NEW IBERDROLA USA TRANSMISSION LINES SHALL BE DESIGNED AND CONSTRUCTED TO THE FOLLOWING STRUCTURAL AND CLEARANCE CRITERIA.

ALL NEW TRANSMISSION LINE STRUCTURES SHALL BE DESIGNED AND CONSTRUCTED TO GRADE B CRITERIA.

THE FOLLOWING LOAD CASES SHALL BE USED. THE ONLY EXCEPTION TO THESE LOADS ARE SPECIAL WIND ZONES AND WHERE THE LATEST NESC CODE DICTATES HIGHER LOADING.

LOADING CONDITION	AMBIENT TEMP. (°F)	RADIAL ICE THICKNESS	WIND SPEED (FPS)	WIND PRESSURE (PSF)	K VALUE (LB/FT)
NESC HEAVY (RULE 250B)	0	0.5"	40	4	0.3
NESC HIGH WIND (RULE 250C)	60	REFER TO 2012 NESC FIGURE 250-2			0
NESC CONCURRENT WIND/ICE (RULE 250D)	15	REFER TO 2012 NESC FIGURE 250-3			0
HEAVY ICE	32	1.5"	0	0	0

THE FOLLOWING LOAD FACTORS SHALL BE USED:

	OVERLOAD FACTORS			STRENGTH FACTORS (%)					
LOADING CONDITION	VERTICAL	WIND	WIRE TENSION	STEEL POLES	WOOD POLES	FRP POLES	GUY WIRES	ANCHORS/ FOUNDATIONS	SPLICES & HARDWARE
NESC HEAVY (RULE 250B)	1.5	2.5	1.65	100	65	100	90	100	80
NESC HIGH WIND (RULE 250C)	1.0	1.0	1.0	100	75	100	90	100	80
NESC CONCURRENT WIND/ICE (RULE 250D)	1.0	1.0	1.0	100	75	100	90	100	80
HEAVY ICE	1.0	1.0	1.0	100	80	100	90	100	80

THE FOLLOWING LOAD COMBINATIONS SHALL BE USED:

LOADING CONDITION	LOADING COMBINATIONS
TANGENT AND RUNNING ANGLES	- ALL WIRES IN TACT. ALL WEATHER CASES - NO CONDUCTORS OR STATIC WIRES ATTACHED. NESC HIGH WIND (RULE 250C) PER NESC RULE 261A2e. - CONSTRUCTION/WIRE STRINGING AS APPROPRIATELY DETERMINED BY ENGINEER PERFORMING DESIGN.
TANGENT AND RUNNING ANGLES W/ DEAD END HARDWARE	- ALL WIRES IN TACT. ALL WEATHER CASES - NO CONDUCTORS OR STATIC WIRES ATTACHED. NESC HIGH WIND (RULE 250C) PER NESC RULE 261A2e. - CONSTRUCTION/WIRE STRINGING AS APPROPRIATELY DETERMINED BY ENGINEER PERFORMING DESIGN. - DIFFERENTIAL ICE: 1" RADIAL ICE ON AHEAD SPAN, NO ICE ON BACK SPAN. THEN VICE-VERSA.
FULL DEAD ENDS	- ALL WIRES IN TACT. ALL WEATHER CASES - NO CONDUCTORS OR STATIC WIRES ATTACHED. NESC HIGH WIND (RULE 250C) PER NESC RULE 261A2e. - CONSTRUCTION/WIRE STRINGING AS APPROPRIATELY DETERMINED BY ENGINEER PERFORMING DESIGN. - DIFFERENTIAL ICE: 1" RADIAL ICE ON AHEAD SPAN, NO ICE ON BACK SPAN. THEN VICE-VERSA. - FULL DEADEND: ALL CONDUCTORS AND STATIC WIRES BROKEN ON ONE SIDE OF STRUCTURE. ALL WEATHER CASES.

WHEN CONSTRUCTION INCLUDES THE USE OF WOOD STRUCTURES THE FOLLOWING MINIMUM POLE CLASSES SHALL BE USED:

35KV/46KV/69KV: CLASS 2 POLES FOR TANGENTS, CLASS 1 POLES FOR ANGLES AND DEADENDS
115KV/230KV SINGLE POLE: CLASS H1 POLES
115KV/230KV/345KV H-FRAME: CLASS 1 POLES
ALL POLES 85' AND LONGER: CLASS 1 POLES
ALL POLES 100' AND LONGER: CLASS H1 POLES

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Drawing Scale: N/A

IBERDROLA USA

TRANSMISSION CONSTRUCTION STANDARDS MANUAL

TRANSMISSION STANDARDS - STRUCTURAL DATA
DESIGN CRITERIA - LOADING

REVISION 00
DATE 5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TC-01-001	Sheet 1
B. Franklin	4/16/2013	Becken/Hart	9/13/2013	Barry R. Hart	4/09/2015		

NEW IBERDROLA USA TRANSMISSION LINES SHALL BE DESIGNED AND CONSTRUCTED TO THE FOLLOWING STRUCTURAL AND CLEARANCE CRITERIA.

