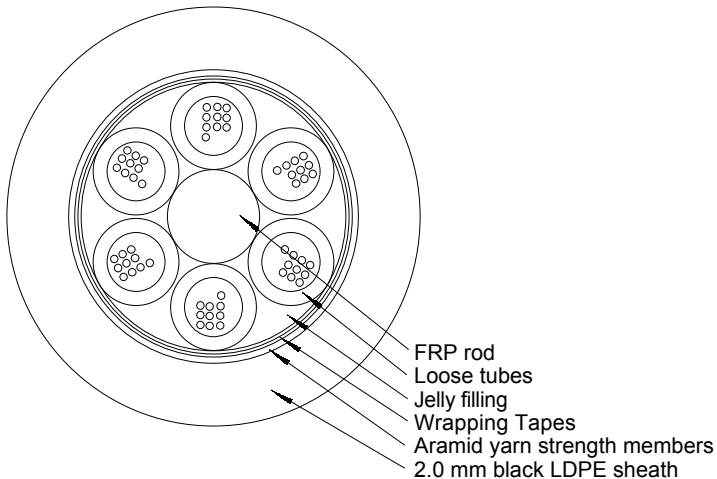




# Cables with 2 to 168 fibres

## Type A-DF (ZN) 2Y (1..14) x (2..12), according to DIN/VDE



### APPLICATION

- Outdoor data communication connections
- Telecom trunk lines
- CATV trunk lines

The main application for these cables is for installation in ducts.

The cables are also suitable for direct burial where rodent protection is not an issue and where soil conditions are not difficult.

### GENERAL

This specification covers optical cables with 2 - 168 optical fibres of loose tube construction.

The cable construction is fully dielectric for immunity against lightning.

The cables fulfil the requirements of:

- DIN/VDE 0888-3 (VDE 0888 Teil 3) Entwurf 1996 (note: The

Entwurf 1996 is meant to replace the current 1987 issue)

- EN 187 100
- IEC 794-3

The cables have the following type designation according to DIN/VDE: A-DF (ZN) 2Y (1..14) x ( 2..12) LG;

### CABLE CONSTRUCTION

### OPTICAL FIBRES

The cable can be supplied with any Draka Denmark optical fibre.

The standard single mode fibre according to Fibre Specification Sheet C03 has lower attenuation as the fibre according to DIN/VDE 0880-3 The designation for this fibre is: E9,3/125 0,40F3,5 0,25H18.

The standard 50 µm multi mode fibre according to Fibre Specification Sheet C01 fulfils the requirements of DIN/VDE 0880-3. The designation for this fibre is:

G50/125 2,7B400 0,8F800 .

The 62.5 µm multi mode fibre type 47705 according to Fibre Specification Sheet C09 fulfils the requirements of DIN/VDE 0880-3. The designation for this fibre is: G62,5/125 3,2B200 0,9F600.

For other optical fibre properties and performance please see the appropriate Fibre Specification Sheet.

The fibres in each tube are individually coloured for identification.

Standard colours are:

Fibre 1:	Red
Fibre 2:	Green
Fibre 3:	Blue
Fibre 4:	Yellow
Fibre 5:	White
Fibre 6:	Grey
Fibre 7:	Brown
Fibre 8:	Violet
Fibre 9:	Turquoise
Fibre 10:	Black.



Fibre 11: Orange  
Fibre 12: Pink

The fibre colours are marking colours according to DIN IEC 304.

The cable has a glass fibre rod (FRP) as central strength member.

The fibres are contained in jelly filled loose tubes.  
The loose tubes have a nominal outer diameter of 2,3 mm or 2.8 mm, depending of the number of fibres in the tube.

There are 2, 4, 6, 8,10 or 12 fibres in each of the loose tubes.

The cable core is water blocked using a jelly.

The jelly for filling of the cable fulfils the requirements of IEC 811-5-1 as well as DIN VDE 0819-108

A layer of non-hydroscopic tape, and a layer of swellable tape protect the cable core.

The cable is reinforced with a number of high strength, high modulus aramid yarns.

The longitudinal water tightness of the cable is tested according to DIN VDE 187 000 method 605 and IEC 794-1-F5B. The sample length is 3 m. The testing time is 24 h.

**SHEATH**

The cables have a 2,0 mm thick black LDPE sheath (minimum mean value).

The black LDPE contains 2.5 ± 0.5 % carbon black and fulfils the requirements of DIN VDE 819-104 as well as IEC 811.

**CABLE STRUCTURE AND OTHER PHYSICAL PROPERTIES**

The cable comes with 6 different lay-ups, depending on the number fibres in the tubes: They are given in table 1 - 6.

The tables also give the following physical parameters:

- Nominal cable diameter
- Cable nominal weight
- Minimum bending diameter
- Cable tensile strength

The other physical properties of the cables are given in Table 7 below.

The cables are made with a red tube for counting, the other tubes are yellow if containing single mode fibres and green tubes if containing multi mode fibres. Any possible fillers are natural in colour.

