SYMBOLS OF TS AND CORRESPONDINGS TO VDE , IEC

Part Number	Harmonized type	VDE Code	TS Number	VDE Number	IEC Number	Rated Voltage	Insulation material
2	H05V-U	NYA	9758	0281-3	IEC 227/3	300/500V	PVC
2	H07V-U	NYA	9758	0281-3	IEC 227/3	450/750V	PVC
2	H07V-R	NYA	9758	0281-3	IEC 227/3	450/750V	PVC
2	H05V-K	NYAF	9758	0281-3	IEC 227/3	300/500V	PVC
2	H07V-K	NYAF	9758	0281-3	IEC 227/3	450/750V	PVC
2	H03VV-F	NYLHYrd	9760	0281-5	IEC 227/5	300/300V	PVC
2	H03VVH2-F	NYLHYfl	9760	0281-5	IEC 227/5	300/300V	PVC
2	H03VH-H	NYFAZ	9760	0281	IEC 227/5	300/300V	PVC
2	H05VV-F	NYMHY	9760	0281-5	IEC 227/5	300/500V	PVC
2	NVV (05VV-U)	NYM	9759	0250	IEC 227/5	300/500V	PVC
2	NVV (05VV-R)	NYM	9759	0250	IEC 227/5	300/500V	PVC
3	YVV	NYY	TS IEC 60502-1	0271	IEC 60502-1	0.6/1 kV	PVC
3	YVZ2V	NYRY	TS IEC 60502-1	0271	IEC 60502-1	0.6/1 kV	PVC
3	YVZ3V	NYFGbY	TS IEC 60502-1	0271	IEC 60502-1	0.6/1 kV	PVC
3	YVC7V	NYCY	TS IEC 60502-1	0276	IEC 60502-1	0.6/1 kV	PVC
4	YXV	N2XY	TS IEC 60502-1	0276	IEC 60502-1	0.6/1 kV	XLPE
4	YXZ2V	N2XRY	TS IEC 60502-1	0276	IEC 60502-1	0.6/1 kV	XLPE
4	YXZ3V	N2XFGbY	TS IEC 60502-1	0276	IEC 60502-1	0.6/1 kV	XLPE
4	YXC7V	N2XCY	TS IEC 60502-1	-	IEC 60502-1	0.6/1 kV	XLPE
5	H07Z-U	-	TS HD 22.9	-	IEC 227/3	450/750V	XL-HFFR
5	H07Z-R	-	TS HD 22.9	-	IEC 227/3	450/750V	XL-HFFR
5	H07Z1-U	-	TS HD 21.15	-	IEC 227/3	450/750V	HFFR
5	H07Z1-R	-	TS HD 21.15	-	IEC 227/3	450/750V	HFFR
5	H05Z-K	-	TS HD 22.9	-	IEC 227/3	300/500V	XL-HFFR
5	H07Z-K	-	TS HD 22.9	-	IEC 227/3	450/750V	XL-HFFR
5	H05Z1-K	-	TS HD 21.15	-	IEC 227/3	450/750V	HFFR
5	H07Z1-K	-	TS HD 21.15	-	IEC 227/3	450/750V	HFFR
5	H05Z1Z1-F	-	TS HD 21.14	-	IEC 227/3	300/300V	HFFR
5	NHMH	-	-	0250	-	300/500V	HFFR
5	NHXMH	-	-	0250	-	300/300V	XLPE
5	N2XH	-	TS HD 604S1	0276	IEC 60502-1	0,6/1 KV	XLPE
5	N2XH FE 180	-	TS HD 604S1	0276	IEC 60502-1	0,6/1 KV	XLPE
5	NHXHXFE 180	-	TS HD 604S1	0266	-	0,6/1 KV	XL-HFFR
6	YXC7V	N2XCY	TS IEC 60502-2	-	IEC 60502-1	3.6/6 kV	XLPE
6	YXC7V	N2XSY	TS IEC 60502-2	-	IEC 60502-2	6/10 kV	XLPE
6	YXC7V	N2XSY	TS IEC 60502-2	-	IEC 60502-2	8.7/15 kV	XLPE
6	YXC7V	N2XSY	TS IEC 60502-2		IEC 60502-2	12/20 kV	XLPE
6	YXC7V	N2XSY	TS IEC 60502-2	-	IEC 60502-2	18/30 kV	XLPE
6	YXC7V	N2XSY	-	-	IEC 60502-2	20.3/35 kV	XLPE
6	YXC8VZ3V	N2XSEYFGbY	TS IEC 60502-2	-	IEC 60502-2	6/10 kV	XLPE
6	YXC8VZ3V	N2XSEYFGbY	TS IEC 60502-2	-	IEC 60502-2	8.7/15 kV	XLPE
6	YXC8VZ3V	N2XSEYFGbY	TS IEC 60502-2	-	IEC 60502-2	12/20 kV	XLPE
6	YXC8VZ3V	N2XSEYFGbY	TS IEC 60502-2	-	IEC 60502-2	18/30 kV	XLPE

