

OVERHEAD DESIGN MANUAL

Section 8 – Sag Tension Temperature Charts


Approved by: F. ZAINI

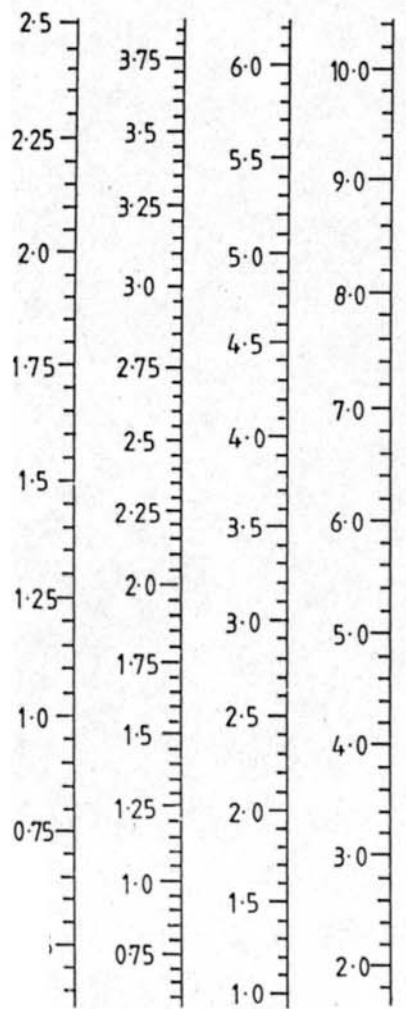
OVERHEAD DESIGN MANUAL

SECTION 8 SAG TENSION TEMPERATURE CHARTS

Subsection Title

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3. SAG TENSION TEMPERATURE CURVES TABLE - ACSR
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			CKD K. GOSDEN		10824-A4				
			DRN W. DE LEON						
			CAD						
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LIBRA
7/3.00

MARS
7/3.75

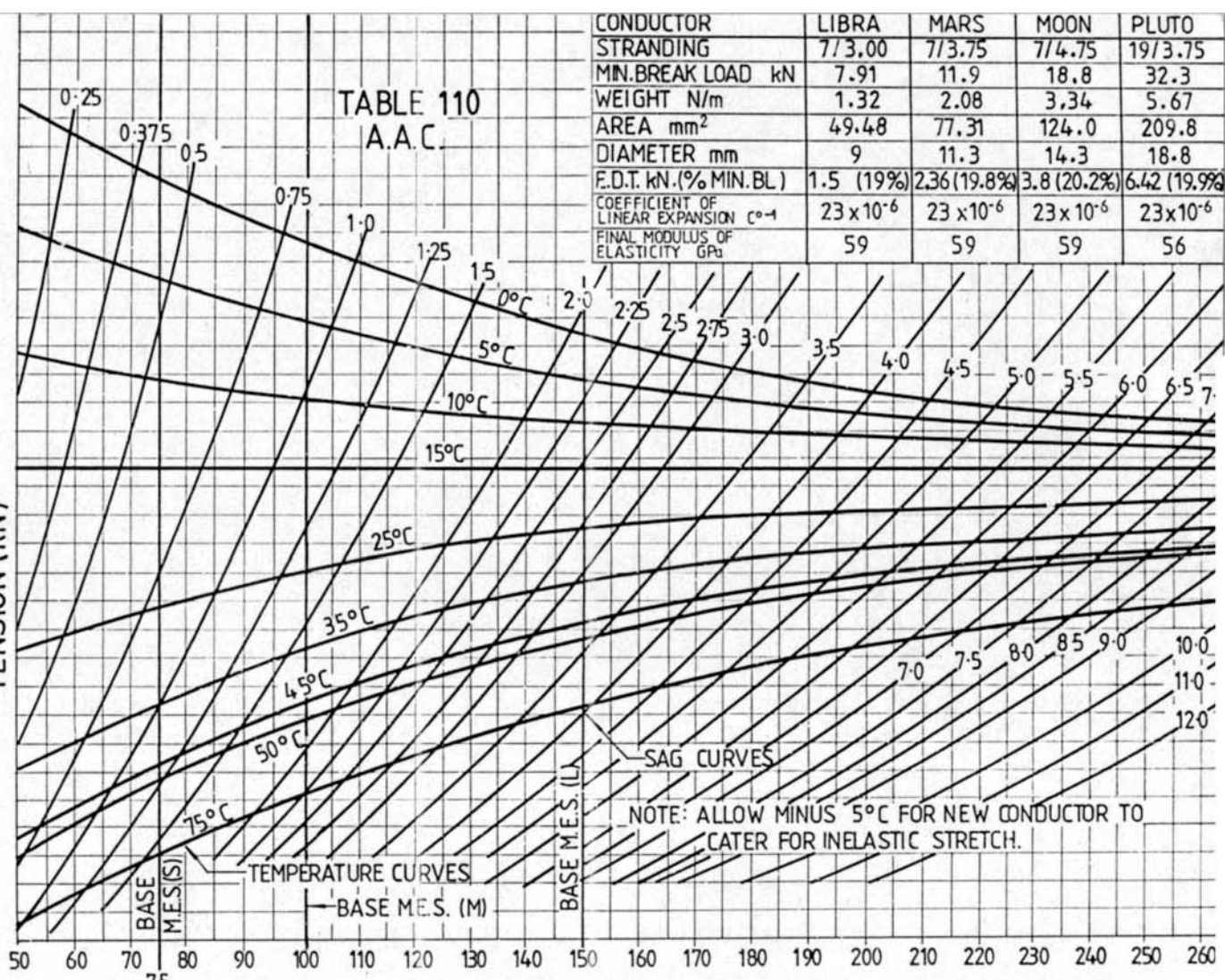
MOON
7/4.75

PLUTO
19/3.75

TABLE 110
A.A.C.

CONDUCTOR	LIBRA	MARS	MOON	PLUTO
STRANDING	7/3.00	7/3.75	7/4.75	19/3.75
MIN.BREAK LOAD kN	7.91	11.9	18.8	32.3
WEIGHT N/m	1.32	2.08	3.34	5.67
AREA mm ²	49.48	77.31	124.0	209.8
DIAMETER mm	9	11.3	14.3	18.8
E.D.T. kN.(% MIN.BL)	1.5 (19%)	2.36 (19.8%)	3.8 (20.2%)	6.42 (19.9%)
COEFFICIENT OF LINEAR EXPANSION °C ⁻¹	23 x 10 ⁻⁶	23 x 10 ⁻⁶	23 x 10 ⁻⁶	23 x 10 ⁻⁶
FINAL MODULUS OF ELASTICITY GPa	59	59	59	56

TENSION (kN)



SPAN (m)

TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

NOTE: ALLOW MINUS 5°C FOR NEW CONDUCTOR TO CATER FOR INELASTIC STRETCH.

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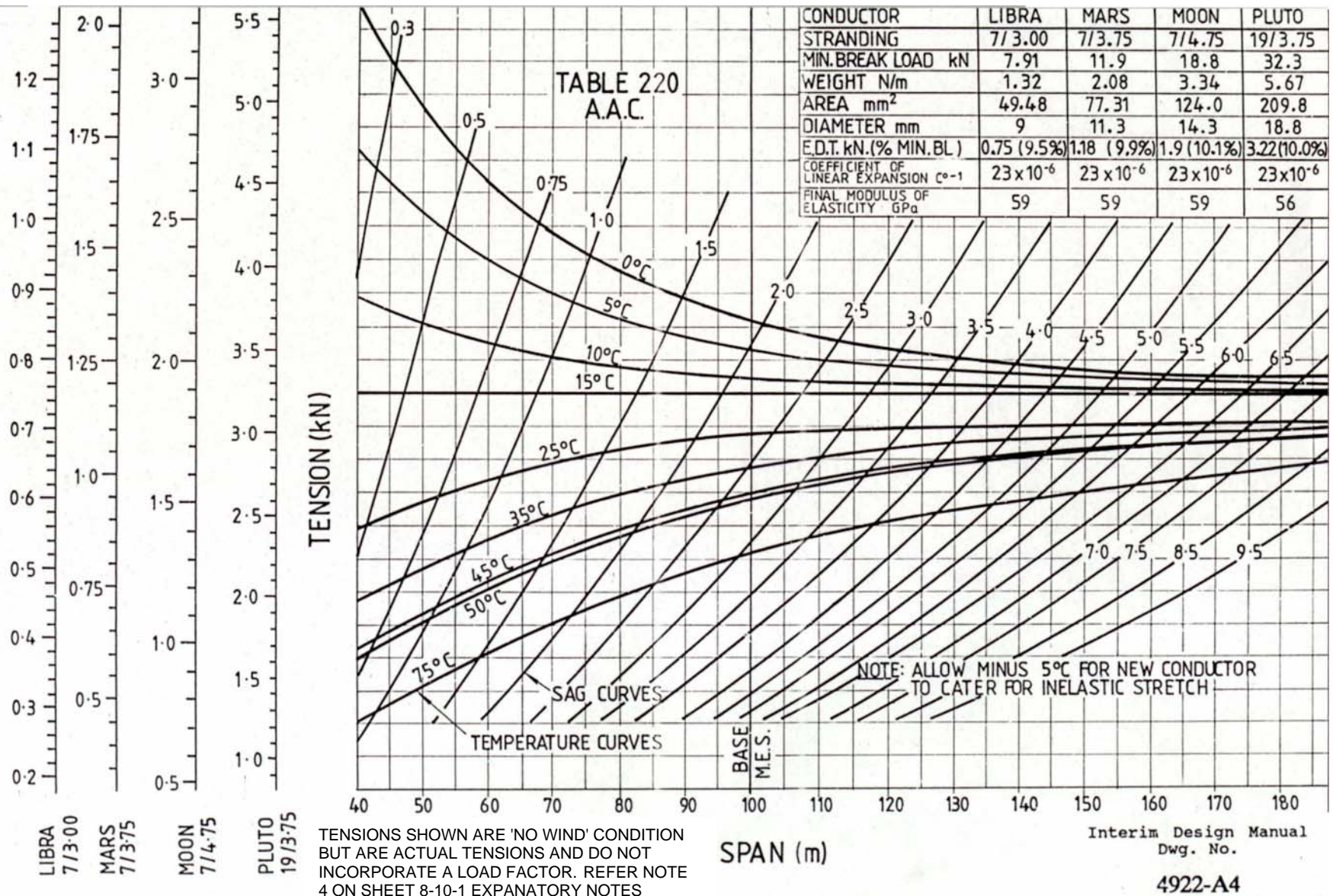
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SAG TENSION TEMP. CHARTS A.A.C.				
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TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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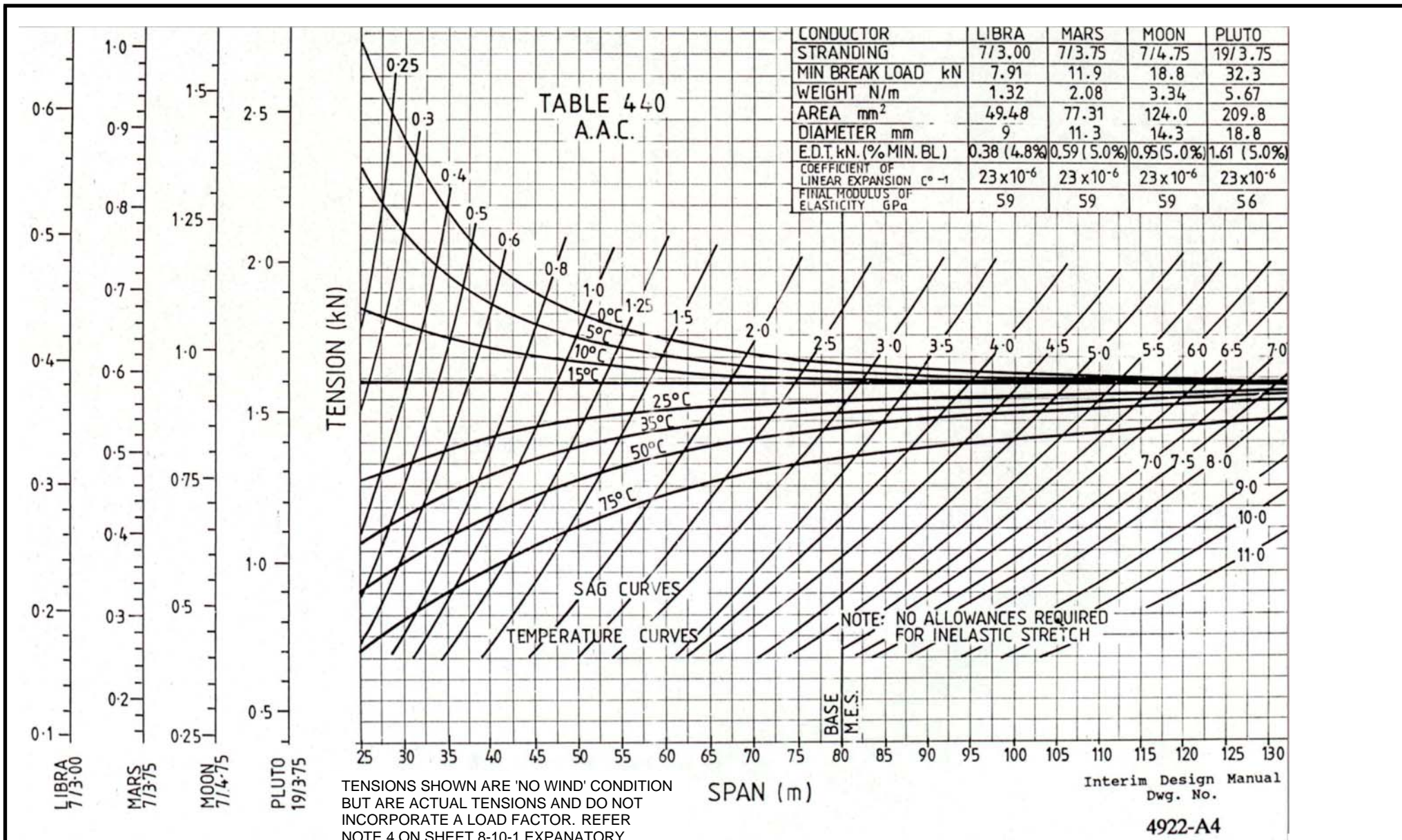



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SAG TENSION TEMP. CHARTS A.A.C.

