

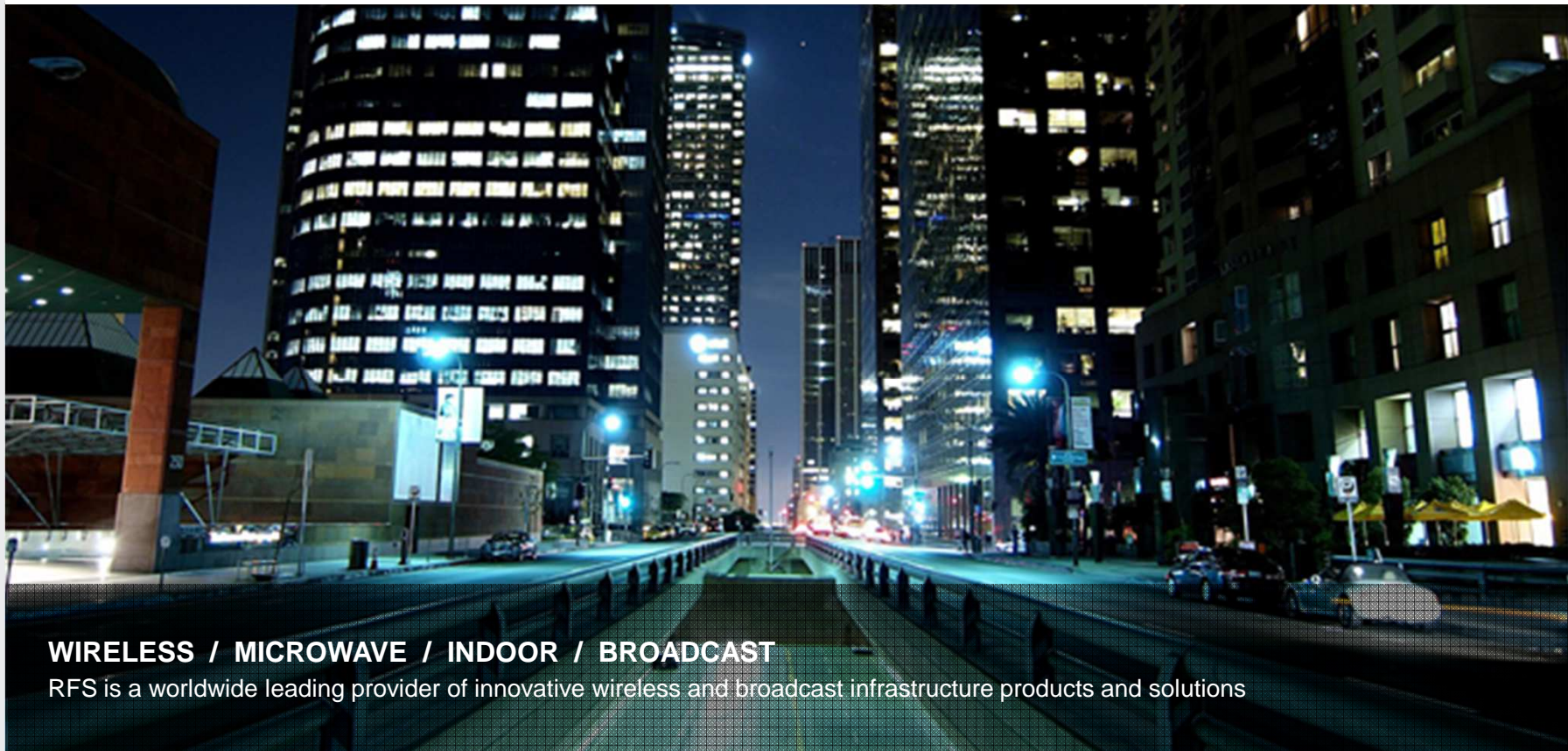
RADIO FREQUENCY SYSTEMS

RADIO FREQUENCY SYSTEMS
The Clear Choice®



RFS CELLFLEX® Transmission Lines

Cables, Connectors and Accessories – May 2015



WIRELESS / MICROWAVE / INDOOR / BROADCAST

RFS is a worldwide leading provider of innovative wireless and broadcast infrastructure products and solutions

RFS TRANSMISSION LINE Portfolio

RFS offers a complete line of foam & dielectric coaxial cables & accessories



CELLFLEX® Foam Dielectric Coaxial Cable

Used for
for many wireless applications
(e.g. Cellular/Mobile systems)



RGFLEX® Braided Cable

RFS TRANSMISSION LINE Portfolio



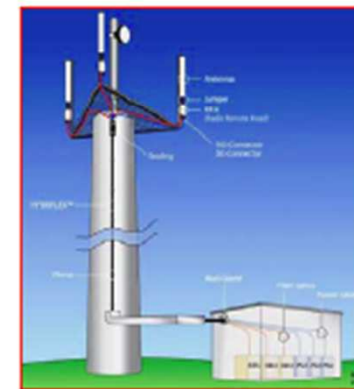
HELIFLEX® Air Dielectric Coaxial Cable

Used for Broadcast applications
(large RF power up to 5.8MW
e.g. AM/FM transmission)



HYBRIFLEX™ Hybrid cable

Optical fiber and DC power cables
in one single outer corrugated aluminium armor.
Infrastructure Solutions for Remote Radio Head Deployments.

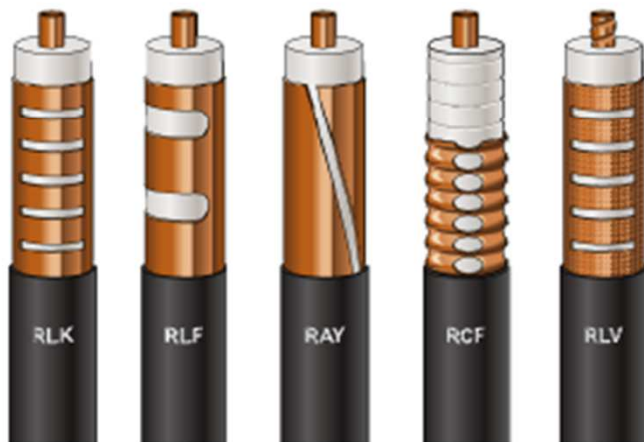


RFS TRANSMISSION LINE Portfolio



FLEXWELL® Elliptical Waveguide

Used for Microwave applications
(e.g. Point to Point)

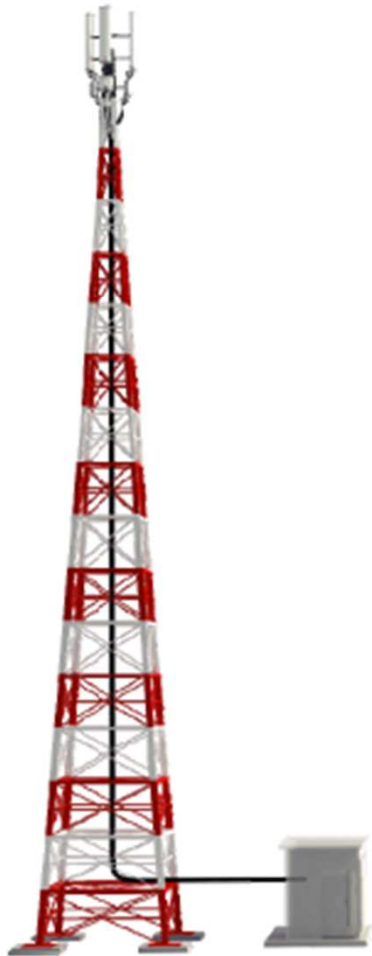


RADIAFLEX® Radiating Cable

Used for Wireless distributed
communication systems
(e.g. in Tunnel & in-buildings)



RFS CELLFLEX® cables



CELLFLEX® Foam Dielectric Coaxial Cable

Feeder & Jumper cables for the connection of Basestation to Antenna (e.g. on tower or on rooftop)





RFS CELLFLEX® cables

• Inner conductor

- solid aluminium copper clad
- copper wire
- copper tube
- corrugated copper tube