ALL NEW TRANSMISSION LINE STRUCTURES SHALL BE DESIGNED AND CONSTRUCTED TO GRADE B CRITERIA.

CONDUCTORS SHALL NOT EXCEED THE FOLLOWING PERCENTAGE OF THEIR ULTIMATE BREAKING STRENGTH:

LOADING CONDITION	MAXIMUM PERCENTAGE OF ULTIMATE CONDUCTOR STRENGTH
NESC HEAVY (RULE 250B)	60%
0°F INITIAL	35%
0°F FINAL	25%
ALL OTHER CASES	80%

INSULATORS SHALL NOT EXCEED THE FOLLOWING PERCENTAGE OF THEIR ULTIMATE STRENGTH:

LOADING CONDITION	NESC HEAVY LOAD (RULE 250B)	ALL OTHER LOADINGS
PORCELAIN BELLS		
M&E STRENGTH	50%	70%
PORCELAIN LINE POSTS (NOTES A, B, & C)		
CANTILEVER STRENGTH	40%	70%
TENSILE/COMPRESSIVE STRENGTH	50%	70%
POLYMER SUSPENSION		
SPECIFIED MECHANICAL STRENGTH	50%	70%
POLYMER LINE POSTS		
SPECIFIED TENS./COMP. STRENGTH	50%	70%

NOTE A: THIS CRITERIA EXISTS FOR THE ANALYSIS OF PORCELAIN LINE POST INSULATORS CURRENTLY INSTALLED ON STRUCTURES. WHEN IN NEED OF REPLACEMENT, PORCELAIN LINE POST INSULATORS SHALL BE REPLACED BY POLYMER LINE POST INSULATORS. CONTACT SYSTEM ENGINEERING - TRANSMISSION SECTION FOR POLYMER LINE POST SELECTION.

NOTE B: WHEN REPLACING EXISTING PORCELAIN LINE POST INSULATORS WITH POLYMER LINE POST INSULATORS ALL PORCELAIN LINE POST INSULATORS ON THE STRUCTURE SHALL BE REPLACED WITH POLYMER LINE POST INSULATORS. THERE SHALL BE NO STRUCTURES WITH A COMBINATION OF PORCELAIN AND POLYMER LINE POST INSULATORS. CONTACT SYSTEM ENGINEERING - TRANSMISSION SECTION FOR POLYMER LINE POST SELECTION.

NOTE C: ALL NEW CONSTRUCTION USING LINE POST INSULATORS SHALL USE POLYMER LINE POSTS. NEW PORCELAIN LINE POST INSULATORS SHALL NOT BE INSTALLED.

THE FOLLOWING LIMITS FOR INSULATOR SWING SHALL NOT BE EXCEEDED:

LOADING CONDITION	34.5kV CLEARANCE	46kV CLEARANCE	69kV CLEARANCE	115kV CLEARANCE	230kV CLEARANCE	345kV CLEARANCE
60°F, NO WIND, NO ICE	19"	19"	25"	42"	71"	100"
60°F, 6 PSF WIND, NO ICE	9"	11"	16"	26"	50"	75"
HIGH WIND (60°F, 25.6PSF WIND)	3"	3"	5"	10"	20"	30"

ALL CONDUCTORS SHALL BE CHECKED FOR UPLIFT AT -20°F. THERE SHALL BE NO UPLIFT ON CONDUCTORS SUPPORTED BY SUSPENSION INSULATORS. THERE SHALL BE NO MORE THAN 100 LBS. OF UPLIFT ON CONDUCTORS SUPPORTED BY POST INSULATORS. OHGW AND OPGW MAY HAVE UP TO 50 LBS. OF UPLIFT.

AT WIRE CROSSINGS, WHEN CHECKING CLEARANCES THE UPPER WIRE SHALL BE CHECKED AT MAXIMUM RATED OPERATING TEMPERATURE (REFER TO TF-04-001) WITH THE LOWER WIRE AT 30°F.

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Drawing Scale: N/A

IBERDROLA USA

TRANSMISSION CONSTRUCTION STANDARDS MANUAL

TRANSMISSION STANDARDS - STRUCTURAL DATA
DESIGN CRITERIA - CONDUCTOR AND INSULATORS

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