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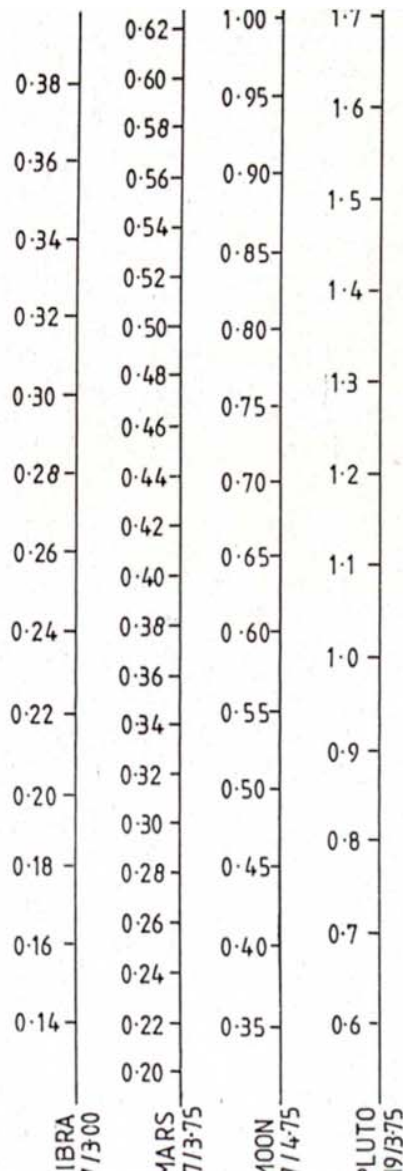
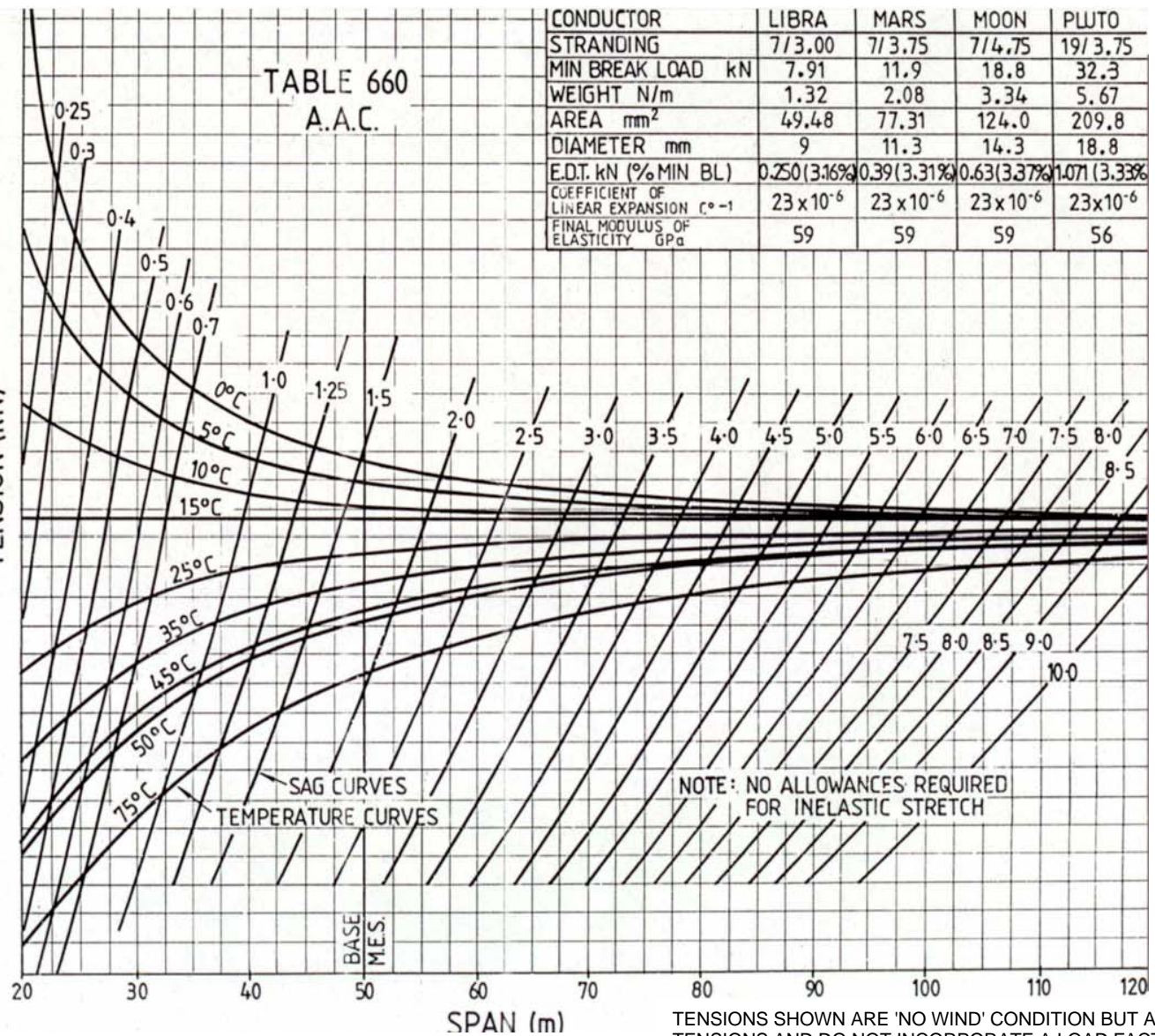


TABLE 660
A.A.C.

CONDUCTOR	LIBRA	MARS	MOON	PLUTO
STRANDING	7/3.00	7/3.75	7/4.75	19/3.75
MIN BREAK LOAD kN	7.91	11.9	18.8	32.3
WEIGHT N/m	1.32	2.08	3.34	5.67
AREA mm ²	49.48	77.31	124.0	209.8
DIAMETER mm	9	11.3	14.3	18.8
E.D.T. kN (% MIN BL)	0.250 (3.16%)	0.39 (3.31%)	0.63 (3.37%)	1.07 (3.33%)
COEFFICIENT OF LINEAR EXPANSION $^{\circ}\text{C}^{-1}$	23×10^{-6}	23×10^{-6}	23×10^{-6}	23×10^{-6}
FINAL MODULUS OF ELASTICITY GPa	59	59	59	56

TENSION (kN)



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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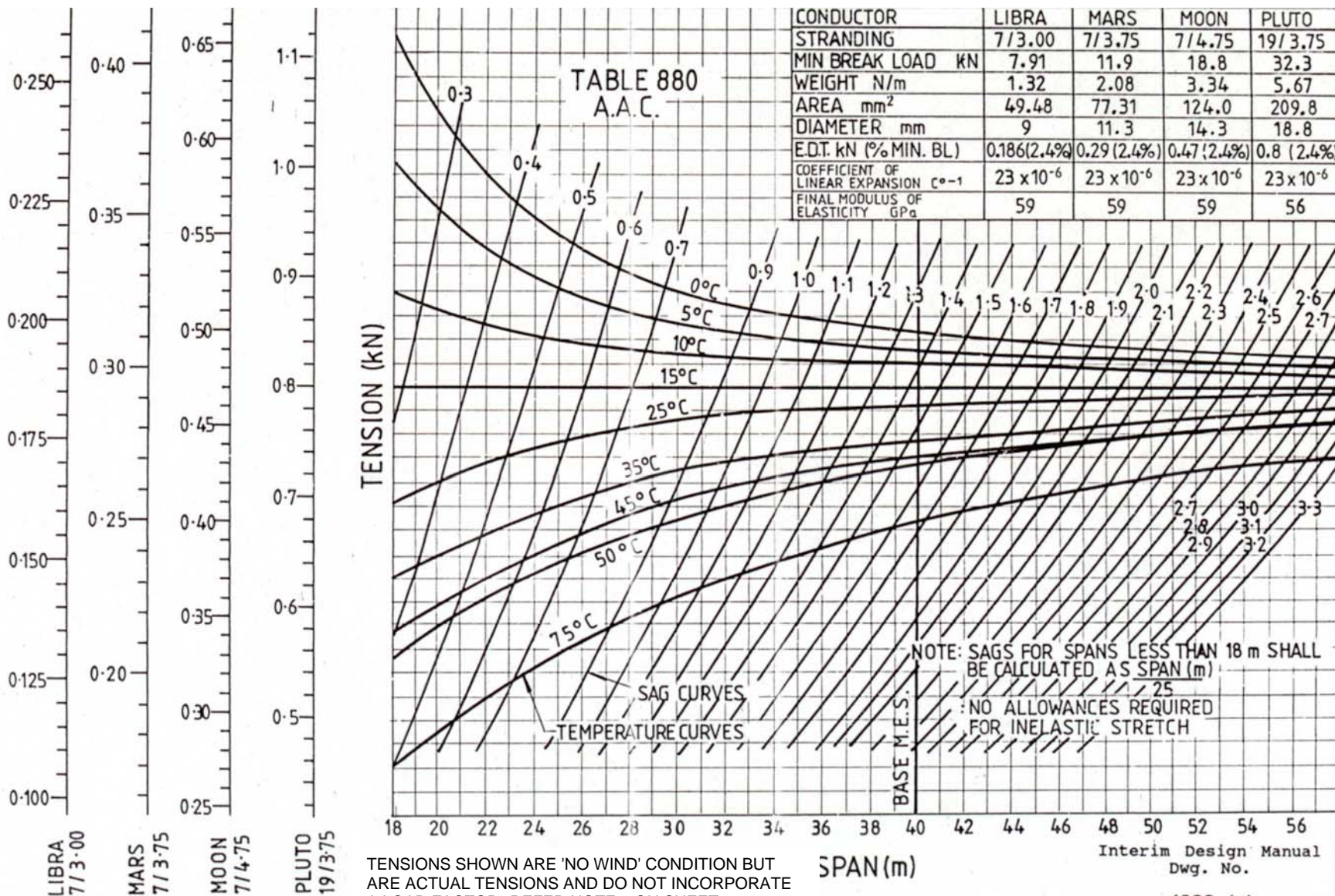


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SAG TENSION TEMP. CHARTS
A.A.C.

10824-A4	SEC 8	SUB 2	SHT 4	REV A
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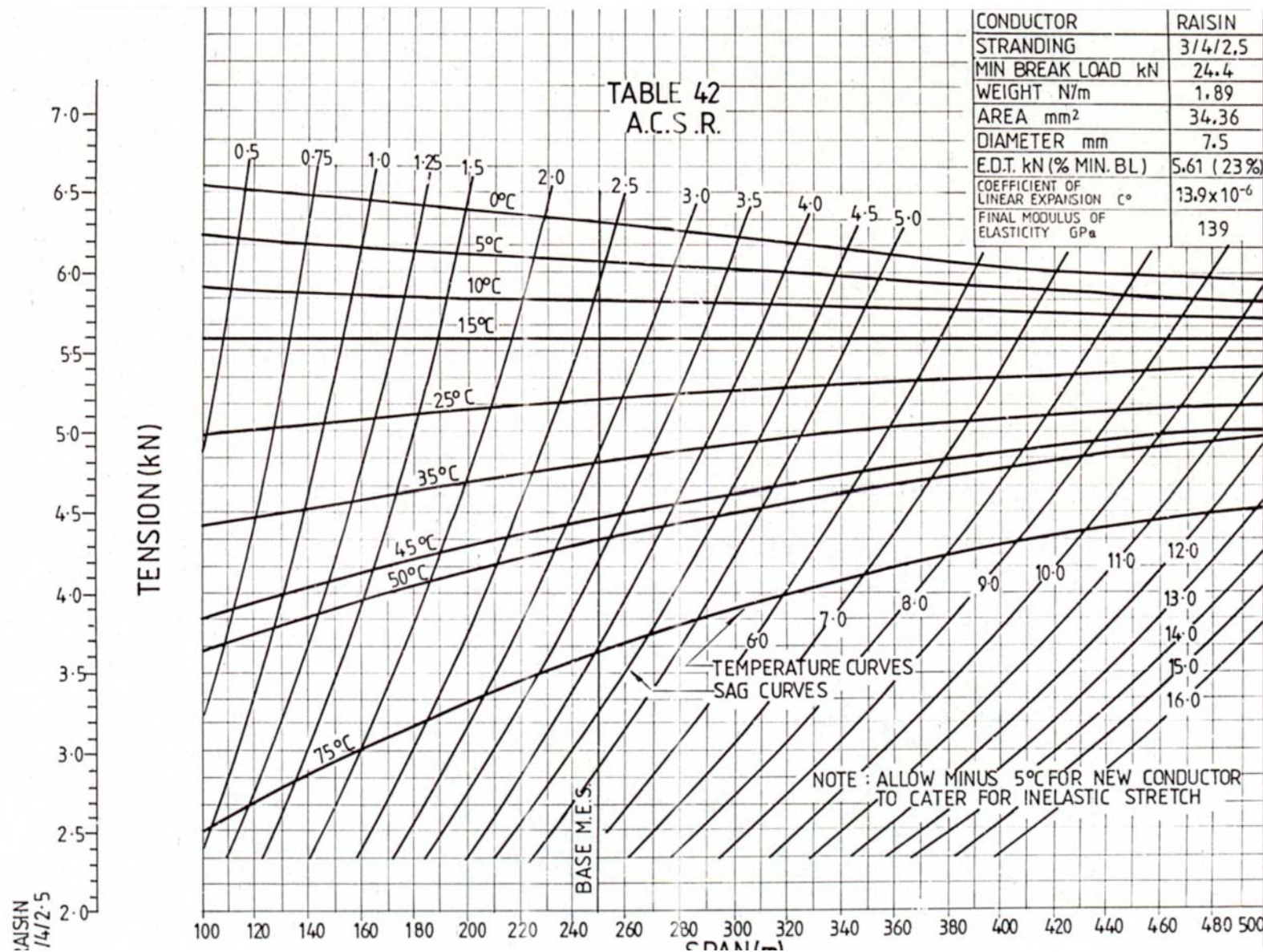


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**SAG TENSION TEMP. CHARTS
A.A.C.**

10824-A4	SEC 8	SUB 2	SHT 5	REV A
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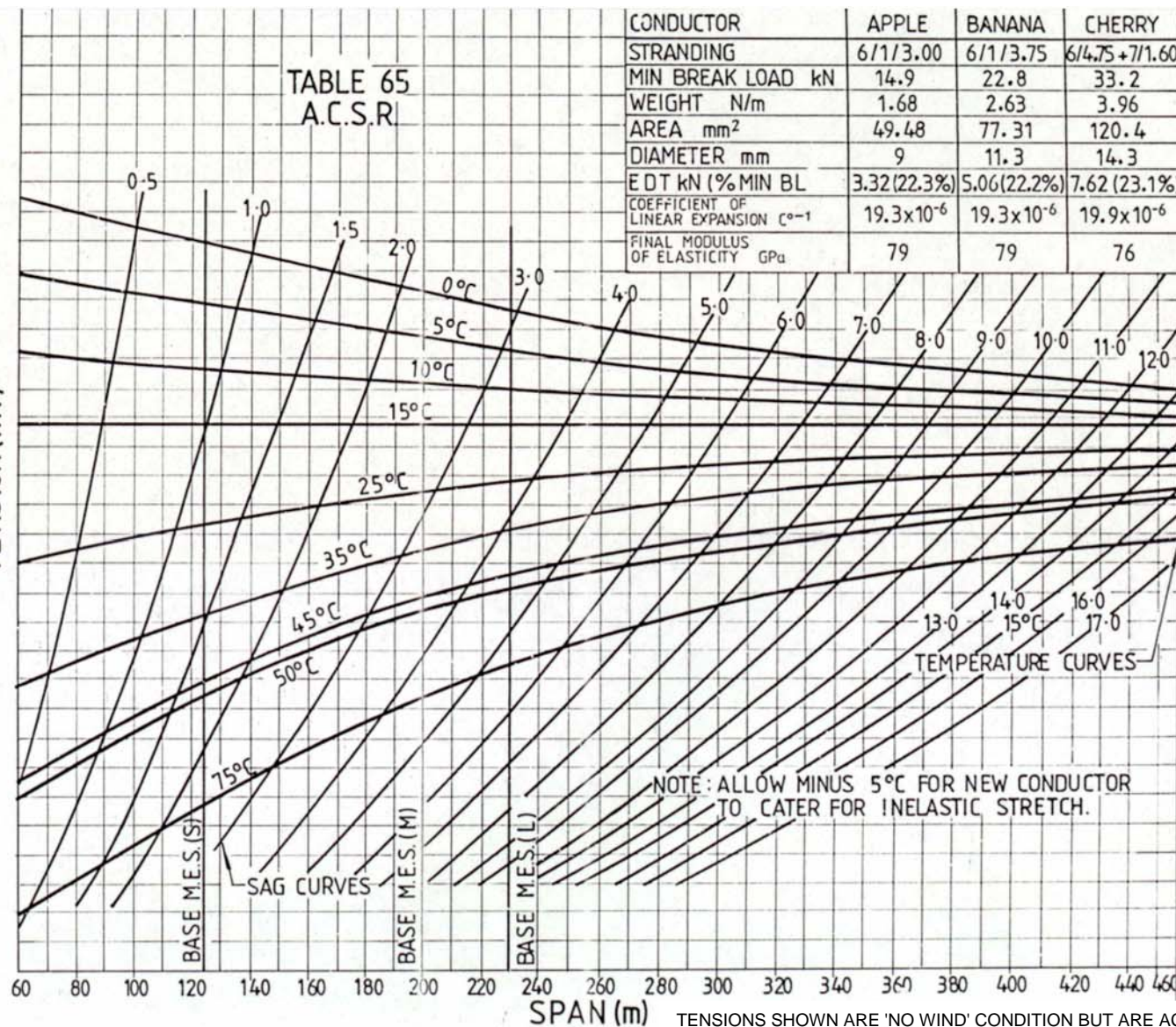
SAG TENSION TEMP. CURVES A.C.S.R.