• Dielectric

- low loss foam polyethylene

• Outer conductor

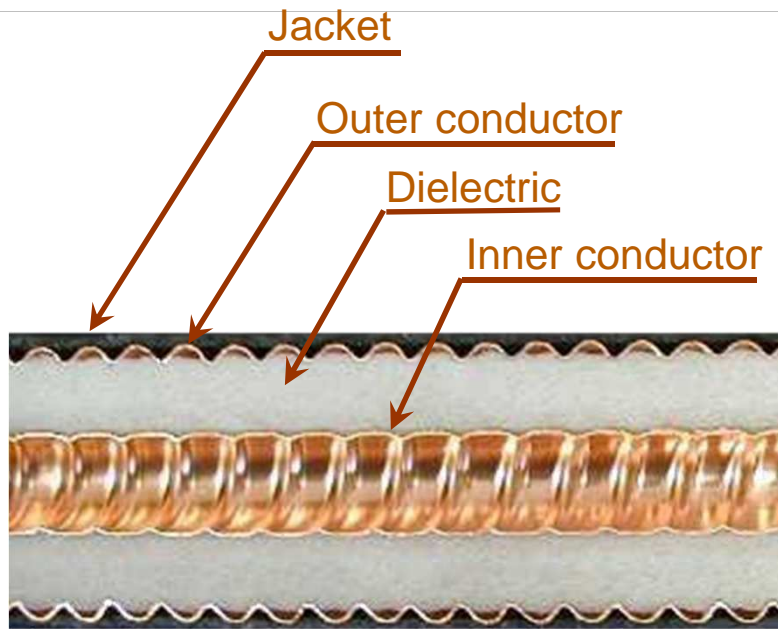
- SCF types:
helically corrugated copper tube
- LCF & UCF type:
annularly corrugated copper tube
- CELLFLEX® LITE:
annularly corrugated aluminium tube

• Jacket

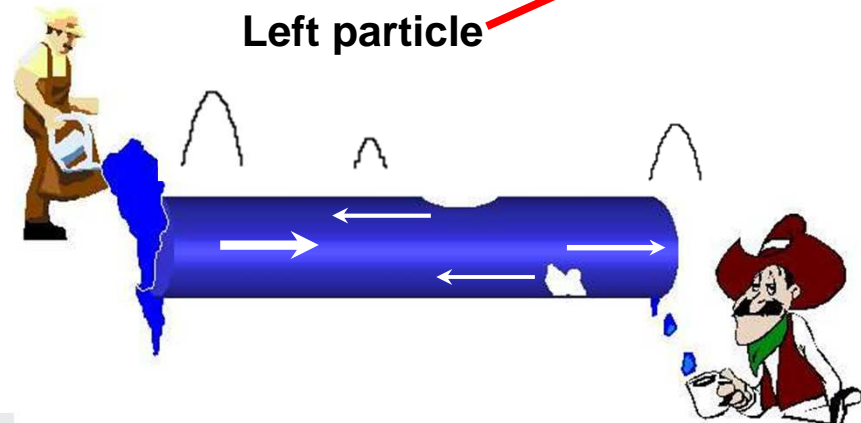
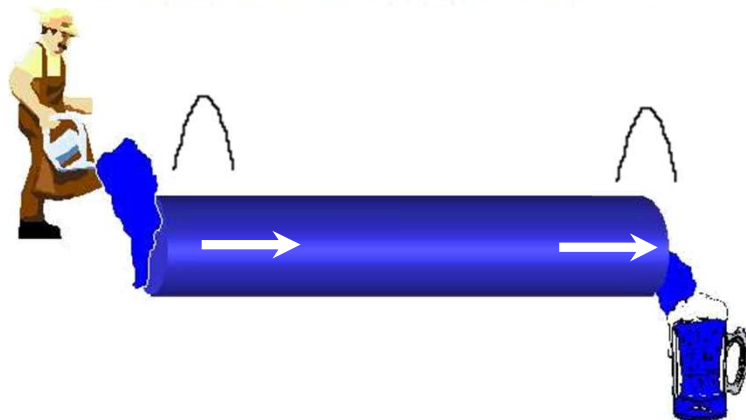
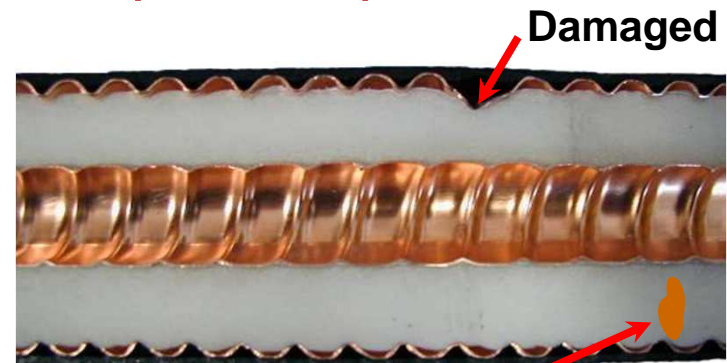
- abrasion resistant, halogen free,
UV resistant and non-corrosive
black polyethylene
- Different Options available



RFS CELLFLEX® cables – construction & function



If the cable is deformed, damaged or particles are left inside the performance will be lost (flow rate)



RFS CELLFLEX® cables – numbering structure

Example:

LCF 158 - 50

Cable Size

Impedance
50 = 50 Ohms

Jacket Options

Model Number	Jacket Type/Power
J, JGR	Standard, Grey
JT	High power
JB	Standard, Self-Healing
JBT	Standard, Self-Healing, High Power
JFT	Flame Retardant, High Power
JF, JFN	Flame Retardant
JPL	Plenum rated

A L - A 8

LITE
(Aluminium
outer conductor)

Suffix for A-Series
(cables with improved
attenuation of around
5% better – introduced 2003)

Cable Type

- LCF** - CELLFLEX® Low Loss Foam
- LCFS** - CELLFLEX® Low Loss Foam
with smooth wall center conductor (11/4" only)
- SCF** - CELLFLEX® Low Loss Super Flexible Foam,
helically corrugated outer conductor
- UCF** - CELLFLEX® Ultra Flexible Foam