EXPLANATIONS OF SYMBOLS USED IN HD 361.S3

Harmonized type	H
National Type	A

Nominal Voltage	
100/100 V	01
300/300 V	03
300/500 V	05
450/750 V	07

Insulation	
Polyvinilchloride	V
90 °C ambient temperature resistant Polyvinilchloride	V2
Low ambient temperature resistant Polyvinilchloride	V3
Cross-Linked Polyvinilchloride	V4
Oil Resistant Polyvinilchloride	V5
Polyetylene based,No corrosive gas creating while burning	Z
Low smoke Density,Cross-Linked Compound	
Polyetylene based,No corrosive gas creating while burning	Z1
Low smoke Density,Thermoplastic Compound	

Metalic Screen	
Concentric Copper Wire	C
Copper Wire Braiding	C4

Structural Features	
Divisible Flat Cables	H

Undivisible Flat Cables	H2
Three or More Than Cores Flat Cables	H6

Conductor Structure	
Solid Class 1	U
Stranded Class 2	R
Fine Stranded flexible for fixed Installations Class 5	K
Fine Stranded flexible for movable Installations Class 5	F
High twistable flexible Class 6	H

No of Cores	
Without Green/Yellow Core	X
With Green/Yellow Core	G

8 mm ELECTROLYTIC COPPER ROD PRODUCTION AND TECHNICAL INFORMATION

Electrolytic copper rod is producing as continuously casting by SCR 2000 SOUTHWIRE casting line. Electrolytic Copper Cathodes is to be melting in the vertical furnace by under atmosphere oxygen controlled.

Melted copper comes to the Holding Furnace from the Vertical Furnace to transported by upper launders. And after goes to the Casting machine by lower launders. Copper casts as Bare to be used Full Automatic Metal Pouring System (AMPS)
To be produced Bare has temperature approx. 900-950 °C and pass to the Mill section by controlled PLC and Computer synchronosiation controlled systems.8 mm Copper rod is to be cleaned with alcohol and covered with wax material. Then Copper rod laying as coil on the Pallets in 3-4 tons weight.

Copper rod coils are to be ready to delivery after completed Plastic wrapped and Shrinked.
To tested sample cut from each coils in equipped with modern test eqipments laboratuary. All Tests are making according to Standarts and Technical specifications.Evaluate all test results and keep all test results take into consideration standards and Quality System TS-EN ISO 9001.

SCR 2000 Electrolytic Copper Rod line production capacity is 12 tons/hour and it is 70.000 tons annually.

PVC Granule Production and Technical information

Soft PVC is used in cable industry..Especially PVC has low temperature stability can easily remove the metalic surface when it is heated.PVC is widely used in cable industry because of its resistant for heavy weather condition,easy prossesing and better electrical properties.Some additional materials should be added in PVC production. Generally, below formulas uses in cable proses.

PVC FORMULATION

1- PVC Vinil chloride
2- Plastiphians
3- Stabilizator
4- Lubricant
5- Filling compound
6- Strenght modifier
7- Pigments

Flame retardant and sun shine resist material can also be used with above materials.Different type PVC granules can be produced by the changing the rate of the above materials in the granule according to the requirements of application field for final product.PVC granules are mainly used as 4 different types in the cable proses.