10824-A4

SEC	SUB	SHT	REV
8	3	1	A

APPLE /1/3.00
 ANANA /1/3.75
 CHERRY /1/4.75+7/1.60

TENSION(kN)



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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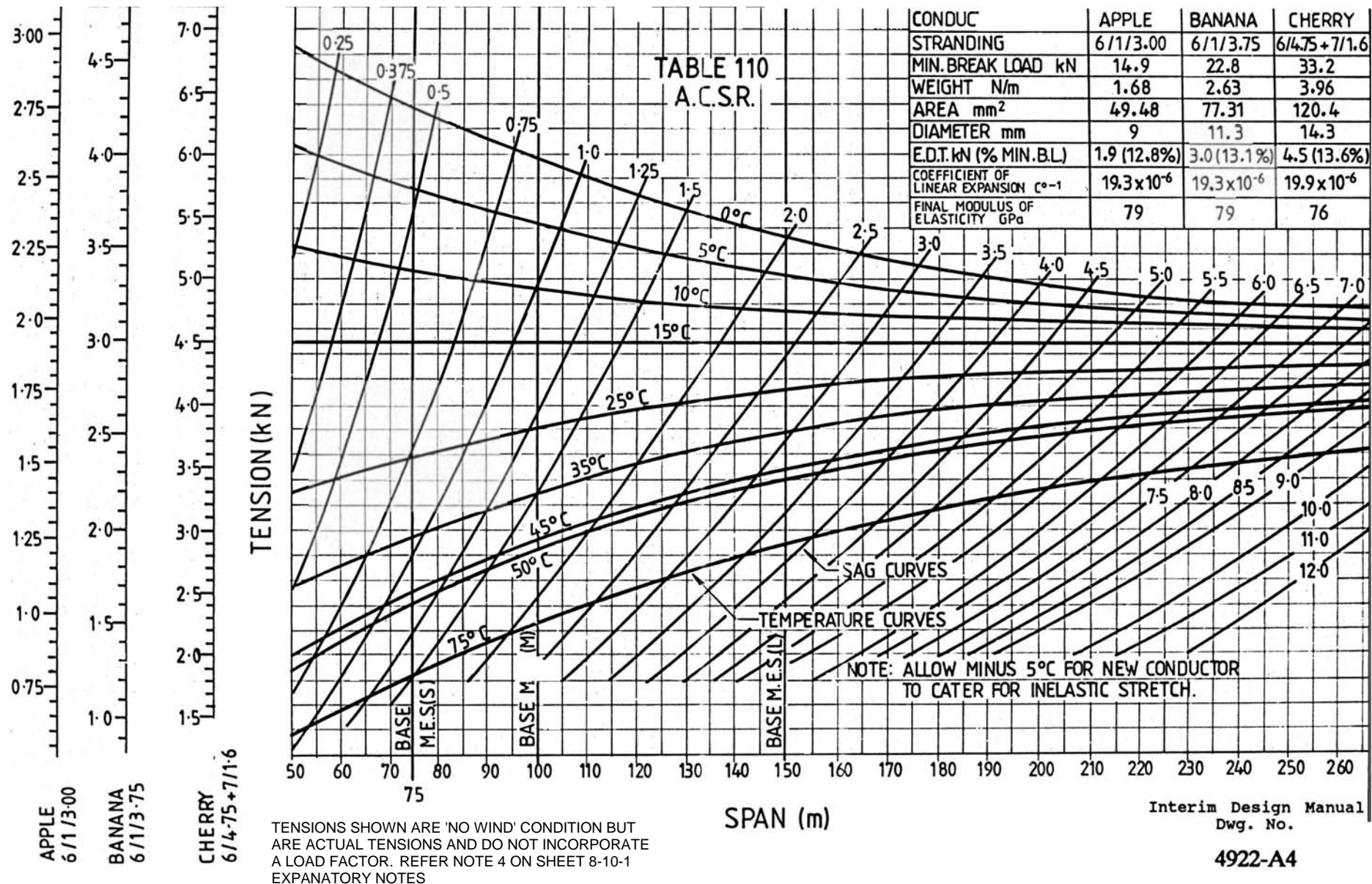


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**SAG TENSION TEMP. CURVES
A.C.S.R.**

10824-A4	SEC 8	SUB 3	SHT 2	REV A
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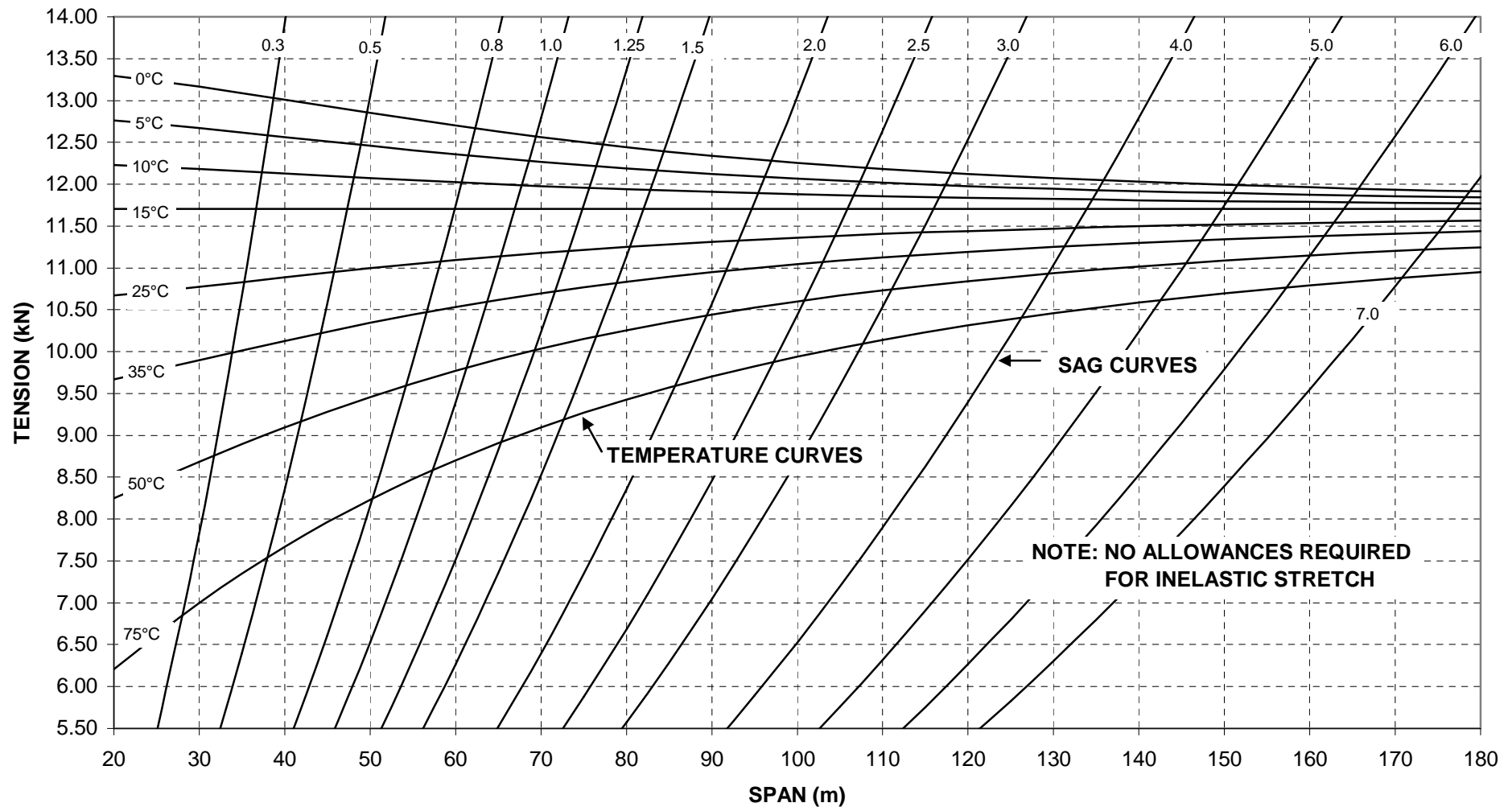
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SAG TENSION TEMP. CURVES
A.C.S.R.

10824-A4	SEC	SUB	SHT	REV
8	3	3	A	

Table 220 Sag/Tension - 35sqmm HVABC



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


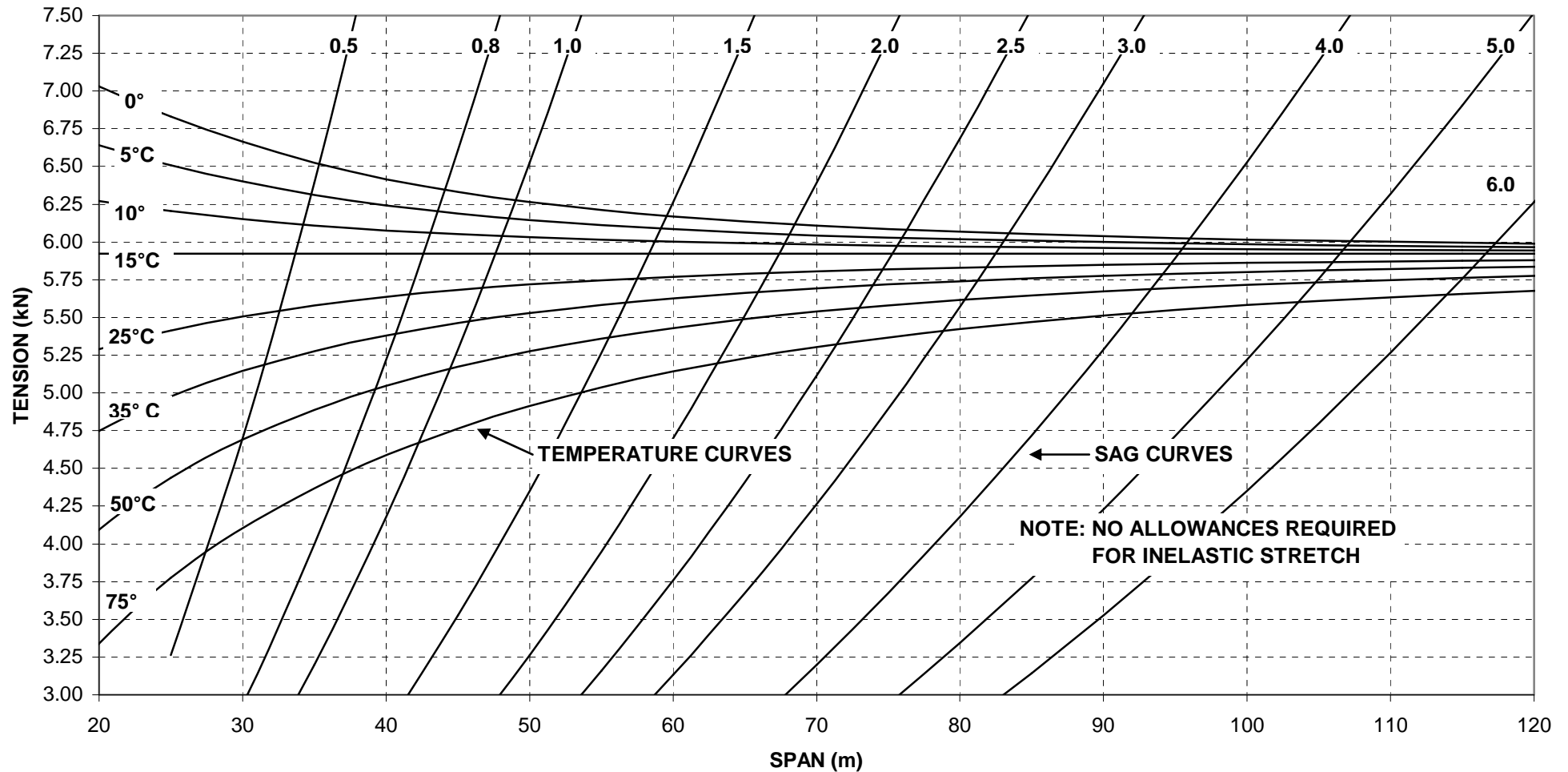
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				WORD			8	4	1	A

Table 440 Sag/Tension - 35sqmm HVABC



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


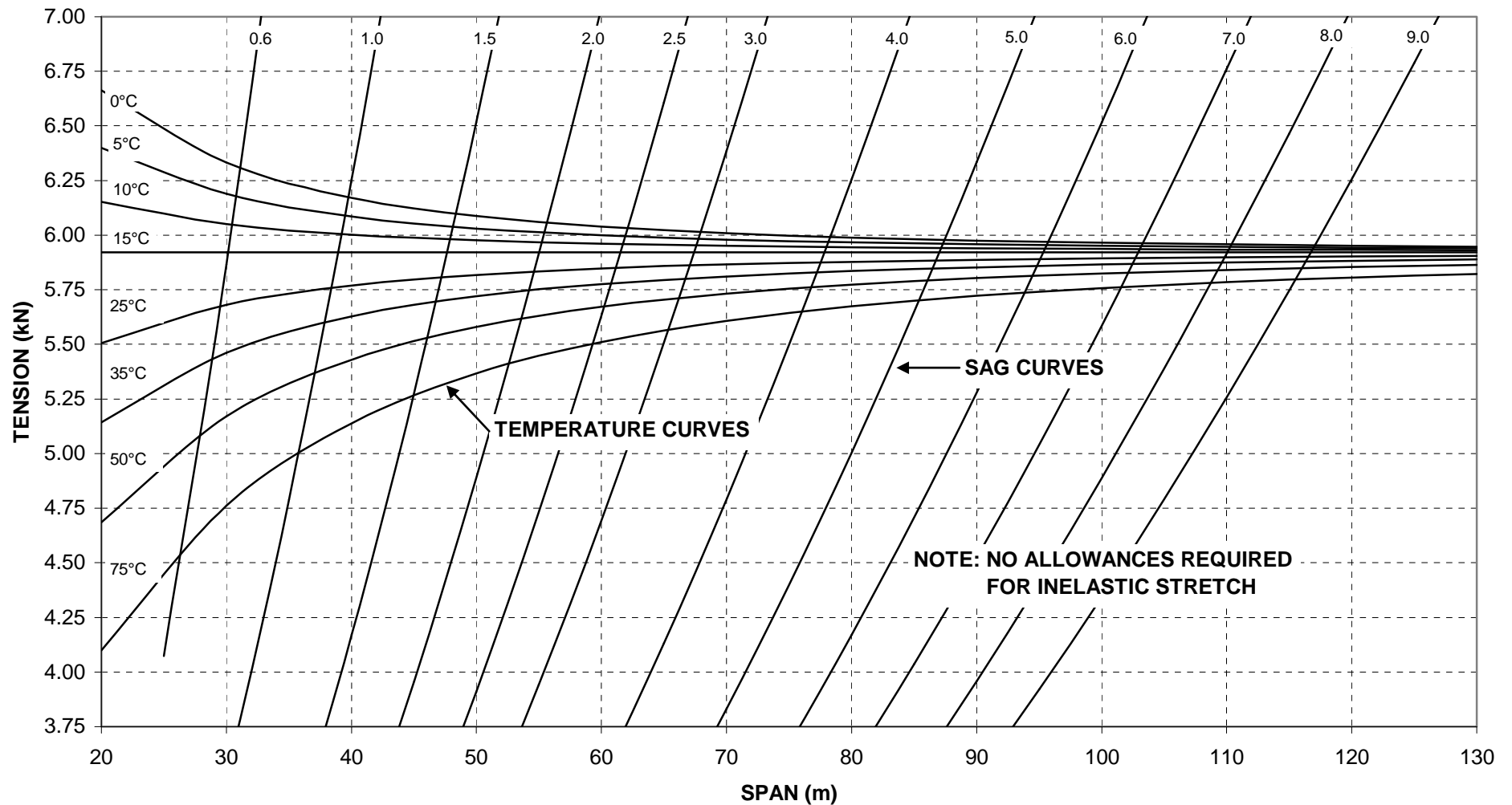
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Table 660 Sag/Tension - 35sqmm HVABC