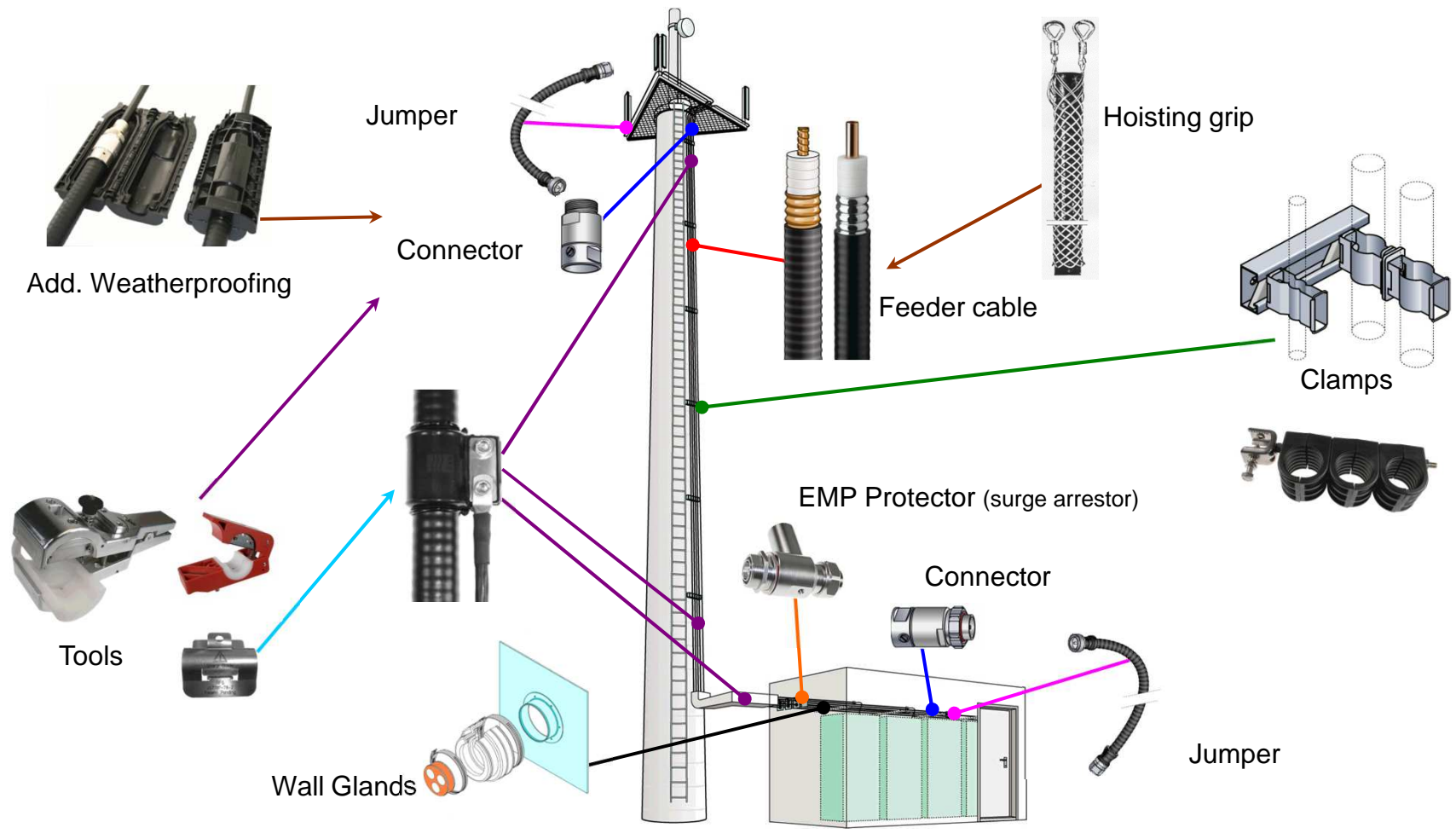
CELLFLEX Cable Return Loss

PREMIUM CODE		FREQUENCY RANGE	ASSEMBLED VERSION	
Premium	VSWR		RETURN LOSS	(VSWR) (REFLECTION COEFFICIENT)
no code	A0	Specify when ordering	24.0dB	(1.135:1) (6.3%)
P1	A1	410 - 470 MHz	23.0dB	(1.152:1) (7.1%)
P2	A2	790 - 960 MHz	24.0dB	(1.135:1) (6.3%)
P3	A3	2500 - 2700 MHz	24.0dB	(1.135:1) (6.3%)
P4	A4	1700 - 1880 MHz	24.0dB	(1.135:1) (6.3%)
P5	A5	1710 - 2155 MHz	28.0dB	(1.083:1) (4.0%)
P6	A6	1900 - 2200 MHz	24.0dB	(1.135:1) (6.3%)
P7	A7	698 - 794, 824 - 960, 1710 - 1755 1850 - 1990, and 2110 - 2155 MHz	24.0dB	(1.135:1) (6.3%)
P8	A8	790 - 960 MHz and 1710 - 2200 MHz	23.0dB	(1.152:1) (7.1%)

RFS CELLFLEX® cables – Portfolio

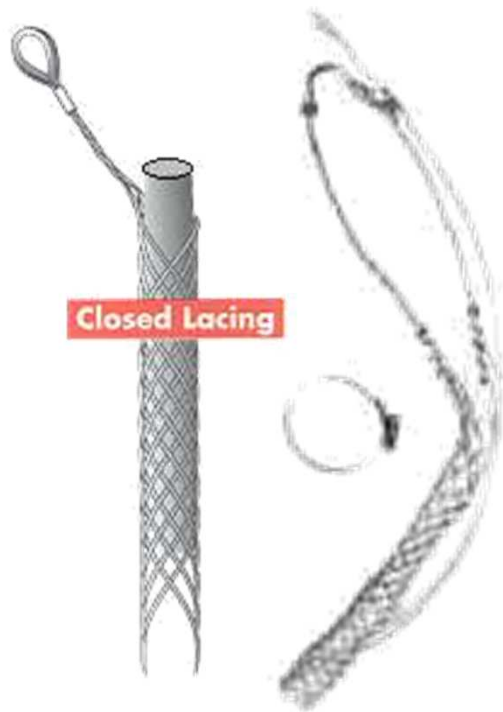
CELLFLEX CABLE TYPE		INNER CONDUCTOR	DIELECTRIC	OUTER CONDUCTOR
Superflexible Cables	SCF14-50*	Copper-Clad Aluminium Wire	PE-Foam	Helically Corrugated Copper Tube
	SCF38-50*	Copper-Clad Aluminium Wire	PE-Foam	Helically Corrugated Copper Tube
	SCF12-50*	Copper-Clad Aluminium Wire	PE-Foam	Helically Corrugated Copper Tube
Ultraflexible Cables <i>Phase out</i>	UCF78-50A	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
	UCF114-50A	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
Low Loss Cables	LCF14-50*	Copper-Clad Aluminium Wire	PE-Foam	Annularly Corrugated Copper Tube
	LCF38-50*	Copper-Clad Aluminium Wire	PE-Foam	Annularly Corrugated Copper Tube
	LCF12-50*	Copper-Clad Aluminium Wire	PE-Foam	Annularly Corrugated Copper Tube
	LCF58-50*	Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
	LCF78-50*A	Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
	LCFS114-50*A	Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
	LCF158-50*A	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
	LCF214-50*A	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Copper Tube
Ultraflexible LITE Cables <i>Phase out</i>	UCF78-50*L	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Aluminium Tube
	UCF114-50*L	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Aluminium Tube
Low Loss LITE Cables	LCF12-50*L	Copper-Clad Aluminium Wire	PE-Foam	Annularly Corrugated Aluminium Tube
	LCF78-50*L	Copper Tube	PE-Foam	Annularly Corrugated Aluminium Tube
	LCFS114-50*L	Copper Tube	PE-Foam	Annularly Corrugated Aluminium Tube
	LCF158-50*L	Corrugated Copper Tube	PE-Foam	Annularly Corrugated Aluminium Tube

RFS CELLFLEX® cables - Accessories



Hoisting grips

Hoisting grips available in One ore Two Loop versions.
As closed or open type.



Closed type:

are to be used
only for cables
without mounted
connectors



Max. pulling
length
60 m (200ft)



Open type of Hoisting grip

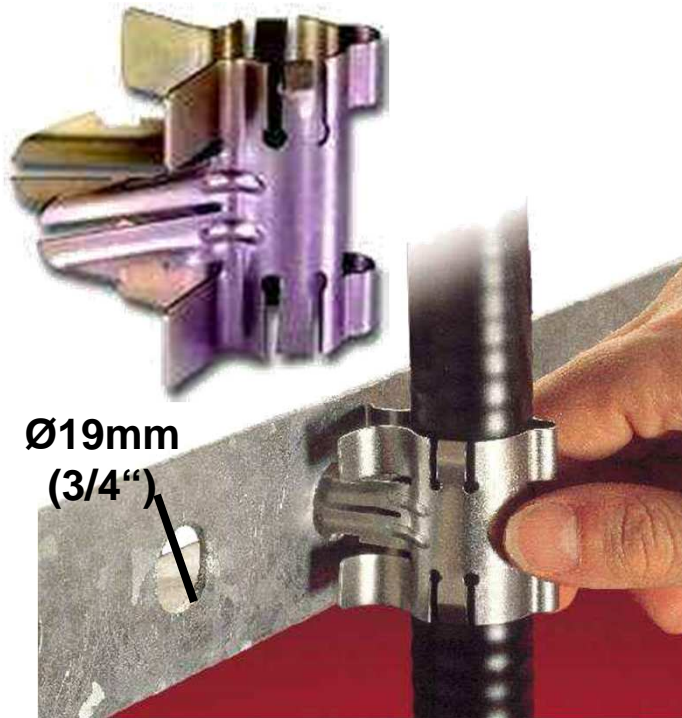
Usable for cables with
already installed
connectors as well



Max. pulling
length
70 m (230ft)