1- Insulation
2- Filler
3- Outer Sheath
4- PVC Outer Sheath for flexible cables

With modern automation technology , ÖZNUR KABLO has ; 2 tons/hour PVC Granule production. This capacity will be reach 6 tons/hour to be activated new granule line

HALOGEN FREE ,FLAME RETARDANT AND FIRE RESISTING CABLES TEST METHODS

The characteristics of halogen free cables regarding their behaivour in fire can be tested according to IEC 332-1-2-3 well as tested in 3 different test methods.These are classified as Test A, Test B ,Test C

TEST A (Single cable) IEC 332-2

Test sample of 600 mm cable lenght shall be in a position vertically hanging.A propan gas burner shall be at a angle 45 degrees to the axis and the flame of approx. 100 mm below the lower edge of the sample.Flame influence depending max. 20 s. The test is passed if the sample not burned or the flame not extinguished by itself and the damage by fire does not reach the remotest upper side of sample

TEST B (Single cable) IEC 332-1

Test sample of 600 mm cable lenght shall be in a position vertically hanging. A propan gas burner shall be at a angle 45 degrees to the axis and the flame of approx. 100 mm below the lower edge of the sample.Flame influence time has shown below table.. The test is passed if the sample not burned or the flame not extinguished by itself and the damage by fire does not reach the remotest upper side of sample.

Cable Dia.(mm)	Flame influence time (sn)
D<25	60
25<D<50	120
50<D<75	240
D>75	480

TEST C (Bunched Cable) IEC 332-3

Test sample of 360 mm cable lenght are laying paralel side by side attached to a test ladder which is hanging vertically with a distanceof 150 mm to the furnace.The sample should be flame lenght of 60 cm on the test sample approx.. temperature 800 °C y a burner width of approx. 250 mm.The test duration is 20 minutes. The test is passed if the sample not burned or the flame not extinguished by itself and the damage by fire does not reach the remotest upper side of sample.

• NON HALOJEN VERIFICATION ACCORDING TO IEC 60754-1-2

- The proof of halogen on the materials of the cable insulation and the cable sheath can be verified by the chemical analysis.Materials with a content of less than %0,5 chlorine and and bromine and less than %0,1 fluorine ,If does not exceed PH value 4,3 and electrical conductivity 10 microS/mm as regarded as halogenfree.

• SMOKE DENSITY ACCORDING TO IEC 61034-1-2

The test of smoke density is effected to a single cable laid in horizontal position within a room 3 meter cube.The photometrically measured absorption of light is a measuring unit in % of light transmit for the smoke density.
The test is regarded as passed when light absorption appears within 40 minutes and the following values shall be obtained for light transmission.

Cable Dia.(mm)	Light Transmission (%)
>5-10	50
>10-20	60
>20-40	60
>40	70

• TEST FOR ELECTRIC CABLES UNDER FIRE CONDITIONS AND CIRCUIT INTEGRITY IEC 60331-11

This test proof behaviour of the cable insulation in fire conditions.To tested cables according this standarts if it has passed are called FE 180 type.
Test sample of 1.2 meter cable lenght with outer sheath are laying parallel to a test device and the flame of approx. 75 mm. Below the lower edge of the sample. 3A fuse connect to each conductor and to tested nominal voltage and at least 750 °C under test conditions.The test is passed if the fuses has not blown in 180 minutes.

- **FUNCTIONALITY ACCORDING TO DIN VDE 4102 Part 12**

The functionality is said to be achieved during the test is electrical cable system under fire when there is no accurance of short circuit an a interruption of the current flow.
According to this Standard , the security cables are always to be tested together with the corresponding supporting devices,clamps,holder and mounting accessories.