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


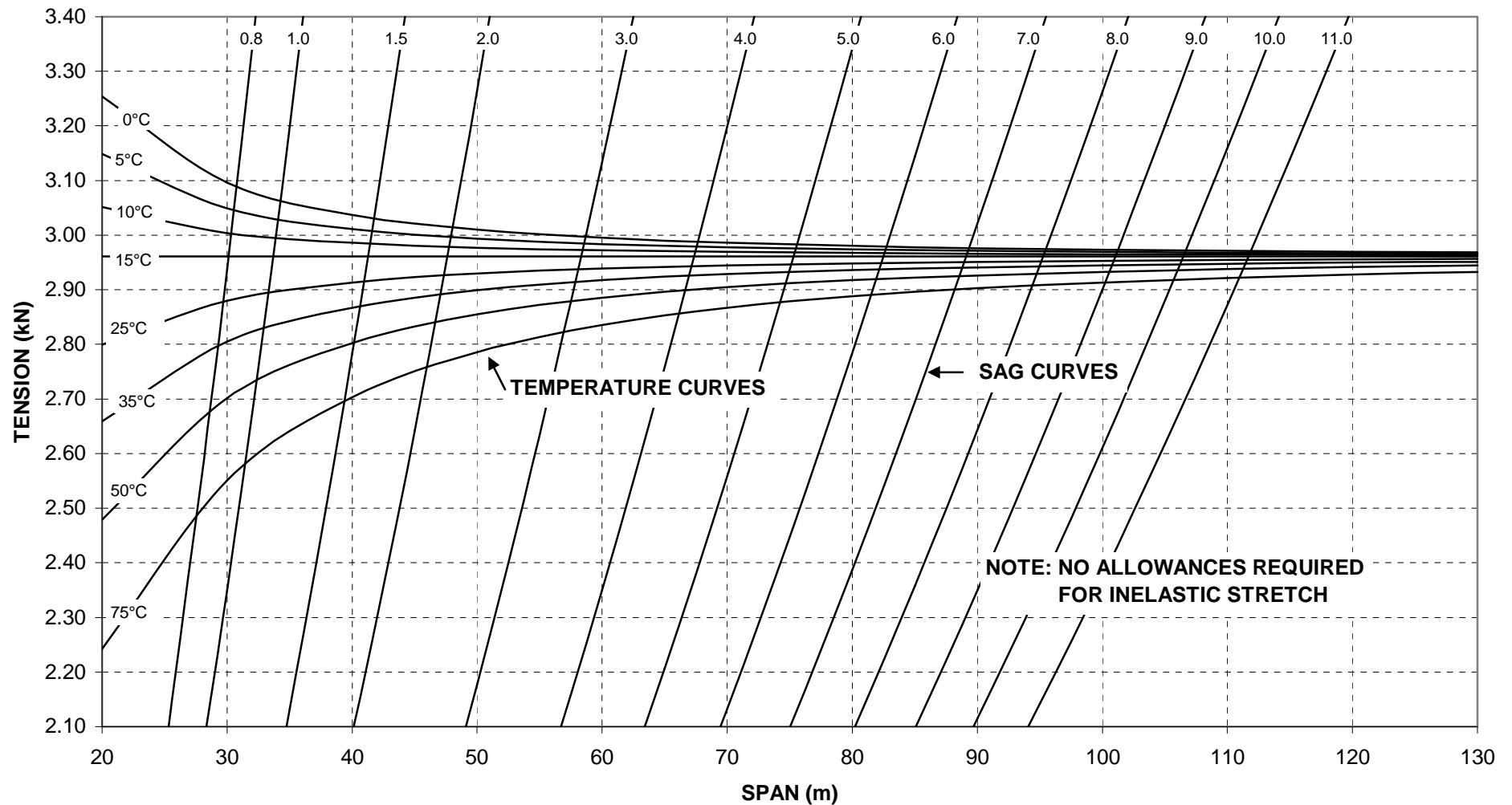
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Table 880 Sag/Tension - 35sqmm HVABC



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


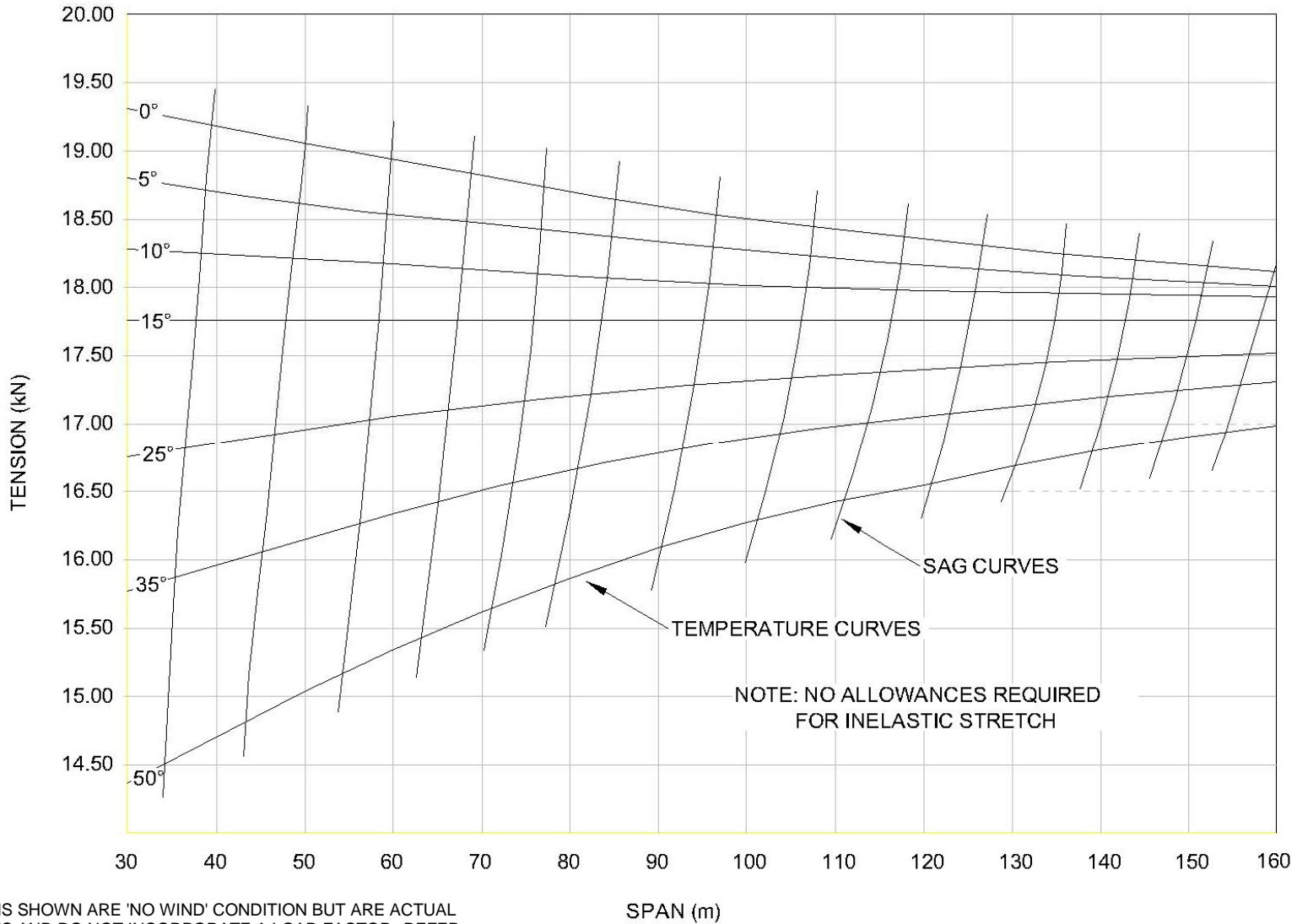
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Table 220 Sag/Tension - 120sqmm HVABC



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


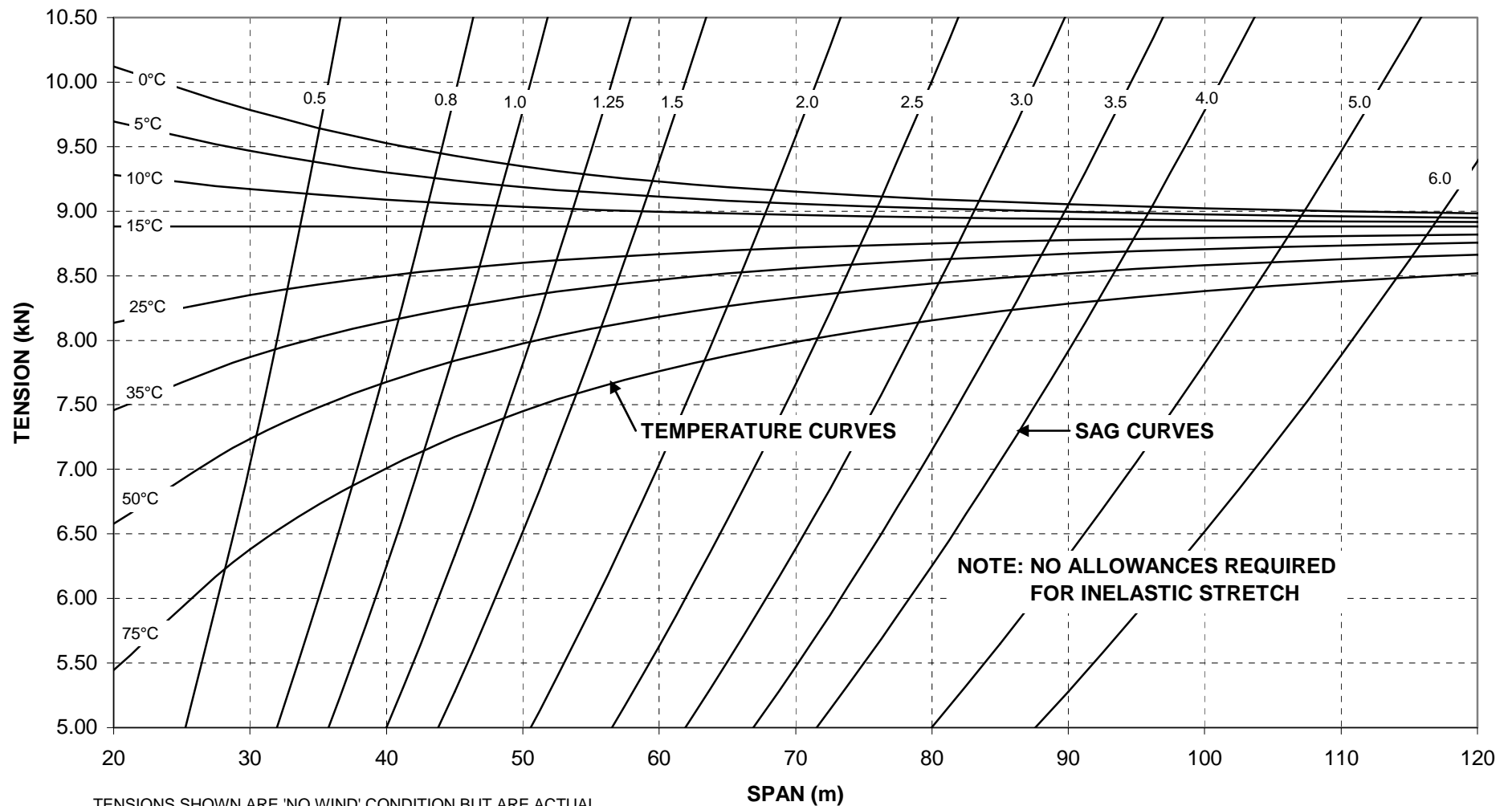
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				WORD			8	5	1	A

Table 440 Sag/Tension - 120sqmm HVABC



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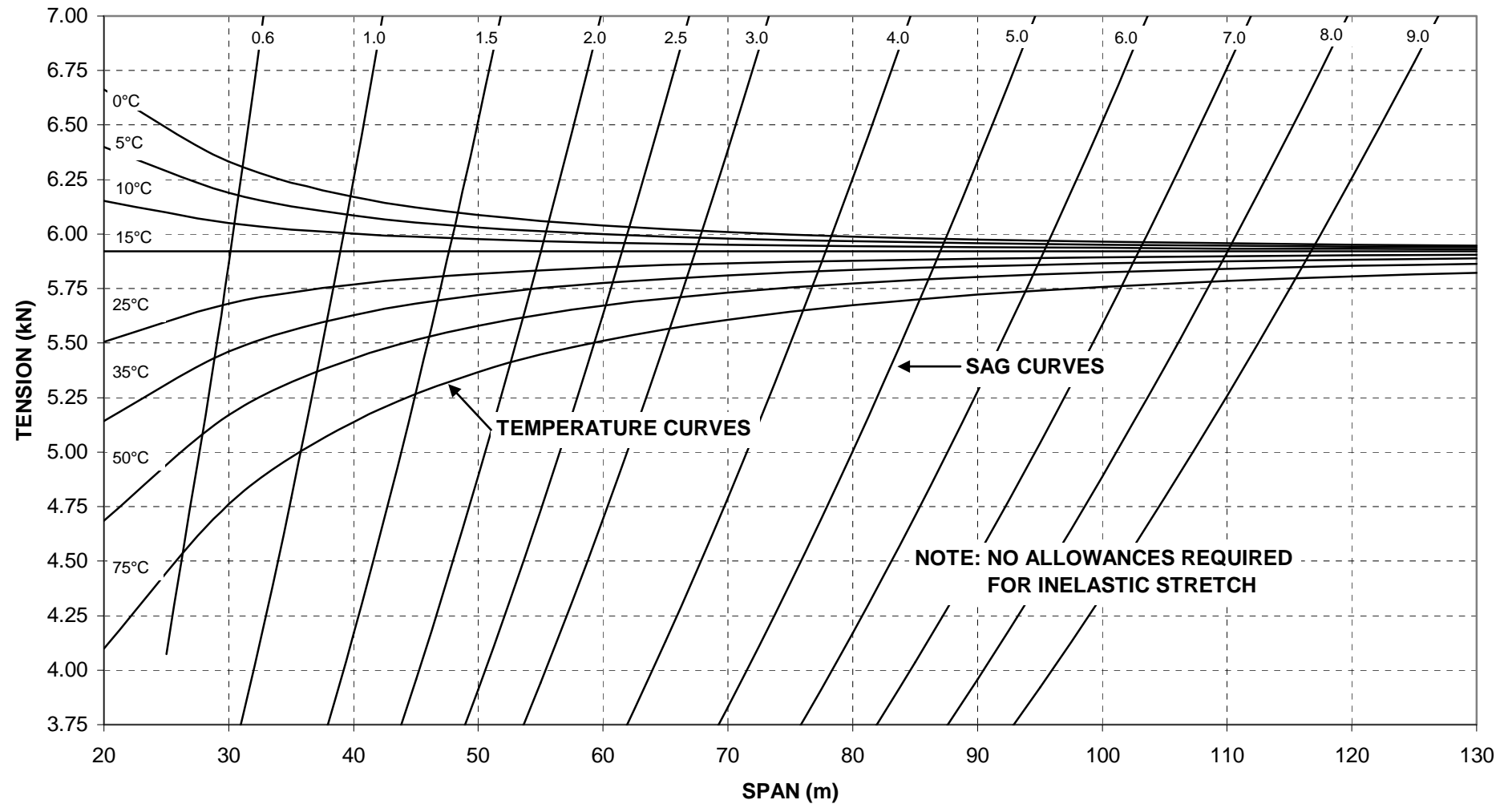
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Table 660 – 120mm² HVABC



