TIMES MICROWAVE SYSTEMS
An Amphenol Company

T-RAD®

High Performance Radiating Cable

T-RAD® Leaky Feeder Cable:

Times Microwave offers the T-RAD series of flexible, low-loss leaky feeder cables. This design provides a cost effective solution where point source antennas are not practical. The T-RAD cables utilize a continuous single slot design, which is achieved by bonding a metalized shield to the low-loss foamed polyethylene core. This foamed core/shield design yields a very flexible lightweight design, which allows for easy installation. The slot opening is designed to provide a balance between downline signal attenuation and coupling loss. It's broadband design allows it to be used from lower frequency through the higher frequency applications.

There are currently two different jacket versions available with the T-RAD cables. The standard T-RAD cable utilizes a flexible PVC outer jacket while the T-RAD-FR series utilizes a non-halogen, low-smoke flame retardant jacket. Both designs exhibit excellent flexibility, and provide very cost effective installation methods.

A wide range of connector styles are available for the T-RAD cables. The T-RAD-400 and -600 sizes were designed to accept the Times LMR® EZ-style crimp connectors. For T-RAD-600 cables, a special thinner crimp ring is required to properly crimp the outer ring to the connector body.

T-RAD 50 Ohm Leaky Feeder Coaxial Cable:

- Provides RF coverage in buildings, mines and other enclosed areas
- Offers broadband performance up to 3.5 GHz (5.8GHz Available)
- Flexible, non-kinking design provides easier installation
- Accepts standard "EZ" crimp connectors
- FR series is MSHA approved for mining applications

Radiating Cable Solutions for Interior RF Communications and Security Applications:

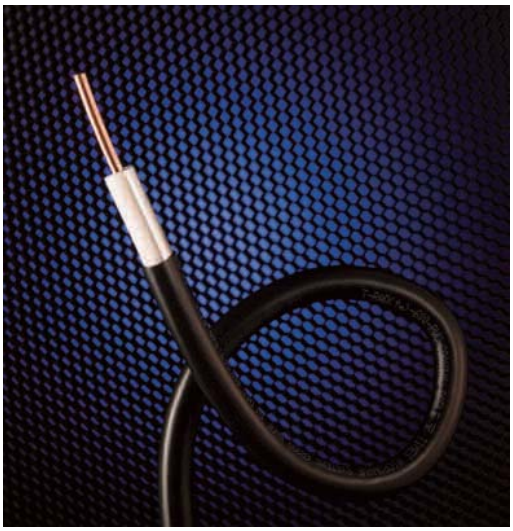
- Mines
- Tunnels
- Ships
- Subways
- In-Building
- Oil Rig Platforms
- Perimeter Detection

T-RAD®

High Performance Radiating Cable

	T-RAD-400			T-RAD-600		
Physical Specifications						
Description	in (mm)			in (mm)		
Center Conductor	0.108 (2.74)			0.176 (4.47)		
Dielectric	0.294 (7.47)			0.455 (11.56)		
Shield	0.300 (7.62)			0.458 (11.63)		
Jacket	0.360 (9.14)			0.530 (13.46)		
Bend Radius	1.500 (38.10)			1.500 (38.10)		
Weight	62 pounds per 1000 ft			95 pounds per 1000 ft		
Environmental Specifications						
Operating Temp. Range	-40°C to +85°C					
Electrical Specifications						
Velocity of Propagation	84%			85%		
Impedance	50 ohms			50 ohms		
Capacitance: Pf/ft(Pf/m)	23.9pF/ft			23.6pF/ft		
Attenuation (MHz)	dB/100ft	dB/100m	50% /95% CL*(dB)	dB/100ft	dB/100m	50% /95% CL*(dB)
150	1.94	6.36	64/73	1.63	5.35	57/68
450	3.52	11.55	68/79	2.79	9.15	67/79
900	5.00	16.40	76/84	4.26	13.97	74/87
1900	8.30	27.22	74/84	6.84	22.44	70/84
2400	9.57	31.39	77/86	8.44	27.68	75/86
3500	14.38	47.17	77/84	12.41	40.70	77/86

** CL=Coupling Loss*



Cable Structure:

Center Conductor: Solid Bare Copper Clad Aluminum

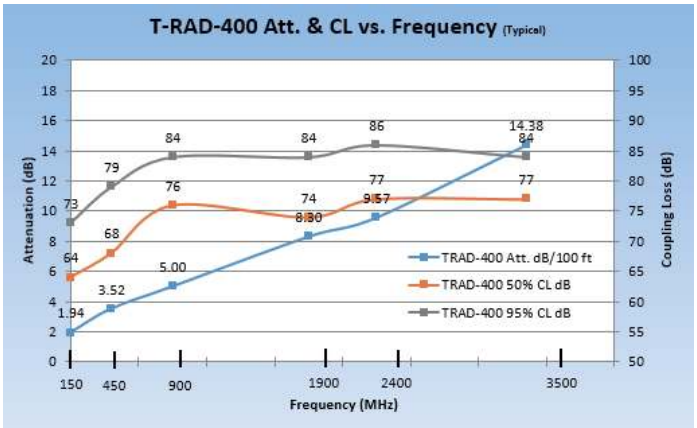
Dielectric: Gas Injected Foam Polyethylene

Shield: Bonded Aluminum Tape plus Braided Drain Wire

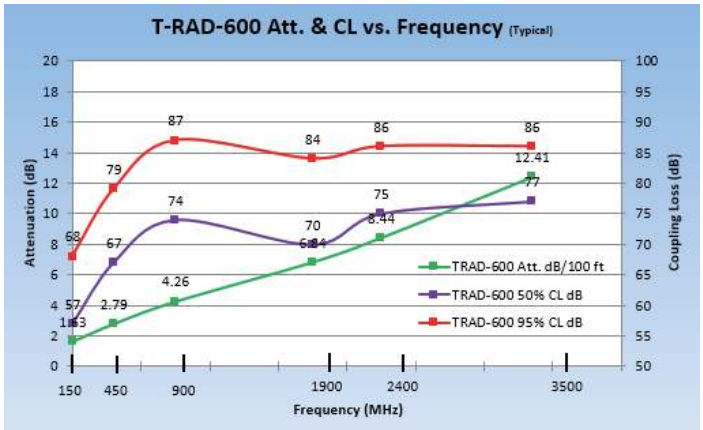
Jacket: FR: Black FR Polyolefin

PVC: Polyvinylchloride

T-RAD-400
Att. & CL vs Frequency



T-RAD-600
Att. & CL vs Frequency



Connectors for T-RAD-400:

Interface	Description	Part Number	Stock Code	VSWR Freq. (GHz)	Coupling Nut	Inner Contact	Outer Contact	Finish * Body/Pin	Length in (mm)	Width in (mm)	Weight lb (g)
7-16 DIN Male	Straight Plug	EZ-400-716M-X	3190-2524	<1.25:1 (6)	Hex	Spring Finger	Crimp	A/G	1.6 (39.5)	1.38 (35)	0.277 (126.0)
7-16 DIN Male	Right Angle	EZ-400-716M-RA-X	3190-2545	<1.35:1 (6)	Hex	Spring Finger	Crimp	A/G	1.6 (41.7)	1.75 (44.3)	0.374 (169.4)
N Female	Straight Jack	EZ-400-NF-X	3190-2818	<1.25:1 (2.5)	N/A	Spring Finger	Crimp	N/G	1.8 (45)	0.66 (16.8)	0.105 (47.6)
N Male	Straight Plug	EZ-400-NMH-X	3190-2590	<1.25:1 (10)	Hex/Knurl	Spring Finger	Crimp	A/G	1.5 (38)	0.89 (22.6)	0.103 (46.8)
N Male	Right Angle	EZ-400-NMH-RA-X	3190-6342	<1.30:1 (6)	Hex	Spring finger	Crimp	A/G	2.0 (50.3)	1.26 (32.1)	0.084 (38.0)
4.3/10 Din Male	Straight Plug	EZ-400-4310M-X	3190-8096	<1.30:1 (6)	Hex	Spring finger	Crimp	B/G	1.9 (49.1)	1.0 (24.5)	0.112 (51.0)
4.3/10 Din Male	Right Angle	EZ-400-4310M-RA-X	3190-8097	<1.30:1 (6)	Hex	Spring finger	Crimp	B/G	2.1 (52.3)	1.4 (35.4)	0.152 (69.0)

Connectors for T-RAD-600:

Interface	Description	Part Number	Stock Code	VSWR Freq. (GHz)	Coupling Nut	Inner Contact	Outer Contact	Finish * Body/Pin	Length in (mm)	Width in (mm)	Weight lb (g)
7-16 DIN Male	Straight Plug	EZ-600-716M-X	3190-2643	<1.30:1 (6)	Hex	Spring Finger	Crimp	A/S	1.6 (42.0)	1.38 (35)	0.209 (94.8)
7-16 DIN Male	Right Angle	EZ-600-716M-RA-X	3190-6471	<1.15:1 (3)	Hex	Spring Finger	Crimp	A/S	2.2 (55.8)	1.63 (41.5)	0.401 (182)
N Female	Straight Jack	EZ-600-NF-X	3190-2817	<1.30:1 (6)	N/A	Spring Finger	Crimp	A/G	1.7 (43)	0.69 (17.6)	0.090 (40.6)
N Male	Straight Plug	EZ-600-NMH-X	3190-2627	<1.25:1 (8)	Hex/Knurl	Spring Finger	Crimp	A/G	2.1 (53)	0.92 (23.4)	0.164 (74.4)
N Male	Right Angle	EZ-600-NMH-RA-X	3190-6387	<1.30:1 (6)	Hex	Spring Finger	Crimp	A/G	2.5 (64.6)	1.31 (33.4)	0.196 (89.0)
4.3/10 Din Male	Straight Plug	EZ-600-4310M-X	3190-8100	<1.30:1 (6)	Hex	Spring finger	Crimp	B/G	2.3 (58.4)	1.0 (24.5)	0.148 (67.0)
4.3/10 Din Male	Right Angle	EZ-600-4310M-RA-X	3190-8101	<1.30:1 (6)	Hex	Spring finger	Crimp	B/G	2.4 (61.5)	1.4 (36.7)	0.187 (85.0)

Special Crimp Ring part number 3192-038 (TR-600) must be used on all EZ style connectors.

CST-600-TRAD (stock code 3192-197) cable strip tool available.

EZ-400-716M-X
3190-2524

EZ-400-716M-RA-X
3190-2545

EZ-400-NF-X
3190-2818

EZ-400-NMH-X
3190-2590

EZ-600-716M-X
3190-2643

EZ-600-NF-X
3190-2817

Accessories:

Hangers are available for use with T-RAD installations. This hanger ensures trouble-free RF operation during the entire lifetime of the radiating cable. Simple mounting of cables is achieved by pushing the cable into the hanger. The hanger will lock shut holding the cable's in place.

Flame Retardant
Metal Hanger

Standard
Plastic Hanger

For safety, the standard plastic hanger should be the main clamping option; every 10th hanger should be of the flame retardant metal hanger.

In case of fire one in ten metal hangers will hold the cable in position and enables the cable to keep in operation as long as the cable itself allows. It also prevents the cable from detaching from the wall that might block any escape route.

T-RAD-600 connector installation procedure

(Video instructions located at www.timesmicrowave.com)

Step 1: Flush cut the cable squarely.

Step 2: Slide the heat shrink and TR-600 crimp ring over the cable. Use a knife or razor blade to cut a 0.250" long ring from the end of the cable. Make sure that the cut is square.

Note: CST-600-TRAD (Stock code 3192-197) cable strip tool is available.

Step 3: Lightly score the circumference of the cable 0.20" back from the end of the core. Make one long longitudinal cut. Pry up a piece of the jacket and gently peel the ring of the jacket off the core.

Step 4: Debur the center conductor using the DBT-01 deburring tool.

Step 5: Slide the connector over the end of the core and push it up to the end of the jacket. Rotate the connection back and forth in a clockwise-counter clockwise motion in reference to the axis of the cable until the back of the connector works its way under the end of the jacket. Now push the connector onto the cable with some back and forth motion until it stops. The drain wire should be on the outside of the connector and under the crimp ring, when the crimp ring is pushed up.

Note: A small longitudinal cut of 1/4" may be made to the outer jacket to assist with the connector body sliding under the jacket.

Step 6: Position the heavy duty HX-4 crimp tool with the appropriate dies (stock code 3190-203) directly behind and ajacent to the connector body, and crimp the connector. The crimp tool automatically releases when the crimp is complete.

Step 7: Position the heat shrink boot as far forward on the connector body as possible without interfering with the coupling nut; use a heat gun to form a weather tight seal.

TIMES MICROWAVE SYSTEMS
An Amphenol Company
www.timesmicrowave.com

World Headquarters:
358 Hall Avenue, Wallingford, CT 06492 | Fax: 203-949-8423
Tel: 203-949-8400 , 1-800-867-2629| International: 203-949-8503

China Sales:
TMC Building 4, No. 318 Yuanshan Road, Xinzhuang Industrial Park,
Shanghai, China 201108 |Tel: 86-21-5176-1209 | Fax: 86-21-64424098