Test voltage for power cables 380 V, Current load 3A

The functionality base on the test period is classified here as below.Raise of temperature in a combustion chamber

E30 for the functionality are equal or greater than 30 min. For E30 to approx. 820 °C
E60 for the functionality are equal or greater than 60 min. For E60 to approx. 870 °C
E90 for the functionality are equal or greater than 90 min. For E90 to approx. 980 °C

After passing the functionality test,this will be certified with the class identification as E30, E60 , E90

XLPE CABLE TECHNOLOGY

XLPE with superior technical characteristic, is the importantest insulation materials of modern kablo industry. XLPE obtain by reaction pure polietilen and peroxide under definite temperature and pressure. In this process called as Cross-linking , used technic is very important in production of middle and high voltage cables.
I
n the cable factory of ÖZNUR CABLE , these kind of cables are produce with the import insulation and semi-conductor raw materials usage, at the line of continuous vulcanization inner semiconductor insulated, at the same time out half conductor phases are sprayed by the special type extruder head and untouched in the reaction.

SUPERIOR CHARACTERISTIC OF XLPE

- Material have high thermic endurance and longlife
- XLPE have endurance for against temperature change as physical and electrical.
- XLPE protect flexibility in very low temperature (-40 °C).
- Dielectric loss of XLPE is very few and economic for middle and high voltage in long trasmittal line.
- XLPE have endurance against chemistry and XLPE is without halogen.
- XLPE haven't water absorbent characteristic.
- XLPE have tensile strenght over 15N/mm2 and elongation of break over %400 because of high mechanical endurance.
- XLPE is unique alternative in point of use safety and flooring in inclined ground because of positive result of cross-linking.

XLPE, PVC Comparison Table		
Insulation Material	**XLPE**	**PVC**
Max. Operating temperature	90	70
Max. Short circuit Temperature	250	160
Dielectric loss factor tan delta (20 ^{0}C)	< 0.0004	< 0.10
Dielectric coefficient (20 ^{0}C 50 Hz)	2.3	4.5-8
Partial discharge PC	< 5	< 40
Density gr/cm^3	0.92	1.4
Volume Resistivity ohm*cm	1x10^{15}	1x10^{14}
Thermic Resistance K.m/W	3.5	6

- Continual current carrying capacity of XLPE Cable and short circuit endurance is high and longlife.
- XLPE cable is lighter.Diameter of cable is smaller because of density is less and insulation resistance is high.

SHORT CIRCUIT CURRENT INTENSITY

Nominal Short circuit current's intensity for 1 sec.											
Cable Type	Max operating temperature	Max short circuit temperature	Conductor Temperature of in starting of short circuit °C								
	^{0}C	^{0}C	90	80	70	65	60	50	40	30	20
With copper conductor XLPE insulated	90	250	143	149	154	157	159	165	170	176	181
With aluminium conductor XLPE insulated	90	250	94	98	102	104	105	109	113	116	120
With copper conductor With PVC insulated											
<300 mm^2	70	160	-	-	115	119	122	129	136	143	150
>300 mm^2	70	140	-	-	103	107	111	118	126	133	140
With aluminium conductor PVC insulated											
<300 mm^2	70	160	-	-	76	78	81	85	90	95	99
>300 mm^2	70	140	-	-	68	71	73	78	83	88	93

Short circuit current for various tripping times, I_{th}

$$I_{th} = \frac{I_{thN}}{\sqrt{T_k}}$$

I_{thN}= Short circuit current for 1 sec.

T_k=Tripping time, sec.

I_{thN}= Cross-section of conductor(mm2)* short circuit current f density for 1 sec. (A/mm2)*10 -3 kA.

BENDING RADIUS

MİN. PERMISSIBLE BENDİNG RADIUS DURING LAYING OF CABLES

Multi-core Cables :

- To 0.6/1 kv : 12 D
- Over 0.6/1 kv : 15 D

All single-core Cables:15D

(D: Cable diameter)
Take into consideration cables should not be twisted during laying.

MİN. PERMISSIBLE AMBIENT TEMPERATURE DURING LAYING OF CABLES : +3 °C

Alternative casing materials cvan be recomended that convenient for laying and operating under +3 °C Preheting is recommended for low temperatures.

MAX. PERMISSIBLE PULLING FORCE DURING LAYING OF CABLES IN CONDITION OF PULLING FROM CONDUCTORS

For cables with copper conductor :50 N/mm^2 (5 kg/mm^2)
For cables with aluminium conductor :30 N/mm^2 (3 kg/mm^2)

In condition that cables are laid by pulling the total strenght of cable weight,pulling speed and friction strenght will not exceed permissible max. Pulling strenght..Pulling strenght should be continuously checked and recommended not to exceed above values.

