Habia Cable

Maxishield®

High-performance Low-loss Coaxial Cable

www.habia.com

Habia Cable

Maxishield®

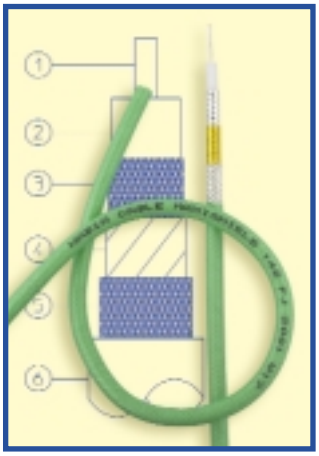
High-performance, Low-loss Coaxial Cable

Maxishield is a high performance, low loss alternative to standard RG coaxial cables.

Engineering Data

Item	Material	Maxishield 316 Diam (mm)	(in)	Maxishield 142 Diam (mm)	(in)	Maxishield 400 Diam (mm)	(in)	Maxishield 393 Diam (mm)	(in)
1 Conductor	Stranded SPC					0.98	0.038	2.39	0.094
or	Solid or stranded, SCW	0.51	0.0201	0.94	0.037				
2 Dielectric Solid	PTFE	1.52	0.060	2.95	0.116	2.95	0.116	7.24	0.285
3 Flat Braid Flat	SPC strip	1.70	0.067	3.40	0.134	3.40	0.134	7.60	0.299
4 Tape Inter-layer	Aluminium/polyimide tape	1.90	0.075	3.60	0.142	3.60	0.142	7.80	0.307
5 Braid	SPC Wires	2.40	0.094	4.05	0.159	4.05	0.159	8.50	0.334
6 Jacket	FEP, green	2.80	0.11	4.65	0.183	4.65	0.183	9.70	0.381

SPC = Silver Plated Copper
SCW = Silver Plated Copper Weld
Note: all figures are nominal unless otherwise specified



Introduction

The new range of Maxishield cables have been primarily designed to provide high-performance coaxial cables with dimensions similar to their MIL-C-17 counterparts but with lower attentuation and also to operate at higher frequencies.

The high performance is achieved through the use of an inner screen made up of flat strips of silver plated copper, braided over the PTFE dielectric core. This is overlaid with a kapton/aluminium foil and an outer round wire braid.

The resulting cables have very stable SRL and attenuation, due to ageing and flexing, especially at frequencies above 12 GHz.

Standard types use FEP as a jacket material but a variation with a halogen free jacket is also available. The standard jacket colour is green.

Features & Benefits

Lower loss than MIL-C-17 versions
Use standard RG connectors
Excellent shielding effectiveness
Stable loss and SRL against flexing
Use up to 18 GHz
Excellent temperature range

Connectors

Compatible wtih standard connectors for dimensionally equivalent RG styles.

Cable Marking

Jackets of all cables are marked with type and date of manufacture.

Custom Design

Variations available on request:-
Halogen-free jacket
Different coaxial types
Other jacket colours

Typical applications

Base station interconnects
Antenna applications
Radar Systems
Wireless Communications
Microwave Links

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Habia Cable

Maxishield® 316

High-performance, Low-loss Coaxial Cable

Engineering Data

Cable Design

		Ø (mm)
Centre conductor	Stranded SCW (7/0.17mm)	0.51
Dielectric	Solid PTFE	1.52
Flat braid	SPC	
Tape Interlayer	aluminium/polyimide	
Braid	SPC Wires	2.40
Jacket	FEP, green	2.80
Marking	Habia Cable Maxishield 316 FJ, and date of manufacture	

Electrical Data

Impedance	50 ± 2 Ω
Capacitance	94 pF/m
Velocity of signal propagation	70 %
Signal delay	4.8 ns/m
Working voltage, maximum	1000V
Shielding effectiveness	>90 dB
Attenuation, typical values	see graph
Power, typical values	see graph