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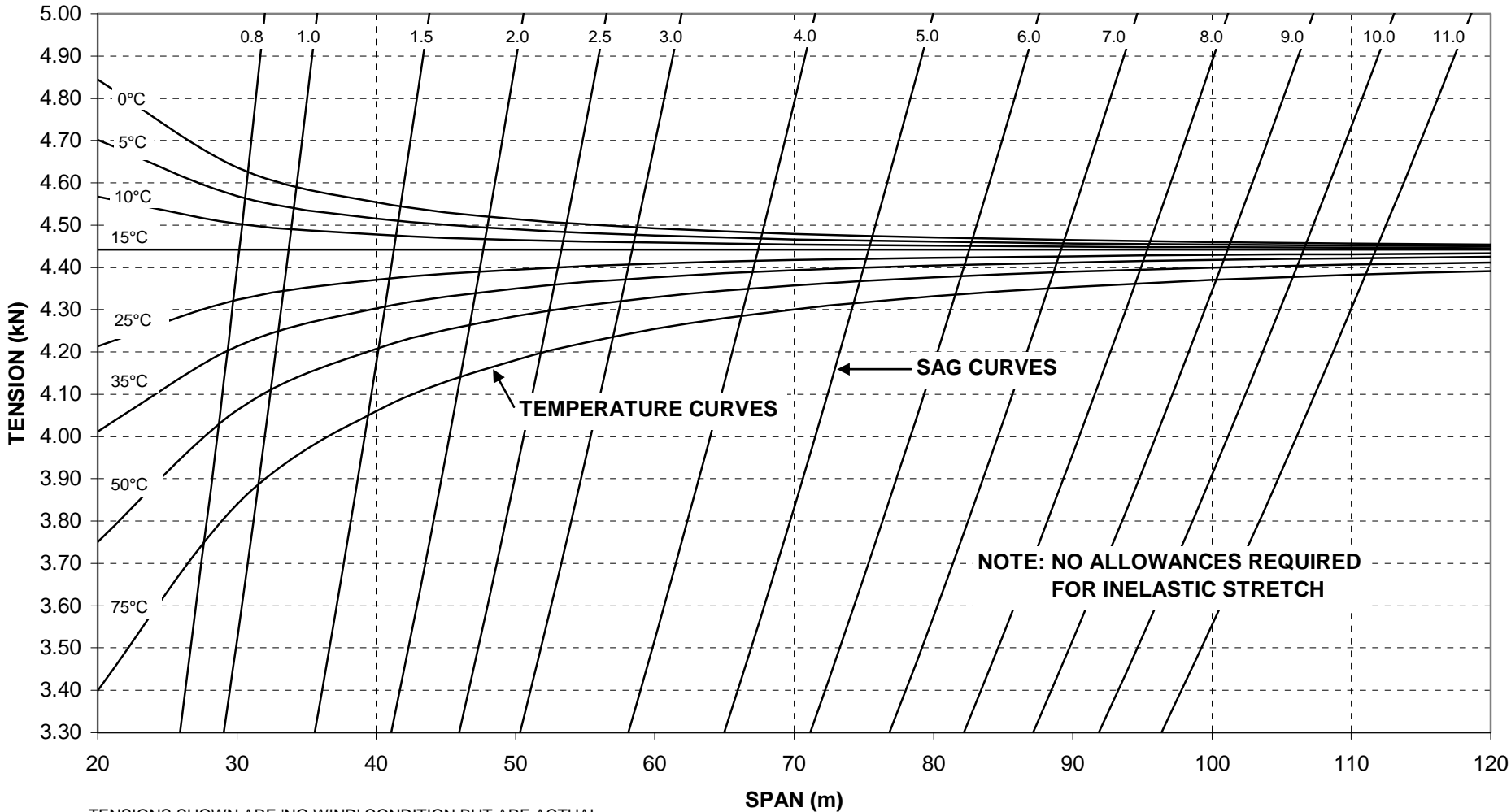

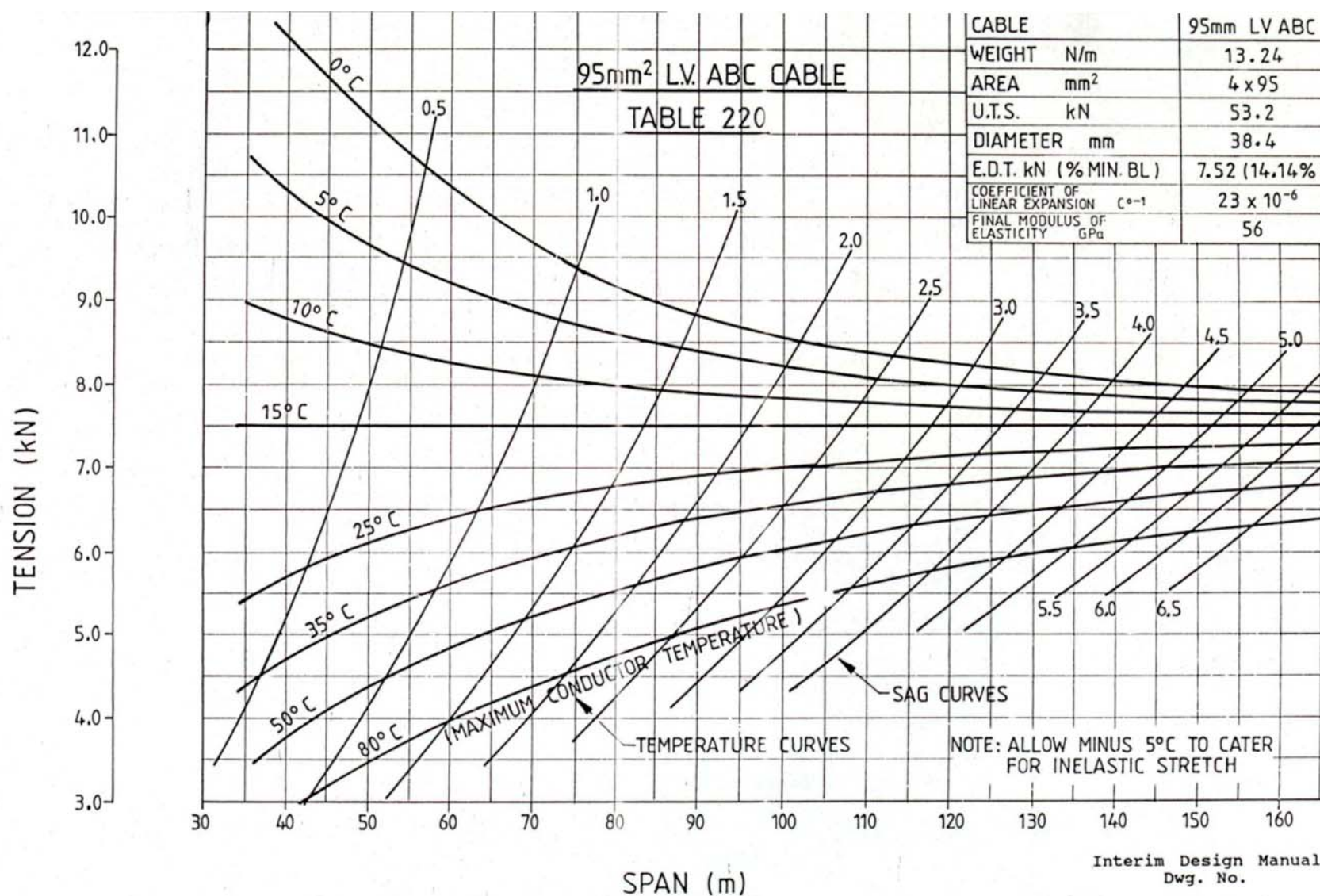
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Table 880 Sag/Tension - 120sqmm HVABC



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					WORD						



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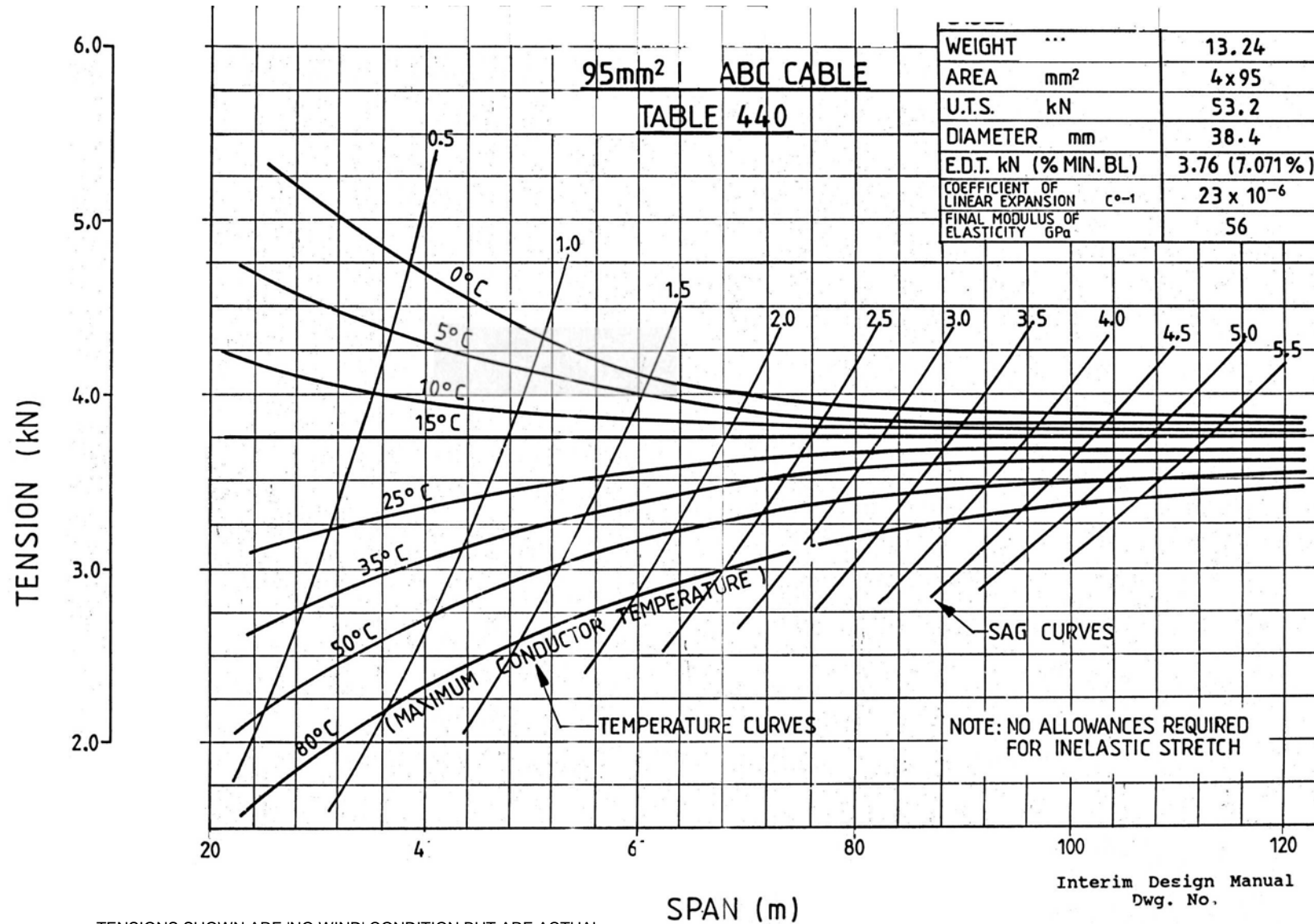


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SAG TENSION TEMP. CURVES
95mm² L.V. ABC.

10824-A4	SEC 8	SUB 6	SHT 1	REV A
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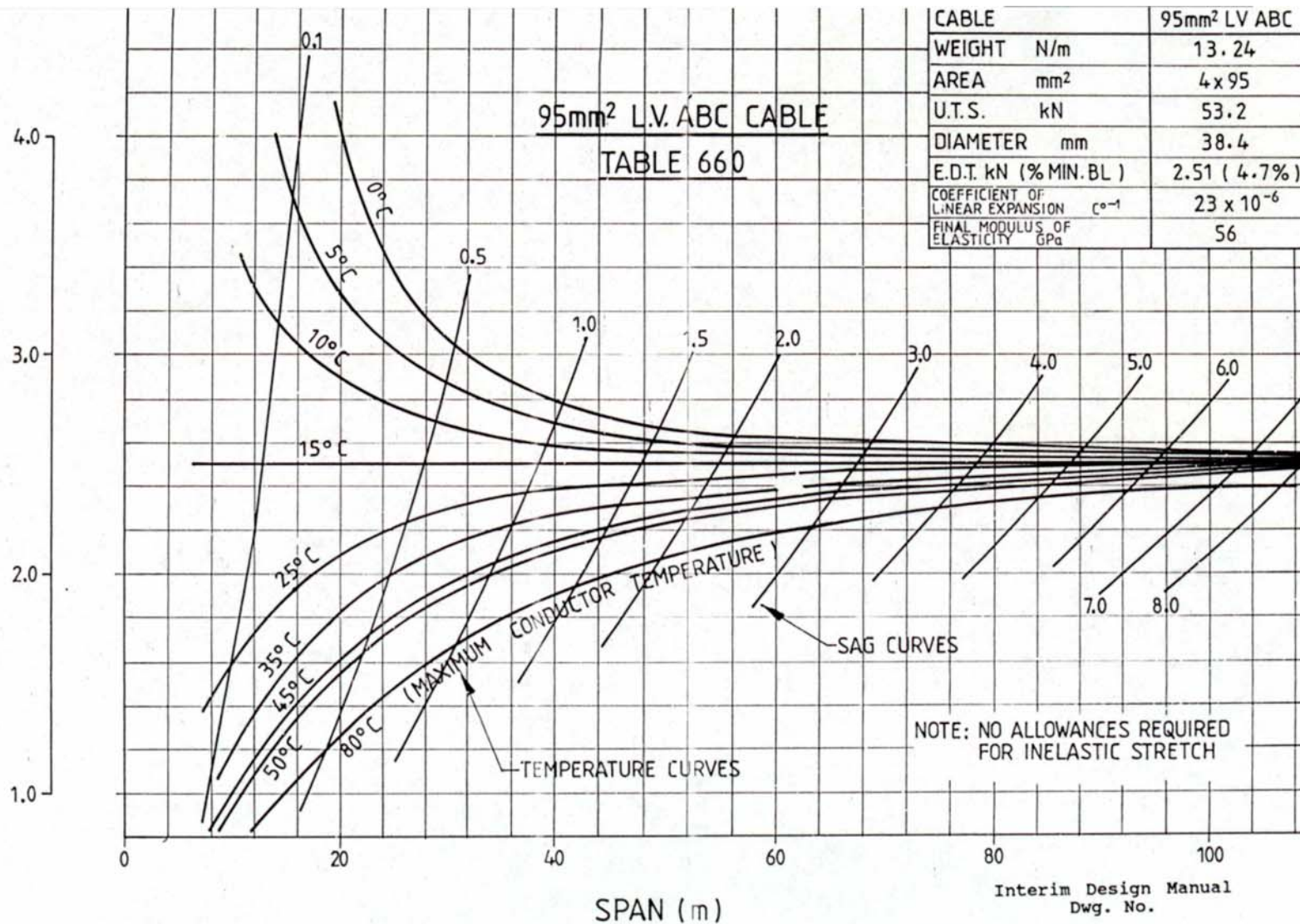
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SAG TENSION TEMP. CURVES
95mm² L.V. ABC.