Soil Thermal Resistivity (*)		
Soil Thermal Resistivity K.m/W	**Ground Conditions**	**Air Conditions**
0.7	Very humid	Continuous Humid
1	Humid	Continuous Rainy
2	Dry	Rare Rainy
3	Very Dry	Low rainy or drought

CURRENT CARRYING

For control cables which are installed underground or on air. (In cross-section 1,5 and 10 mm^2) Current convert factors according to number of the core that under load.

Number of the core that under load	Ground	Air
5	0,70	0,75
7	0,60	0,65
10	0,50	0,55
14	0,45	0,50
19	0,40	0,45
24	0,35	0,40
40	0,30	0,35
61	0,25	0,30

Current carrying capacity(A) at 30 °C of cables H07V-U(R), H05VV-F , NYM

VDE 0100			
Rated cross-section mm^2	Group 1	Group 2	Group 3
0,75	-	12	15
1	11	15	19
1,5	15	18	24
2,5	20	26	32
4	25	34	42
6	33	44	54
10	45	61	73
16	61	82	98
25	83	108	129
35	103	135	158
50	132	168	198
70	165	207	245
95	197	250	292
120	235	292	334
150	-	335	391
185	-	382	448
240	-	453	528

Group 1 One or more single-core cables in conduit as H07V-U®,H07V-K

Group 2 Multi-cores outer sheathed Cables as H05VV-F,NYM

Group 3 Single-core Cables laid outside at least one cable diameter distance as H07V-U(R),H07V-K

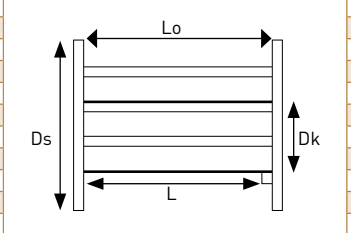
GROUP FACTOR

Correction Factors for grouping of underground cables.
Single-core Cables (In System with three phase)

Cable Type	Laying form ●●● cables side by side, distance of cables and systems : 7 cm					
	Load Factor		0,7			1,0
	Soil Thermal Resisitivity		0,7	1,0	1,5	2,5	0,7-2,5
XLPE Insulated cables 0,6/1 kV - 20,3/35 kV	Number of System	1	0,99	1,00	1,01	1,03	0,85
		2	0,86	0,87	0,88	0,88	0,71
		3	0,77	0,77	0,78	0,79	0,62
		4	0,73	0,73	0,74	0,74	0,58
		5	0,69	0,70	0,70	0,71	0,55
		6	0,67	0,68	0,68	0,69	0,53
		8	0,64	0,65	0,65	0,65	0,52
		10	0,62	0,63	0,63	0,63	0,49
PVC Insulated cables 0,6/1 kV - 6/10 kV	Number of System	1	0,98	1,00	1,01	1,02	0,85
		2	0,86	0,87	0,88	0,89	0,71
		3	0,77	0,78	0,79	0,79	0,62
		4	0,73	0,74	0,74	0,75	0,58
		5	0,70	0,70	0,71	0,71	0,55
		6	0,68	0,68	0,69	0,69	0,53
		8	0,65	0,65	0,65	0,66	0,51
		10	0,63	0,63	0,63	0,64	0,49