Clamps

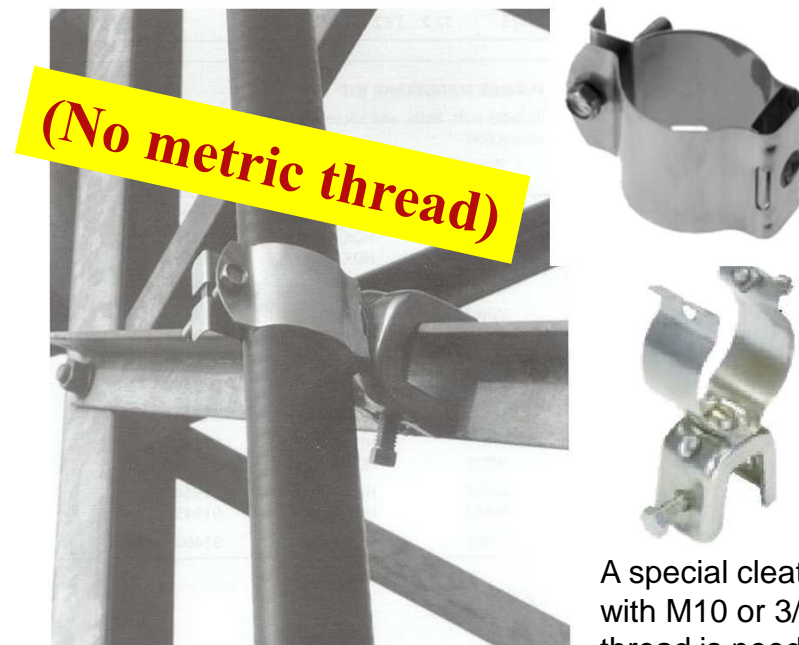
SNAP-in Hanger



Snap- in Hanger
for installation on pre-drilled surface
Mod. No. **SNAP-*****

Bolt on Hanger

for direct installation
or with accessories



Mod. No. **CLAMP-*****

A special cleat
with M10 or 3/8"
thread is needed

Clamps

RSB-Clip

“Foolproof”
can not deform cable



The stainless steel hanger RSB® Clip can be used in many mounting configurations. Easy to close & and easy to open

Model No. for LCF cables **RSB-***** e.g. RSB-78

Rostfreier Stahl Bügel

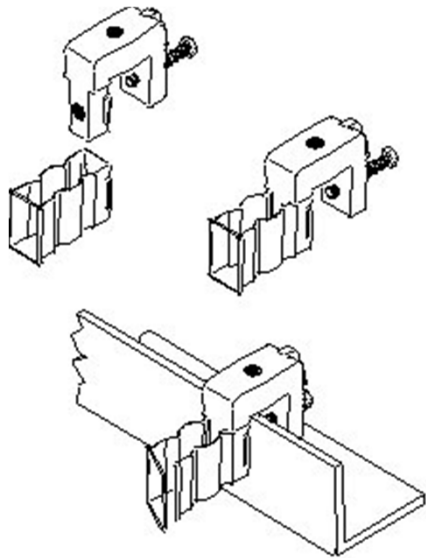
Size of cable

Model No. for SCF cables **RSB-S***** e.g. RSB-S12

For SCF cables (with clamp lining)

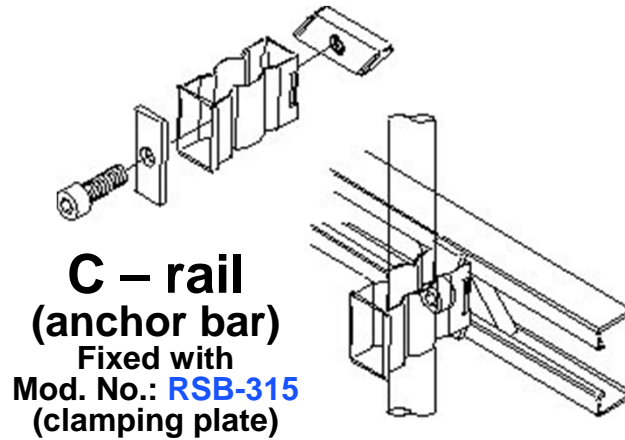
Clamps

RSB-Clip - RSB Clip components



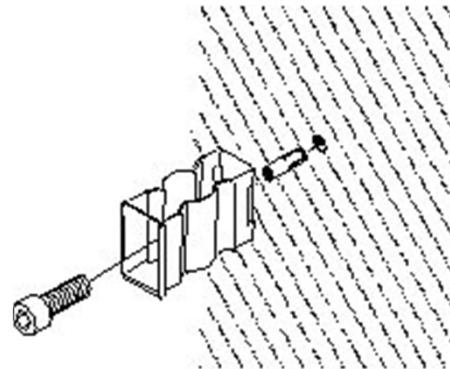
Angle, flat or U- member

Fixed with Mod. No.:
RSB-310 (RSB Cleat)



C – rail (anchor bar)

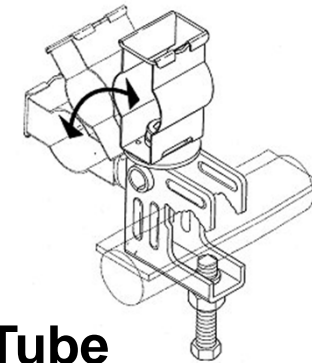
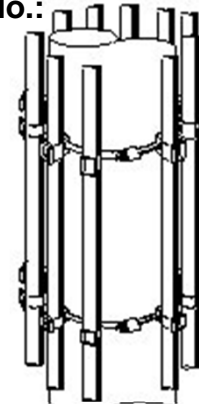
Fixed with
 Mod. No.: **RSB-315**
 (clamping plate)



Direct Wall or to hole installation

Round member

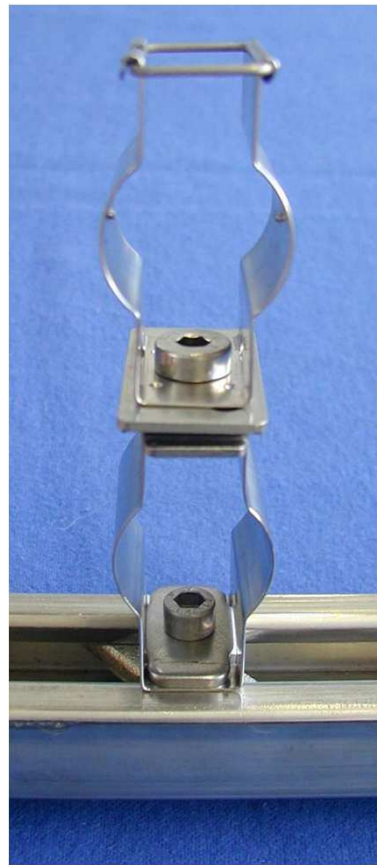
Fixed with Mod. No.:
RMA-***
 (round member
 adaptor)
 or **STRAP-***
 (strapping kit)



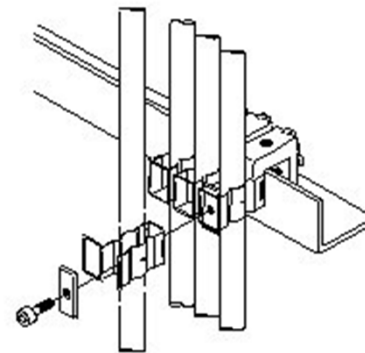
Tube **ANGLE-R-MBH**

Clamps

RSB-Clip - Rucksack option



For
LCF12-50
Mod.No **RSB-12-R**
&
LCF+UCF78-50
Mod.No.: **RSB-78-R**



Supply without RSB-Clip

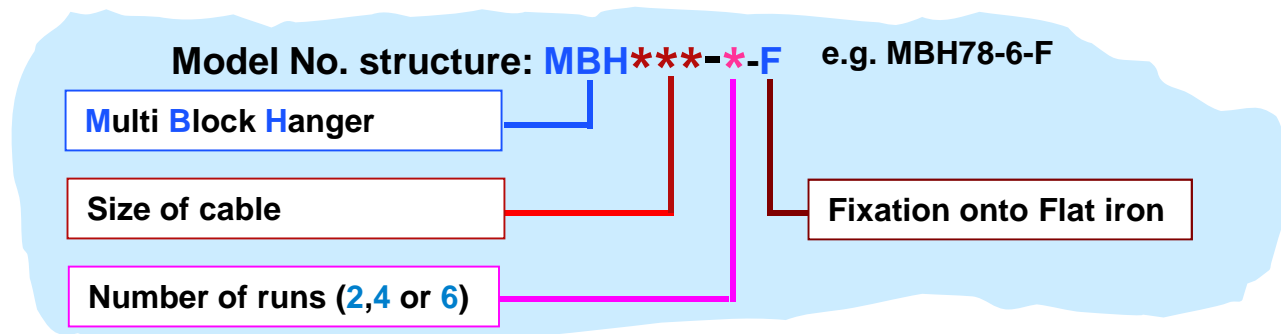
Clamps

MBH-Clamps



Double Multi block hangers can be stacked up to three layers to accept a total of 6 feeders.

