PDF E HB-04-01-03	Handbook Steel Wire Ropes	C:\ Handbook
6.5.3.2.1	Type of Ropes, Rope Construction, Classification	04-Berechnung
3.6 & 3.6.1.8.1	Characteristics of Wire Ropes	01-01-03T01.doc
8.2.1.3.4.1 & 4.1.8.1	Terms – Symbols - Abbreviation EN 12385-2	2003-09-15

1	Values (3.9)	Nominal = $_0$	Measured = $_m$	Aggregate = $_e$	Calculated = $_c$	Reduced = $_{red}$			
		Minimum = $_{min}$	Maximum = $_{max}$	Nominal Rope Length = L	Measured Rope Length = L_m				
2	Elements	Wire-∅= δ (3.1)	Outer-Wire-∅= δ_a	Stand-∅= dS	Rope-∅ = d	Core-∅ = dC			
3	Symbols (4.3.1)	round	flat	Triangular	Oval	Trapezoidal	Z-shaped	H-shaped	Built-up Centre
4	Wire Shape	no	P	V	Q	T	Z	H	B
5	Strand Shape	no Symbol	P (3.2.5)	V (3.2.3)	Q (3.2.4)				
6	Rope Shape	no	P			Rectangular = R			
7	Flat Rope: P (3.6.1.10)	Single stitched = PS	Double stitched = PD	Clamped = PN	Braided = BR				

8	Core (3.3.1)	Fibre Core FC (3.3.2)	Steel Core WC (3.3.3)		Solid Polymer	Covered with Fibre	Covered extruded	Filled
9	(4.3.3)	Natural / Synthetic	Strand	Steel Core	(3.3.4)		Polymer Covered	
10	C	N / S		Independent / parallel	SPC	EF	EP	CLM
11	C	NFC / SFC	WSC	IWRC / PWRC (3.6.1.4)	SPC	EFIWRC	EPIWRC	CLMWR
12		With compacted strands		IWRC(K) / PWRC(K)	Cushioned Core (3.6.3.4)			
13	Fibre Material	Natural Fibre = N	Synthetic = S	Polyamid = PA	Polypropylen = PP	Polymer = P		

14	Rope Lay	Lay Direction (3.8)		Type of Lay (4.4.7)						
15		Right Lay	Left Lay	Ordinary Lay (3.8.3)		Lang Lay (3.8.4)		Alternate Lay (3.8.5)	
16	Strand (3.8.1)	z	s	Right Lay	Left Lay	Right Lay	Left Lay	Right Lay	Left Lay
17	Rope (3.8.2)	Z	S	sZ	zS	zZ	sS	AZ	AS

18	Lay Angle:	Rope = β	Strand = α	Wire Clearance = qW (qδ)	Strand Clearance = qS (3.7.14)
19	Lay Length:	Rope = H (3.7.11)		Strand = h (3.7.10)	Rope Grade R_R (3.10.11)
20	Preformed Rope: No Symbol (3.11.3)			Not Preformed: NON-PRE	Wire Tensile Strength Grade: R (3.1.10) Wire Tensile Strength: R_m (3.1.11)

21	Finish of Coating: (3.1.12)	Bright = U	Zinc = B	Zinc: A		Alloy
22	Strand/Wire Layers closed opposite = J			Rotation Resistant: STR-RR		Low Rotation: STR-LR
23	Compacted: K (3.2.15)			Spin Resistant: STR-SR		
24	Inserts = I (3.5)	Natural Fibre = IN	Synthetic Fibre = IS	Profile = IC		Solid Polymers = IC
25	Covering = E	Covered with Fibres = EN		Coverer with solid Polymer (extruded) = EM (3.6.3.1)		
26	Solid Polymer covered Rope (3.6.3.1)	Cushioned Rope (3.6.3.5)	Cushioned Core Rope (3.6.3.4)			
27	Filled = L (3.6.3)	Solid Polymer filled Rope = LM (3.6.3.2)	Solid Polymer covered & filled = ELM (3.6.3.3)			
28	Solid Polymer filled Rope (3.6.3.2)	Ropes Covered & Filled with Solid Polymer (3.6.3.3)				

29	Type of Closing	Strand	Single Lay = no Symbol (3.2.6)			
30			Parallel Lay = P (3.2.7)	Seale = S (3.2.8)	Warrington = W (3.2.9)	Filler = F (3.2.10)
31			Combined Parallel Lay: Seale-Warrington = SW (3.2.1.1.)			
32			Multiple Operation Lay	Cross Lay = M,	Compound Lay = N (3.2.1.3)	
33		Multi Layer Rope, Spiral Strand Rope:		Contra Lay = J	Multi-Layer Stranded Rope = STR-ML	