REEL CAPACITIES

Capacity Of The Cable Drums															
Ds	50	30	70	80	90	100	120	140	160	180	200	220	240	260	280
Dk	26	30	35	40	45	50	60	70	80	100	120	140	150	160	180
Lo	31	31	40	40	55	55	70	70	90	90	90	115	115	115	140
L									86	86	84	108	107	107	131
	Reel flange Diameter -Ds- (cm)														
mm	50	60	70	80	90	100	120	140	160	180	200	220	240	260	280
6	710	1050													
7	520	760	1500												
8	400	580	1130												
9	320	450	900	1230											
10	260	370	720	1000	1800										
11	210	310	600	820	1500										
12	180	260	500	700	1250										
13	150	220	430	600	1050										
14	130	200	370	500	920	1150									
15	110	170	320	440	800	1030									
16	100	150	280	400	710	900	1650								
17		130	250	350	640	800	1500								
18		120	220	310	560	710	1300								
19		100	200	270	500	640	1180								
20			180	250	450	580	1050								
21			170	230	410	530	960	1350							
22			150	200	380	480	870	1250							
23			130	190	340	440	790	1130							
24			120	170	320	410	730	1040	1700						
25			110	160	290	380	680	950	1650						
26				150	270	340	620	870	1520						
27				130	250	320	530	800	1400						
28				120	230	300	520	730	1300						
29				110	220	280	500	700	1230						
30					200	260	460	630	1100						
31					180	240	440	600	1050						
32					170	230	410	570	980	1150					
33					160	230	380	520	930	1080	1130				
34					150	200	350	500	880	1020	1120				
35					140	190	340	470	810	960	1100	1500			
36					130	180	320	450	780	900	1050	1450			
37					120	170	300	430	730	830	990	1420			
38						160	280	400	700	810	930	1350			
39						150	270	380	670	780	880	1290	1600		
40						140	260	360	640	720	820	1200	1500		
41							250	340	600	700	800	1150	1450		
42							230	320	570	660	750	1100	1370		
43							220	310	550	640	730	1050	1330		
44							210	300	510	610	700	1000	1260		
45							200	280	480	570	660	940	1200		
46								270	470	550	640	900	1130		
47								250	450	530	610	860	1100	1350	
48								240	430	510	580	820	1050	1250	
49								220	410	490	560	790	1000	1220	
50								210	400	470	540	760	970	1170	
51								200	380	450	510	730	930	1130	
52								190	360	430	490	700	900	1080	
53									350	410	410	680	860	1030	
54									340	400	450	650	840	1000	1350
55										380	440	630	800	960	1300
56										370	430	600	780	930	1250
57										350	410	580	760	900	1200
58										340	390	560	730	860	1150
59										330	380	540	700	830	1120
60										320	360	520	670	800	1080
61										300	350	500	650	770	1020
62										290	340	480	630	750	1000
63										280	330	470	610	720	960
64										270	320	460	580	700	940
65										260	300	450	560	680	900
66										250	290	430	540	660	870
67										240	280	410	520	630	840
68										230	270	400	510	610	800
69										220	260	390	490	580	780
70										210	250	380	480	560	750
71										200	240	360	460	540	730
72											230	350	450	530	710
73											220	340	430	510	680
74											210	330	420	500	670
75											200	320	410	480	640
76											190	310	390	470	630
77											180	300	370	450	600
78												290	360	440	590
79												270	350	420	560
80												240	340	410	550



VOLTAGE DROP

Max. Load carrying distance of 0,6/1 kv PVC insulated and PVC sheathed cables for specific voltage drop