With cleat, e.g. for the fixation onto Flat-, Angel or U-Iron.
Because of structural reasons not available with hardware for anchor bars.



Clamps

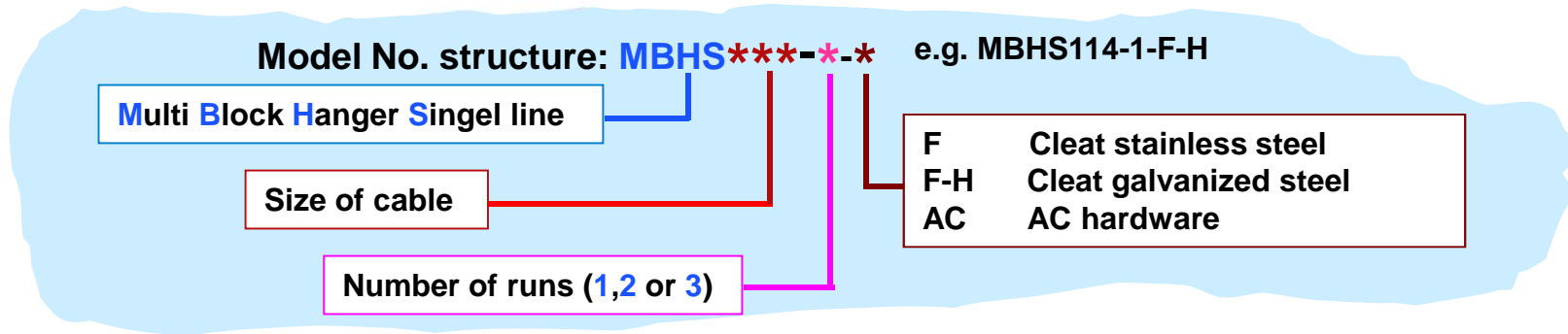
MBHS-Clamps



Single Multi Block Hanger system F-Series comes including angle member adapter made of stainless steel, excepted the -H type which is made of galvanized steel. AC-series comes with hardware for anchor bar fixation.

F - Series

AC - Series



Clamps

MBHS-Clamps – Fixation onto round interfaces



MBHS F – Series

whit cleat, e.g. for the
fixation onto Flat-, Angel
or U-Iron 4 – 30 mm



ANGLE-R-MBH



for fixation onto round irons/tubes 8 – 25 mm



remaining parts

Connectors - Interfaces

N - connectors:
 Very often used for
 equipment's

7-16 - connectors:
 Recommended in cases
 where a rugged and
 accurate connection is
 required

EIA system:
 Designed for rigid lines,
 but now also widely
 accepted for use
 with coaxial cables.
 It is recommended that
 connector and cable are
 of the same size.

Note: The necessary
 coupling element must
 be ordered separately!



N female



7-16 female



*** EIA (**EIAF exceptions)



N male



7-16 male



***EIA-CE-002

Coupling
 element



***EIAM
 (exception)

New entrants

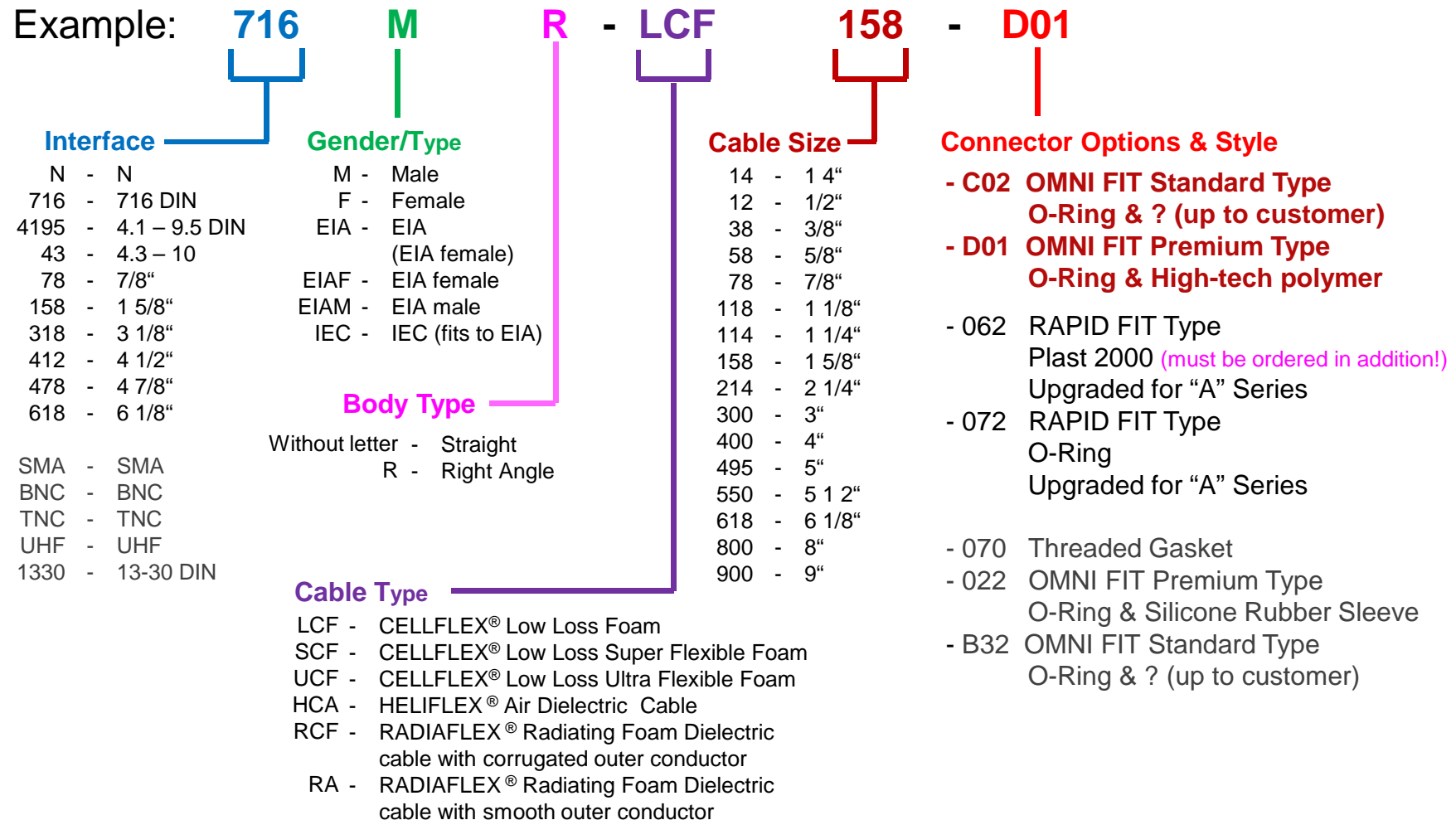


4.3-10



"Mini DIN"
 4.1-9.5

Numbering Structure of Connectors



OMNI FIT™ Connectors

OMNI FIT™ Connectors



One for both, CELLFLEX® & CELLFLEX® Lite



OMNI FIT™ Connectors



OMNI FIT™ Standard connectors

- Cost effective two piece design for safe and easy installation
- Consistent standard electrical performance.
- Robust mechanical design for low intermodulation performance.
- Waterproof to IP 68 (sealing against outer conductor included)



OMNI FIT™ Premium connectors

- Highest quality connector series, easy and fast connector attachment..
- Robust mechanical design with very low VSWR.
- Outstanding PIM performance.
- Waterproof to IP 68, as well against cable jacket (360° compression method)
- Eliminates the need for additional sealing such as tape, sleeves etc.