10824-A4	SEC 8	SUB 6	SHT 2	REV A
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TENSION (kN)



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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SAG TENSION TEMP. CURVES
95mm² L.V. ABC.

10824-A4	SEC 8	SUB 6	SHT 3	REV A
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TENSION (kN)

3.0
2.0
1.0

0

20

40

60

80

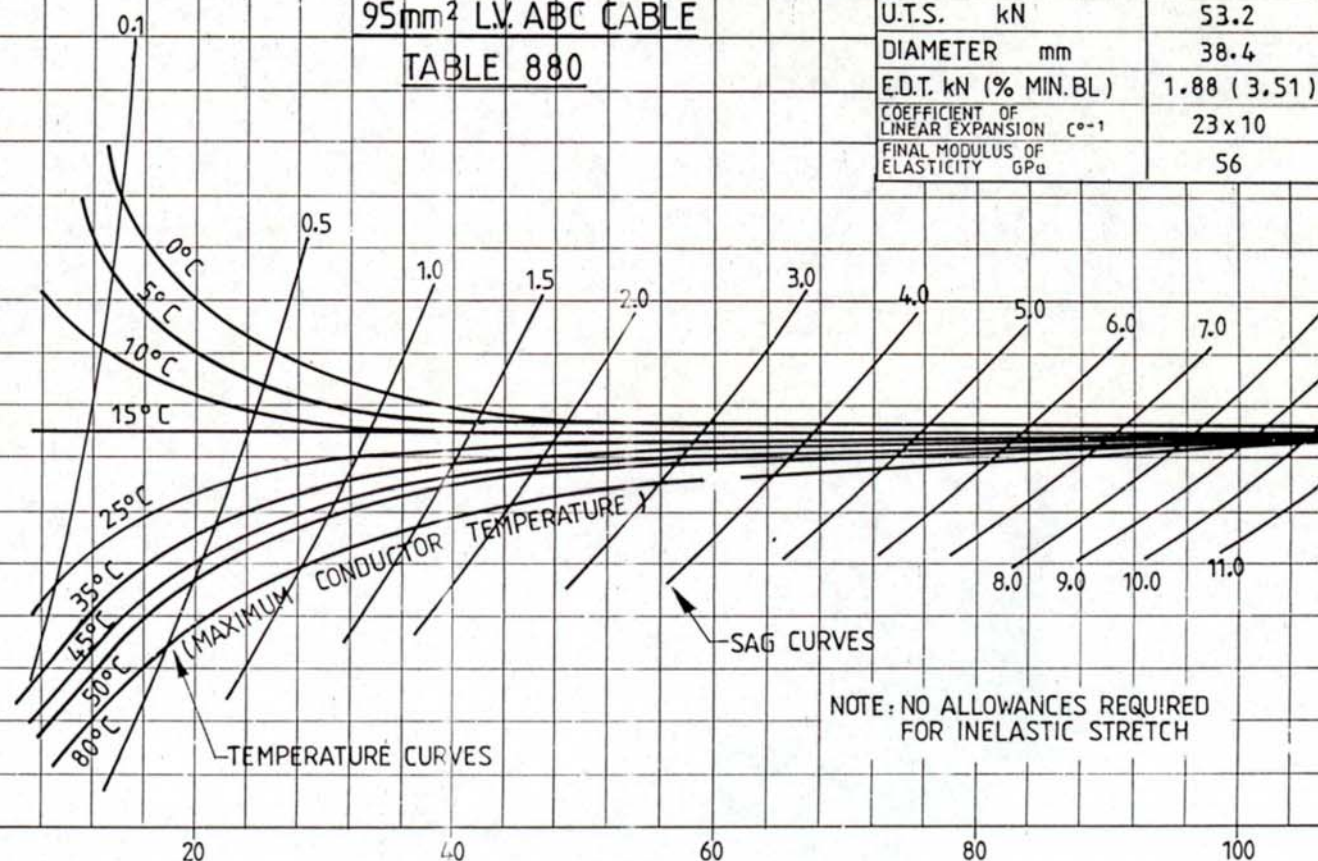
100

SPAN (m)

95mm² L.V. ABC CABLE

TABLE 880

CABLE		95mm L.V. ABC
WEIGHT	N/m	13.24
AREA	mm ²	4 x 95
U.T.S.	kN	53.2
DIAMETER	mm	38.4
E.D.T. kN (% MIN.BL)		1.88 (3.51)
COEFFICIENT OF LINEAR EXPANSION	°C ⁻¹	23 x 10
FINAL MODULUS OF ELASTICITY	GPa	56



NOTE: NO ALLOWANCES REQUIRED
FOR INELASTIC STRETCH

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TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL
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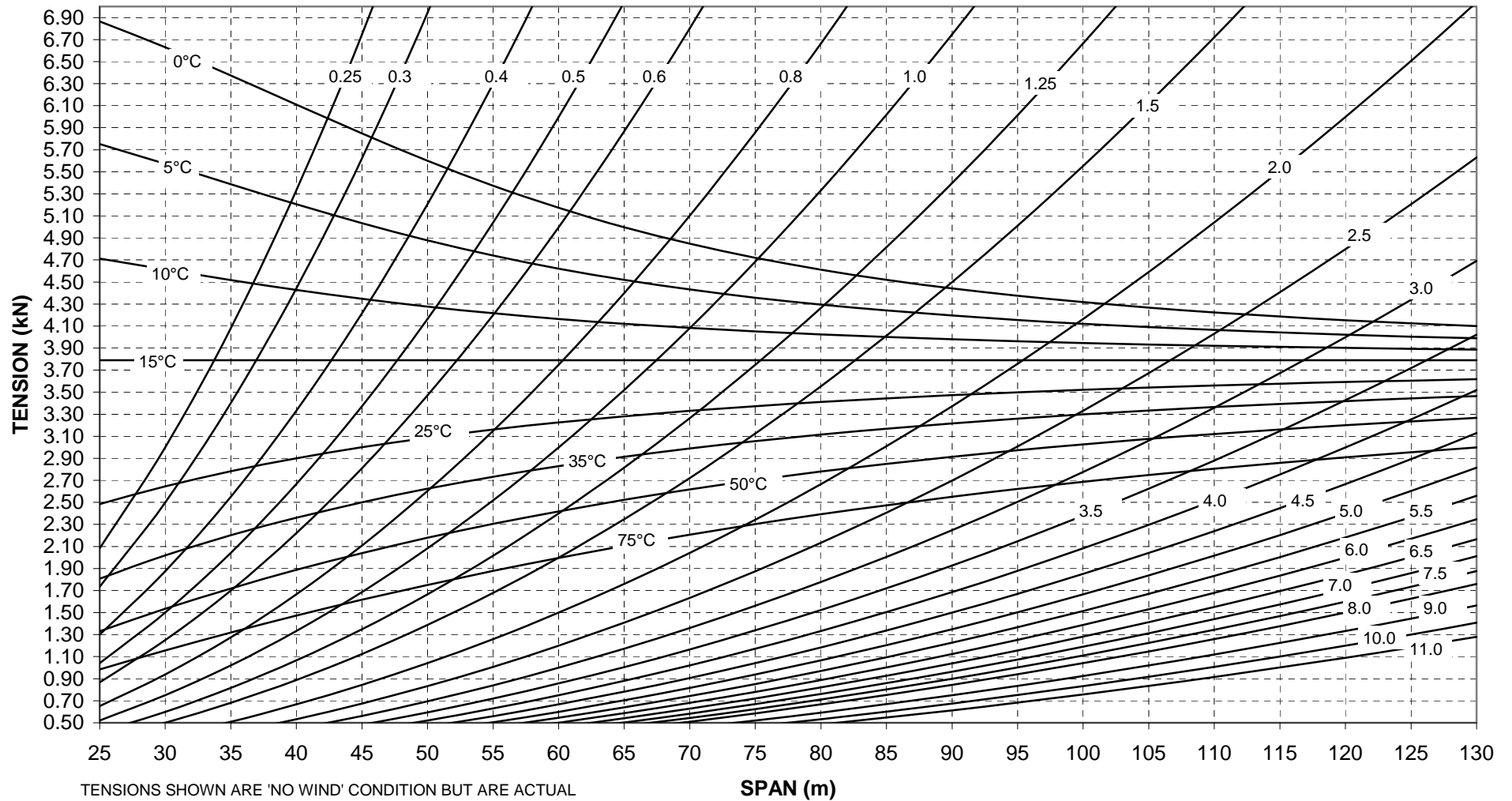
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SAG TENSION TEMP. CURVES
95mm² L.V. ABC.

10824-A4

SEC	SUB	SHT	REV
8	6	4	A

Table 220 Sag/Tension - 2 x 95mm ABC Conductor



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


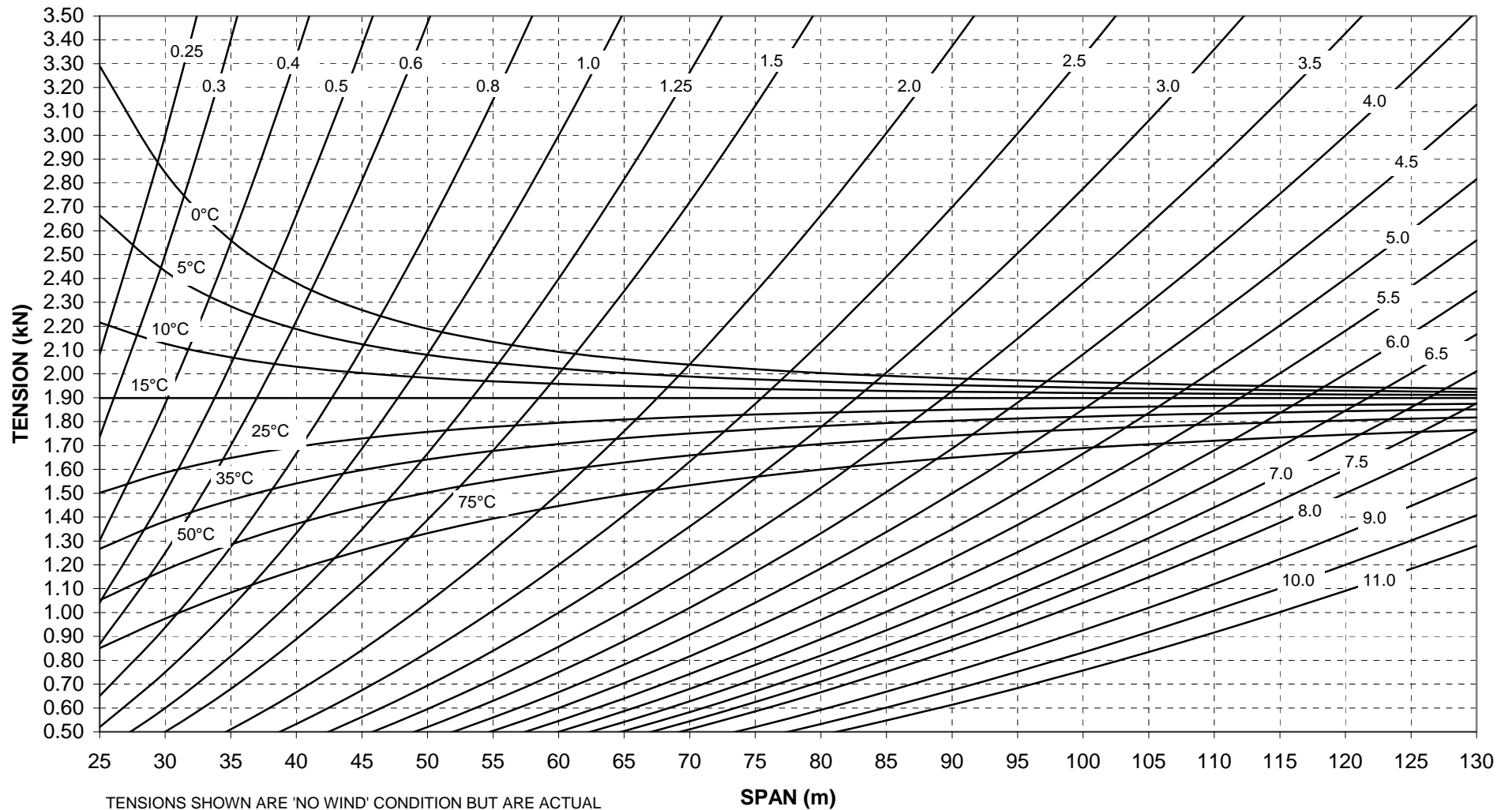
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Table 440 Sag/Tension - 2 x 95mm ABC Conductor



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES


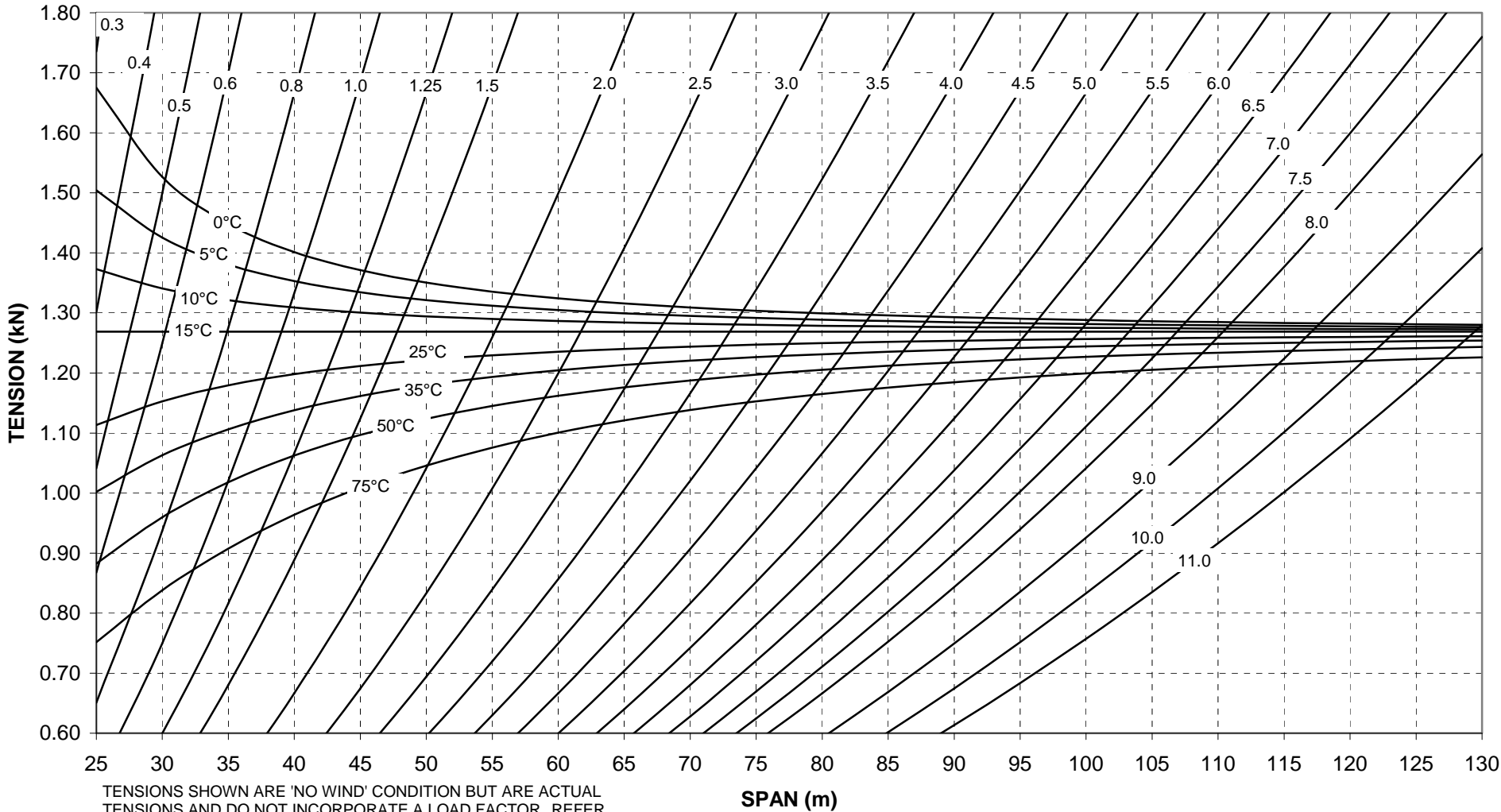
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					WORD					

