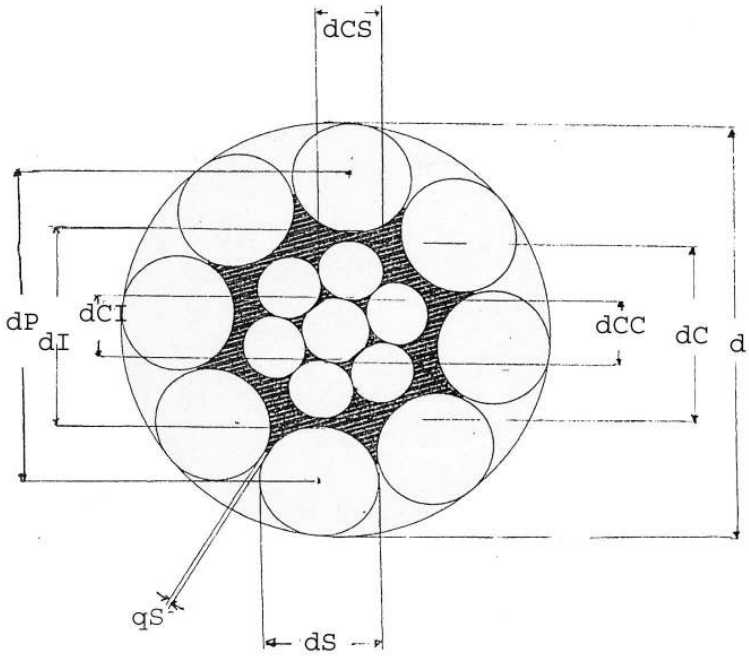
PDF E	**Handbook Steel Wire Ropes**	c:\-Handbuch
HB-04-02-03	**Calculation of Rope**	04-Berechnung
6.5.1.2.2	**Calculation of Rope Construction and its Elements**	/01/01/
7.7.2.2.4	**General: Definition of Rope, Strand, Core∅, Clearance Abbreviation, Symbols, Standards, Specifications**	02B01.doc
4.1.1.2	**Symbols, abbreviation of Rope-, Strand-, Core-, Wire-∅**	2002-12-03

Symbols, Abbreviation for Rope Strand & Core Diameter



d	**=**	**nominal Rope-∅**
dS	**=**	**Strand-∅**
dC	**=**	**Core-∅**
dCS	**=**	**Outer Strand-∅ of Core**
DCC	**=**	**Centre Strand-∅ of Core**
dP	**=**	**Pitch-∅ of Rope**
dI	**=**	**Inner Circle-∅ of Rope**
dCI	**=**	**Inner Circle-∅ of Core**
qS	**=**	**Clearance between Outer Strands**
qCS	**=**	**Clearance between Outer Strands of Core**

Steel Wire Rope Diameter

Rope Design Diameter d_B = Nominal Rope Diameter d

Definition

The nominal rope diameter d is the rope diameter where the strands are not quite touching
Not quite touching = 0,005 mm for all diameters
No percentage increase (factor calculation method)

Discarding Rope diameter d_{dis}

By EN 12385 ISO-4009 10 % of the nominal rope diameter

The discarding rope diameter d_{dis} could be not anymore safe, if the diameter tolerance is used for increasing the metallic area (breaking force) of the rope. The 10 % rule should be taken from the measured rope diameter. Or with another percentage value from the actual design rope diameter d_B. The design diameter and the manufacturing diameter tolerance must be taken in consideration.

From measured Rope diameter d_m (actual) or nominal Rope diameter d								
7.7.2.2.4	Design Rope Diameter d_B = Nominal Rope diameter d							
	Fibre Core		Steel Core					
Example: **Nominal Rope Diameter** **10 mm**			**6-strand Rope**		**8-strand Rope**		**Rotation Resistant**	
	Rope diameter							
	%	mm	%	mm	%	mm	%	mm
1	2	3	4	5	6	7	8	9
Manufacturing Tolerance = d_m [1)]	+4,5	10,45	+ 2,5	10,25	+ 2	10,20	+1,5	10,15
Critical Rope Diameter d_{crit}								
Regular Lay - 5% of d_B	- 5	9,50	- 5	9,50	- 5	9,50	4	9,60
Lang Lay – 3 % of d_B	- 3	9,70	- 3	9,70	- 3	9,70	2,5	9,75
Total reduction from measured rope diameter d_m								
- Ordinary Lay from d_m	- 9,5	9,46	- 7,5	9,48	7,0	9,49	5,5	9,59
- Lang Lay from d_m	- 7,5	9,67	- 5,5	9,69	5,0	9,69	4,0	9,74
Discarding Rope Ø 10 % of d		9,00		9,00		9,00		9,00
1) is also the value for the setting of the rope. (nominal rope-Ø if the strands are not quite touching.								

7.7.2.2.4	Design Rope Diameter d_B = Nominal Rope diameter d							
Nominal rope diameter 10 mm	Fibre Core		Steel Core					
Example: **Nominal Rope Diameter + 2,5%** **D_B =10 mm + 0,25 = 10,25 mm**			**6-strand Rope**		**8-strand Rope**		**Rotation Resistant**	
	Rope diameter							
	%	mm	%	mm	%	mm	%	mm
1	2	3	4	5	6	7	8	9
Manufacturing Tolerance = d_m [1)]	+2,5[2)]	10,50	+ 2,5	10,50	+ 2	10,40	+1,5	10,40
Critical Rope Diameter d_{crit}								
Regular Lay - 5% of d_B 10,25	- 5	9,74	- 5	9,74	- 5	9,74	4	9,84
Lang Lay – 3 % of d_B	- 3	9,94	- 3	9,94	- 3	9,94	2,5	9,94
Total reduction from measured rope diameter d_m								
- Ordinary Lay from d_m	- 10	9,45	- 10	9,45	9,5	9,41	8	9,57
- Lang Lay from d_m	- 8	9,66	- 8	9,66	8,5	9,52	6,5	9,72
Discarding Rope Ø 10 % of d	10	9,10	10	9,10	10	9,10	10	9,10

[1)] is also the value for the setting of the rope. (nominal rope-Ø if the strands are not quite touching.

[2)] Total Tolerance is only 5 % if already 2,5 % is taken for the design diameter only 2,5 % is left for the manufacturing tolerance. This could be not enough for a fibre core rope.

[3)] Relating the 10 % from nominal rope diameter to design diameter the tolerance would be 11.2 %

By this assumption the discarding rope diameter should be -- % of the new unused rope diameter d_m:		
	Ordinary lay	**Lang lay**
6 strand fibre core ropes	**10 %**	**7.5 %**
6 strand steel core ropes	**7,5 %**	**5,5 %**
8 strand steel core ropes	**7,0 %**	**5,0 %**
Rotation Resistant Ropes	**5,5 % [1)]**	**4,0 % [1)]**

[1)] might be different for different speciality rope constructions. Depending on crossing of wires per layer and Lay Directions, Crossing angles.