OMNI FIT™ Connectors

Comparison

Product Data Sheet **716M-LCF78-C02** 

7-16 DIN Male Connector for 7/8" Coaxial Cable, OMNI FIT™ standard, O-ring sealing

Product Description

OMNI FIT™ high performance connectors are designed for use with both CELLFLEX® (copper) and CELLFLEX® Lite (aluminum) cables. They are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up connector attachment. All RFS connectors are fully tested for mechanical and electrical compliance to industry specifications. The 7-16 connector is the most rugged RF connection meeting all requirements even under the most severe environmental conditions.



OMNI FIT™ Standard Connectors

Features/Benefits

- Cost effective two-piece design for safe and easy installation
- Compatible with copper and aluminum cable types i.e. one connector for both outer conductor materials eliminates the risk of faulty connector installation and helps to keep inventory down
- Robust mechanical design for low and consistent intermodulation performance i.e. keeps the mobile network performance up, reduces the number of dropped calls and avoids revenue losses
- Superior electrical performance for consistent and repeatable low VSWR i.e. improved network system performance
- Waterproof to IP 68 i.e. no downtime risk, secures revenue
- RoHS (EU) and CRoHS (China) compliant i.e. can be used on a global basis

Technical Specifications

Transmission Line Type	Coaxial Cable
Cable Size	7/8"
Cable Type	Foam Dielectric, Ultraflexible, Radiating
Model Series	UCF78-50A-Series, LCF78-50A-Series, UCF78-50L-Series, LCF78-50L-Series, RCF78-50A-Series
Connector Interface	7-16 DIN
Nominal Impedance, ohms	50
Connector Type	OMNI FIT™ Standard
Sealing Method	O-ring
Gender	Male
Plating Outer/Inner	Trimetal/Silver
Length, mm (in)	57.3 (2.3)
Outer Diameter, mm (in)	35.5 (1.4)
Weight, kg (lb)	0.18 (0.4)
Inner Contact Attachment	Spring Finger
Outer Contact Attachment	Spring O-Ring
3rd Order IM Product @ 2x20 Watts, dBc	-15@ typical
Maximum Frequency, GHz	3.7
VSWR (Return Loss, dB)	0 < f = 1.0 GHz: 1.03 (36.6) 1.0 < f = 2.7 GHz: 1.04 (34.1) 2.7 < f = 3.7 GHz: 1.08 (28.3)
Wrench size front, mm (in)	32 (1-1/4)
Wrench size rear, mm (in)	32 (1-1/4)
Waterproof Level	IP68

Notes

Other Documentation

Installation instruction: [0000000027-04.pdf](#)
Application Note: [0000000183-01 Application Note Installation of Heat Shrink Sleeves for additional sealing of Connectors.pdf](#)

The present data sheet is subject to confirmation in line of order

Product Data Sheet **716M-LCF78-D01** 

7-16 DIN Male Connector for 7/8" Coaxial Cable, OMNI FIT™ Premium, Straight, O-Ring and compression sealing

Product Description

OMNI FIT™ high performance connectors are designed for use with both CELLFLEX® (copper) and CELLFLEX® Lite (aluminum) cables. They are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up connector attachment. All RFS connectors are fully tested for mechanical and electrical compliance to industry specifications. The 7-16 connector is the most rugged RF connection meeting all requirements even under the most severe environmental conditions. Sealing against outer conductor and jacket by means of O-Ring and 360° compression fit. Multifunctional, self-lubricating HighTech polymer assembly locks on cable corrugation, avoids electrochemical potential differences and compression-fits to the jacket.



OMNI FIT™ Premium Connectors

Features/Benefits

- Ultra high PIM performance i.e. reduced interference leading to high customer satisfaction
- Two-piece design i.e. visual inspection of interlocking leads to improved installation security
- OMNI FIT™ concept i.e. streamlined order management and reduced stock level
- Watertight sealing in mated and unmated condition, i.e. reduced efforts during installation and improved security during operation
- Unique NiTi in plating i.e. extreme resistance against corrosion even under hardest climatic and environmental circumstances
- Multi-thread (Tristar) design i.e. simplified and accelerated tightening process
- RoHS (EU) and CRoHS (China) compliant i.e. can be used on a global basis

Technical Specifications

Transmission Line Type	Coaxial Cable
Cable Size	7/8"
Cable Type	Foam Dielectric
Model Series	UCF78-50A-Series, LCF78-50A-Series, UCF78-50L-Series, LCF78-50L-Series, RCF78-50A-Series
Connector Interface	7-16 DIN
Nominal Impedance, ohms	50
Connector Type	OMNI FIT™ PREMIUM Straight
Sealing Method	O-Ring + 360° Compression
Gender	Male
Plating Outer/Inner	NiTi/Silver
Length, mm (in)	65.25 (2.57)
Outer Diameter, mm (in)	40 (1.57)
Weight, kg (lb)	0.2 (0.44)
Inner Contact Attachment	Spring Finger
Outer Contact Attachment	360° clamping
3rd Order IM Product @ 2x20 Watts, dBc	-163 ; typical -167
Maximum Frequency, GHz	3.7
VSWR (Return Loss, dB)	0 < f = 1.0 GHz: 1.02 (40.0) 1.0 < f = 2.7 GHz: 1.03 (38.8) 2.7 < f = 3.7 GHz: 1.06 (30.7)
Wrench size front, mm (in)	38 (1-7/16)
Wrench size rear, mm (in)	38 (1-7/16)
Trimming Tool	TRIM-78-L TRIM-SET-L78-D01 TRIM-LCF78-D01-A
Waterproof Level	IP68

Notes

Other Documentation

Installation Instruction: [800131-A Inst Con LCF-UCF-L78-001.pdf](#)

The present data sheet is subject to confirmation in line of order

OMNI FIT™ Standard Connectors = C02 series



Mod. No. ends with -C02
e.g. 716M-LCF78-C02

Sealing with O-Ring & ?

- The O-Ring seals against outer conductor
- The additional sealing (necessary when installed on Lite cable! But also recommended for Copper cables especially if installed outside) can be made e.g. with tapes or sleeves.



OMNI FIT™ Premium Connectors = D01 series



High performance, high quality connector series



Mod. No. ends with **-D01**
e.g. 716M-LCF78-D01

Sealing with
High Tech Polymer
**No additional sealing
is necessary**



OMNI FIT™ Connectors – Tools for the installation



Preparation tools for easy and safe installation of connectors



Complete Hand tool kit with standard tools for CELLFLEX® cables (without the preparation tools)