Table 660 Sag/Tension - 2 x 95mm ABC Conductor




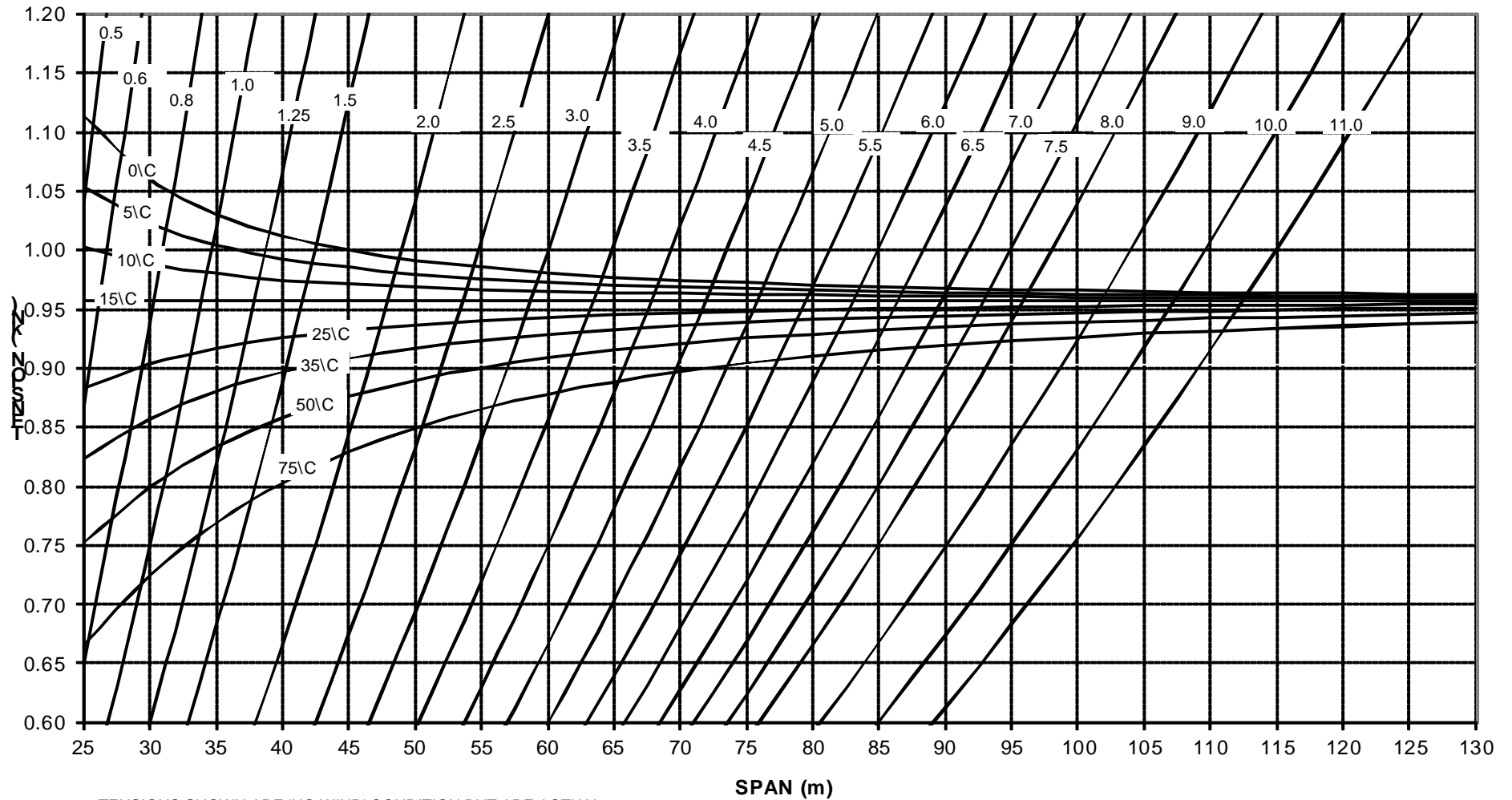

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CKD				REC'D						
ATHR				CKD	P. RELF					
ORIGINAL ISSUE				AUTHR	K. GOSDEN	10824-A4	SEC 8	SUB 7	SHT 3	REV A
				WORD						

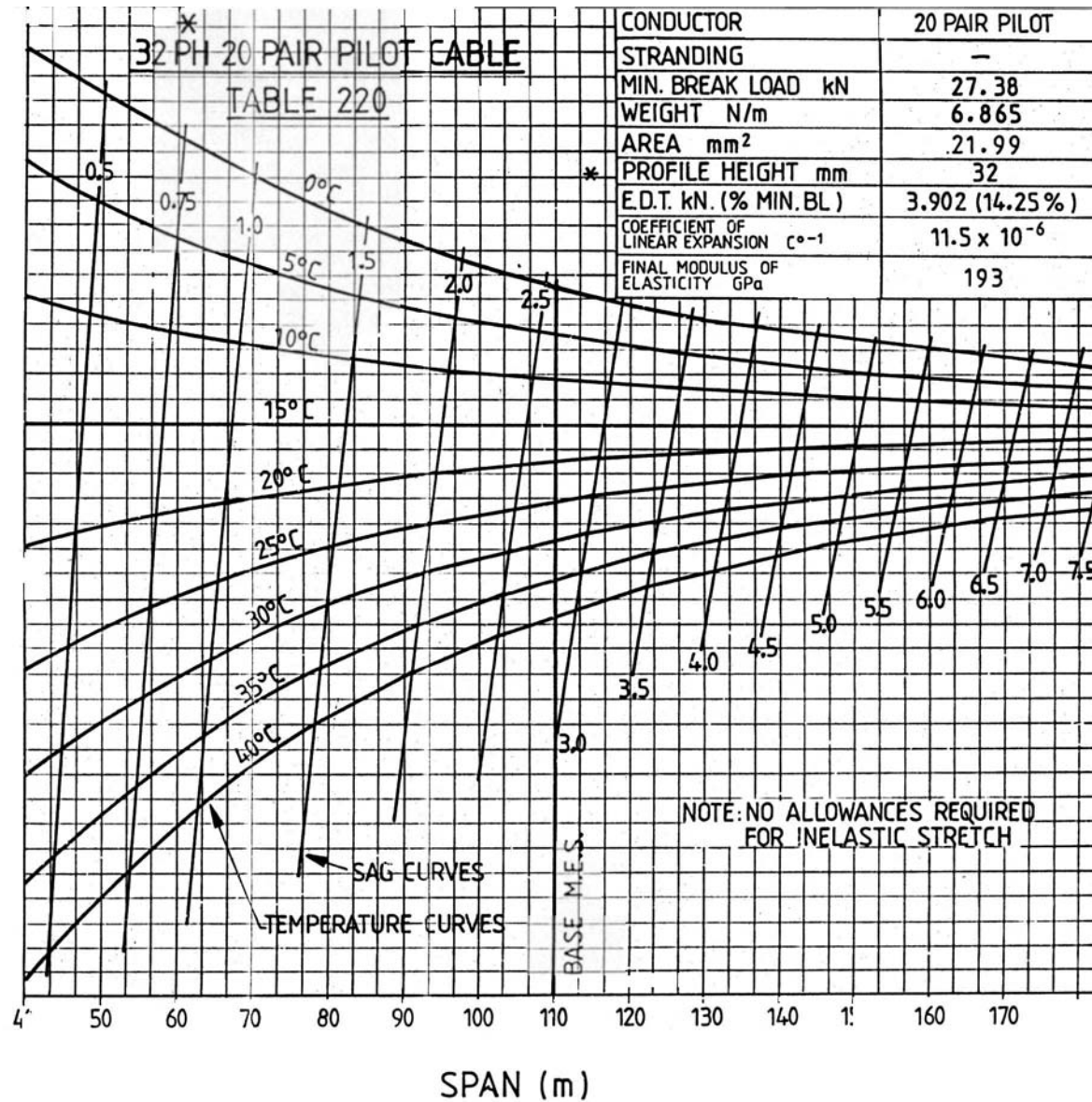
Table 880 Sag/Tension - 2 x 95mm ABC Conductor



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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APP'D					DATE	20/10/2015	95mm ² 2-CORE L.V.ABC.				
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ORIGINAL ISSUE					AUTHR	K. GOSDEN	10824-A4	SEC 8	SUB 7	SHT 4	REV A
					WORD						

TENSION (kN)

4.4
4.3
4.2
4.1
4.0
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2

TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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ORIGINAL ISSUE	



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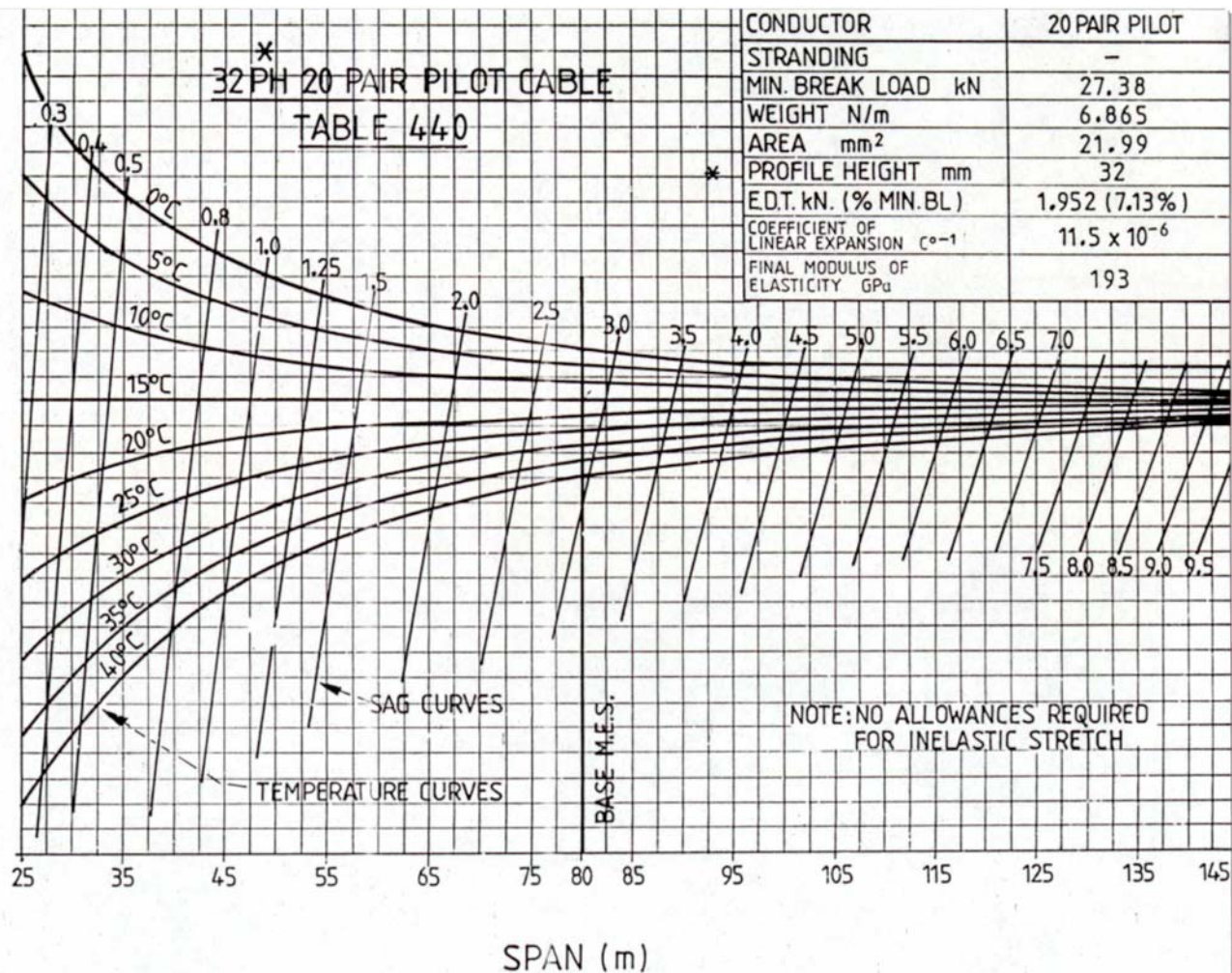
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WORD	

SAG TENSION TEMP. CURVES PILOT

10824-A4

SEC
8SUB
8SHT
2REV
A

TENSION (kN)

2.3
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5Interim Design Manual
Dwg. No.

4922-A4

TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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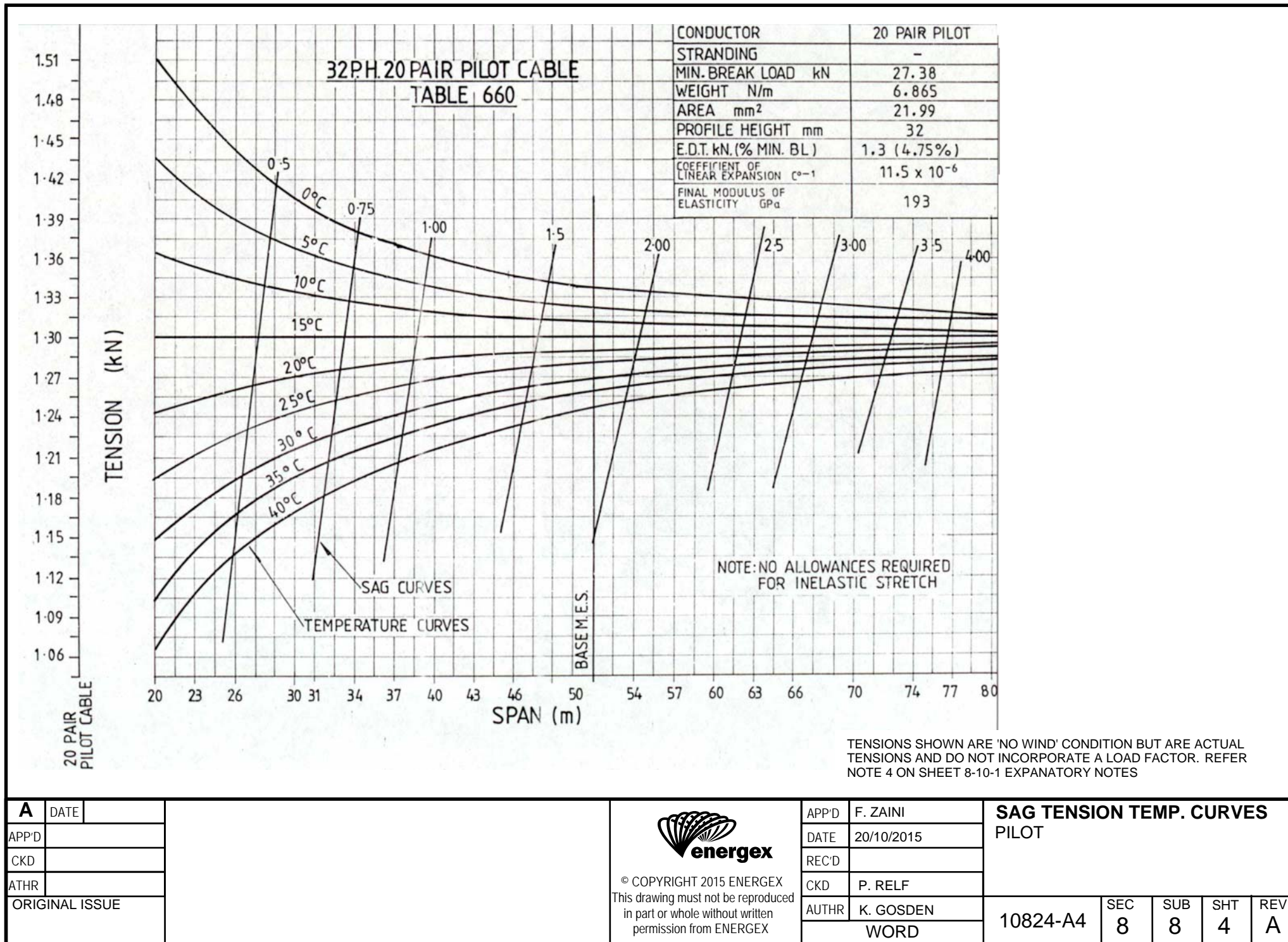
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WORD	