**Table 1: Structure of cables with 2 to 16 fibres**

Cable type A-DF (ZN) 2Y (1..8) x 2 .....							
Number of fibres in the cable	2	4	6	8	10	12	16
Number of cable elements	6	6	6	6	6	6	8
Number of ø 2,3 mm loose tubes with 2 fibres	1	2	3	4	5	6	8
Number of dummies	5	4	3	2	1	0	0
Cable nominal diameter [mm]	12						13,5
Cable nominal weight [kg/km]	120						150
Minimum bending radius [mm]	240						270
Tensile strength (permanent) [N]	2000						2000
Tensile strength (installation) [N]	3000						3000

**Table 2: Structure of cables with 4 to 40 fibres**

Cable type A-DF (ZN) 2Y (1..10) x 4 .....										
Number of fibres in the cable	4	8	12	16	20	24	28	32	36	40
Number of cable elements	6	6	6	6	6	6	7	8	9	10
Number of ø 2,3 mm loose tubes with 4 fibres	1	2	3	4	5	6	7	8	9	10
Number of dummies	5	4	3	2	1	0	0	0	0	0
Cable nominal diameter [mm]	12						13	13,5	14	15
Cable nominal weight [kg/km]	120						130	150	160	180
Minimum bending radius [mm]	240						260	270	280	300
Tensile strength (permanent) [N]	2000						2000	2000	2000	2000
Tensile strength (installation) [N]	3000						3000	3000	3000	3000

**Table 3: Structure of cables with 6 to 60 fibres**

Cable type A-DF (ZN) 2Y (1..10) x 6 .....										
Number of fibres in the cable	6	12	18	24	20	36	42	48	54	60
Number of cable elements	6	6	6	6	6	6	7	8	9	10
Number of $\varnothing$ 2,3 mm loose tubes with 6 fibres	1	2	3	4	5	6	7	8	9	10
Number of dummies	5	4	3	2	1	0	0	0	0	0
Cable nominal diameter [mm]	12						13	13,5	14	15
Cable nominal weight [kg/km]	120						130	150	160	180
Minimum bending radius [mm]	240						260	270	280	300
Tensile strength (permanent) [N]	2000						2000	2000	2000	2000
Tensile strength (installation) [N]	3000						3000	3000	3000	3000

**Table 4: Structure of cables with 8 to 80 fibres**

Cable type A-DF (ZN) 2Y (1..10) x 8 .....										
Number of fibres in the cable	8	16	24	32	40	48	56	64	72	80
Number of cable elements	6	6	6	6	6	6	7	8	9	10
Number of $\varnothing$ 2,3 mm loose tubes with 8 fibres	1	2	3	4	5	6	7	8	9	10
Number of dummies	5	4	3	2	1	0	0	0	0	0
Cable nominal diameter [mm]	12						13	13,5	14	15
Cable nominal weight [kg/km]	120						130	150	160	180
Minimum bending radius [mm]	240						260	270	280	300
Tensile strength (permanent) [N]	2000						2000	2000	2000	2000
Tensile strength (installation) [N]	3000						3000	3000	3000	3000

**Table 5: Structure of cables with 10 to 120 fibres**

Cable type A-DF (ZN) 2Y (1..10) x 10 .....										
Number of fibres in the cable	10	20	30	40	50	60	80	100	120	
Number of cable elements	6	6	6	6	6	6	8	10	12	
Number of $\varnothing$ 2,8 m loose tubes with 10 fibres	1	2	3	4	5	6	8	10	12	
Number of dummies	5	4	3	2	1	0	0	0	0	
Cable nominal diameter [mm]	13,5						15,5	17	18	
Cable nominal weight [kg/km]	150						190	230	250	
Minimum bending radius [mm]	270						310	340	360	
Tensile strength (permanent) [N]	2000						2000	3000	3000	
Tensile strength (installation) [N]	3000						3000	4000	4000	

**Table 6: Structure of cables with 12 to 168 fibres**

Cable type A-DF (ZN) 2Y (1..14) x 12 .....											
Number of fibres in the cable	12	24	36	48	60	72	84	96	120	132	168
Number of cable elements	6	6	6	6	6	6	7	8	10	11	14
Number of $\varnothing$ 2,8 m loose tubes with 12 fibres	1	2	3	4	5	6	7	8	10	11	14
Number of dummies	5	4	3	2	1	0	0	0	0	0	0
Cable nominal diameter [mm]	13,5						14,5	15,5	17	18	20,5
Cable nominal weight [kg/km]	150						165	190	230	250	340
Minimum bending radius [mm]	270						290	310	340	360	410
Tensile strength (permanent) [N]	2000						2000	2000	3000	3000	3500
Tensile strength (installation) [N]	3000						3000	3000	4000	4000	4500

**Table 7: Physical properties of the cable**

Property	Reference according to IEC 794-1	Reference according to EN 187 000	Reference according to DIN VDE 0888 part 3	Value
Tensile strength	E1	501	Table 12	1 W. The tensile strength is dependent on the cable weight, see table 1- 6
Compressive strength (crush)	E3	504		3000N
Impact	E4	505		25 Nm
Reverse bending	E6	507		1000 reversed bends; R = 200 mm
Torsion	E7	508		5 cycles $\pm$ 1 turn
Kink, cable	E10	511		The cables do not form a kink when a loop is drawn together to a diameter 12 times the cable nominal diameter
Kink, loose tube	E16	512	section 7.2.5	The loose tubes do not kink
Temperature range	F1	601	Table 12	The cables can bear temperature cycling between -40°C to +70°C. The cables will operate without any attenuation variation ( $\leq$ 0.05 dB) in the temperature interval -25°C to +60°C. The cables will operate with a maximum attenuation variation of 0.1 dB/km in the temperature interval -40°C to +60°C. The cables can be transported and stored in the interval -25°C to +70°C. The cables can be installed in the interval -10°C to +50°C.
Water penetration	F5	605	section 7.2.2	No water on free end