Mod.No.: **TRIM-T01**

Universal Trimming Tools

RFS Innovations for customers satisfaction



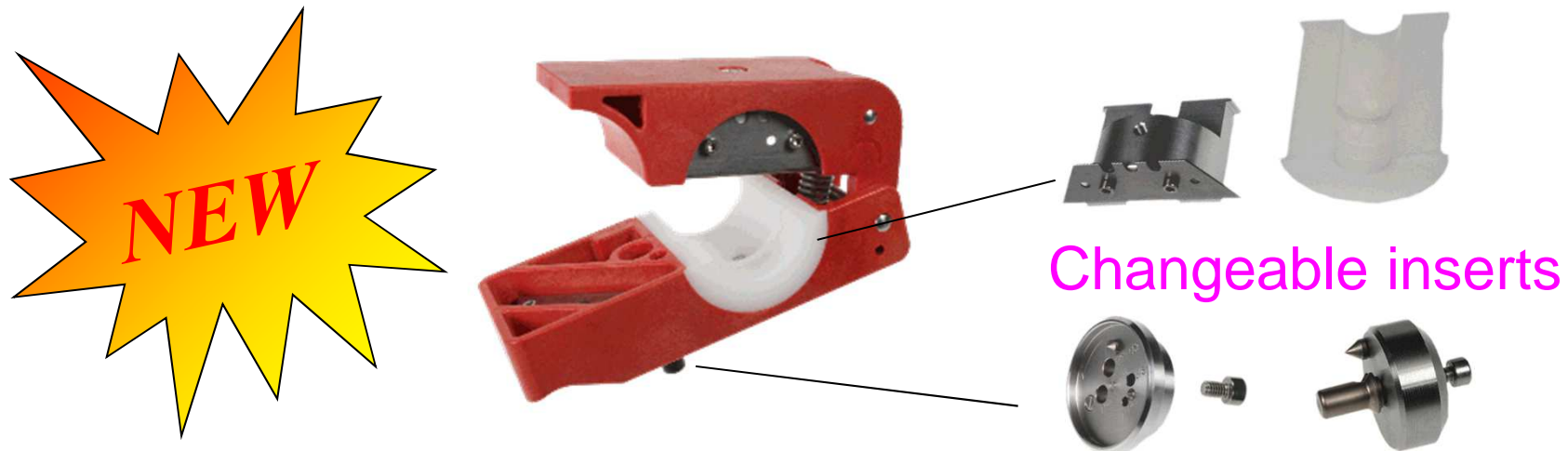
**Only two Tools for all CELLFLEX® cable sizes and
CELLFLEX® Connector types because of changeable inserts**

Tools and inserts for RADIAFLEX® cables under development.



Universal Trimming Tools for SCF, LCF, LCFS & UCF up to 7/8”

Universal Trimming Tool **TRIM-SET-***-*****



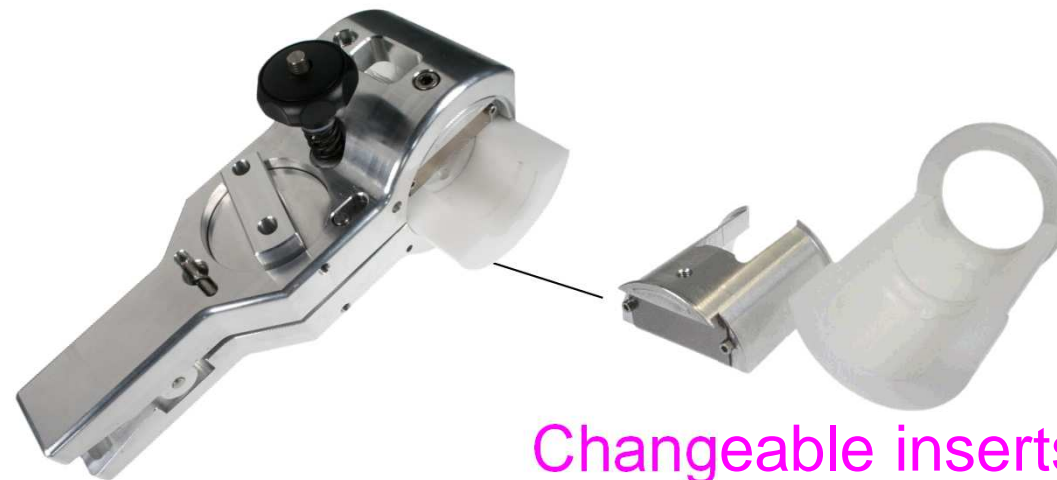
The new Universal Trimming Tool make the connector attachment onto CELLFLEX® foam dielectric cables even easier. No further tools are required to prepare the cable for the connector attachment. This is due to the special design of the trimming tool, which combines all necessary functions in one compact tool.

The new Tool is well prepared for the future, because the inserts are changeable (the body of the tool is always the same)



Universal Trimming Tools for LCF & UCF 1 1/4" & 1 5/8"

Universal Trimming Tool TRIM-SET-***-***



Changeable inserts

The new Universal Trimming Tool make the connector attachment onto CELLFLEX® foam dielectric cables even easier. No further tools are required to prepare the cable for the connector attachment. This is due to the special design of the trimming tool, which combines all necessary functions in one compact tool.

The new Tool is well prepared for the future, because the inserts are changeable (the body of the tool is always the same)

Trimming tools for drilling machines

Device for 14V power rating drill

Automated trimming tool
for D01 Connectors



Mod. No. **TRIM-L(S)CF**-D01-A**



Available types:

(for D01 connector family only)

TRIM-SCF12-D01-A

TRIM-LCF12-D01-A

TRIM-LCF78-D01-A

TRIM-LCF114-D01-A

TRIM-LCF158-D01-A

Other helpful tools



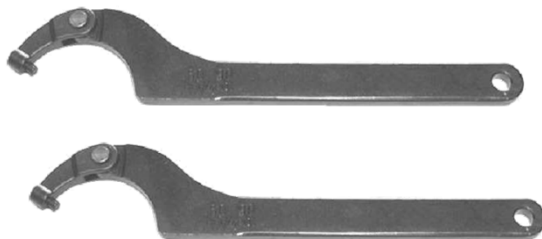
JSTRIP-12-3 (for LCF12)
JSTRIP-78-2 (for LCF78)
JSTRIP-114-2 (for LCF114)
JSTRIP-158-2 (for LCF158)

**Tool for dismantling of cable jacket
(for the installation of grounding kits
and usable for the installation of
connectors as well)**



Inner conductor
cleaner / scraper
Model No.: **CC200EUR**

Poly Hook Spanner

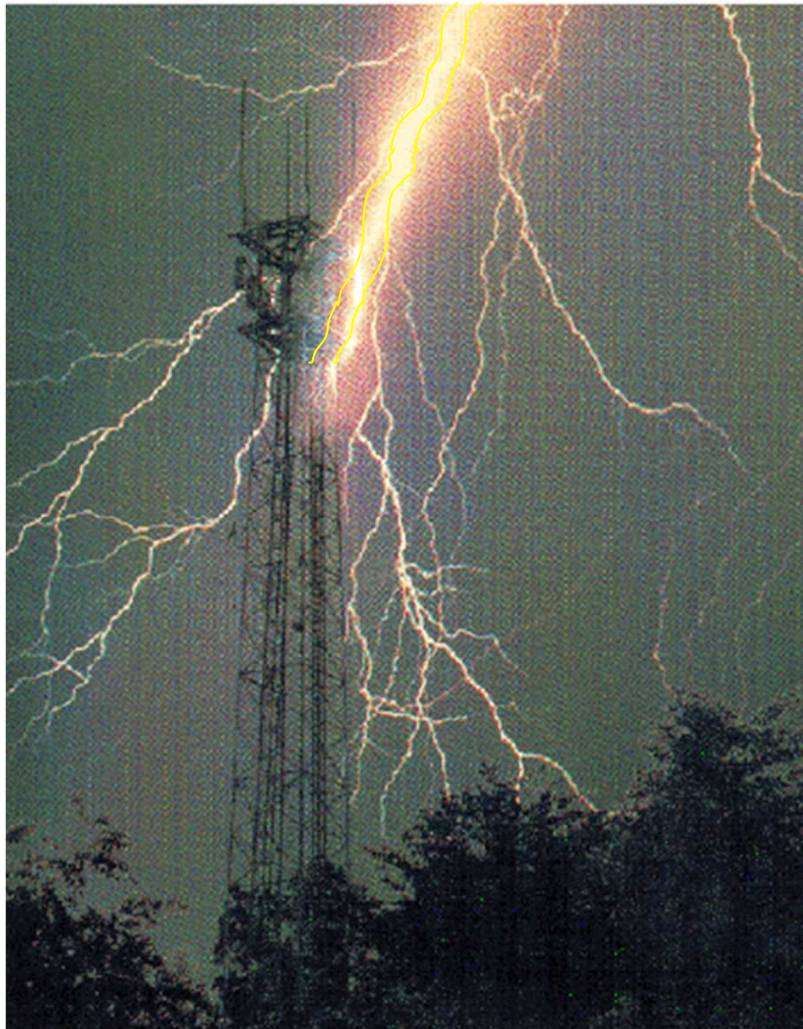


Type 60-90/5 Model No.: **PHS60-90-5** Included in tool box
needed for Connectors installation
on LCF 114-50 & 158-50