34	Rope Construction Connecting Symbols (4.4.3)	Behind Number of Strands (x)				
35	Parallel (-)	Crossing (/)	Same Layer (+)	Contra Lay (:)		
36	Behind Strand Construction (-) in front of Core (-IWRC)				Covered Rope-∅/Rope-∅ (4.2.2.)	
37	Spiral Rope =SPI (3.6.2)	Spiral Strand Rope =SPI-STD (3.6.2.2.)			Half-Locked Coil Rope=SPI-HLC (3.6.2.3)	
38	Flat Rope = P (3.6.1.10)				Full-Locked Coil Rope=SPI-FLC (3.6.2.4)	
39	Cable-Laid Rope=CL (3.6.1.7)	Braided Rope= BR (3.6.1.8)	Rope = R	Stranded Rope = STR (3.6.1)		
40	Single Layer Stranded Rope: STR-SL (3.6.1.2)	Multi Layer Stranded Rope STR-ML	Rotation Resistant Rope=STR-RR (3.6.1.3)			
41	Conductors = DC (4.3.4)	Electromechanical Rope = EM or Elec-R				
42	Parallel-Closed Rope (3.6.1.4)	Ropes with Compacted Strands (3.6.1.5)	Compacted (swaged) Rope (3.6.1.6)			

	Rope-Class & Rope-Construction	(3.12)
	Rope Class (3.12.1) / Rope Construction (3.12.2)	
	Half-Locked Coil Rope (3.6.2.3)	
	For Guide Ropes = HLGR / For Track Ropes for Aerial Rope Ways = HLAR	
	Full-Locked Coil Rope (3.6.2.4)	
	For Mine Hoist Ropes = FLHR / For Track Ropes = FLAR / For Bridge Ropes = FLBR	

	Lubricants & Preservation Agents (3.4)	(3.12)
	Lubricants & Preservation Agents (3.4)	
	Lubricant (3.4.1) / Impregnating Agent (3.4.2) / Preservation Agent (3.4.3)	

	Dimensions		(3.7.)
	Dimension of Round Wire = δ (3.71)	Dimension of Shaped Wire Z = h & w (3.73)	
	Dimension of outer round Wire = δ (3.72)	Dimension of Shaped Strand = w & s (3.7.5)	
		Dimension of Flat Rope P w & s (3.7.7)	
	Dimension of Round Strand = dS (3.7.4)	Dimension of Covered Round Rope d (e.g. 16/13) (3.7.8)	
	Dimension of Round Ropes = d (3.7.6)	Dimension of covered Flat Rope w & s (3.7.9)	

	Rope Characteristics		(3.11)
	Torque		(3.11.1)
	Turn		(3.112)
	Fully Preformed Rope		

	Wires			(3.1)
	Outer Wires (3.1.1)	Filler Wires (3.1.3)	Centre Wires (3.1.4)	
	Inner Wires (3.1.2)		Core Wires (3.1.5)	
	Layer of Wires (3.1.7)		Load Bearing Wires (3.1.6)	
	Stitching Wire or Strand (3.1.8)	Serving Wire or Strand (3.1.9)		
	Wire Tensile Strength Grade = R (3.1.11)	Wire Tensile Strength = R_m		
	Finish & Quality of Coating (3.1.12)		Mass of Coating (3.1.13)	

	Strand Types			3.2
	Strand (3.2.1)			
	Round Strand (3.2..2)	Triangular Strand = V (3.2.3)	Oval Strand = Q (3.2.4)	
	Flat ribbon Strand = P (3.2.5)			
	Single Lay Strand = E (3.2.6)			
	Parallel Lay Strand (3.2.7)	Seale = S (3.2.8)	Warrington = W (3.2.9)	
	Combined Parallel Lay (3.2.11)		Warrington-Seale = WS	
	Multiple Operation Lay (3.2.12)	Cross-Lay = M (3.2.13)	Compound Lay = N (3.2.14	
	Compacted Strand = K (3.2.15)			

	Core Types			3.3
	Core = C (3.3.1)			3.3.1
	Fibre Core = FC = (3.3.2)	Natural Fibre Core = NFC	Synthetic Fibre Core = SFC	
	Steel Core = WC (3.3.3)	Strand Core = WSC	Independent Wire Rope Core =IWRC	
		Parallel Laid = PWRC		
	Solid Polymer Core = SPC (3.3.4)			