Environmental & Mechanical

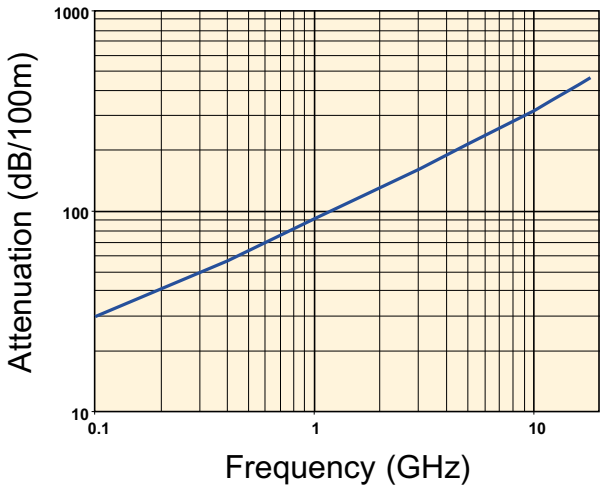
Minimum bend radius, single bend	10 mm
Minimum bend radius, multiple bends	25 mm
Weight	14 kg/km
Operating temperature	-55 to +200 °C
Flame resistance, passes	IEC 60332-3
Smoke, passes	IEC 61034-2

Connectors

Compatible with all standard connector types for M17/152-00001.

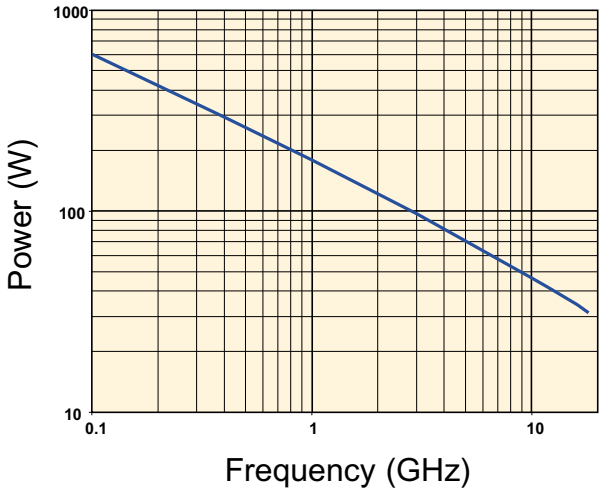
Cable Attenuation

Nominal values @ +25°C ambient temperature



Average Power

Ambient temperature 40°C at sea level & VSWR1.0



Dimensional Equivalents:

M17/152-00001
low-smoke, flame-retardant

Additional Information

Maxishield 316 UL 1375

UL version in accordance with AWM style 1375.

Working voltage	30 V
Operating temperature	-40 to +60 °C
Flame rating	UL 1581 VW-1
Our file no	E75929

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Habia Cable

Maxishield® 142

High-performance, Low-loss Coaxial Cable

Engineering Data

Cable Design

		Ø (mm)
Centre conductor	Solid SCW	0.94
Dielectric	Solid PTFE	2.95
Flat braid	SPC	
Tape Interlayer	aluminium/polyimide	
Braid	SPC Wires	4.05
Jacket	FEP, green	4.65
Marking	Habia Cable Maxishield 142 FJ, and date of manufacture	

Electrical Data

Impedance	50 ± 2 Ω
Capacitance	94 pF/m
Velocity of signal propagation	70 %
Signal delay	4.8 ns/m
Working voltage, maximum	1900 V
Shielding effectiveness	>90 dB
Attenuation, typical values	see graph
Power, typical values	see graph

Environmental & Mechanical

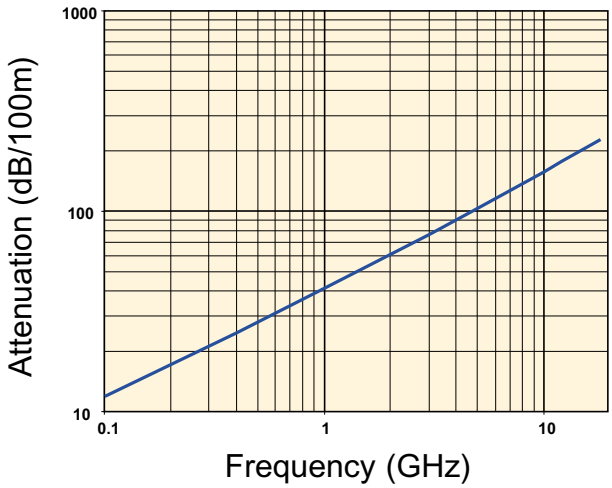
Minimum bend radius, single bend	25 mm
Minimum bend radius, multiple bends	50 mm
Weight	54 kg/km
Operating temperature	-55 to +200 °C
Flame resistance, passes	IEC 60332-3
Smoke, passes	IEC 61034-2