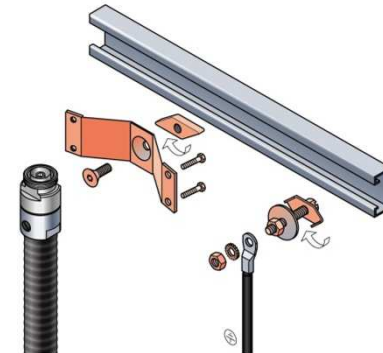
Type 90-155/6 Model No.: **PHS90-155-6** Not included in tool box
needed for Connector installation
on LCF 214-50

Note: twice are needed always

Cable Grounding



Cable grounding
(outer conductor)



Connector grounding
(outer conductor)



EMP Protector
(EMP = electromagnetic pulse)
also called lightning arrestor or
surge arrestor

GKSPEED – Premium Grounding Kit



This Grounding Kit has been developed by RFS for the CELLFLEX® cable series. The Grounding Kit body facilitates a proper attachment to the coaxial cable, ensuring that the performance of the coaxial cable is not being compromised. The tin plated copper mesh provides a secure, low resistance contact to the cable outer conductor. The installation only takes a few minutes. No additional sealing with mastic and electrical tape required.

Premium grounding kit

- complete with all relevant standards
- proof and resistant to all environmental influences
- easy and time saving installation
- **Compatible with both copper & aluminium**



For dismantling we recommend to use the **JSTRIP-**-*** tool



GKSPEED20-*P**

Grounding wire 16mm², 0,5m

GKSPEED20-*S**

Grounding wire 6AWG, 0,5m

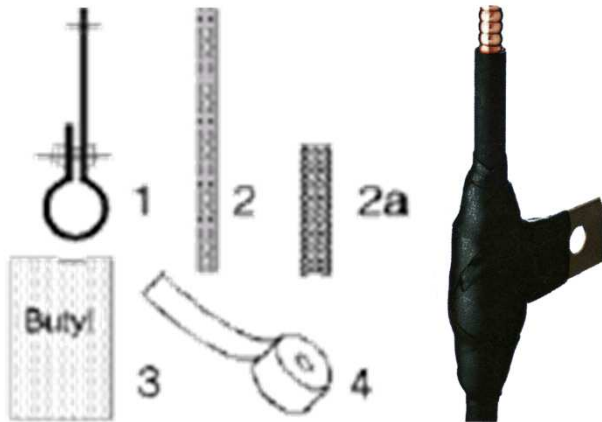
GKSPEED60-*P**

Grounding wire 16mm², 1,5m

GKSPEED60-*S**

Grounding wire 6AWG, 1,5m

EAR & GKFORM –Standard Grounding Kits



EAR Grounding Kit

EAR-**-*

required sealing material included

Grounding Kit – Pre-formed

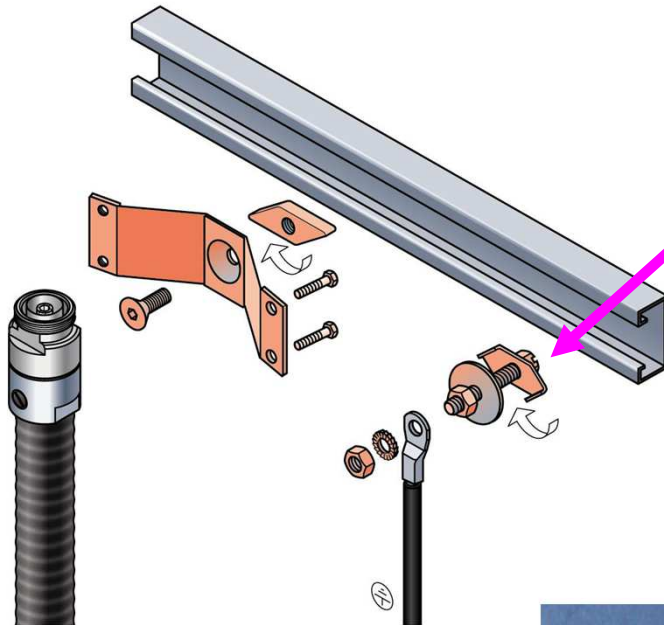
GKFORM20-*** (Factory attached lug-500mm 16mm² wire

GKFORM60-*** (Field attachable lug, 1,5m 13mm² Wire)
with mastic and electrical tape for weatherproofing



In order to avoid any corrosion problems, the **new** contact element/body of this Grounding Kit are tinplated copper. Tin plating allows **compatibility with both aluminium and copper conductors**

Connector Grounding Kit

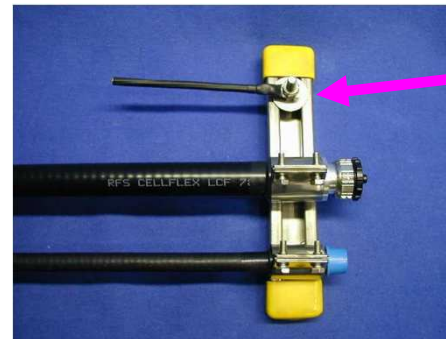


connector grounding kit
fixes and grounds the
connector for instance
on C-rail or bracket at the
same time.

Model .No.:
CEAR-***



By using a grounding terminal a lot of
connectors can be grounded with only
one earthing cable onto anchor bar



Model .No.:
CEAR-AC



Universal Connector
Grounding Kit
for Cable/Connector sizes
LCF1/2" and bigger



Model .No.:
CEAR-38-214

EMP Protectors (also called lightning arrestor or surge arrestor)



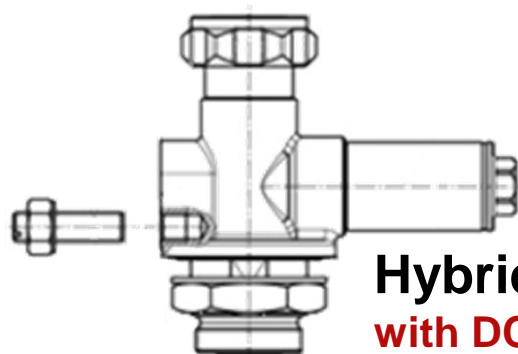
Model .No.:
*****-STUB- ****
e.g.: 716-STUB-14



Model .No.:
*****-UC- **- ****
e.g.: N-UC230-01



Spare Capsule
UC230



**Hybrid $\lambda/4$ type
with DC-Path**
Model .No.:
******B-HYB**- ****
e.g.: 7F7FB-HYB90-01



Grounding Wire Kit
16mm², 0,5m
Model No.:
GW-16/20

CELLFLEX® Jumper cables

Numbering Structure of Jumper cables

Example:

7M 7M R S12 F - 0100 FFP

Connector Type/Interface A + B

7 = 716 DIN Type

43 = 4.3-10 Type

N = N Type

M = Male

F = Female

H = Knurled coupling nut (hand screw, e.g. 43MH)

Connector Body Type

No letter = Standard = Straight

R = Right Angle (e.g. 7MR)

Cable Types

S38 = SCF38-50

S14 = SCF14-50

S12 = SCF12-50

L12 = LCF12-50



Premium Code

FFS = Factory Fit Standard

FFP = Factory Fit Premium

Length

e.g. 1000 = 10 m

e.g. 0100 = 100 m

e.g. 0050 = 0,5 m

Jacket Options

F = JFN (Flame Retardant)

G = Grey Jacket

No letter = Standard J

Additional Sealing – Weather Seal Kit - WSHIELD

**Gel seal weather shield for coaxial connector junction
1/2" jumper to:**

feeder cable



Available types:
[WSHIELD-12-78](#)
[WSHIELD-12-114](#)
[WSHIELD-12-158](#)

Antenna port (7-16 female)



Available type:
[WSHIELD-12-ANT-*](#)

Sealing with sealing WSHIELD

- + quick and easy to install
- + easy removable and re-usable
- + no tape, no mastic or tools required

Follow us !