**SAG TENSION TEMP. CURVES
PILOT**

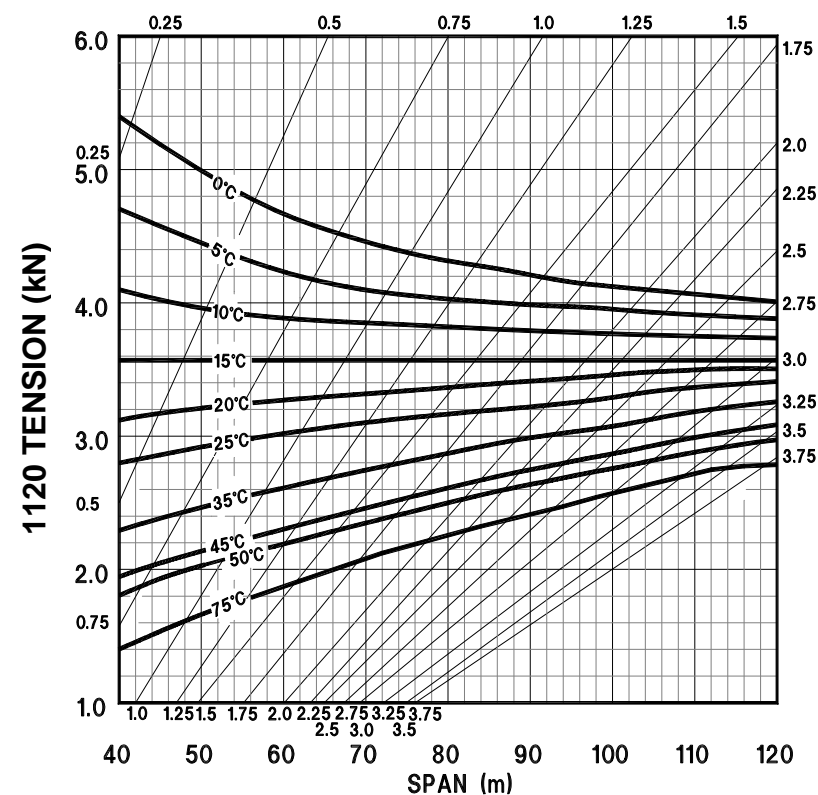
10824-A4

SEC	SUB	SHT	REV
8	8	3	A




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					10824-A4 <div style="display: flex; justify-content: space-between;"> <div>SEC 8</div> <div>SUB 8</div> <div>SHT 4</div> <div>REV A</div> </div>

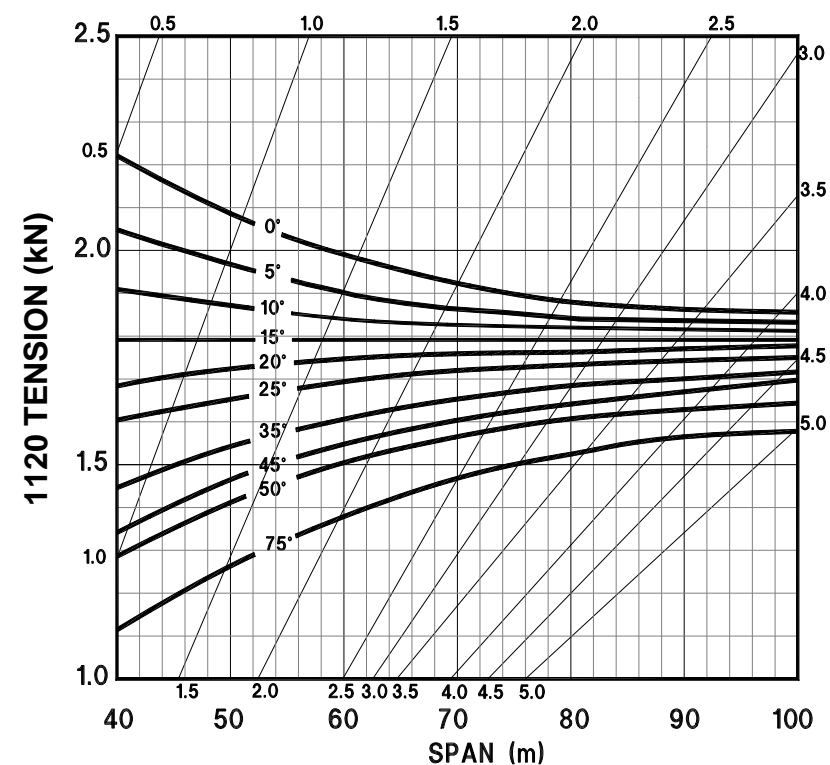
Conductor	120mm ² AAAC (older style)	120mm ² AAC (newer style)
Stranding	7/4.75 AAAC 1120	7/4.75 AAC 1350
Min. Breaking Load	27.1	18.9
Weight (N/m)	6.3	5.6
Area (mm ²)	124	124
EDT kN (% min. BL)	3.6 (13.28%)	3.18 (16.8%)
Coeff. of linear Expansion	23 x 10 ⁻⁶	23 x 10 ⁻⁶
Final Modulus of Elasticity (GPa)	65	65




TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

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APP'D				DATE	20/10/2015					
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ATHR				CKD	P. RELF	10824-A4	SEC 8	SUB 9	SHT 1	REV A
ORIGINAL ISSUE				AUTHR	K. GOSDEN					
					WORD					

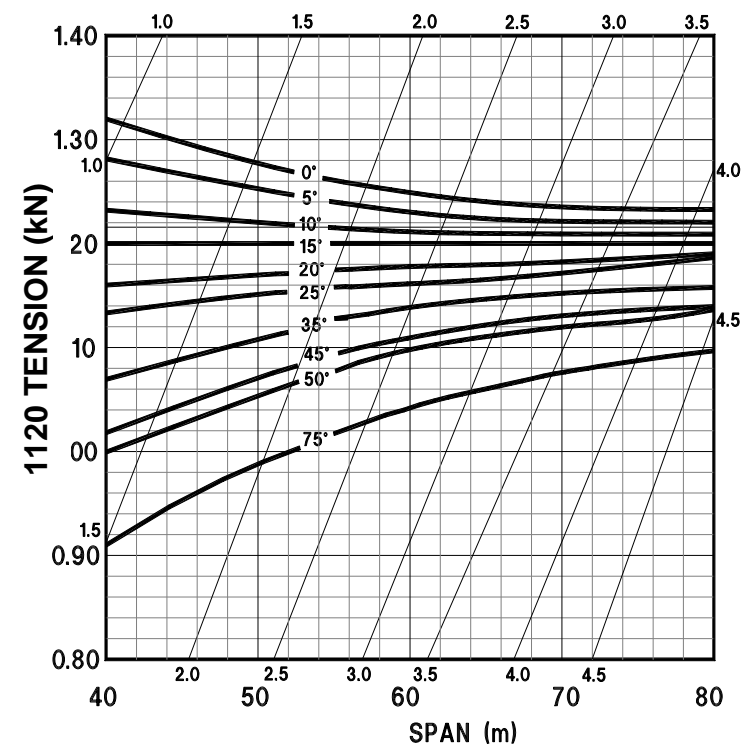
Conductor	120mm ² AAAC (older style)	120mm ² AAC (newer style)
Stranding	7/4.75 AAAC 1120	7/4.75 AAC 1350
Min. Breaking Load	27.1	18.9
Weight (N/m)	6.3	5.6
Area (mm ²)	124	124
EDT kN (% min. BL)	1.8 (6.64%)	1.59 (8.4%)
Coeff. of linear Expansion	23 x 10 ⁻⁶	23 x 10 ⁻⁶
Final Modulus of Elasticity (GPa)	65	65




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APP'D				DATE	20/10/2015					
CKD				REC'D						
ATHR				CKD	P. RELF					
ORIGINAL ISSUE				AUTHR	K. GOSDEN	10824-A4	SEC	SUB	SHT	REV
				WORD			8	9	2	A

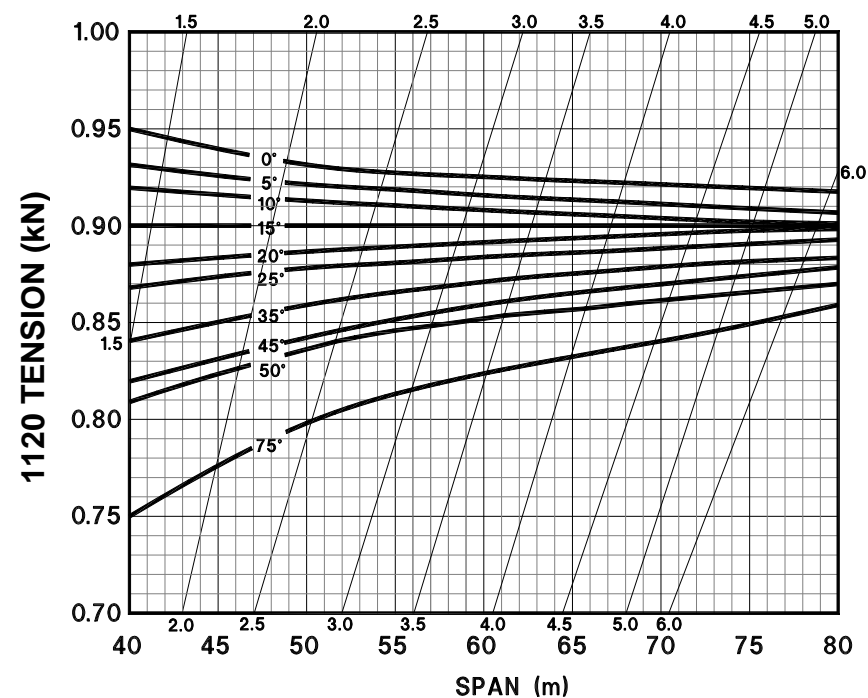
Conductor	120mm ² AAAC (older style)	120mm ² AAC (newer style)
Stranding	7/4.75 AAAC 1120	7/4.75 AAC 1350
Min. Breaking Load	27.1	18.9
Weight (N/m)	6.3	5.6
Area (mm ²)	124	124
EDT kN (% min. BL)	1.2 (4.43%)	1.06 (5.6%)
Coeff. of linear Expansion	23 x 10 ⁻⁶	23 x 10 ⁻⁶
Final Modulus of Elasticity (GPa)	65	65




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APP'D				DATE	20/10/2015					
CKD				REC'D						
ATHR				CKD	P. RELF					
ORIGINAL ISSUE				AUTHR	K. GOSDEN	10824-A4	SEC 8	SUB 9	SHT 3	REV A
				WORD						

Conductor	120mm ² AAAC (older style)	120mm ² AAC (newer style)
Stranding	7/4.75 AAAC 1120	7/4.75 AAC 1350
Min. Breaking Load	27.1	18.9
Weight (N/m)	6.3	5.6
Area (mm ²)	124	124
EDT kN (% min. BL)	0.9 (3.32%)	0.8 (4.2%)
Coeff. of linear Expansion	23 x 10 ⁻⁶	23 x 10 ⁻⁶
Final Modulus of Elasticity (GPa)	65	65



TENSIONS SHOWN ARE 'NO WIND' CONDITION BUT ARE ACTUAL TENSIONS AND DO NOT INCORPORATE A LOAD FACTOR. REFER NOTE 4 ON SHEET 8-10-1 EXPLANATORY NOTES

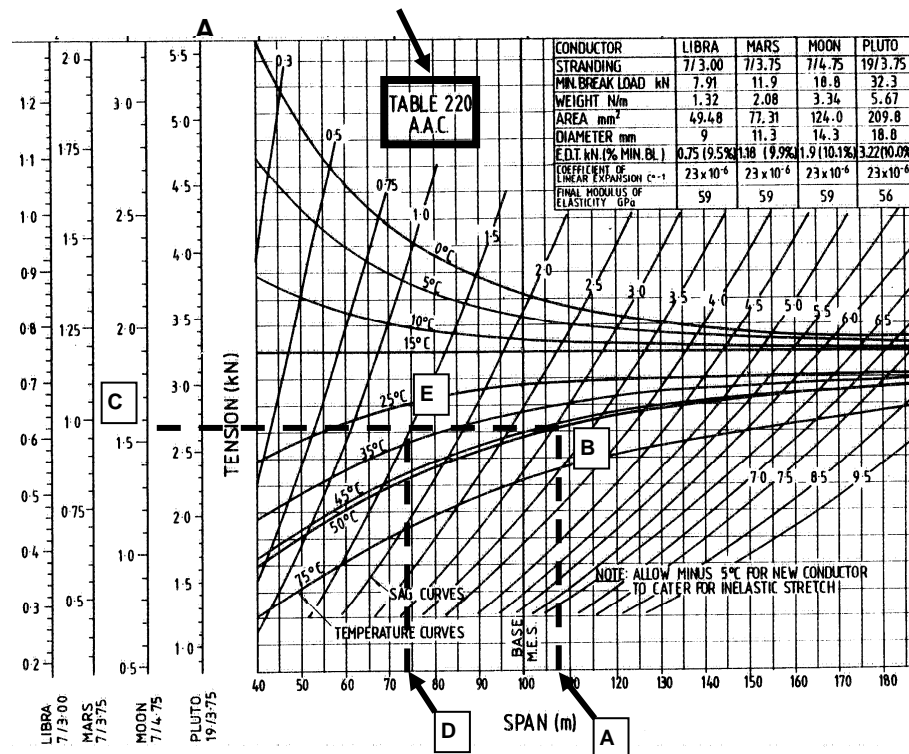
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APP'D				DATE	20/10/2015					
CKD				REC'D						
ATHR				CKD	P. RELF					
ORIGINAL ISSUE				AUTHR	K. GOSDEN	10824-A4	SEC	SUB	SHT	REV
				WORD			8	9	4	A

READING A SAG TENSION TEMPERATURE CHART

Example


Conductor MOON (7/4.75 AAC)
 Stringing Tension: Table 220
 Span Length: 74m
 MES of Strain Section: 108m
 Temperature: 50°C

Determine the sag and the tension in the conductor under the above (no wind) conditions.



Solution

1. Select the Sag-Tension-Temperature chart for AAC conductor at stringing table T220, as shown below.
2. Plot the MES length of 108m on the horizontal axis – Point A. Always 'enter' the chart from the MES.
3. Trace upwards vertically to the 50°C curve – Point B.
4. Now we have established the tension in the line, which we can read by tracing a horizontal line across to the tension scale for MOON at the left – Point C. Reading from the chart, the tension in the conductor is 1.53kN. Note that if we wanted to use this to determine mechanical loading on the structure we would need to apply a load factor of 1.1 to this value.
5. To determine the sag, we now plot the actual span length of 74m on the horizontal axis – Point D.
6. Trace upward to the horizontal line showing tension, at Point E. Looking at the sag contours on the chart, we note that the sag is slightly less than 1.5m – 1.49m say.

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APP'D		DATE		20/10/2015							
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