Connectors

Compatible with all standard connector types for M17/60-RG142 (RG142 B/U) and M17/158-00001.

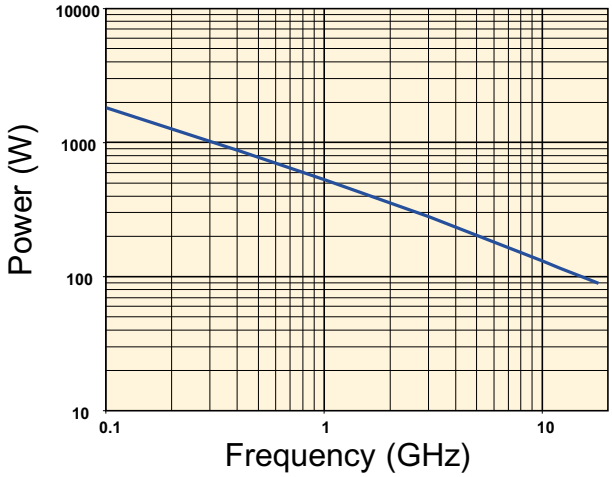
Cable Attenuation

Nominal values @ +25°C ambient temperature



Average Power

Ambient temperature 40°C at sea level & VSWR1.0



Dimensional Equivalents:

MIL-C-17/60 - RG142 (RG142 B/U)
M17/158-00001
low-smoke, flame-retardant

Additional Information

Maxishield 142 UL 1375

UL version in accordance with AWM style 1375.

Working voltage	30 V
Operating temperature	-40 to +60°C
Flame rating	UL 1581 VW-1
Our file no	E75929

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Habia Cable

Maxishield® 400

High-performance, Low-loss Coaxial Cable

Engineering Data

Cable Design

		Ø (mm)
Centre conductor	Stranded SPC (19/0.20)	0.98
Dielectric	Solid PTFE	2.95
Flat braid	SPC	
Tape Interlayer	aluminium/polyimide	
Braid	SPC Wires	4.05
Jacket	FEP, green	4.65
Marking	Habia Cable Maxishield 400 FJ, and date of manufacture	

Electrical Data

Impedance	50 ± 2 Ω
Capacitance	94 pF/m
Velocity of signal propagation	70 %
Signal delay	4.8 ns/m
Working voltage, maximum	1900 V
Shielding effectiveness	>90 dB
Attenuation, typical values	see graph
Power, typical values	see graph

Environmental & Mechanical

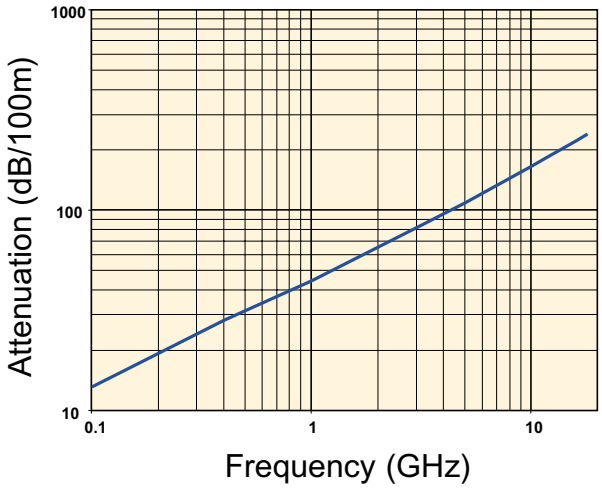
Minimum bend radius, single bend	25 mm
Minimum bend radius, multiple bends	50 mm
Weight	53 kg/km
Operating temperature	-55 to +200 °C
Flame resistance, passes	IEC 60332-3
Smoke, passes	IEC 61034-2

Connectors

Compatible with all standard connector types for M17/28-RG400 (RG400 /U) and M17/175-00001.