Cos fi: 0,9		Section (mm²)															
Power kW	Current load A	1,5	2,5	4	6	10	16	25	35	50	70	95	120	150	185	240	300
2,5	4,2	178	291	466	695	1162											
		103	168	271	404	675	1063										
3	5	150	244	391	584	976	1536										
		87	142	227	339	567	892	1391									
3,5	5,9	127	207	331	495	827	1302										
		73	120	192	227	480	756	1180									
4	6,7	111	182	292	435	728	1146										
		65	106	169	253	423	666	1038									
4,5	7,5	100	163	261	389	650	1024										
		58	94	51	226	378	595	927	1266								
5	8,4	89	145	233	347	581	914	1425									
		51	84	135	202	337	531	828	1130								
6	10,1	74	121	193	289	483	706	1185									
		43	70	112	168	200	442	689	940	1247							
7	11,8	63	103	165	247	413	651	1015									
		36	60	96	143	240	378	590	805	1067							
8	13,5	55	90	145	216	361	569	887	1210								
		32	52	84	125	210	330	515	703	932	1301						
9	15,2	49	80	128	192	321	505	787	1075								
		28	46	74	111	186	293	457	625	828	1155						
10	16,8	44	72	116	173	290	457	712	972	1290							
		25	42	67	101	168	265	414	565	750	1045						
12	20	37	61	97	146	244	384	598	817	1083							
		21	35	56	84	141	223	347	474	630	878	1166					
14	23	12	53	85	127	212	334	520	710	942	1315						
		18	30	49	73	123	194	302	413	547	764	1014					
16	27		45	75	108	180	284	443	605	802	1120						
			26	42	62	105	165	257	351	466	650	863	1053				
18	30		40	65	97	162	256	399	544	722	1007						
			23	37	56	94	148	281	316	419	585	777	948	1119			
20	33		37	59	88	147	232	362	495	656	916	1216					
			21	34	51	88	135	210	287	381	532	706	862	1017			
22	37			52	78	111	207	323	441	585	817	1085					
				30	45	76	120	288	256	340	475	630	769	907	1072		
25	42			46	69	116	182	285	389	516	719	955	1165				
				27	40	67	106	165	226	299	418	555	677	799	944	1156	
30	50				58	97	153	239	326	433	605	802	979	1155			
					33	56	89	139	189	251	351	466	569	671	793	971	1124
35	59					82	130	202	277	367	512	680	830	979	1157		
						48	75	117	161	213	297	395	482	569	672	823	952
40	67					72	114	178	243	323	451	599	730	862	1018		
						42	66	103	141	187	262	348	425	501	592	725	838
45	76						101	157	215	285	397	528	644	760	898	1100	
							58	91	124	165	231	306	374	442	522	639	739
50	84						91	142	194	258	359	477	582	688	812	995	1151
							53	82	113	149	209	277	338	400	472	578	669
55	93						82	128	175	233	325	431	526	621	734	898	1040
							48	74	102	135	188	250	305	361	426	522	604
60	101							118	161	214	299	397	484	572	675	827	957
								68	94	124	173	230	281	332	392	481	556
70	118							101	30	183	256	340	414	487	578	708	819
								58	80	106	148	197	241	284	336	411	476
75	126							95	129	172	239	318	388	458	541	663	767
								55	75	99	139	185	225	266	314	385	446
80	135								121	160	223	297	362	427	505	619	716
									70	93	130	172	210	248	293	360	416
90	152								107	142	198	172	322	380	449	549	636
									62	82	115	264	187	220	261	319	369
100	169									128	178	153	289	341	403	495	572
										74	103	237	168	198	234	287	332
110	185									117	163	138	264	312	369	451	522
										68	94	216	153	181	214	262	303
130	219										138	126	223	263	311	381	441
											80	183	129	153	181	221	256
133	224										134	106	218	527	304	373	431
											78	179	127	149	177	216	250
150	253											104	193	228	269	330	382
												158	112	132	156	192	222
160	270											92	181	213	252	309	358
												148	105	124	146	379	208
180	303											86	161	190	225	275	319
													93	110	130	160	185
200	337													171	202	248	286
														99	117	144	166
205	346													166	197	241	279
														97	114	140	162
230	386														175	215	249
															102	125	145
270	456															183	212
																106	123
280	472																205
																	119
290	490																197
																	114
300	506																191
																	111
305	515																187
																	109

3-380 V
Voltage Drop<%5
Voltage Drop <%3

*Underground installation (at 20 °C) Calculations for max. AC. Resistance at the max. Operation temperetature

EXPLANATIONS

Current carrying capacity of cables in Tables gave according to the below conditions.
(Currents, for cable type HO7V-U(R),H07V-K,H05VV-F VDE 0298, IEC 287)

- In air: 30 °C ambient temperature, load factor :1.0
(Suppose that cables be protected from direct sun light.)

-In conduit: 30 °C ambient temperature, load factor :1.0

-In Ground:20°C ambient tempertaure, ground thermal resisitivity 1 K.m/w, load factor: 0.7, depth of laying : 70 cm.

Location form of single-core cables:

: 3 single-core cable, flooring in triangle bunch form.

: 3 single-core cable, flooring side by side.
Distance of between cables ;
In air: 1* Cable diameter
In Ground: 7 cm

- Metal sheath and screen groundings are from both end.