	Lubricants and Preservation Agents			3.4
	Rope Lubricants (3.4.1)	Impregnating Agent (3.4.2)	Preservation Agent(3.4.3)	

	Insert = I			3.5
	Natural Fibre= IN	Synthetic Fibre = IS	Profile- Solid Polymer = IC	

	Rope Types			3.6
	Stranded Ropes = STR (3.6.1)	Single-Layer Stranded Rope = STR-SL (3,6,1,1)		
		Multi-Layer Stranded Rope = STR-ML		
		Rotation Resistant Stranded Rope = STR-RR (3.6.1.3)	Spin Resistant	
			Rotation Resistant	
			Low Rotation	
	Parallel-Closed Stranded Rope (3.6.1.4) (see Steel Core 3.3.3)			
	Compacted Rope			
	Compacted Strand Stranded Rope (3.6.1.5)	Compacted (swaged) Stranded Rope (3.6.1.6)		
	Cable Laid Rope = CL (3.6.1.7)			
	Braided Rope = BR (3.6.18)			
	Electro-mechanical Rope = EM (3.6.1.9)			
	Flat Rope = FLAT (3.6.1.10)	Single Stitched = PS	**Double Stitched = PD**	
		Rivetted = PN		
	Spiral Ropes (3.6.2)	Spiral Rope = SPI (3.6.2.1)	Spiral Strand Rope = SPI-STD (3.6.2.)	
		Half-Locked Coil Rope = SPI-HLC (3.6.2.3)	Full Locked Coil Rope = SPI-FCL (3.6.2.4)	
	Ropes with Coverings and/or Filling (3.6.3)	Solid Polymer Covered Rope = EM (3.6.3.1)	Solid Polymer Filled Rope = LM (3.6.3.2)	
		Solid Polymer Covered and Filled Rope = ELM (3.6.3.3)		
	Cushioned Core Rope = (3.6.3.4)			
	Cushioned Rope (3.6.3.5)			

	Factors, Areas, Masses and Breaking Forces		**(3.10)**
	Fillfactor = f	$f = \frac{A}{A_u}$	**(3.10.1)**
	Nominal Metallic Cross-Sectional area Factor = C	$C = f \cdot \frac{\pi}{4}$	**(3.10.2)**
	Nominal Metallic Cross-Sectional area = A	$A = C \cdot d^2$	**(3.10.3)**
	Calculated Metallic Cross-Sectional area = A_c	$A_c = \frac{\pi}{4} \sum_1^n \delta^2$	**(3.10.4)**
	Measured Metallic Cross-Sectional area = A_c	$A_m = \frac{\pi}{4} \sum_1^n \delta_m^2$	**(3.10.5)**
	Rope Length Mass Factor = W		**(3.10.6)**
	Nominal Rope Length Mass = M	$M = W \cdot d^2$	**(3.10.7)**
	Measured Rope Length Mass = M_m		**(3.10.8)**
	Breaking Force Factor = K	$K = \frac{\pi f \cdot k}{4}$	**(3.10.9)**
	Minimum Breaking Force = F_{min}	$F_{min} = \frac{d^2 \cdot R_r \cdot K}{1000}$	**(3.10.10)**
	Rope Grade R_r		**(3.10.11)**
	Calculated Minimum Breaking Force = $F_{c.min}$		**(3.10.12)**
	Measured Breaking Force = F_m		**(3.10.13)**
	Minimum Aggregate Breaking Force = $F_{e.min}$	$F_{e.min} = \frac{d^2 \cdot C \cdot R_r}{1000}$	**(3.10.14)**
	Calculated Minimum Aggregate Breaking Force = $F_{e.c.min}$		**(3.10.15)**
	Reduced Minimum Aggregate Breaking Force = $F_{e.red.min}$		**(3.10.16)**
	Measured Aggregate Breaking Force = $F_{e.m}$		**(3.10.17)**
	Measured Reduced Aggregate Breaking Force = $F_{e.red.m}$		**(3.10.18)**
	Calculated Measured Breaking Force = F_{mc}		**(3.10.19)**
	Calculated Measured Aggregate Breaking Force = $F_{e.m.c}$		**(3.10.20)**
	Measured Total Spinning Loss		**(3.10.21)**
	Measured Partial Spinning Loss		**(3.10.22)**
	Spinning Loss Factor = k		**(3.10.23)**
	Measured Total Spinning Loss Factor = k_m		**(3.10.24)**
	Measured Partial Spinning Loss Factor = $k_{p.m}$		**(3.10.25)**
	Outer Wire Factor = a		
	Outer Wire Diameter = δ_a	$\delta_a = a \cdot d$	