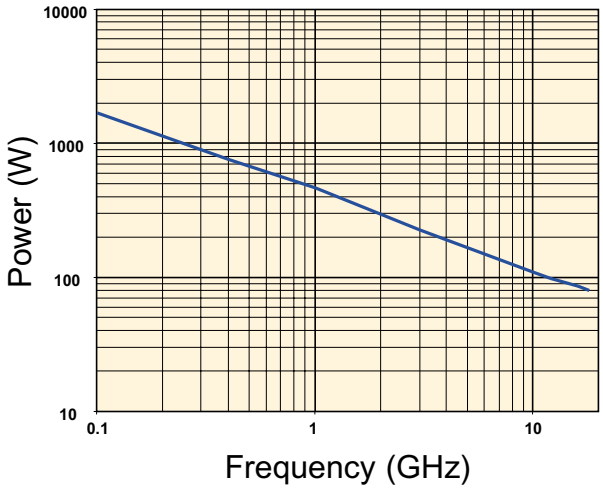
Cable Attenuation

Nominal values @ +25°C ambient temperature



Average Power

Ambient temperature 40°C at sea level & VSWR1.0



Additional Information

Maxishield 400 UL 1375

UL version in accordance with AWM style 1375.

Working voltage	30 V
Operating temperature	-40 to +60°C
Flame rating	UL 1581 VW-1
Our file no	E75929

Dimensional Equivalents:

MIL-C-17/28-RG400 (RG400 /U)
M17/175-00001
low-smoke, flame-retardant

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Maxishield® 393

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Engineering Data

Cable Design

		Ø (mm)
Centre conductor	Stranded SPC (7/0.80)	2.39
Dielectric	Solid PTFE	7.24
Flat braid	SPC	
Tape Interlayer	aluminium/polyimide	
Braid	SPC Wires	8.50
Jacket	FEP, green	9.70
Marking	Habia Cable Maxishield 393 FJ, and date of manufacture	

Electrical Data

Impedance	50 ± 2 Ω
Capacitance	94 pF/m
Velocity of signal propagation	70 %
Signal delay	4.8 ns/m
Working voltage, maximum	4600 V
Shielding effectiveness	>90 dB
Attenuation, typical values	see graph
Power, typical values	see graph

Environmental & Mechanical

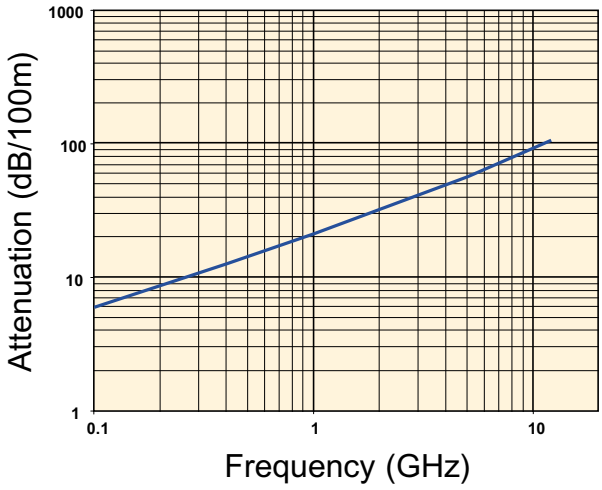
Minimum bend radius, single bend	50 mm
Minimum bend radius, multiple bends	100 mm
Weight	227 kg/km
Operating temperature	-55 to +200 °C
Flame resistance, passes	IEC 60332-3
Smoke, passes	IEC 61034-2

Connectors

Compatible with all standard connector types for M17/127-RG393 (RG393 U) and M17/174-00001.

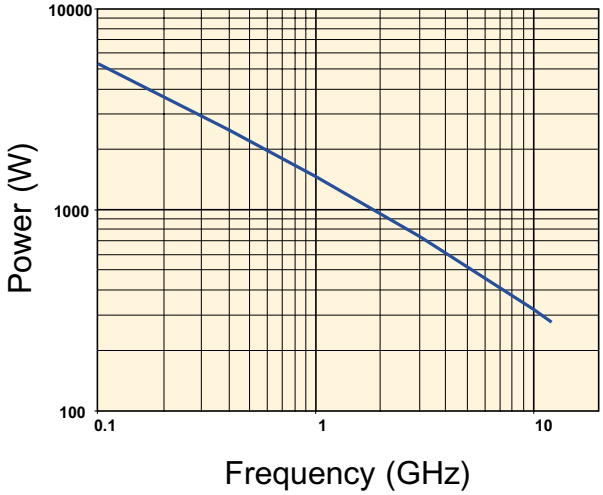
Cable Attenuation

Nominal values @ +25°C ambient temperature



Average Power

Ambient temperature 40°C at sea level & VSWR1.0



Dimensional Equivalents:

MIL-C-17/127 - RG393 (RG393 U)
M17/174-00001
low-smoke, flame-retardant

Additional Information

Maxishield 393 UL 1375

UL version in accordance with AWM style 1375.

Working voltage	30 V
Operating temperature	-40 to +60°C
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Formulas for Coaxial cables

Characteristic impedance

The term expressing the ratio of voltage to current in a cable of indefinite length and without SWR. For coaxial cables it is called characteristic impedance and measured in ohms (Ω). Usually manufactured in 50, 75 and 95 ohms impedance.

$$Z_0 = \frac{60}{\sqrt{\varepsilon}} \cdot \ln\left(\frac{Dm}{d}\right) \quad \text{or} \quad Z_0 = \frac{3333}{V_p \cdot C} \quad \text{or} \quad Z_0 = \sqrt{\frac{L}{C}} \ [\Omega]$$

Capacitance

Capacitance is the ability to store and release electrical energy from voltage.

$$C = \frac{\varepsilon \cdot 55{,}6}{\ln\left(\frac{Dm}{d}\right)} \quad \text{or} \quad C = \frac{3333 \cdot \sqrt{\varepsilon}}{Z_0} \ [\text{pF/m}]$$

Velocity of propagation

The ratio between the signal speed in a cable and light velocity in vacuum (300,000 km/s). Expressed as a fraction or as a percentage of the speed of light. If the speed of light is 100% in vacuum, the value for solid PTFE is 70%

$$V_p = \frac{1}{\sqrt{\varepsilon}} \quad \text{or} \quad V_p = \frac{3333}{Z_0 \cdot C}$$

Time delay

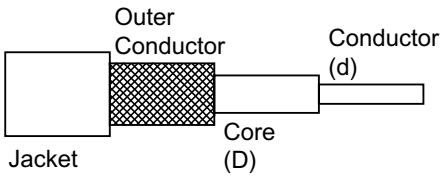
Time delay is the time for the signal to travel a certain distance. For solid PTFE is the delay 4,8 nano seconds per metre. For light in vacuum is the delay 3,3 ns/m.

$$t = 3{,}33 \cdot \sqrt{\varepsilon} \quad \text{or} \quad t = \frac{3333}{Vp} \ [\text{ns/m}]$$

Inductance

Inductance is the ability to store and release electrical energy from current.

$$L = 0{,}2 \cdot \ln\left(\frac{Dm}{d}\right) \ [\mu\text{H/m}]$$



where
D = dielectric core diameter
d1 = diameter of outer conductor wire strand
Dm = D+1,5d1
d = conductor diameter
V_p = velocity of propagation
Z_o = characteristic impedance
C = capacitance
e = dielectric constant. (2,05 for PTFE)
t = time delay
L = inductance

In any transmission line there is the possibility of the energy being transmitted in a variety of modes depending on the frequency and the construction of the transmission line. The top frequency specified (g) for a coaxial line is the highest frequency that can be used where only the TEM_∞ mode will be supported.

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If you would like any further information, please do not hesitate to contact your nearest Sales Office.

Maxishield issue 1 (MS1) The data provided in this publication indicates nominal values unless stated otherwise and is only valid for reference purposes at the time of publication and all information is subject to change without prior notice.

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