-Current carrying capacities of control cables are given in condittion that all the cores are under load

If laying conditions of all the cables are different than above given conditions ,current carrying capacity should be multiply with factors given in the table.

CONVERTION FACTORS FOR CURRENT CARRYING CAPACITIES (VDE 0298)

If laying of cables are different then normal conditions current carrying capacities should be multiplied below given factors.

Factors for different ambient temperatures for underground cable installation :

Cable Type	Soil thermal resistivity		0,7		1		1,5		2,5
	Load Factor		0,7	1,0	0,7	1,0	0,7	1,0	0,7-1,0
XLPE insulated cables 0,6/1 kV - 20,3/35 kV	Ground temperature °C	10	1,16	1,05	1,05	0,98	0,95	0,91	0,86
		15	1,14	1,03	1,02	0,95	0,92	0,89	0,84
		20	1,12	1,00	1,00	0,93	0,90	0,86	0,81
		25			0,98	0,90	0,87	0,84	0,78
		30			0,95	0,88	0,84	0,81	0,75
		35					0,82	0,78	0,72
		40							0,68
PVC insulated cables 0,6/1 kV - 3,6/6 kV	Ground temperature °C	10	1,19	1,06	1,06	0,97	0,94	0,89	0,83
		15	1,17	1,03	1,03	0,94	0,91	0,86	0,79
		20	1,14	1,01	1,00	0,91	0,87	0,83	0,76
		25			0,97	0,88	0,84	0,79	0,72
		30			0,94	0,85	0,80	0,76	0,68
		35					0,77	0,72	0,63
		40							0,59

INSTALLATION IN AIR

Current convertion factors of different ambient temperatures for installation in air :

Ambient temperature										
Insulation Type	°C	10	15	20	25	30	35	40	45	50
	XLPE	1,15	1,12	1,08	1,04	1,0	0,96	0,91	0,87	0,82
	PVC	1,22	1,17	1,12	1,07	1,0	0,94	0,87	0,79	0,71

Current convertion factors depending on combination of installation cables in air.
Single-core Cables (In three phase siystem)

Location form of cables		Space:Diameter of cable d Distance from wall ≥2 cm			Space:Diameter of cable d Distance from wall ≥2 cm		
Number of side by side system		1	2	3	1	2	3
Laying on ground		0,92	0,89	0,88	0,95	0,90	0,88
Laying on the cable troughs impedded air circulation	Number of shelf	Distance between the shelfs >20 cm olmalıdır					
	1	0,92	0,89	0,88	0,95	0,89	0,88
	2	0,87	0,84	0,83	0,90	0,84	0,83
	3	0,84	0,82	0,81	0,88	0,82	0,81
	6	0,82	0,80	0,79	0,86	0,80	0,79
Laying on the cable troughs unimpedded air circulation	Number of shelf	Distance between the shelfs >20 cm olmalıdır					
	1	1,0	0,97	0,96	1,00	0,98	0,96
	2	0,97	0,94	0,93	1,00	0,95	0,93
	3	0,96	0,93	0,92	1,00	0,94	0,92
	6	0,94	0,91	0,90	1,00	0,93	0,90

Current convert factors depending on laying depth:

Depth laying (m)	Factor
0,50	1,03
0,70	1,00
1,00	0,96
1,20	0,93
1,50	0,91
2,00	0,88
2,50	0,86

RATED VOLTAGE

Max. System voltages of the Cables *(System with three phase)

Rated Voltage	Max. Operating Voltage
(Uo/U) kV	kV
0,6/1	1,2
3,6/6	7,2
6/10	12
8,7/15	17,5
12/20	24
18/30	36
20,3/35	42

Max. Operating voltages are max. Value of the voltage at the normal conditions in any time or at any point of the system (Temporary regimes which are caused by switch off and switch on are out of this decscription) VDE 0298 Teil 1 , IEC 183

AC test voltages: IEC 60502-1 , IEC 60502-2

Rated Voltage	AC test voltage
kV	kV
0,6/1	3,5
3,6/6	12,5
6/10	21
8,7/15	30,5
12/20	42
18/30	63
20,3/35	71


ABUS 25t
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ÖZ GARANTİ

Notes: