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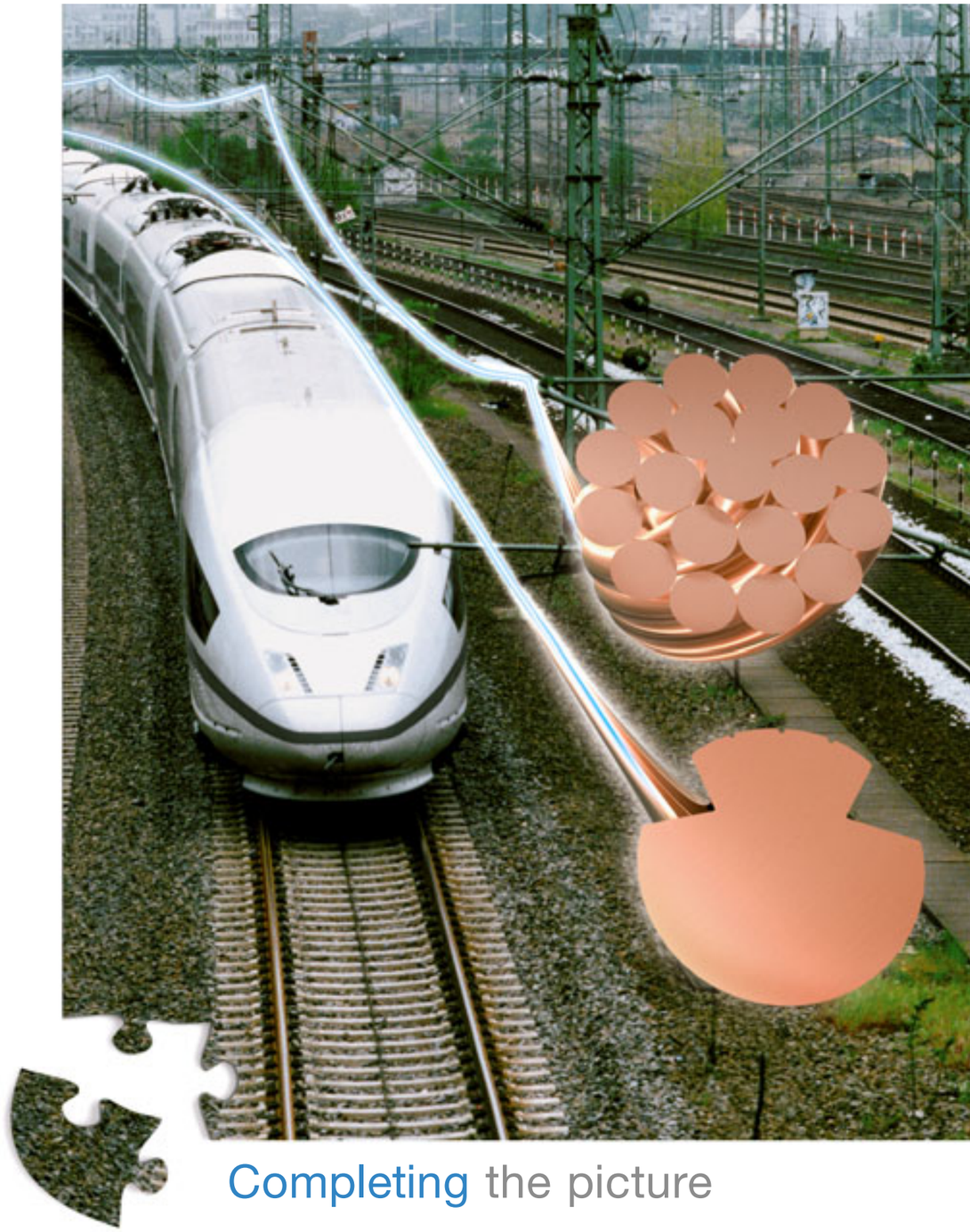
VALCOND®

Innovation in railway technology



Completing the picture

Economy through conductivity

Superior product features

The name of the latest overhead traction line innovation is VALCOND®. Superior product characteristics which meet all the requirements of EN 50149 for CuMg0,2 and CuMg0,5 contact wires, provide increased economy. By optimising the entire process chain the **nkt cables** engineers have succeeded in achieving considerably increased conductivity – combined with noticeably lower thermal loss and the corresponding major savings on energy.

Exceptional material properties

CuMg is the contact wire material with the lowest rate of wear and tear and the highest half-hard point of any material in present-day use. Together with its energy-saving potential this means that VALCOND® is technically and economically the ideal solution for equipping new stretches of rail and the refitting of existing installations.

Pioneering services for rail transport

Since the electrification of rail networks began **nkt cables** has been one of the pacemakers in rail traction technology. Constant innovation and the optimisation of a comprehensive range of conductive materials, traction wires and overhead lines guarantee safety, economy and competitiveness on all stretches of rail. Rail operators throughout the world rely on this efficiency and quality. Today and tomorrow.

VALCOND®

Technical Data for contact wires

Technical Data CuMg 0,2 - VALCOND®: nominal cross section

		80		100		107		120		150	
		VALCOND	standard	VALCOND	standard	VALCOND	standard	VALCOND	standard	VALCOND	standard
Min. Tensile Strength R_m [3]	N/mm²	460	460	450	450	450	440	450	430	430	420
Min. Breaking load [1] F_m	kN	36,0	35,7	44,1	43,6	47,2	45,7	52,9	50,1	63,2	61,1
Percentage Elongation after fracture A_{200}	%	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10
Modulus of elasticity *E*	kN/mm²	120	120	120	120	120	120	120	120	120	120
0,2% proof strenght $R_{p0,2}$	N/mm²	>370	>370	>370	>370	>370	>370	>370	>370	>370	>370
Half-hard point	°C	>370	>385	>370	>385	>370	>385	>370	>385	>370	>385
Elec. conductivity χ at 20 °C	m/Ohm* mm²	≥46,4	44,6	≥46,4	44,6	≥46,4	44,6	≥46,4	44,6	≥46,4	44,6
Elec. conductivity χ	% IACS	≥80	≥77	≥80	≥77	≥80	≥77	≥80	≥77	≥80	≥77
Specific electrical resistance ρ at 20 °C	10^{-8} Ohm*m	≤2,155	≤2,240	≤2,155	≤2,240	≤2,155	≤2,240	≤2,155	≤2,240	≤2,155	≤2,240
Elec. resistance R [1]	Ohm/km	≤0,275	≤0,289	≤0,22	≤0,231	≤0,206	≤0,216	≤0,183	≤0,192	≤0,147	≤0,154
Creepage elongation [2]	‰	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Temperature coefficient of elec. resistance	10^{-3}/K	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
Linear coefficient of thermal expansion α	10^{-5}/K	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7
Specific mass ρ	10^{3} kg/m³	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89

Technical Data CuMg 0,5 - VALCOND®: nominal cross section

		80		100		107		120		150	
		VALCOND	standard	VALCOND	standard	VALCOND	standard	VALCOND	standard	VALCOND	standard
Min. Tensile Strength R_m [3]	N/mm²	520	520	510	510	500	500	490	490	470	470
Min. Breaking load [1] F_m	kN	40,8	40,4	50,0	49,5	52,4	46,3	57,6	57,0	69,1	68,4
Percentage Elongation after fracture A_{200}	%	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10	3-10
Modulus of elasticity *E*	kN/mm²	120	120	120	120	120	120	120	120	120	120
0,2% proof strenght $R_{p0,2}$	N/mm²	>430	>430	>430	>430	>430	>430	>430	>430	>430	>430
Half-hard point	°C	>375	>385	>375	>385	>375	>385	>375	>385	>375	>385
Elec. conductivity χ at 20 °C	m/Ohm* mm²	≥40,6	≥36,0	≥40,6	≥36,0	≥40,6	≥36,0	≥40,6	≥36,0	≥40,6	≥36,0
Elec. conductivity χ	% IACS	≥≥70	≥62	≥70	≥62	≥70	≥62	≥70	≥62	≥70	≥62
Specific electrical resistance ρ at 20 °C	10^{-8} Ohm*m	≤2,463	≤2,770	≤2,463	≤2,770	≤2,463	≤2,770	≤2,463	≤2,770	≤2,463	≤2,770
Elec. resistance R [1]	Ohm/km	≤0,314	≤0,385	≤0,251	≤0,286	≤0,235	≤0,268	≤0,209	≤0,239	≤0,168	≤0,191
Creepage elongation [2]	‰	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Temperature coefficient of elec. resistance	10^{-3}/K	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
Linear coefficient of thermal expansion α	10^{-5}/K	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7
Specific mass ρ	10^{3} kg/m³	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89	8,89

[1] calculation based on the minimum cross section of 98% (EN 50149: 97%)
[2] temperature 150°C; applied load 100N pro mm²; time 1000h
[3] different tensile strenghths on request