		X
Different length on request: < 0.5 m							X	X			X	
Different length on request: > 50 m	X	X	X	X	X		X	X	X	X		X
Without electric conductor	X	X	X	X	X	X /	X					
Electric conductor 4 x 1.23 mm^{2,}						X		X	X	X	X	X
Electric conductor 9 x 1.23 mm^2						X		X			X	
Electric conductor 4 x 1.5 mm^2						X		X				
Electric conductor 5 x 1.5 mm^2						X		X				
Electric conductor 4 x 2.5 mm^2						X		x				
Thimbles on both ends	X	X	X	X	X	x	X	X	X		X	
Loops on both ends (softlink); on request						X	X	X				
Thimble on upper end, cast headpiece on lower								X	X	X		X
Cast headpiece on both ends									X	X		X
Steel end holder (EH-ST up to 20 kN)								X	X	X		X
Connection with safety hook and manual low-torque swivel (SLE)	X	X	X	X	X	X	X					
Connection with electric low-torque swivel (VM-DF, VM-DG)						X		X	X	X		X
Extension (safety hook – thimble)	X	X	X	X	X	X	X	X	X	X	X	X
Extension, electric (VM-VL)						X		(X)	X	X		X
PES multifil cover, braided	X	X	X				X	X	X		X	X
PA6.6 monofil cover, braided										X		X
Cover in PES fabric						X						
PVC cover (clear or yellow)					X							
Equipped with fibrous membrane >5 my							X	X				
Colour red (R)	X	X					X	X		X		X
Colour white/red (W/R)			X						X		X	X
Colour green (G)	X	X										
Colour white/green (W/G)			X									
Colour blue (B)	X	X										
Colour white/blue (W/B)			X									
Colour yellow (Y)	X	X										
Colour white/yellow (W/Y)			X									
Colour black (BK)	X	X					X	X				
Colour grey (GR)		X	X			X	X	X				
Rope without protective sheathing				X1*								
Rope, very soft and flexible	X		X			X						
Rope, a little less flexible		X					X					
Rope, rather stiff				X	X			X				
Rope, stiff (but easy to «guide»)									X	X	X	X
Best aerodynamic profile (no limits)	X	X	X	X	X				X	X	X	X
... limited profile							X	X				
... suboptimal profile (limits)						X						

1* The use of steel ropes without protective sheathing is possible, but not recommended. The sheathing maintains the ropes' lubrication and keeps pollution to a minimum.
(X) available, but with reserve (only after prior consulting with customers)

Link: Compilation of instructions for use and maintenance > www.air-work.swiss, A&H Equipment

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Product labels

A&H Engineering | A&H Equipment | A&H Services | A&H Expert

Approvals

ISO 9001:2015

EASA Part 21 G POA CH.21.G.0022

NCAGE SAC17

see www.air-work.swiss / Approvals

DB SL-LL_EN_D | FC 180101A&H | LM 190808A&H